METHODOLOGY FOR COMPLEX EMPLOYMENT OF MILITARY AND NON-MILITARY FORCES AND MEANS OF THE SECURITY AND DEFENCE SECTOR FOR COUNTERING MODERN TREATS TO THE MILITARY SECURITY OF UKRAINE

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Extended and supplemented 2nd edition

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Methodology for complex employment of military and non-military forces and means of the security and defence sector for countering modern threats to Ukrainian military security: monograph, extended and supplemented 2nd edition/ [V. Yu. Bogdanovych, I. S. Romanchenko, I. Yu. Svyda, A. M. Syrotenko, O.V. Dublian]. 2021. – 364 p.

The monograph is devoted to the development of methodological tools for ensuring the military security of Ukraine in the face of modern threats to the complex, including the asymmetric employment of military and non-military forces and means of the security and defence sector. The research takes advantage of the drastic changes in the world's best practices for the implementation interests of the national security. For the national and military security professionals, academicians, analysts, political experts and all those who study the issues of national and military security of the state.

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Part II

METHODS AND TECHNOLOGIES FOR ASYMMETRIC RESPONSE OF THE SECURITY AND DEFENCE SECTOR TO THREATS TO THE MILITARY SECURITY OF UKRAINE

LIST OF ABBREVIATIONS

AFU	–	Armed Forces of Ukraine
AME	–	armament and military equipment
CMFIPC	–	conceptual model of forming integrated potential for counteracting
DM	–	decision maker
ES	–	expert system
EVPS	–	expert-valued provisional scenario
HA	–	hybrid aggression
HC	–	human civilization
IAAW	–	information-analytical automated workplaces
IAS	–	information and analytical support
IPAC	–	integrated potential of asymmetric counteraction
IPI	–	information-psychological impact
IPS	–	information and psychological support
IS	–	international situation
IAT	–	information and analytical technologies
LEA	–	law enforcement agencies
LSO	–	local special operation
LSOAC	–	local special operation of asymmetric counteraction
LSOAR	–	local special operation of asymmetric response
MF	–	military formations
MFGS	–	method of forming groups of subjects
MM	–	mass media
MPM	–	military-political model
MPS	–	military-political situation
MS	–	military security
MSAC	–	main situation awareness center
MSS	–	military security system
MThs	–	military threats
NS	–	national security
NSDC	–	National Security and Defence Council of Ukraine
NSh	–	“neutralization shift”
NSS	–	national security system
OADLO	–	occupied areas of Donetsk and Luhansk oblasts

PAC	–	potential of asymmetric counteraction
PMA	–	private military agencies
SDSU	–	security and defence sector of Ukraine
SS	–	strategic situation
SIS	–	special information situation
SO	–	special operation
SOF	–	special operations forces

Introduction

During the years of independence and advancing to a democratic state through the transformational processes in Ukraine, the MS system (MSS) has been faced with many controversies. International relations have become more complex due to the global challenges stipulated by the increasing instability in the raw resources, energy, finance, and information, environmental, demographic, and other spheres. And that led to increased threats to national security. In addition, there are drastic changes in the world practices of implementing national interests. The role of non-military means in achieving political and strategic goals is significantly increasing, sometimes overpowering the strength of weapons. The emphasis is shifting from the approaches to national interests implementing towards political, economic, informational, humanitarian, and other non-military measures widespread application, supplemented by military measures of concealed content. The open use of military force is often disguised by peacekeeping activities and the settlement of planned crises, though being employed at a separate phase to achieve or consolidate success in the conflict.

The logical outcome of the chaotic international environment is conflicts proliferation in all social management spheres (administrative-political, social-economic, and cultural-ideological). Such conflicts include various types of struggles: directly armed, political, economic, diplomatic, informational, cybernetic, etc. As a result, there is a transformation of modern conflicts from a linear to a nonlinear paradigm of war.

In the context of globalization and information technology revolution, the weapons arsenal of enemy physical damage is supplemented by technologies of its symbolic destruction, aimed at spiritual, value-motivational spheres of human activity. Modern samples of solving and conducting military (military) actions in war conflicts show that the primary task is to establish strategic control over all spheres of life in the target country employing various non-military methods. It could be implemented through creating hotspots of political, social and economic tension in separate regions of the enemy's country, including the partial territory annexation by holding pseudo-referendums.

The real threats to sovereignty, territorial integrity, political and economic independence of Ukraine, the armed conflict in the East, and the socio-political instability within the country have a negative impact on and permanently hinder the development of society and the state issues solving. The neglect of the needs of the strategic development of society and state leads to increased threats to national security and the weakening of the state's ability to defend their national interests.

The range of military and non-military forms, means, methods and technologies used by the military has been offsetting to the non-military area making it possible

to deprive the opposing side of the actual sovereignty without seizing the territory of the target state by the military force.

Stipulated by the war and hybrid threats to the national security of Ukraine, the problem of completing the security and defence sector rebuilding and its further development is of particular importance. One of the crucial tasks of the state MS system is a proper management of all institutions within the functional union, its capabilities and resources effective application.

The solution of this difficult task, which is new for Ukraine, is hindered by the lack of a generally accepted theory of MS of the state. By this time, most tasks have been solved by a well-known method of trial and error. Existing developments on this subject are sparse, and the system study is practically absent.

Existing methods allow only a few MS system agencies to conduct operations independently.

It is determined by the following:

- low decision-making efficiency and interaction between the security and defence sector institutions;
- lack of an effective tool for possible scenarios planning to eliminate or respond to detected threats;
- excessive consumption of resources needed to counteract threats and insecurities;
- lack of procedures for alternative solutions reasoning and an independent expert examination;
- interminable complication of the MS system functioning within the diverse destructive factors and threats environment, e.g. threats of hybrid nature, special information operations, etc.
- such complications specify contradictions between the emerging needs in solving urgent MS problems and the existing scientific-research and methodology framework.

To solve the abovementioned issue we developed a research framework for the *complex employment of military and non-military forces and means*. It provides the search and reasoning of effective ways to provide an adequate level of the state MS in the modern geopolitical and military-political environment, modern and predicted on the immediate prospect of threats of war and hybrid nature. To counteract such threats, it is essential to improve measures on the state defence, considering the nonlinear nature of contemporary conflicts, which determines the relevance of the following research.

Part 1

METHODS AND TECHNOLOGIES FOR COMPLEX EMPLOYMENT OF MILITARY AND NON-MILITARY FORCES AND MEANS OF THE SECURITY AND DEFENCE SECTOR FOR COUNTERING MODERN THREATS TO THE MILITARY SECURITY OF UKRAINE

Chapter 1

EVOLUTION OF THE SECURITY ENVIRONMENT IN THE 1ST HALF OF THE 21st CENTURY

1.1. Analysis of the security environment and its impact on the state national security

Problematic issues in the field of national security are investigated by state research institutions and educational institutions, independent public organizations of the state, domestic and foreign defence experts, but the definition of the security environment is currently not defined in regulations. In this publication, the **security environment** will be understood as geopolitical, political-diplomatic, military, economic, informational and other spheres where favourable conditions or dangerous phenomena, potential and real threats to the realization of national interests in which the state implements its policy arise, exist, accumulate or manifest. national security interacts with international security structures, strategic partners, allies, military-political and other institutions and organizations in the interests of ensuring its sustainable development in a certain time period.

Publications [2, 3] set out a new approach to the problems of strategy: how to achieve the desired political results and defeat the enemy with minimal resource costs and losses. Effect-based thinking involves understanding the importance of combining the military sphere with other elements of national power to achieve the operational and strategic goals of war.

Rachya Arzumanyan's monograph [4] considers the technologies of immersing the country in chaos and changing the political regime on the basis of the paradigm of nonlinearity of the security environment of the 21st century. However, the results obtained for use in a particular country require consideration of its specifics, which are not considered in the paper.

The publication [5] talks about changes in the security environment, in particular about the expansion of the types of wars and changes in their content, the increase in the number of actors involved in the armed struggle. It is noted that in the modern security environment in the realization of national interests, developed countries actively use the means of economic, political, diplomatic, information pressure, as well as the demonstration of military power in order to increase the effectiveness of non-military measures. However, in these publications, changes and transformational processes in the security environment are considered only in general terms, as well as the formulation of tasks to consider their impact on the MS of the state. In addition, there is little mention of the asymmetry in the application of the above measures by other countries in the protection of their national interests.

Thus, there is a need for a comprehensive analysis of changes in the modern security environment, to identify the most dangerous factors and trends that will significantly affect the effectiveness of MS of Ukraine for the period up to 2030.

Future security environment in the world and around Ukraine will be characterized by the preservation of high dynamics of international and regional processes, increasing instability in the world and the emergence of new areas of tension. Over the next 10 to 20 years, the process of transition to a multipolar world will continue, in which the existing international system and its institutions will undergo a significant transformation. Changing the balance of power between key centers of power within the formation of a multipolar system of world order may exacerbate the security situation in the world. During the transformation of the existing security architecture, states will seek to maximize the realization of national interests, including using military force. With the emergence of new global and regional actors, the confrontation between them will increase, leading to the expansion of instability and military confrontation areas.

Besides, the future security environment will be characterized by the presence of extremism, international terrorism, transnational organized crime, the struggle for resources and markets, further militarization of space, as well as illegal actions in information and cyberspace, its use for military purposes. Cyberspace has become a separate area of hostilities, along with the traditional ones (land, air, sea and space), in which the relevant units of the armed forces of the world's leading states are increasingly active [6, 7].

In the long run, this will become more acute and likely to deepen. Military power will continue to be an important factor in the realization of the national interests of some states.

In the next decade, the role of international security organizations, especially in the context of resolving wars and conflicts, will become increasingly weak. This will create the basis for an increase in the security vacuum, which will most likely raise the question of the expediency of their existence in its current form. In view of this, the attempts of the international community to find new universal international and regional security systems based on principles that will take into account the civilizational and national interests of the new centers of influence should be expected. The erosion of the existing international security architecture, as well as the stagnation of the strategic stability system, will lower the threshold for the use of nuclear weapons, including tactical ones.

The development of high technologies and access to them by state and non-state actors will serve as a driver of their growing ambitions. Forefront of modern research in science and technology will be actively used in the field of defence. Weapons based on unconventional concept of operation will appear. Priority development will be given to military space systems, directional energy weapons, geophysical weapons, non-lethal weapons, remotely controlled systems and samples of military equipment. The share of autonomous robotic complexes in the military

sphere is projected to gradually increase. The role of information and cyber weapons will grow, the use of which will go beyond the classic armed confrontation and will be extended to all spheres of functioning of states and society, the destruction of elements of the enemy's information infrastructure, and so on. The growing share of the latest high-tech weapons will lead to a change in the forms and methods of armed struggle and the formation of new principles of martial arts. In the future, such weapons will solve combat tasks that are currently unavailable for conventional weapons. The advantage in the future military conflict will belong to the party that will have weapons produced by the latest technologies, which will significantly expand the capabilities of troops (forces) [8].

Less developed countries will continue to use traditional forms of armed conflict inherent in current conflicts, which will be characterized by the use of troops, armoured vehicles, aircraft, missiles and artillery systems, small arms to defeat the enemy and win the war. For such states, the use of elements of indirect action will be fragmentary and will not be a key factor in the armed struggle.

Regular armed forces will continue to play a leading role in future conflicts. At the same time, the share of paramilitary formations and private military companies and their asymmetric use will increase in combat actions.

Among the issues important for national security is the identification of challenges and threats to the military security of the state, which is based on the analysis of the security environment for challenges and threats to national security of Ukraine related to the possible use of military force against it in the medium and long term. In this analysis, two aspects can be distinguished: global, which relates to global events and indirectly affects the military security of Ukraine; regional, which reveals the peculiarities of the formation of a safe environment in the immediate vicinity of Ukraine.

Thus, the military-political situation (MPS) in the world is developing under the influence of the following main tendencies:

- formation of a multipolar relations system as well as attempts to change the existing balance of power, especially the world's leading nations. This is reflected in the recent increase in the role of the world's major centers of power, such as the North America’s one, led by the United States, the Western European center of power with the leading role of the European Union, the Eurasian one with the leadership of the Russian Federation, the Asian and the Pacific one with China and Japan. In modern conditions, there is an attempt to change the existing balance of power between the major world centers;
- intensification of contradictions between the leading centers of power regarding the division of spheres of influence. At the present stage of world development, the processes of escalating geopolitical rivalry between the Euro-Atlantic and European systems of collective security on the one hand, and the Eurasian and Asia-Pacific systems on the other remain decisive for the formation of the MPS. At the same time, the growth of economic, technical, and military

potentials of the participants of world centers leads to an intensification of the struggle for influence in the zones of their strategic interests. The formation of the MPS in the world is significantly influenced by the growth of international competition for access to natural, technological and other resources. The intensification of contradictions between the world's centers of power has resulted in the preservation of “frozen” and the emergence of new conflicts, their periodic escalation in the Caucasus and Central Asia, the Balkans, the Middle East, Ukraine, Transnistria and other regions;

- support for separatism, ethnic and religious confrontation, internal instability, bringing to power “loyal regimes”, which creates the basis for the escalation of contradictions and the emergence of new armed conflicts; increasing interdependence of leading states in the context of globalization, increasing the influence of leading international corporations, intensifying the struggle for natural resources, the use of energy to achieve political goals;
- globalization as a characteristic feature of the modern world significantly affects the economy of states, strengthens their interdependence, exacerbates competition for access to energy resources. Along with the positive factors, globalization provokes increasing inequality in the distribution of world resources, leads to turbulence in international capital flows and related contradictions and crises. Given the widening gap in the development of countries, the division of the world into a rich center and a poor periphery remains a problem. The negative consequence of globalization is political instability, which is manifested by an increase in a number of incapables, unrecognized and degrading or failed states. In many countries there is a crisis of power, the development of democratic processes is restrained, separatist movements are gaining strength. The situation is also deteriorating due to crisis processes in the macroeconomics. Further intensification of competition is expected, in particular, in such issues as access to resources (energy primarily), the struggle for preservation and expansion of spheres of influence;
- reducing the effectiveness of measures used to resolve crises and military conflicts by leading international organizations. An important factor in shaping the foreign policy conditions that will affect the level of Ukraine's security will be cooperation with leading global and regional international organizations, maintaining mutually beneficial partnerships at the bilateral level. However, there is a tendency to reduce the effectiveness of mechanisms to counter aggression by existing international systems of collective security.

Under these conditions, stronger states try to impose their will on weaker partners contrary to the norms of international law. This explains the desire of many states to ensure their own security through active cooperation with Euro-Atlantic and European systems of collective security; preserving the role of military force as a means of resolving problematic issues of military-political relations.

Recently, there has been a tendency to use military force more openly to achieve military-political goals. At the same time, the forms and methods of using

military force are significantly changing, and new approaches to armed struggle are emerging, including the use of non-governmental paramilitary organizations. This largely reduces the effectiveness of international collective security systems and complicates the application of international law to resolve conflict situations.

The strivings of some individual states to achieve advantages in the military-technical sphere and to create opportunities for the producing weapons of mass destruction continue. There is an increase in military budgets, increasing the insecurity of uncontrolled proliferation of nuclear weapons and their carriers, materials for their production, dual-use technologies; the spread of terrorism (including cyberterrorism), piracy, organized crime, illegal migration, illicit arms and drug trafficking, human trafficking. International terrorism, piracy, transnational organized crime and illicit trafficking in human beings, arms and drugs, “black transplantation”, the struggle for spheres of influence, and the forcible change of government in various countries are leading to growing international instability. There is a rapid intensification of terrorist activity in cyberspace. Solving such problems requires consolidating the efforts of the entire world community, accelerating the development of information technology, increasing the capacity of states to conduct information and information-psychological operations, strengthening society's sensitivity to civilian casualties and MF personnel losses in the military conflicts.

The information factor in the implementation of the foreign policy of the world's leading states and ensuring their national interests is becoming increasingly important. This is facilitated by the rapid development of new technologies. As the practice of recent years has shown, the importance of information technology to achieve geopolitical goals will grow and become one of the main factors in modern conflicts. Modernization and improvement of technical intelligence systems and complexes by intelligence special services of foreign states, increase of their capabilities, attempts of unauthorized access to information infrastructure of the state and its use against the interests of Ukraine, monopolization of large foreign companies by telecommunication services market and their attempts to impose national conditions. information and telecommunication networks and systems in the conditions of development of information society in Ukraine and globalization of information exchange become threatening factors for functioning of information security system of Ukraine, hinder development and use of information sphere and create danger to vital interests of man and citizen, society and state.

Global climate change, declining natural resources, growing shortages of drinking water, food and increasing migration in the world have a negative impact on foreign policy. Global climate change, together with a number of other global humanitarian problems (aggravation of the demographic situation, constant “food crisis”, rising unemployment, impoverishment of the general population, intensification of migration processes) create a favourable social base for radical

extremist currents and terrorist forces. situations both in individual regions and in the world as a whole.

New global and regional players are emerging in the world and a multipolar world is being formed [9]. The current state of the international system of relations has a relatively unipolar structure, where the role of global leader is still played by the United States, the regional players-contenders for the global role are the EU, China, Russia, India. The rest of the regional leaders – the G-20 - do not have global ambitions or do not have sufficient grounds for them. Japan, Turkey, Great Britain, and Canada play a special role in world politics. In the region of Eastern Europe, to which Ukraine belongs, Poland and Romania are seeking leadership (based on the United States).

In the medium term (until 2030), tensions in world politics should be expected to increase, especially in trade, finance, technology, energy and security. The culture of international behaviour of global and regional players indicates that their national ambitions and efforts will encourage attempts to resolve disputes voluntarily. Outbreaks of aggravation will be permanent and synergistic, when, for example, a trade conflict between two actors will cause a financial conflict among a wider range of participants, the application of protectionism and the destruction of the free (liberal) market, restrictions on the provision (exchange) of new technologies. All this will create conflicts in international law and the system of relations (the system of international organizations), will lead to the chaos of relations and the growth of security and military (defence) tensions, attempts to resolve conflicts by force. As a result, the further transition from the concept of “force of law” to the concept of “right of force” becomes relevant.

Such circumstances will require increased opportunities for the “situation management” – strengthening the operational and contractual capabilities of such international platforms as the current UN Security Council or the G-20. At the same time, it is possible to significantly reduce the effectiveness of such formats as the WTO, G-7, NATO, EU, CoE, OSCE, CSTO, SCO, OPEC and other organizations in which there are conflicts of interest (goals, values). Strategic uncertainty and mistrust, organizational stagnation, everything that ensures the sustainability of certain organizations, which depends not so much on the potential for mutual benefit or the level of common challenges (threats), but on the actual mutual benefit and common risks, i.e. when interests (goals, values) are not shared, then the potential of the partnership does not matter. That is why the fundamental issue of the future of the European Union or NATO is to ensure internal political cohesion and unity [9].

The emergence of new global and regional players is directly the result of a number of new challenges to the sustainable development of the international system and the ability to respond effectively to these challenges. Among such players, only China, given its political, technological and economic development and international

behaviour, has good reason to become a new global player instead of a regional one, which is generally perceived positively [9].

Changes in the international system of relations resulting from the formation of new centers of power, China's global role, Russia's appropriate behaviour in international politics, the emergence of a Euro-Atlantic solidarity deficit, weaken the dominant role of the United States and could potentially lead to multipolarity. However, such multipolarity will pose serious challenges to the redistribution of areas and spheres of influence of international actors and, consequently, the expansion of zones of instability, security vacuum and uncertainty in development vectors. Such a conclusion about the tendency of aggravation of world politics and intensification of international turbulence, which lead to escalation of old and emergence of new areas of instability, becomes important for ensuring the MS of Ukraine. The formation of this tendency is due to the following factors [9]:

- global intrigue of leading international actors (USA, EU, China, Russia) over opportunities to take leading positions in the existing, and further – in the newly formed system of international relations, in which third parties are dangerously involved;
- emergence of a strong EU-China-led alliance to counter US foreign economic protectionist policies, which, from the EU's and China's point of view, are creating the ground for protracted trade wars;
- EU rapprochement in trade (energy, technology, production) and partly in the political sphere with Russia and a joint European-Russian effort to oust the United States from European affairs, which causes a negative perception in the United States;
- China's entry into world politics with its agenda, its formation of exclusive zones of security responsibility and zones of influence by competition for the establishment of regional leadership, deterrence policy towards Russia (limiting its role, at least) in the Central Asian region;
- differences in the approaches of the United States, the European Union, and China in trying to counter the nuclear ambitions of Iran and North Korea, resolving diverse conflicts in destabilized areas in the Middle East, Venezuela, North Africa, and other potentially unstable areas and a separate position of Russia, which rather inspires these problems of world politics in order to achieve its goals.

Thus, the expansion of areas of instability in the modern world (the escalation of the old and the emergence of new ones) affects not only the balance of power between global and regional actors, but also creates a number of challenges for states with limited resources, which become a field for conflict or bargaining. between the big players. Hence, the main task of our state is not only to avoid objectification, but also to maintain influence at the regional level and in areas where Ukraine has experience and importance. Solving such a task inevitably requires Ukraine to formalize and deepen partnership and allied relations with individual states and groups of states with which common interests (goals, values) can be traced.

Under these conditions, the geographical and geopolitical position of Ukraine creates its special vulnerability to the latest and traditional challenges and threats. The presence of frozen and hot conflicts near its borders, vulnerability of energy supply systems, illegal migration, piracy require more active and decisive steps from Ukraine.

From the standpoint of ensuring the MS, the external security environment around Ukraine in the 21st century. acquired a nonlinear character and became much more complicated due to the introduction of the world's leading states of new approaches to the choice of methods and means of realizing their geopolitical interests. First, it concerns the formulation of strategic goals, the choice of methods and ways of resolving wars and military conflicts and their prevention, the place and role of military force in them, when non-military means are becoming increasingly important. Importance is attached to the means of malicious information influence on the societies of other states. As a result, the line between war and peace is now gradually blurring, making it more difficult to track and respond to an act of aggression.

The demand for historically widespread forms of indirect confrontation between states, supported by insurgent and terrorist movements, has increased. With some reservations, such support can be considered one of the important foreign policy instruments of many countries aspiring to regional leadership.

One of the determinants for the development vector of global security environment and the need to modernize the MSS was the global spread of private military companies. Most of them have the most informal channels of interaction with the intelligence services and government circles of their countries and are often used as a tool for indirect involvement in regional conflicts. Private military companies create additional demand for certain types of weapons and military equipment, actually produce some of them, act as intermediaries in operations for their supply through both legal and illegal channels.

The need to counter aggressive non-state actors creates a demand for special combat systems to combat them in asymmetric conflicts. They themselves import large quantities of weapons through the black market, develop their own combat systems and adapt those used in the tactics of subversive-terrorist and guerrilla warfare.

The key areas of reforming the armed forces of the world's leading countries are related to the development of network mechanisms for managing operations, the introduction of combat information systems, unmanned aerial vehicles operating in all environments, robotic combat systems. The general trend is to reduce the number of armed forces and ensure their maximum mobility, shift the emphasis to the use of special operations forces and tools for information and psychological warfare. The rapid development of counter-terrorist tactics, due to the need to solve combat problems mainly in urban environments, taking into account the spread of network-

centric model of combat in its high- and low-tech versions - all this must be taken into account when reforming the MSS in the foreseeable future.

Under these conditions, it can be noted that at present Ukraine's security environment is characterized by instability and uncertainty, which threatens disintegration in the political space and default in the economic space, significantly undermines its ability to forcefully protect national interests and provide MS. The lack of political will to update the mechanism for the use of security guarantees provided to Ukraine for the voluntary renunciation of nuclear weapons in its territory has a destructive effect on the external security environment and its effective use in the interests of strengthening Ukraine's MS.

The complication of the external security environment is facilitated by the actions of the United States and some other European countries to build up NATO military bases and the deployment of US missile defence bases near Ukraine's western borders to intercept ballistic missiles over Ukraine. Analysis of the existing and long-term forecast of future scenarios of MPS development is a very important political, economic and military task, the solution of which will determine the levels of both military and national security of the state, its economic and social well-being.

In the second decade of the 21st century. military conflicts and wars in the Middle East, the Caucasus and in Ukraine have shown that there has been a significant breakthrough in the development of MPS: existing current threats have sharpened and new potential ones have emerged. This requires substantiation of new principles of systematization of the main tendencies of changes in the security environment, tracking the transformation of goals in the wars of the 21st century, forecasting the role and place of the highest priority threats to national security and justifying the need for new approaches to national security and defence policy.

This complication is also formed by the fact that most of the specifics of modern wars, which are conducted not only by traditional weapons, but also more effective and more destructive non-traditional (unarmed), such as political, economic, informational, ideological, psychological, humanitarian. For such wars, the criteria are not the means used, but the goals achieved, comparable to the goals that are usually pursued in traditional wars. This is usually destruction, looting, occupation, regime change, immersion in chaos, used as a tool to realize their geopolitical interests. Thanks to the technologies applied at the present stage, such goals can be achieved without the use of lethal weapons.

To protect statehood (to prevent forcible regime changing), you need to:

- *firstly* – to maintain socio-political stability in the country;
- *secondly* – to identify the main direction of the enemy's offensive, to evaluate the forces involved, their means, resources, nature and scale of application;
- *thirdly* – to understand its design and basic scenarios for its implementation;
- *fourthly*– to prepare the necessary forces, means, resources and to develop a clear strategy of counteraction.

You cannot win a war not to accept its challenge without a relevant strategy. To create such a strategy, it is necessary to study the strategy of the enemy and see in what areas and how he organizes his offensive actions.

The war against statehood is being waged on a global scale, has global goals, and this gives it a global scope. In addition, it is conducted against all state-building components, in all vital spheres of state life, in the physical, mental and spiritual spaces, which decisively form the internal security environment that makes this war a total one.

An analysis of the adversary strategies in the fight against each of these three state-building components shows that the aggressor country and its agents in the target country understand that statehood can be defeated only by "occupation" and subordination of physical, mental and spiritual spaces. Similarly, each space of statehood is divided into three sub-spaces (Fig. 1.1).

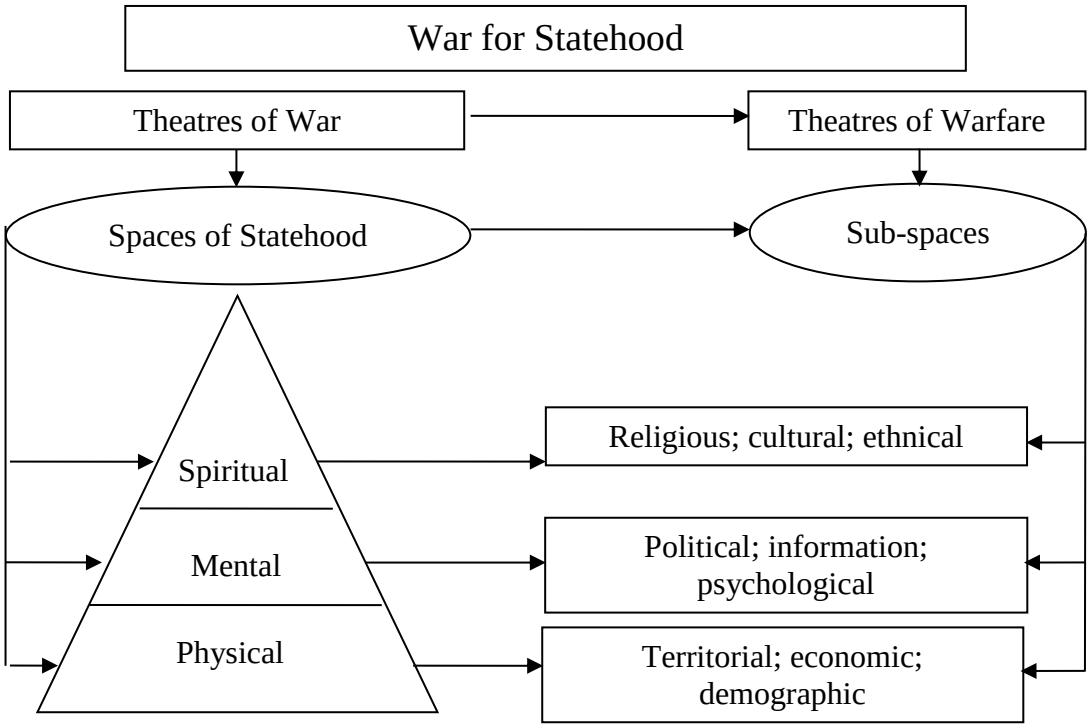

Fig. 1.1. Spaces of Statehood. Structure

Although such a division is conditional, it fully corresponds to such military terms as "theater of war" (large-scale action) and "theater of warfare" (local action). To wage a modern global war, the aggressor needs a fundamentally new global army, which also has a new strategy, different from the strategy of using traditional armed forces. As this new army has no official, open character, this strategy is focused on secret, subversive (special, psychological, economic, informational, etc.) operations.

It is possible to subdue the state by influencing the people, when in a corporate corruption-ridden, state the government ceases to care for the people and brings them to such a condition that they begin to feel hatred for power and translate this attitude to the state and statehood as such. He believes that if the government does not fulfill its functions, then why should it do so. In the event of war, the people, whose consciousness is damaged by hatred of power and, as a consequence, of statehood (that is, the internal security environment will be violated), will not go to protect it. Such a politically, informationally and psychologically "prepared" state is quite easy to subdue and destroy.

In addition, the consciousness of the people through information channels can be influenced in such a way as to orient their individualistic morality. The consciousness of the people for anti-state purposes can be influenced in such a way as to deprive them of lofty ideas, to impose the image of the enemy and the threat of aggression on his part. This is achieved by discrediting the existing ideology or rewriting (falsifying) the history of the state.

In the 21st century. the formation of a new environment and information space is observed. It is obvious that the information space does not cancel the struggle in traditional spheres, but it can and does affect the effectiveness of this struggle, and therefore the conditions for achieving political victory in the 21st century. In the near future and in the period up to 2030 we should expect a steady trend of increasing information and psychological influences on the population and personnel of the security and defence sector of Ukraine, including in the form of special information operations; expanding the range of non-military means of violating sustainable economic development and provoking socio-political instability in the state.

If the abovementioned issue is not taken into account, Ukraine risks remaining in the role of a state that, in the context of globalization, loses effective levers to counter the latest threats, radically weakening the ability to protect its own national interests and finally becoming a non-independent buffer zone between powerful international players, who, more and more, increase their pressure on it.

The security environment around Ukraine will change under the influence of the following major global and regional security trends:

1. *Worthening of the "external environment of disasters"* ("disaster economics"). Thus, since the early 80's of the twentieth century. there is an increase in the number of emergencies and disasters. The number of natural disasters has quadrupled [9], epidemics (pandemics) - almost doubled. First of all, it is a manifestation of the consequences of anthropogenic actions, including global warming. The current dynamics of particularly important global negative events (phenomena) is 2… 3 in 10 years (excluding wars).

2. *Demographic pressure*. The demographic map of the world is changing rapidly. The population is declining in many developed countries. The share of high-income countries is declining. The population is growing rapidly in most developing countries, especially the poorest. The population of large developed countries is

declining. The whole of Europe is in the reduction zone. The demographic pressure of the most populated countries on the wealthier ones is growing. The “great migration of peoples” will continue – the movement of large masses of people from poor countries to rich ones, where the number of immigrants will grow, with all their cultural characteristics. Ukraine is characterized by a demographic crisis. The population is rapidly declining, and that is dangerous, due to the departure of people of working age abroad.

3. *Gaps between the capabilities and maturity of states.* The use of “catch up and overtake” strategies, which require the mobilization of maximum resources, can provoke the growth of authoritarianism and conflict in the security environment

.4. *Rising inequality within states.* The influence of models of societies built on the principles of “take away and divide” or “close and not let go”, or “mobilize, stand up for all as one” will provoke the uncontrolled use of military force against militarily weaker states. In response, these weaker countries are expected to use asymmetric action in all areas, not just the military.

5. *Sharp growth of innovations.* The evolution of states will continue. Possible growth of liberalism, individualism based on the expansion of freedom (more capability, personal independence, less risk of survival, such as hunger, cold) on the basis of improving the property of people. The growth of innovation flows that can stimulate chaos, intensification of interstate competition, loss of control over socio-political processes will be accompanied by the growth of authoritarianism, attempts to eliminate chaos with an “iron hand” and get rid of external governance.

6. *Digitalization, development of biotechnology and medicine.* There is a tendency to create systems of comprehensive control over individuals and mass behavior, large databases, loss of privacy, manipulation of collective behavior. The transformation of people into a “playing”, “sitting”, “immobile”, “inert” society is intensifying. Formation of groups of people with the set physical and intellectual properties is possible that will lead to considerable complication of the security environment.

In addition to purely military pressure, other (hybrid) factors of influence on Ukraine should be expected in the regional security environment, namely: energy, religious and linguistic, negative informational influence on the military-political leadership and personnel of the state defence forces, special intelligence and subversive activities. Against this background, Russia will increase the combat potential of its ground forces on its western borders, primarily through the recreation of combined arms (tank) formations and military units that existed during the Soviet era. The combat capabilities of aviation units and units of the Russian Armed Forces will be increased with the latest (modernized) models of AME.

The military potential of Bulgaria, Poland, Romania, Slovakia and Hungary adjacent to Ukraine is projected to grow. The main efforts will focus on upgrading the existing armament fleet by re-equipping the armed forces with modern Western models to replace Soviet systems, increase defence spending, increase the number

of troops and increase their combat readiness, as well as build territorial defence forces. Considering these tendencies, the armed forces of those countries will gain expanded combat power by 2030, which will strengthen both NATO's eastern flank and their military capabilities.

The main focus of the North Atlantic Alliance will be on strengthening the defence capabilities of the northeastern and eastern flanks. Eastern European NATO countries are likely to significantly increase defence spending to (over) 2% of GDP by 2030 and to pursue programs for the development and re-equipment of national armed forces.

Under these conditions, Ukraine, which has limited resource capabilities in all spheres of life, needs to develop and further implement in its policy methodology and practical measures to respond asymmetrically to the challenges and threats of today's security environment at all levels.

1.2. New labyrinths of the security environment at the beginning of the 21st century

Transformational processes taking place in the geopolitical space at the beginning of the 21st century also initiate changes in the global security environment. At present, one of the main processes of world politics and international relations that affect the security environment is globalization, which is accompanied by a wider and more vigorous entry into the international arena of constructive and destructive non-state actors and organizations. Threats generated by destructive non-state actors or organizations modify traditional threats generated by states. Along with the armed forces of sovereign states, various gangs, private military companies and self-proclaimed “quasi-states” [10] are at war. Military force is used when the goal has not been achieved by non-military methods.

Another new phenomenon of the external security environment is the so-called democratization of the world, in which the exporting states of democracy can cover with noble intentions their selfish interests in the spread of control and influence - both political, financial and military-economic. For international security, this means the emergence of the phenomenon of “humanitarian intervention”. Another consequence of this phenomenon is the growing demands for the “humanization” of the use of military force: the reduction of “associated losses” among the civilian population, the prohibition of “inhumane” or “non-selective” weapons, and so on. For example, in Syria, for the first time, a new form of military formation of Russian Armed Forces employment was developed and tested in practice. It was a humanitarian operation.

The security environment is experiencing a rapid increase in the number of strategic concepts for achieving the goals of geopolitical interests by the world's leading countries, from “strategy of destruction” and “strategy of fatigue” to strategies of “global war”, “nuclear deterrence” and “indirect action”. For example,

the United States and its allies are considering offensive hostilities such as the “global strike”, the “multifaceted battle”, and the use of “color revolutions” and “soft power”. Recently, the Pentagon has been developing a fundamentally new strategy of warfare, called the “Trojan horse” [11]. The essence of this strategy is to actively use the “protest potential of the fifth column” in the interests of destabilizing the situation while targeting high-precision weapons strikes on the most important objects.

The scientific and technological breakthrough with far-reaching consequences in the economic, social, political, ideological, military spheres of human life being an important factor. Computing and information revolution paved the way for a scientific and technological revolution in military affairs. Recently, the importance of the quality of weapons has been growing, and it is increasingly difficult to compensate for their quantity. The gap between technologically advanced countries and the rest of the world is widening. The crisis of international law is exacerbated, which significantly affects the behavior of actors in the field of international security.

The threats of transnational terrorism have brought to the fore a qualitatively new problem of “preventive strikes”. Uncontrolled migration creates ethno-political instability in developing countries and an additional burden on the social sphere in developed countries.

The development of cross-border links makes modern societies vulnerable to various epidemics and creates opportunities for the formation of cross-border criminal groups. International crime, from money laundering and trafficking in human beings and human organs to drug trafficking and the secret arms trade, is closely linked to other global threats, including international terrorism [13].

Modern technology has led to the actualization of very old security threats, such as piracy or the slave trade. The slave trade has become a lucrative business, especially in the Middle East, and hostage-taking with their subsequent use for propaganda purposes has become one of the technologies of modern terrorism..

Ukrainian crisis of 2014 demonstrated that the process of forming a multipolar world will not necessarily be conflict-free. Sanctions imposed on Russia by the United States, the European Union, Japan, and a number of other countries are clearly undermining globalization and raising economic and information security issues in a completely different plane. The external security environment at the beginning of the 21st century. acquired a nonlinear character and became much more complicated due to the introduction of the world's leading states of new approaches to the choice of methods and means of realizing their geopolitical interests [14]. First of all, it concerns the formulation of strategic goals, the choice of methods and ways to resolve and prevent wars and military conflicts, the place and role of military force in them. The transformation of political violence is evident in the modern world. Non-military means acquire a more expressive role in it. Particular importance is attached to the means of malicious information action on the societies of other states.

As a result, the line between war and peace is now gradually blurring, making it more difficult to track and respond to an act of aggression [15]

The demand for historically widespread forms of indirect confrontation between states, supported by insurgent and terrorist movements, has increased. One of the factors determining the vector of development of the global security environment and the need to modernize the MSS was the proliferation on a global scale, primarily in Western countries, of private military companies (PMCs). Most of them have the most informal channels of interaction with the intelligence services and government circles of their countries and are often used as a tool for indirect involvement in regional conflicts. Private military companies create additional demand for certain types of weapons and military equipment, actually produce some of them, act as intermediaries in operations for their supply through both legal and illegal channels.

The need to counter aggressive non-state actors creates a demand for special combat systems to combat them in asymmetric conflicts. They themselves import a significant amount of weapons through the black market, develop their own combat systems and adapt those used in the tactics of subversive-terrorist and guerrilla warfare.

The key directions of reforming the armed forces of the world's leading states are related to the development of network mechanisms for controlling operations, introduction of combat information systems, unmanned aerial vehicles operating in all environments, robotic combat systems, and transition to an “active defence strategy”. threats to state security. The general trend has been to reduce the number of armed forces and ensure their maximum mobility, shift the emphasis to the SOF units and tools employment for conducting information and psychological warfare. The rapid development of counter-terrorist and counter-insurgent confrontation tactics, due to the need to solve combat tasks mainly in urban environments, taking into account the spread of network-centric model of combat in its high- and low-tech versions – all this must be taken into account when reforming MSS in Ukraine.

At present, the external and internal security environments are characterized by catastrophic instability and uncertainty for Ukraine's national security, which puts it on the verge of disintegration in the political space and default in the economic space, significantly undermines its ability to forcibly protect fundamental national interests and ensure MS.

Lack of political will to update the mechanism of using security guarantees provided to Ukraine for voluntary renunciation of nuclear weapons that were on its territory, has a destructive effect on the external security environment and its effective use in the interests of strengthening the MS of Ukraine [16].

The aggravation of relations between Russia and the West, in the light of the Ukrainian crisis, is a reflection of the systemic transformation of international relations, associated with at least three key trends in world development over the past 20 years: – Pacific region (centered in China), the dispersal of the resource of

influence in world politics in various fields, as well as strengthening the polycentric structure of international relations.

The complication of the external security environment is facilitated by the actions of the United States and some other European countries to build up NATO military bases and the deployment of US missile defence bases near Ukraine's western borders to intercept ballistic missiles over Ukraine, focused on intercepting ballistic missiles over the territory of Ukraine.

For Ukraine, both the interception of Russian (or other) missiles and the corresponding, including preventive, measures of Russia (or the country against which these missile defence systems are directed) create two groups of large-scale threats:

- *firstly,* the interception will take place over the territory of Ukraine with all the consequences that follow from them (unburnt in the atmosphere fragments of interceptor missiles and warheads will fall on the territory of the country; it is possible to hit critical infrastructure, including nuclear power plants, enterprises chemical industry, etc., which can cause great losses to the country and its population);
- *secondly,* in the course of countermeasures in response aimed at destroying missile defence bases, it is not excluded to inflict»false» missile and air strikes on objects located on the territory of Ukraine and other countries. A similar situation has already been observed during NATO missile strikes on Yugoslavia, when the missile “accidentally” hit the territory of Bulgaria.

Analysis of existing and long-term forecast of future scenarios of MPS development is a very important political, economic and military task, the solution of which will determine the levels of both military and national security of the state, its economic and social well-being.

In the second decade of the 21st century. the problem of forecasting MPS development scenarios has become particularly acute. Military conflicts and wars in the Middle East and Ukraine have shown that there has been a significant turning point in the development of MPSs: existing potential and new potential and current threats have sharpened. This requires substantiation of new principles of systematization of the main trends of changes in the security environment, tracking the transformation of goals in the wars of the 21st century, forecasting the role and place of the highest priority threats to national security and justifying the need for new approaches to national security and defence policy.

The war against statehood is being waged on a global scale, has global goals, and this gives it a global scope. In addition, it is conducted against all state-building components, in all vital spheres of state life, in the physical, mental and spiritual spaces, which decisively form the internal security environment that makes this war total.

Preservation of statehood depends on the correct prediction of the development of the military-political and strategic situation in the interests of timely response to

threats. You cannot win a war without accepting its challenge without a strategy. To create such a strategy, it is necessary to study the strategy of the enemy and determine in which areas and how he organizes his offensive actions.

The ruling elite must not allow ideological emptiness to arise in the souls of the people. As the territory of a state that has undergone depopulation, if it does not have its own, will be occupied by strangers, so the territory of the mass consciousness, if there is no state ideology, will be occupied by its antipode. State ideology, brought to the people, simple and clear to him, gives birth to a clear perspective in his mind. And hope, aspiration for the future, awareness of the meaning of life and desire to live are connected with perspective.

Another way to destroy statehood, which is widely used, is to deprive the people of its history. Occupation and destruction of the state occurs through the occupation and destruction of historical consciousness. Without knowing the history, it is impossible to understand the essence of the modern war against Slavs, and without understanding this essence, it is impossible to develop a strategy for its conduct. Man lives with hope for the future and memories of the past.

In the 21st century. there is a formation of a new environment and information space containing domains of information and cognition, based on the media environment, as well as the financial sphere. It has already become an international domain of trade and communication, influencing the country's position in the world hierarchy of power. The information space has firmly taken its place in the list of basic elements of national power.

Strengthening the country's position in the information space increases the share of traditional elements of national power – diplomacy, military, economic spheres. However, the new environment also has important differences. First of all, it concerns the cost of access to it. In addition, the information space is largely controlled not so much by states as by corporations, institutions and even individuals. And if sea and air spaces are defined and limited by the appropriate physical environment, information has no dimension and is constantly expanding.

Obviously, the information space does not abolish the struggle in traditional spheres, but it can and does affect the effectiveness of this struggle, and hence the conditions for achieving political victory in the 21st century.

Using the information space, an aggressive state destabilizes the internal security of the target state by organizing and carrying out subversive-terrorist acts on its territory. To counter such actions, it is necessary to adequately improve the system of territorial defence, its structure, methods of construction, justify a set of measures to keep it in constant readiness to prevent subversive-terrorist activities in its area of responsibility.

In order to achieve a higher level of MS in a fast-paced modern security environment, it is necessary to develop a system of predictive scenarios for resolving and conducting military conflicts for each potential adversary, which will be the basis for developing appropriate forms and methods of military and defence forces.

It is necessary to clarify the essence and content of military strategy, the principles of strategic deterrence and prevention of war, preparation for war and its conduct, as well as constantly improve organizing a national defence.

To successfully address these complex challenges in Ukraine, it is necessary to reform the military education system and, first of all, introduce the training of forecasting analysts for the security and defence sector.

Thus, the security environment in the 21st century. it turns out to be qualitatively more complex and requires readiness to counteract more complex threats both to the individual and to society and the state, such as hybrid threats. The peculiarity of these threats is the strictly purposeful, adaptive nature of the target state and the specific political situation. The complex of hybrid threats has a number of characteristics that ensure its effective use at all stages of the so-called hybrid war. Such a complex due to its unique synergy can have a much greater destructive power than the simple sum of the threats contained in it. This feature determines their powerful destructive potential. The synergistic effect of this type of threat is provided by the implementation of a system of comprehensive and interdependent preparatory and follow-up activities related to the coordination of a significant number of participants operating in the target country and beyond. Success is facilitated by the effective employment of factors that determine the high dynamics of the situation and add to the processes of controlled orientation with application of both non-military and military solutions.

For the nearest future and for the period until 2030, a steady trend should be expected to increase information and psychological impacts on the population and personnel of the security and defence sector, including in the form of special information operations, expanding the range of non-military means socio-political instability in the state in the interests of maintaining external governance. Purposeful nature and high dynamics of transition of hybrid threats from the category of potential to real ones require new approaches to the organization of monitoring of hybrid threats and their assessment, careful preliminary elaboration at the state level, including the security and defence sector, measures to counter the full range of threats to national interests and national security.

1.3. Role and place of a military sphere in the system of national security

The purpose of forming the military policy of the state is to ensure a sufficient (specified) level of its MS [17]. The need for security of the individual, society and the state is of vital interest, without the realization of which the existence of any state is impossible. That is why the main motives of people and their communities are aimed at ensuring a sufficient level of security, especially in the face of military threats. To do this, the state creates the necessary institutions, public organizations,

and it unites with the other states in the format of international security organizations. [18].

The absence or inefficiency of the national security system results in large-scale social upheavals and crises, such as coups, “color revolutions”, wars, the collapse of states, and the destruction of society's material and spiritual values. In addition, the entire established system of international relations may collapse in the face of new threats and challenges that it is not ready to face.

If security objects (state, society, individual) do not care about their safety, they lose their viability. To prevent this from happening, it is necessary to constantly conduct a comprehensive study of security issues, taking into account all its aspects. Of particular importance at this time is the study of the transformation of war, its impact on the functioning of major subsystems of society, the place and role of man in national security, MS, as well as a clear definition of the military, its place and role in society and the state, ensuring their livelihood, especially in the conditions of modern threats [17, 19].

Nowadays is characterized by increasing conflict, increasing the number and severity of armed conflicts, arms persecution. Wars are getting tougher. In addition, the politicization and ideologization of wars, the dominance of political goals in them, and the achievement of political victories are growing, which distinguishes them from military victories in the wars of the past.

New tendencies in the socio-political content, the formation of a new outline of wars were identified. For example, “Westernization”. That is, they are aimed at the global spread of the Western model of development, which is presented as a universal and best model of society (wars in Yugoslavia, Afghanistan and Iraq). In modern wars, social, geopolitical, resource-ecological, demographic and other factors are simultaneously intertwined, giving the socio-political nature of wars multifaceted content, the fundamentality of their consequences [19].

Scientific and technological revolutions, which occur continuously one after another, radically change the material and technical base of war. The widest possible introduction of space, information technology, high-precision weapons, technical equipment of troops, a sharp increase in the role of knowledge compared to muscular and machine strength, etc. cause revolutionary changes in the armed struggle [20].

Until recently, the promotion and protection of their geopolitical interests through wars was carried out by traditional armed means employing regular armies. Direct military clashes between states occur less and less often, giving way to internal conflicts, civil wars, which are primarily due to internal causes, but are provoked and supported from the outside. Non-state actors, or actors who act as a key instrument and guide in the foreign policy of a state that pursues its geopolitical interests, are playing an increasingly important role in the hostilities of such wars.

Analysis of local wars at the beginning of the 21st century shows that the evolution of politics does not allow us to succumb to illusions about reducing the bitterness of future wars. It is no coincidence that in the development of weapons

and military equipment the main attention is paid to increasing the impressive power, range, speed of reaction and accuracy of action, maneuverability. Priorities are given to their offensive types, the improvement of high-precision weapons, computer science, intelligence, communications, electronic warfare, automated command and control systems for troops and weapons, and spacecraft. In the future, the appearance of robotic combat systems and weapons based on new physical principles is expected. Therefore, the defence sphere must be attuned to all these transformations and play a major role in society.

Defence sphere covers the sphere of people's activity, which is obliged to meet their needs in the guaranteed protection of the state's sovereignty and the achievement of other military-political results [21].

The category "**defence sphere**" will mean the subsystem formed in the state, which is responsible for meeting the needs of the state in countering military threats employing specially created military and non-military formations, institutions and other organizations.

The attitude to the defence sphere depends on a set of conditions and factors that affect the safe development of society itself. The growing level of war threats contributes to raising the social status of the military man, increasing defence expenditures and production of weapons, the state of lasting peace creates the illusion of automatic protection from various military threats and possible savings on military components.

The state of peace, or the absence of direct military clashes, is the result of the systematic work of many actors in both the military and other spheres of society.

Defence sphere is dialectically connected with the main subsystems of society: economic, political, social, spiritual, information. The spheres of society are closely interconnected. The processes that take place in them, objectively affect the entire life of society, are manifested in the defence sphere [18].

Economic sphere forms the material basis of military construction. The industry provides the creation of armament, military and special equipment, as well as other means necessary for the effective of troops command and control. Ultimately, the quality of personnel, improvement of the organizational structure of the Armed Forces, methods and forms of combat operations depend on the level of economic development of the country.

The essence of the influence of *political sphere* on the defence subsystem is manifested in the implementation of policy functions of goal-setting. It is the policy that determines the nature, methods and purposes of the use of MF, the functioning of the entire defence sphere. The political organization of society is always based on forceful support, the basis of which is the armed forces. The military security of the state is also directly related to the political image of the state, which in the modern information society is largely formed under the influence of the MM. It is obvious that a strong, self-sufficient and independent in conducting international politics Ukraine can resist the incitement of interethnic conflicts and the promotion of racist

and xenophobic attitudes and ideas, the commission of crimes, including those related to unauthorized access to automated management support systems in national security and MS.

Social sphere of society actively influences the state of the defence sphere, which is the immediate environment for military personnel. The social sphere is designed to create favorable conditions for their selection and training, operation and management. The defence sphere reflects the spectrum of the social structure of society. The serviceman is the main creator of connections and relations with other servicemen, his consciousness is formed under the strong influence of the social sphere, is one of the important factors that characterize him primarily as a social entity.

Spiritual sphere creates and preserves the spiritual values of society, forms ideological views and relations in society, provides moral and psychological stability of the personnel of the MF.

Defence sphere forms and reflects the policy and ideology of ensuring the MS as an integral part of the national ideology. Achieving the main goal of the military sphere, the tasks in the system of state MS is carried out through military activities, which is a kind of social activity, which is a complex system of conscious, purposeful actions of social actors to create, develop and employ the MF as a whole or individual elements to ensure national and military security through the use of means of armed violence. Understanding its essence, structure, functions, regulations and other types of support is important not only for servicemen, but also for society as a whole.

Ensuring MS is impossible without the development of the defence sphere of society and the improvement of its main structural components, such as institutional and managerial (military and political leadership of the country); military and law enforcement (military formations of the state); resource (defence-industrial complex); professional and personnel (system of military education, training and education of servicemen); military-scientific (military science); infrastructure, etc. Changing the nature of military threats at the present stage of development of the art of war, as well as forms and methods of armed struggle, the hybrid nature of the enemy's actions put forward new requirements to the system of military security, which requires additional requirements for military development.

Information sphere has recently become the most powerful factor in counteracting warefare and hybrid threats, because it is through it and thanks to it that negative informational influences are exerted on all spheres of state life to achieve strategic goals in peacetime and wartime.

Defence sphere accumulates defence and military activities. In our opinion, in the Law of Ukraine “On National Security of Ukraine”[Pro natsionalnu bezpeku Ukrainy] military sphere, the sphere of defence and the sphere of military construction are illegally separated from each other (Article 15, item 1). Their main difference is in the subjects. The subject of military activity is military formations

(MF) and servicemen. The subjects of defence activity are more diverse. Defence activity takes place in all spheres of society, so it makes sense to talk about specific activities: military-political, military-economic, military-social, military-spiritual, military. Defence activity can be a command, staff, engineering, logistics, military scienctific one, and so on.

The concept of "**military activity**" characterizes the life of the armed forces and other MF in society. Military activity is a complex social phenomenon. Military activity is carried out in the form of daily activities, armed struggle, combat duty, combat moral and psychological training of troops, command and control activities of headquarters and other military command and control organizations, training of military personnel, military research activities. All forms are interconnected, complementary and interdependent.

Methods and criteria for assessing military activity are enshrined in public consciousness and culture (attitudes and assessments, imperatives and prohibitions, goals and projects, expressed in the form of normative ideas), acting as moral, aesthetic and legal guidelines for society.

Military activity is substantive, ie it affects material objects. This influence is more likely to lead to the destruction of certain material objects than to their creation. The creation of new material facilities within the framework of military activity is possible only in the interests of strengthening the combat potential of the elements of the armed forces and the country's defence capabilities.

Military activity involves the impact on the enemy's manpower, its neutralization, including through annihilation. The possibility of tough and extraordinary measures against a person and the results of his work requires comprehensive preparation and deep justification of certain management decisions. A significant role is played by the development of legal and moral norms governing military activities, the level of development of weapons and equipment, technologies used in military activities.

Military activity is strictly standardized by regulatory documents. It has a strict hierarchy of its subjects of different levels, requires a special effort of spiritual and physical strength.

Thus, **military activity** is a form of social activity of a serviceman, which has the characteristics of work. As an activity that is not limited to the direct production of material goods, military activity can be divided into non-destructive (in peacetime) and destructive (in wartime). And the latter, depending on the social orientation, goals and interests of its subjects can play both positive and negative role in social progress [18].

An important structural element of the activity is a **goal**, which is understood as the ideal image of the desired future result. In the military activity there is set not one, but a set of goals that have their own hierarchy. The most priority of them are enshrined in the Constitution of the country, the National Security Strategy, the

Military Doctrine of the state and other legal documents governing military activities. The key goal of military activity is to protect national interests and ensure the security of the individual, society and the state.

Realization of the purposes of military activity is carried out by the means. The goals and means of military activity are in dialectical unity. Means of military activity are means of armed violence (weapons and military equipment), important components of which are special technologies of management, development and implementation of tasks.

Military activity in both peacetime and wartime serves the interests of politics in general and military policy in particular. The political goals of war and the interests of ensuring the security of society determine the nature of military activity, which is a means of protecting society from both internal and external threats, ie performs the functions of its armed defence.

Thus, in the wars of the 21st century, the role of political, diplomatic, economic, informational, psychological, humanitarian, and intelligence means, which are often more effective and destructive than traditional weapons, is significantly increasing. So, the capabilities of the military sphere to respond to the actions of these means must be expanded.

The main component of national security in the face of modern threats is the system of ensuring the state MS, the effectiveness of which is determined by the quality of functioning of the military sphere of society. The MS of the state is an independent subsystem of society, which is characterized by specific social relations, laws, as well as the activities of social actors to meet the needs of society in military and national security.

The most important priority of the national security strategy should be the advanced development of science, science-intensive technologies and education in terms of ensuring the MS.

The military sphere needs constant improvement and development, especially given the complicated nature of threats to national security.

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Chapter 2

ANALYSIS OF THE VIEWS OF THE WORLD LEADING COUNTRIES ON MILITARY AND NON-MILITARY FORCES AND MEANS EMPLOYMENT FOR NATIONAL INTERESTS REALIZATION IN CONDITIONS OF GLOBALIZATION

2.1. Transformation of views on ways and means of ensuring the military security in the conditions of globalization

The views of the leading countries of the world of their geopolitical interests do not change in themselves, but under the influence of changes in the environment, which are caused by the specifics of each stage of human development. It is precisely this stage that globalization should be considered, the processes of which objectively, in the opinion of the vast majority of scientists, arose at the end of the twentieth century, and are characterized by conceptual novelty [1].

We live in a world of a global economy where the interdependence of states and societies has increased significantly. Generally, there are many approaches to the study and definition of the term "globalization". Consequently, it makes sense to summarize these approaches [1], realizing that they emphasize certain features of human development, and therefore they can all be considered as inherent in globalization. Such features, in our opinion, are:

- specific interaction and interdependence between the states that have recently become considerably stronger in comparison with the period before the beginning of the globalization process;
- certain "openness" of the world, that's why resources (economic, financial) can move anywhere, without restrictions;
- coverage of global connections of social space that exceeds geographical boundaries.

The trends of globalization appear as a multilevel and multilateral system of various integration and disintegration manifestations [1], which requires consideration of the methodological and practical benefits of many disciplines. Objectively, the development of globalization processes changes both the geopolitical interests of states and the views on their implementation, primarily on ensuring MS as a security aspect of geopolitical interests.

Global world system as the highest result of globalization is considered a complex of state, over-state, trans-state formations and a certain superstructure over the existing world systems that go beyond the limits of state institutions, internal integration of regions, subjects of world politics and international relations. The main factor of the global system is considered to be the most developed countries in the world that actually exploit less developed ones. Less developed countries act as

periphery. It is important that in the global world system the potential for the spread of threats (threats, conflicts, crises) is much higher [1].

Nowadays world is characterized by the disagreements intensifying, arms race evolving, severity of armed conflicts increasing. The politicization and ideologization of wars, the domination of political goals in them, and the achievement of political victories, which distinguishes them from military victories in the wars of the past, are inhancing.

The basis for the success of the initial period of the conflict is laid even in peacetime, especially during a menacing period. At this time:

- advantage over the enemy is developed in the forces, means and technologies;
- rearrangement of troops, the delivery of weapons, equipment and supplies of material resources to the area of future battles are carried out;
- measures towards the economic, political, diplomatic and, in fact, military blockade of the opposing side are taken;
- special operations are carried out, and opposition forces are used to destabilize the internal political situation;
- coalitions are created and various international organizations are involved.

At preparation stage, the so-called demonstration of force is usually implemented. During a threatening period, the parties conduct intense informational confrontation, during which there is a powerful moral and psychological influence on the population and troops of the enemy, which gives grounds to consider it as one of the phases of the development of armed conflict.

New tendencies in the socio-political content, the formation of a new outline of wars were identified. For example, “Westernization”. That is, they are aimed at the global spread of the Western model of development, which is presented as a universal and best model of society (wars in Yugoslavia, Afghanistan and Iraq). In modern wars, social, geopolitical, resource-ecological, demographic and other factors are simultaneously intertwined, giving the socio-political nature of wars multifaceted content, the fundamentality of their consequences [2].

Scientific and technological revolutions change radically capabilities of war. The widespread introduci of space, information technology, high-precision weapons, the technical equipment of troops, a sharp increase in the role of knowledge compared with muscular and machine strength, etc., cause revolutionary shifts in the armed struggle.

Aimed pointing devastating blows, desire to achieve the goal without large-scale combat clashes, increasing the proportion and significance of applying non-military means and methods of action, further displacement of man from direct armed struggle face to face with the enemy – these and many other novelties of armed struggle change the very paradigm of modern warfare.

Solving the tasks of force character, blocking and capturing state and military institutions, and counteracting measures taken by official authorities to restore order and safety are often carried out through the use of paramilitary, criminal, terrorist and other irregular formations of indefinite affiliation. These formations are completed with representatives of special units and special services, nationalist organizations and criminal groups, as well as lumpen part of the local population.

Regular armed forces are usually used to exert pressure on the leaders of the adversary countries by demonstrating their strength near the borders, as well as establishing control over their border areas in the form of “peacemaking”, “antiterrorist”, “stabilization” or “humanitarian” operations for “rendering assistance” (“protection”) to the civilian population, etc.

Thus, globalization provides the opportunity for the most developed countries to significantly enhance the effect of traditional methods of influencing world processes in their geopolitical interests and to introduce new ones that are in line with modern times.

World politics has been and remains an extremely adversarial realm, and the armed forces have been and remain an integral instrument of foreign policy. That is why the wars appear to be an objective “structural effect“ of international relations. And weapons, along with diplomacy and propaganda, were and are the basic tool of foreign policy, without them this activity will never be effective [3].

The defence of own geopolitical interests by means of wars until recently was conducted by traditional armed means with regular armies. Specificity of 21st century wars is that the value of traditional weapons is no longer the leading one, and the role of such means as political, diplomatic, economic, informational, ideological, psychological, humanitarian, intelligence, which is often more effective and more devastating, is increasing [4].

Consequently, globalization itself determines such a specificity of international relations and enhances its development and implementation of modern technologies of the above mentioned means. Direct military conflicts between states occur less often, yielding to internal conflicts, civil wars, which are primarily due to internal causes, but are provoked and supported from outside. In this type of military operations of wars, non-state actors are increasingly important, acting as a key instrument and conductor of a state foreign policy that implements its geopolitical interests.

World history shows that often the military-political conflicts are preceded by the trade-economic confrontation. One of the economic means of this confrontation is the economic war. Among the economic wars, trade warfare takes the leading position, which, according to classical economic theory, is defined as the state's struggle for markets with the help of economic and procedural instruments of state policy [5].

Trade war, as well as conflicts caused by protectionism and expansionism, is an economic conflict between states, which, by all methods available to them, are

struggling for their national interests. A trade war begins when one state evaluates the economic policy of another state as unfavorable for itself and takes appropriate measures. The deployment of a trade war does not depend on the civilization level of the development of the economic system and the chosen socio-economic model of development, and even sometimes on common geopolitical interests [5]. Such a war has deep historical roots and, as ever, is widespread today.

The peculiarity of the current economic confrontation between countries should be considered its transfer to the global plane and the plane of agreement and hidden confrontation. In modern trade wars, a new component - an economic conspiracy - is gaining strength. In order to strengthen the common potential of trade wars, countries are united into blocks (eg OPEC) [5].

For modern wars, which have received the name of ‘hybrid’, typical are not used means, but the goals that are achieved and which are consistent with the goals that are usually pursued during traditional wars, such as destruction, looting, occupation, regime change, immersion in chaos.

One of the most important differences of the hybrid war is that its purpose is not so much capture of territories and natural resources, but the desire to control the mood of the citizens of the opponent's country by controlling the information space and “brainwashing” in the captured territories [8].

Due to the technologies used at the present stage, the above goals can be achieved without the use of lethal weapons. An example of this can be the so-called "cold" war, when as a result the West, not using traditional lethal weapons, won the victory over the USSR, and led to the collapse of the Warsaw Treaty, Yugoslavia, Czechoslovakia.

Another tool for realizing its geopolitical interests is the enforcement of a country to armed conflict with the ones chosen to destroy (weaken) the enemy. In this case, the diplomatic factor plays a significant role.

Latest hybrid conflict showed another way of achieving geopolitical interests, namely the formation and usage of fear of the authorities to use military force to implement its national interests (protection of state sovereignty, the restoration of territorial integrity and repel aggression and punishment of aggressors) that paralyzes foreign policy, making it incapacitated and dependent on those who do not have such fear [3].

Separately, there is a tendency to expand the scale of wars in the mental space. A country can be destroyed without declaring war against it and not conducting traditional military operations, but only by using political, information and psychological means. There are a lot of such methods. For example, the revolution, the reprogramming of the consciousness of the ruling elite to the anti-state course, the change of the regime and the establishment of the puppet government, which executing the will of the aggressor, acts in an anti-national interest and destroys statehood. In general, all these methods are reduced to the influence on authorities by force methods (revolution), or non-force (spreading corruption or its generation

from already corrupt individuals or pre-prepared agents of influence) [9]. In any case, this involves external force, which implements the factor of external control [10].

To solve these problems, a nation should focus on analytical structures, creative politicians, military, diplomats who have to respond adequately to the rapidly changing situation in a country and region [13].

Military force remains a legitimate tool in resolving political, economic, ethno-national and other contradictions.

The transformation of views towards conducting of modern wars and conflicts means changing their goals, namely: destruction, looting, occupation, regime change, immersion in chaos, use as an instrument for the realization of its geopolitical interests, for example, the country's involvement in an armed conflict with the chosen for destruction (weakening) enemy. Distinguishing characteristic becomes the fact that due to the technologies used at the present stage, such goals can be achieved without application of lethal weapons.

Introduced at the end of the twentieth century the new notion of “war of controlled chaos” [14], “colour revolution”, “hybrid wars” and “hybrid threats” according to researchers belong to a new kind of conflicts of the present, based on subversive innovation technologies. The security and defence sector of Ukrainemust be ready to respond appropriately under the specified conditions.

2.2. Analysis of threats to national interests realization and problems of ensuring a sufficient level of military security of Ukraine in the 21st century

The peculiarities of Ukraine are that at this time the system of national interests is not defined in the legal framework. Politicians who come to government formulate national interests, based on their understanding. For example, according to the Law of Ukraine “National Security of Ukraine” [15], “**national interests** are the vital interests of an individual, society and the state, the realization of which is ensured by the state sovereignty of Ukraine, its progressive democratic development, as well as safe living conditions and welfare of its citizens”. This law lists the fundamental national interests.

In the Monograph we will consider national interests as socially perceptible essential material and spiritual needs of a individual, society and the state, the realization of which ensures their progressive development.

Under **vital interests** we will understand the defining needs, without satisfaction of which makes an individual, society and state impossible to exist.

At the current stage of development of Ukraine, the following general national interests can be identified in the most general terms:

- protection of state sovereignty, territorial integrity and inviolability of state borders, prevention of interference into internal affairs of Ukraine;

- internal stability, characterized by the stability of state institutions and the balance of interests of all social groups;
- effective functioning of the National Security system (NSS);
- the priority of universal human democratic principles in the development of the state, national consensus and national consciousness of the people;
- economic growth, satisfaction of material needs of the population, ability to efficient economic development;
- enhancing equal, mutually beneficial relations with other countries of the world in the interests of Ukraine;
- developing spirituality, moral principles, intellectual potential of the Ukrainian people, strengthening of the physical health of the nation, creation of conditions for expanded reproduction of the population;
- building national strategy that will include the national goal, national idea, national needs and national values;
- creating positive international image of Ukraine;
- developing Ukraine as a 'rule of law country';
- ensuring the development and functioning of the Ukrainian language as a state in all spheres of public life throughout Ukraine, guaranteeing the free development, use and protection of other languages of national minorities of Ukraine;
- guarantee of constitutional rights and freedoms of a man and a citizen;
- overcoming corruption, effectively combating crime, ensuring the safety of citizens, etc.;
- The Law of Ukraine " On National Security of Ukraine" [15] defines the following **fundamental national interests** of the country:
- state sovereignty and territorial integrity, democratic constitutional order, prevention of interference into the internal affairs of Ukraine;
- sustainable development of the national economy, civil society and the state in order to ensure an increase in the level and quality of life of the population;
- integration of Ukraine into European political, economic, security, legal space, membership of the European Union and the North Atlantic Treaty Organization, development of equal, mutually beneficial relations with other states.

Threats to national interests are events, tendencies and factors that make it impossible or complicate or can make it impossible or complicate the realization of national interests and preservation of national values of Ukraine [15].

The Law of Ukraine "On National Security of Ukraine" **lists the threats to national security** accotding to the following spheres of their impact:

- foreign policy, state security;
- military security and security of the state border of Ukraine;
- domestic political;

- economic;
- scientific and technological;
- social and humanitarian;
- civil protection;
- ecological;
- information.

The threats to Ukraine's national security dentifined in the Law of Ukraine “On National Security of Ukraine” have fundamental, generalized and long-term character. The threats to the national security of Ukraine are clarified and actualized by other state legal acts (“National Security Strategy of Ukraine”, “Military Doctrine of Ukraine”, “Concept for the Development of the security and defence sector of Ukraine”, etc.), which also define the directions of activity for ensuring national security and realization of Ukraine's national interests in the medium-term perspective.

Thus, according to p. 2, Art. 26 of the Law of Ukraine “On National Security of Ukraine” [15], the “National Security Strategy of Ukraine” defines:

- priorities of national interests of Ukraine and ensuring national security, goals, main directions of state policy in the field of national security;
- current and predicted threats to national security and national interests of Ukraine taking into account foreign policy and internal conditions;
- the main directions of the foreign policy activity of the state to ensure its national interests and security;
- directions and tasks of reforming and developing the security and defence sector;
- resources necessary for its realization.

Current threats to the national security of Ukraine in the military sphere (defence sector) are defined in the “National Security Strategy of Ukraine” [16]. It is aimed at implementing by 2020 the priorities of its national security policy as well as the reforms envisaged by the Association Agreement between Ukraine and the EU. That was ratified by the Law of Ukraine of 16.09.2014 № 1678-VII, and the Strategy of Sustainable Development “Ukraine-2020”, approved by the Decree of the President of Ukraine dated January 12, 2015, No. 5/2015.

The Military Doctrine of Ukraine [17] identifies together with military threats, also military-political challenges and risks that may pose a threat to the use of military force against Ukraine.

The most urgent threats to the national security of Ukraine in the medium-term perspective are defined in the Concept of Development of the security and defence sector of Ukraine(hereinafter - the Concept) [18].

An analysis of the security environment around Ukraine shows that recently, since the end of 2013, the security and defence situation in Ukraine has undergone a significant deterioration and deteriorates further.

The main threat to Ukraine's national interests remains the armed conflict in the East of Ukraine.

Among the threats to the national security of Ukraine in the military sphere and the realization of its national interests, it is necessary to pay attention to the following:

- aggravation of the criminal situation on the ocupied areas of Donetsk and Luhansk oblasts (OADLO), creation of channels for the illegal movement of goods, weapons, narcotic substances, migrants (due to the inability to control by the Ukrainian authorities the state border area in the respective territory);
- political destabilization within the country, the socio-economic crisis, one of the most significant manifestations of which is the militarization of life, it bears witness by the emergence of new social challenges on the background of a number of outdated and still unresolved issues. The geopolitical confrontation between the West and Russia aggravates the international climate, first of all in Europe, where the tendency towards the return of the elements of behavior inherent for the Cold War is clearly outlined in the intergovernmental relations;
- the threat of the proliferation of weapons of mass destruction (taking into account the implementation of nuclear programs in Iran and North Korea) is increasing, which can not help causing concern of Ukraine as a state that has voluntarily abandoned nuclear weapons;
- migration crisis in Europe and uncontrolled migration of the population within the state.

Terrorism remains a significant destabilizing factor of European security and national security in Ukraine. The rise of islamic fundamentalism generates a set of threats of an international character and becomes a long-term factor that will affect international stability and determine the further policies of the leading countries of the world.

Ukraine can not stay away from this problem. The conflict in the East of our state creates a dangerous springboard for the use of the islamic fundamentalists opportunities to establish illegal transit schemes and the formation of terrorist networks in its territory.

Taking into account the development trends of the security situation around and within Ukraine, one can conclude that the security environment in the long run-term is characterized by the presence of such threats to the national security of Ukraine and the realization of its national interests which are connected with the possible use of military force against it:

- encroachment on the state sovereignty and territorial integrity of Ukraine by foreign states, as well as terrorist organizations and separatist movements operating on the territory of Ukraine;
- interference in the internal affairs of Ukraine by foreign states, in particular by supporting political or other organizations whose activities are aimed at

violating the territorial integrity and sovereignty of Ukraine, internal social and political stability, law and order;

- violation of international treaties, non-proliferation agreements and facilities if its delivery, arms control, arms limitation and reduction;
- increase of troops and armaments, creation of new ones near the borders of Ukraine, expansion and modernization of existing military bases and facilities, including missile defence systems, which leads to a violation of the balance of forces in the region;
- intensification of intelligence and reconnaissance-sabotage activities against Ukraine by special services of foreign states, as well as other state or non-state foreign organizations;
- disclosure of information constituting state secrets, illegal gathering and use of information in the spheres of defence, state security, economics, science and technology;
- special influence on information in order to distort or destroy it; violation of the standard mode of operation and destruction of information processing systems;
- manifestations of cyber-espionage, an increase in the number of cyber attacks aimed at blocking, leaking, modifying or destroying information circulating in a country information-telecommunication and other systems of socio-political significance;
- insecurity of committing terrorist acts, including in cybernetic space, on critical infrastructure of Ukraine by intelligence and sabotage groups of special services of foreign states, terrorist organizations and separatist movements operating on the territory of Ukraine;
- assistance in the illegal import into Ukraine weapons, ammunition, explosives, radioactive and narcotic drugs, mass destruction materials;
- the use by foreign countries of the crisis situation in the Ukrainian-Russian relations to squeeze Ukraine out of the traditional arms markets, to discredit Ukraine as a reliable partner in military-technical cooperation;
- implication of energy, trade and economic dependence of Ukraine to achieve military-political goals;
- the use of military force in the region or with the participation of the states of the region, the presence of “frozen” conflicts, including those near the state borders of Ukraine, and the creation of prerequisites for the spread of instability into the territory of Ukraine;
- strengthening separatist sentiment in areas of compact residence of national minorities in the territory of Ukraine, as well as active support of such actions by individual countries;
- political, financial, military or other support of not allowed by law paramilitary or armed formations, terrorist organizations on the territory of Ukraine;

- strengthening the informational and psychological impact on Ukraine to destabilize the socio-political situation in Ukraine or in its individual regions and places of compact residence of national minorities;
- application of political and (or) economic sanctions against Ukraine, suspension of diplomatic relations with Ukraine;
- violation of the 1958 Convention on the Law of the Sea because of piratical actions against sea-going vessels or aircraft of Ukraine;
- an increase in the flow of illegal migrants to Ukraine or through its territory as a result of armed conflicts, a sharp deterioration in the socio-economic status of individual countries.

The list of intentions (actions) of foreign states (military-political forces), which may constitute a military threat to national security, should be divided into three groups:

- intentions (actions) that require an immediate response from the state and military authorities;
- intentions (actions) that do not require the immediate reaction of state and military authorities, but are important for decision-making in the interests of strengthening the national security of Ukraine;
- intentions (actions) that at a certain time do not directly affect the nature of the decisions taken by the state and military authorities.

In each particular group, shoud be outlined intentions and actions which are carried out:

- in military-political sphere;
- in military-economic and military-technical spheres;
- in information sphere;
- in the Armed Forces.

To estimate and forecast the trends of the threats influence on the realization of national interests is more expedient by the method of scenario analysis by means of generating possible scenarios of emergence and development of crisis situations that may threaten the realization of national interests (singly or in their totality). Each of these scenarios is based on a number of threats.

In order to ensure the realization of Ukraine's national interests and to eliminate or neutralize the threats to the security of the state, in particular the military, it is necessary to provide the necessary (appropriate) capabilities in the components of the security and defence sector of Ukraine (SDSU). At the same time, as experience shows, taking into account the complexity (hybridity) of these threats, preventing their impact (reducing such impact to a safe level) is possible only by common (integrated) efforts of all entities of thes ecurity and defence sector of Ukraine.

2.3. Features of long-term forecasting of military insecurity sources for Ukraine based on the global tendencies in the development of international situation

Forecasting of the **international situation** (IS), which refers to the state of the world system of international relations at a certain period of time is characterized by the composition of subjects of world politics (state, international and non-state), leading world tendencies and relations between them. It is conducted in order to assess the prospects of the development of international situation and the state of the nation in different ways of changing the internal and external character [19, 20].

The success of state depends on the interaction of the subjects of the IS and the consequences of the influence of external and internal factors of development. The result will be guaranteed when we know what waiting for us and what needs is being prepared to in advance (the most unwanted threats). To prepare for "everything" and to reflect "all threats" is impossible. It is necessary to select some options, to substantiate them and to try to use them for the benefit of realizing their own national interests.

For the defence sphere, the main interest is the predicted state of the main component of the MS, namely of MPS, and its probable scenarios. The long-term outlook for the probable scenarios for the development of the MPS is an important political, economic and military task, the solution of which largely depends on the security of the state, its economic and social well-being. In the 21st century. military security (MS) determines not only the state sovereignty, territorial integrity and the the ability to protect their national interests, but also the preservation of statehood, national identity and values [13, 21]

In the second decade of the 21st century the problem of development of the MPS scenarios in the future has become particularly acute. Military conflicts and wars in the Middle East, Central Asia, Georgia, and Ukraine showed that there was a significant breakthrough in the development of the military-political situation: the existing and new potential and actual threats have sharply aggravated [19]. This is due to two global and mutually exclusive processes, which will further intensify the MPS. On the one hand, the balance of power in the world has changed not in favor of the United States, which has led to the emergence of new centers of power, but on the other hand, the United States seek to preserve their global leadership and the ability to influence the development of most processes in the world. In addition, the objective strengthening of a number of states and other entities of the International Situation inevitably strengthens the role and significance of new MPS subject.

If at the beginning of the 21st century the character of the World War II was determined by several great world powers (during the First World War – Germany, France, Russia, Great Britain, the USA, Austria-Hungary, Italy, Turkey, etc.), then in the middle of the twentieth century the circle of these states was narrowed to the

USSR, the United States, Germany, Japan and the United Kingdom. And since the beginning of the 21st century not only large states, but also emerging economies, as well as non-state actors, international organizations and other civil, political and military non-state agencies influence the formation of the MPS and future scenarios of its development.

The development of future military-political situation (MPS) scenarios in the world is under the influence of the following groups of factors:

- the main subjects of the MPS (States);
- non-state actors of the MPS (coalitions, unions, political organizations);
- global trends in political, economic, information and communication, scientific and technological development;
- the interaction between these entities and the trends of the MPS.

You should pay attention to the following:

- scenarios for the development of IS and their options largely determine the scenarios and options for the military-political situation development;
- scenarios for the military-political situation development depend on the spheres of the IS as well as the main factors that determine the military-political situation;
- the analysis and forecast of the MPS are purely specific (temporal, military-technical, economic and financial) and cannot be universal;
- extrapolation of a scenario of the military-political situation development in the long run may be only very limited due to a large number of changing factors of influence in general.

However, against the backdrop of qualitative changes taking place in the MPS in the second decade of the twenty-first century, the conclusion is made that the possibility and need for an analysis of the existing and projected future scenarios and options for the development of MPS are clearly confirmed.

The specific scenarios for the MPS development and their variants are theoretically and methodologically based on the interconnection of the development scenarios of the IS and MPS. The existing and future specific scenarios for the MPS development are a logical consequence of the development of relevant scenarios of the international situation, their natural component [19] (Fig. 2.1).

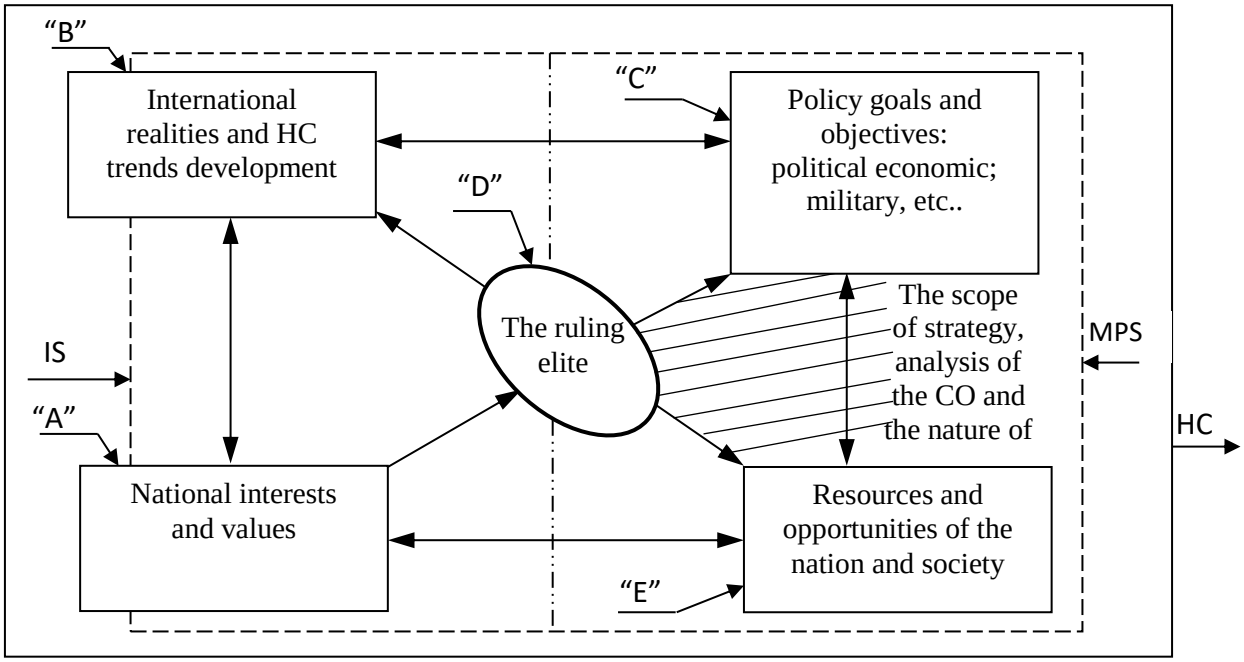

Fig. 2.1. Generalized logical scheme of evaluation of the MPS: "A", "B", "C", "D", "E"– groups of factors, influencing scenarios and variants of the military-political situation development.

Fig. 2.1 shows that the overall part of the military-political situation covers a wide area of the political process (marked with a dotted line), and the international environment includes international realities and leading trends (group of factors "B") and a part of the system of national values and interests (group of factors "A").

The most general is human civilization (HC).

We will prognosticate the most probable sources of threats of military and partly hybrid nature for Ukraine's military security on the basis of the leading tendencies considered in the publication [22].

By 2030, no country can act as a hegemony. The expansion of the rights and freedoms of citizens, the division of power between the state and informal structures will largely stop the historic growth of the West, which began in 1750, and will regain the weight of Asia in the world economy.

At the international and national levels, a new era of "democratization" will come.

In addition to expanding citizens' rights and freedoms and redistributing state power, two more mega-trends will form our world in 2030: demographic problems, especially the sharp increase in the number of elderly people, and the growing need for food and water, which can lead to a shortage of resources. These tendencies are to some extent already evident today, and in the next 15-20 years they will have an impetus for development. The basis of these mega-trends is the structural shift-

critical changes in the key characteristics of the global environment that affect the way the world "works"[22, 23].

Extrapolation of mega-trends indicates only that the world will change by 2030, but with this change may be diametrically opposed scenarios. We proceed from the assumption that the development of the world in 2030 will be influenced by six key factors that can change the course of the game, namely: the problems of the world economy; management issues; conflict-relatedness; regional instability; high technology; the USA's role.

Depending on the megatrends, you can predict the following scenarios of changes:

- empowerment accelerates poverty reduction and growth in the middle class world, raises education, expands the application of new knowledge;
- demographic models provide for the reduction of the demographic arc of the middle class world, increases the level of education, expands the use of new knowledge;
- the distribution of influence will not leave the place of the hegemonic state. The authorities will move to networks and coalitions of multipolar instability. In aging countries, the level of economic growth may decline. 60 percent of the world's population will live in the city, and migration will increase;
- food, water and energy with increasing world population will become the most demanded resources. The solution to problems in the field of mass demand products will be related to the level of consumption of other products.

Consider the probable scenarios for the development of alternative worlds:

- "silent engines" – in case of the worst scenario, the risks of international conflicts will increase. The USA will deal with internal problems;
- integration – in the case of the most positive scenario, China and the United States will strengthen partnerships that will contribute to expanding global cooperation;
- "a genie from a bottle"– the inequality will increase because some countries will feel themselves victorious, others will be in the role of loser. Inequalities within these countries will increase social tension. As a result of the redistribution of influence the USA will cease to be a "global police";
- world without a state – armed with new technologies, non-state actors will take the initiative in solving problems.

There are several potential discrete events that can trigger a large-scale decline. Based on the chosen megatrends and their possible interaction with key factors, four archetypal versions of the future are proposed, which are certain ways of developing the world by 2030 [22, 23]. The onset of any of these alternative worlds is not considered inevitable. The specific scenarios for the development of MPS, which stem from the development scenarios of the IS, will inevitably differ.

Even if events unfold at one and the same time, in the same place, the specific military-political conditions can be – and will certainly be – different [19], depending on the set of subjective factors, some of which were unknown and not taken into account, and some have just appeared.

The adequacy of the assessment of the MPS depends directly on the adequacy of the ruling elite, because subjective factors and interests can seriously affect perceptions of threats (see Fig. 2.1). This is very important at a time when the boundary between military and non-military forces of politics has actually disappeared or become so blurred that it largely depends not on the real state of things, but on political or media interpretation. So, if earlier the beginning of the war was associated with its announcement (as defined by international law) or with the actual actions of the armed forces, today military action can begin without declaring war.

The analysis and strategic forecast for the development of MPS scenarios for the coming decades necessarily implies [19]:

- creation of a certain system for systematization of numerous and often contradictory military-political situation (MPS) scenarios;
- embedding these scenarios in the development scenarios of the IS, which are of priority in relation to the nature of the military-political situation scenarios;
- allocation of the main factors influencing formation of the MPS;
- definition of time differences between current (existing) scenarios of IS and the MPS and possible future ones (until 2030 and beyond);
- selection of the most probable one from the maximum number of possible scenarios;
- consideration of variants of the most probable scenarios of MPS.

Existing or future scenarios of the MPS development have their own options, which specify and detail the baseline depending on specific historical and other conditions. It is possible to describe the global MPS differently, but it is important that such descriptions be realistic. Only understanding the political part of the SE can be a scientific long-term forecast for the development of various scenarios of the military-political and strategic environment. The logic of this study is shown in Fig. 2.2.

Unfortunately, the process of political and military-political decisions in Ukraine is characterized by a considerable lag in the adequacy and quality of analyzing and forecasting. Main Situation Awareness Center (MSAC) was created for the tasks of analysis and forecast of the strategic situation, the future nature of international and domestic wars and military conflicts, but is not ready yet for accomplishing its mission.

NATO member states, Russia, China and other countries are paying much attention to improving the effectiveness of national security management, with a

huge amount of resources, which is incomparable with Ukrainian funding. That is why, even in the near future, one should not expect that different policy scenarios and options for the development of the IS and the MPS will be continually analyzed, updated and forecast for the higher political and military leadership on a comprehensive and systematic basis.

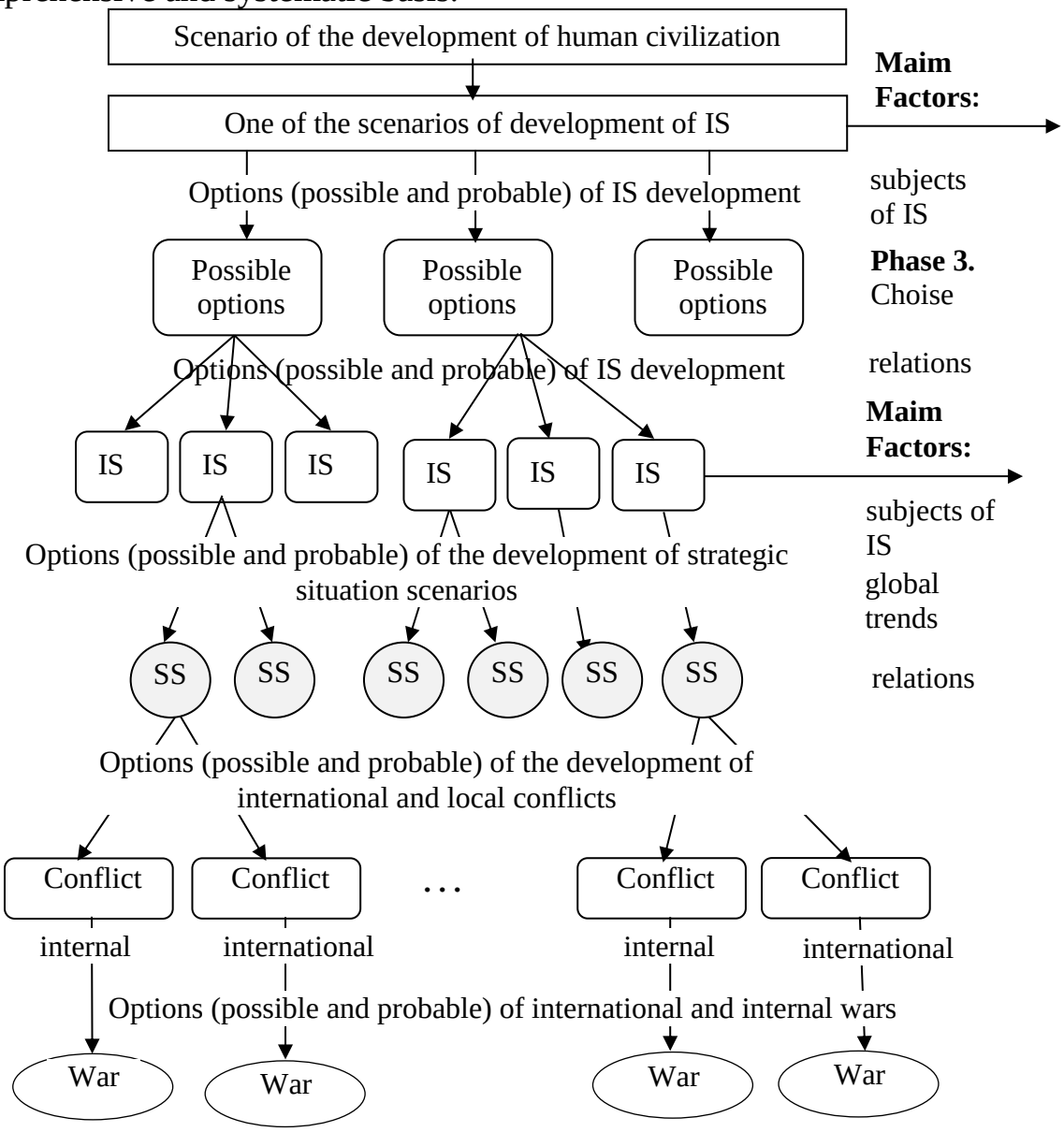

Fig. 2.2. Logic of analysis and long-term forecast of strategic situation, future character of international and internal wars and military conflicts

The practice of the leading countries shows that this work cannot be done by only one agency - either the National Security and Defence Council (NSDC) or the Ministry of Defence, or the General Staff, or the Foreign Intelligence Service. We need a very versatile and well-prepared team of researchers, able to systematically analyze and predict the prospects for the development of military-political situation scenarios and the threats that follow them. The scale of this work is enormous, but

not only the effectiveness of using a large part of national resources allocated to national security and defence, but also the very possibility of the existence of a nation and a state in the 21st century depends on its quality.

Therefore, firs it is important to construct correctly the model of such analysis and forecast, knowing that it is very difficult (if at all possible) to consider all the factors that will affect the formation of military-political situation and, moreover, the diversity of scenarios and options for the development of such MPS scenarios in the future. To address these challenges, it is now necessary to begin the targeted preparation of analysts and forecasters for the national security system and appropriate testing of the main situation awareness center (MSAC) .

The ultimate characteristics of wars, conflicts and strategic conditions depend on and even are determined by the state of MPS, IS and trends in the development of human civilization , that is they are quite objective and regular in nature, which allows to carry out not only adequate analysis but also to create a long-term forecast.

The subjective nature of any strategic situation and, accordingly, the same subjective nature of its analysis and strategic forecast naturally follows the enormous number of subjective and partial factors that influence its formation. Unlike the MPS, which is largely determined by political, economic and other realities, the SE is so dynamic that subjective factors play a decisive role in it. In this case, the most important aspect that characterizes the strategic situation and the war is the degree, depth of engagement of the nation and the country in armed struggle, because even a small part of it is reflected in all spheres of society and state's life. At this time, the most important priority of the national security strategy should be the advanced development of science, science-intensive technologies and education.

Forcasting the development of the SE scenarios and the possible nature of future wars and military conflicts is the most difficult subject for analysis. Moreover, it is even more difficult one for a strategic forecast, from all possible spheres of long-term forecasting and strategic planning in the following circumstances. Any SE, military conflict or war (external or internal) are unique specific phenomena that do not repeat exactly, even if they coincide in place and time, the composition of participants, the use of AME, political configuration, etc. This uniqueness manifests itself in the social, military, political and other concreteness of the SE, wars and conflicts, which are sometimes decisive. The uniqueness of any SE or war (conflict) lies in the fact that they cannot be ripped off from the general context of the MPS and IS. War (military conflict) or SE is not just an organic part of them, but also directly depends on their development. It is impossible to “tear out” the war and even a slight conflict from the entire context of the development of world events of the evolutionary and even more revolutionary ones. It is the “hybridity” that should become a key point in assessing the war, conflict and strategic situation.

2.4. Analysis of security and defence sector capabilities on ensuring the military security of Ukraine

The Laws of Ukraine [24-34], the Military Doctrine of Ukraine [17] and the Development Concept of the security and defence sector of Ukraine[18] define the tasks of the security and defence sector of Ukraine constituents in the spheres of defence and security of the state.

According to certain crisis scenarios [18, 35], the security and defence forces of Ukraine should have operational capabilities that would ensure:

- deterring and repelling armed aggression against Ukraine;
- deterring and localization the early stage of armed conflict on the state border of Ukraine;
- localization and elimination of armed conflict within the state.

In general, the security and defence forces should be capable of conducting operations (combat operations) of various scale with determined objectives in the face of information confrontation, struggle for domination in the air and at sea, the use of high-precision weapons by the enemy and asymmetric actions, effectively counteract the enemy's reconnaissance and sabotage activities.

The constant tasks of the security and defence forces are:

- effective protection of the airspace of the state and important state facilities, as well as strengthening their protection in the event of an anti-terrorist operation in Ukraine or large-scale international events;
- ensuring the safety of flight over the territory of the state of aircraft of civil aviation of other countries in accordance with international agreements of Ukraine;
- protection of the exclusive (marine) economic zone of Ukraine and underwater space within the territorial sea of Ukraine;
- readiness for a counterterrorist operation in any region of the state;
- opposition to the enemy in the temporarily occupied territories by deploying the guerrilla movement (resistance movement);
- participation in operations against piracy, uncontrolled proliferation of mass destruction, trafficking in human beings, drug trafficking, organized crime, etc. outside the territory of Ukraine in accordance with decisions of the United Nations and other international organizations;
- counteracting the destructive information influence, the activity of intelligence special services of foreign states, conducting on the territory of Ukraine technical intelligence and cyber-espionage, committing cybernetic attacks;
- readiness to liquidate the consequences of natural and man-made disasters on the territory of the state;
- ensuring the sustainable functioning of transport and facilities of the infrastructure both in peacetime and in conditions of martial law and state of emergency;

- Ukraine's participation in international peace-keeping and security operations under the auspices of the international organizations authorized by the respective composition of the defence forces and / or the involvement of the security forces, determined by a separate decision of the state authorities.

In the interests of fulfilling the tasks of defence of the state in crisis situations defined by the Presidential Decree [18], agencies of the security and defence sector of Ukraine (SDSU) responsible for the defence of Ukraine, the protection of its sovereignty and territorial integrity in line with the Constitution of Ukraine (apart from the Ukrainian Armed Forces) should have certain opportunities.

The National Guard of Ukraine should have the following capabilities:

- participate in the repelling of armed aggression against Ukraine and the elimination of armed conflict by conducting military (combat) actions and in fulfilling the tasks of territorial defence (in cooperation with the Armed Forces of Ukraine);
- to carry out isolation and restraint measures, reliably block the territory in which the crisis occurred or the fighting was carried out, limiting its further distribution, depriving the law enforcement of paramilitary and / or armed formations of the enemy of the ability to build up their factions;
- to take measures on the legal regime of a state of emergency in order to maintain or restore law and order in areas of occurrence of particularly serious emergencies of technogenic or natural nature for the quick elimination of their consequences.

The State Special Transport Service in the interests of the defence of Ukraine should have the following capabilities:

- to organize the technical cover of the most important state facilities of transport infrastructure, to restore, to set up floating, railway bridges (crossings);
- to protect and defend the objects of the national transport system in a special period, to carry out emergency rescue and to rebuild transport communications that have been caused as a result of emergency situations;
- to build and repair transport objects, to demolish them, to install barriers;
- participate in the implementation of territorial defence measures aimed at adhering to the legal regime of martial law.

The State Service for Special Communications and Information Protection of Ukraine in the interests of state defence should have the following capabilities:

- to ensure the reliable functioning, security and development of the state system of government communication, in particular its readiness to work in peacetime, in special periods and in conditions of emergency;
- to participate in the provision of activities of entities directly engaged in the fight against terrorism, in carrying out the tasks of territorial defence, as well as in the conduct of measures aimed at maintaining the legal regime of martial law and state of emergency.

The State Border Guard Service of Ukraine, as a special law enforcement body, is guaranteed to ensure the integrity of the state border, in particular, effective coordination of the activities of military formations and law enforcement agencies of the state on the protection of the state border in peacetime, and within the competence to participate in the defence of the state during wartime.

The State Service of Ukraine for Emergency Situations should have facilities for the engineering protection of areas in emergency situations. It's main objectives are to prevent the emergence and elimination of the consequences of emergencies on sites and territories that are characterized by unsatisfactory man-made and ecological condition; to clear the territory from explosive objects; to participate in the rehabilitation of territories contaminated as a result of military activity; to help the civilian population in the area of hostilities.

The Security Service of Ukraine, the External Intelligence Service of Ukraine, the Office of the State Protection of Ukraine, the State Penitentiary Service of Ukraine should be able to perform tasks in defence interests in accordance with legislative acts of Ukraine.

The tasks of these components of the security and defence sector of Ukraineon development of defence capabilities will be determined by the documents on defence planning of the state.

The Security Service of Ukraine must have the ability to protect effectively State sovereignty, constitutional structure and territorial integrity of Ukraine, focusing on the following objectives:

- counter-intelligence protection of state sovereignty, constitutional order, territorial integrity, economic, scientific and technical and defence potential, information security of Ukraine, vital interests of the State, rights and freedoms of citizens from encroachment by foreign special services, particular organizations, groups and individuals that pose a threat to the national security of Ukraine;
- counteracting the intelligence, subversion and other unlawful activities of foreign special services, particular organizations, groups and individuals that pose a threat to the national security of Ukraine;
- counter-intelligence protection of state authorities, scientific, technical and defence potential, defence industrial and transport complexes, national telecommunications system, critical infrastructure of strategic importance;
- preventing, detecting and suppressing the crimes against peace and security of mankind committed in cyberspace; counter-intelligence and operational-investigative measures aimed at combating cyberterrorism and cyberespionage; counteracting cybercrime whose possible consequences directly threaten the vital interests of Ukraine;
- investigation of cyber incidents and cyberattacks against State electronic information resources, information whose protection is required by law and critical

information infrastructure; testing of readiness to protect critical information infrastructure against possible cyberattacks and cyberincidents; response to computer incidents related to the national security;

- implementating a range of legal and administrative, institutional, operational-investigative and operative-technical measures to counter terrorist activities, including international ones, and the financing of terrorism;
- counteracting crimes that pose threats to the national security of Ukraine (followed by phased optimization of the powers of the Security Service of Ukraine determined by the law in this area);
- disclosure and counteracting transnational and interregional organized criminal groups, combating various types of organized crime (followed by phased optimization of the powers of the Security Service of Ukraine determined by the law in this area);
- counteracting specific information operations and influence of foreign special services, organizations, groups and individuals;
- combating illicit trafficking and use of special technical devices intended for the private transmission of information;
- conducting information and analysis in the interest of the national security of Ukraine;
- preventing offences against national security of Ukraine.

The State Guard Department of Ukraine playing its support role though, it must facilitate the fulfilment of the tasks of the elements within the security and defence sectors of Ukraine in a military conflict, for this purpose it should be able:

- to improve state security of government authorities of Ukraine;
- to protect and defend the facilities determined by law;
- to participate in actions aimed at combating terrorism, etc.

The capabilities analysis of those components shows that their current state does not provide a guaranteed response to actual threats to the national security of Ukraine, as there are some unresolved issues:

- inefficiency of the mechanism of prevention and neutralization of modern threats to the national security of Ukraine;
- long-term financial and material support of the components of the security and defence sector by residual principle, deficiencies in development, coordination and interaction of the components of the security and defence sector in the mutual task of ensuring national security;
- incomplete building an effective resource management system in crisis situations threatening national security;
- imperfect system of planning and joint use of troops (forces) and facilities, their training and supply;
- imperfect and ineffective interaction between central and local government bodies, especially relating to the prevention and suppression of terrorism;

- inefficiency of activities of the SDSU countering cyber threats of a military, reconnaissance, criminal, terrorist or similar nature;
- inconsistency of a single national civil protection system and civil protection forces and their technical equipment with current challenges.

Taking into account the country's limited resources to ensure, first of all, MS, guidance documents in the area of national security [16, 17] determine the priority response to the military threats (MThs) by non-forcible actors of SDSU, and upon failure to eliminate or neutralize the detected threats by non-forcible actors to involve power structures. The country's limited resources require rational use of non-forcible and forcible actors and relevant identification of their tasks, organization of their management and sufficient resource, information and analysis, legal and other types of support. To ensure the practical realization of this approach, it is proposed to establish an integrated potential of non-forcible and forcible actors to eliminate and neutralize the detected (predicted) threats to the national military security (military threats).

The Integrated Potential to Counter Military Threats (IPCMThs) is formed rational composition of the security and defence sector of Ukraine forces and means and their required capabilities, which are planned to be implemented on a unified basis, generally in the form of a special operation to de-escalate the detected (predicted) MThs within the resources allocated by the State and non-governmental organizations.

Since the SDSU consists of certain agencies [18], its integrated potential to counter threats of a military nature should combine the potentials of only those actors that are able to influence the level of such threats. The Integrated Potential for Countering Military Threats (IPCMThs) will be discussed in detail in the following paragraphs. The analysis of the distribution of dutied of the security and defence sector of Ukraine agencies for responding to military threats has shown that not all of them are involved in this process and have different characters of influence [18].

Changes in the level of MThs after the SDSU response to them, as a result of its activity, becomes the SDSU corresponding target function. That will depend on the realization of the capabilities of each of the components involved in countering the threats in the chosen version of their integration. Such an approach allows for more sustainable use of existing capacities, to eliminate duplication of tasks and wasteful use of the extremely limited resources allocated in Ukraine to provide its MS.

However, improving the efficiency of the SDSU in this way requires the preparation of answers to two questions:

However, military security system (MSS) in this way requires the preparation of answers to two questions:

- which actors should be involved in counteracting the detected threats?
- what tasks should be defined for each agency of the SDSU, involved in eliminating or neutralizing threats to the national military security?

Well-known approaches [36-40] for the distribution of powers in the security and defence structures and the definition of the tasks for the agencies of the SDSU are based on expert assessment methods giving inaccurate results. That is why, it is necessary to develop a scientific and methodological apparatus to determine the necessary capabilities of the security and defence sector of Ukraine in order to substantiate the answers to the questions posed, on which the joint combating of selected components and determination of their tasks to establish the IPCMThs will be based.

The generalized scheme of the scientific-methodical apparatus for distribution of tasks and the determination of the SDSU capabilities to form an integrated potential for elimination and neutralization of threats to the national Military Security is shown in Fig. 2.3.

It is suggested that the scientific-methodical apparatus of task substantiation for the agencies of the SDSU if they are jointly involved in eliminating and neutralizing threats to the national military security and in forming an integrated potential for that could be based on the method of de-escalation of threats to the national security [41]. This method allows counteracting both military and hybrid threats, primarily by non-forcible means, using modern information technologies and in the event of their low efficiency to use appropriate law inforcement means.

The main hypothesis underlying this method is that the detected or predicted level of the MThs should be eliminated or neutralized primarily by non-military (political, economic, information-psychological, etc.) methods and means, and in the event of low efficiency – using appropriate military-political, military-technical, special, defence and other instruments, provided that sufficient level of national MS is ensured.

The point of the proposed threat de-escalation method is as follows. The insecurity (threat) to national interests revealed during monitoring [13] is supposed to be eliminated or neutralized by joint efforts of the agencies of the national security system without using forcible methods and means, and in the event of their ineffectiveness, involving the relevant actors for the use of forcible methods and means.

Comprehensive methodology of tasks defining for the agencies of the national security and defence sector (*method of de-escalation*)

Block 1 Assessment of the MPS. Monitoring of risks and threats by *i*-state (*where* $i = 1, I$, I – set of eventual enemies). Assessment of military threat escalation $K_i(t_1)$

Block 2. Forecast of military insecurity escalation level

Block 3. Determination of required "neutralization shift" of military insecurity escalation level by *i*-state

Block 4. Formation of a convolution of a set of neutralization tasks for the subjects of the national security system

Block 5. Decomposition of a range of neutralization tasks for the agencies ensuring the NSS

Methods of justifying requirements for prospective capabilities of the Security and Defence Sector of Ukraineto form an integrated potential to counter the military threats
(*method of meta-approach*)

Block 1. Determining baseline data

Block 2. Defining requirements for potential opportunities

Block 3. Decision-making on the formation of integrated capacity to counter military threats

Methodolody of determining baseline data for integrated potential creation to eliminate and neutralize threats to the national military security

Distribution of opportunities of the SDSU agencies to form an integrated potential to counter military threats

$$Q_k = \begin{vmatrix} Q_1 \\ Q_2 \\ \vdots \\ Q_I \end{vmatrix}^k = \overbrace{\begin{vmatrix} q_{11} & q_{12} & \dots & q_{1J} \\ q_{21} & q_{22} & \dots & q_{2J} \\ \vdots & \vdots & \ddots & \vdots \\ q_{I1} & q_{I2} & \dots & q_{IJ} \end{vmatrix}^k}^{\text{Суб'єкти}} \Bigg\} \text{Можливості}$$

Recommendations on determining required composition of forces and means of the SDSU agencies allocated for ensuring the national security tasks (realization of the potential)

Recommendations on preparing relevant forces and meanst for ensuring the national security tasks (realization of the potential)

Recommendations on planning towards the further development the SDSU agencies to provide the required capabilities for the creation of integrated potential to counter military threats (overcoming capacity constraints)

Fig. 2.3. Recommendations on planning towards the further development the SDSU agencies to provide the required capabilities for the creation of integrated potential to build an integrated capacity for eliminating and neutralizing threats to the military security of the state

The general procedure for the above method of de-escalation of insecuritys (threats) in the field of national security is as follows:

- a revealed increase of military threat by the amount which, according to the forecasting results [41], reduces the expected effectiveness of the implementation of national interests below the threshold (admissible level), analyzes analytical units in detail for destructive influence on the significant spheres of the vital activities of the state;
- when a decision is made to de-escalate the detecteded threat, a strategy (a master plan) of de-escalation is developed first without using forcible means with the possible involvement of the international community capabilities;
- on the basis of the developed strategy, a great deal of measures are generated to eliminate or neutralize the detectedthreat (insecurity) level for each area of relations, where it can initially affect the de-escalation of the detectedthreat (insecurity) level;
- the proposed set of measures is assessed to determine possibilities of realization if the resources for this are allocated;
- if the possibility of realization of the available resources is assessed positively, a management decision regarding the implementation of the developed strategy is taken. Should this not be possible, the method provides for a transition to a de-escalation strategy of the detected threat level drawing on methods and means;
- demand for information and psychological, political, economic and other types of implementing each of the proposed measures is justified;
- there have been strategic and operational-strategic requirements for the set of measures proposed, after which the possibility of their practical implementation is assessed considering the resources that are planned for the security support of national interests. If the assessment is positive, then the developed set of measures is reported to the official decision maker (DM). If it being negative, the proposals are being prepared to adjust the geopolitical and (or) military-political model of the state, after which the procedure for developing a strategy using forcible means is repeated.

The proposed method allows for a scientific substantiation of the tasks for the joint activity of the agencies, ensuring the national security, to eliminate or neutralize the identified escalation of the to national interests at a specified time interval. In this way the distribution of tasks of tasks also enables a distribution of responsibility for their implementation in the system of national security, to form an integrated potential to eliminate and neutralize threats to the national military security, to improve management and expand the possibilities for civilian control, to move on to centralized comprehensive support of realization of national interests, to strengthen the influence of civil society through the institution of

public expertise of management decisions on the effectiveness of the national security system.

This method is a basis of an appropriate comprehensive methodology that has been developed to define tasks for the agencies ensuring the NSS regarding the prevention or neutralization of military threats and formation of an integrated potential for elimination or neutralization of threats to the national military security.

2.5. Analysis of possible directions for guaranteed ensuring a sufficient level of the national military security. Scientific research problem statement

Sufficient level of the national military security is a status of state institutions, defence forces of the country that ensure its reliable abalities for defence, protection from insecurity and threats of a military character, prevention or containment of the armed aggression, and in the event of a direct military threat to the State interests, society and individual, exercising their armed protection.

Considering the external aspect of security, it should be noted that in view of a waged war, the State is fighting to defeat the aggressor, to restore peaceful conditions and its security. In peaceful conditions the activities of the nation and the functioning of its military organization are aimed at preventing war, deterring the aggressor from waging a war, maintaining peaceful conditions for their existence and ensuring the security. To this end, an appropriate mechanism for ensuring military security, which is a system of military security agencies, is developed in the state. The interaction of these agencies enables to identify and predict the insecuritys and threats of a military nature, to develop strategic security directions and to organize coordinated military-political actions for their de-escalation in the interests of security of individual, society and State on the basis of the legal framework.

An analysis of the state of MS in Ukraine, its level of defence capability must take into account the state and conditions of functioning of its MSS which is based on the Armed Forces, the military-industrial complex and the defence management system of the country. Participation of Ukraine in regional and other collective security systems, as well as the number, reliability and capacity of its military allies, and their readiness to provide military assistance in the event of initiating an aggression against it are of great importance.

Under the prevailing circumstances, the MS of Ukraine should be ensured by the combination of available forces and means that are currently integrated into the **security and defence sector** [18]. The latter represents a combination of state authorities, the Armed Forces of Ukraine, Special Communication and Information Protection State Service of Ukraine, the State Special Transport Service, other military formations formed in accordance with the laws of Ukraine, specialized

state law enforcement agency whose activities are aimed at protecting national interests against external and internal threats to the national security of Ukraine under the Constitution and the laws of Ukraine.

In general, the issue of the MS of Ukraine has many political, economic, social, legal, informational psychological and purely military aspects, most of which have to be resolved through the development of the SDSU [18], which has been frustratingly slow. This is because the state lacks both theoretical and material prerequisites. Currently, national defence forces can guarantee the MS of Ukraine if the problems are immediately resolved in the military and foreign policy areas, if necessary resources are found to perform their assigned tasks. Military Security should become a national priority, not only of the Armed Forces of Ukraine. The main limiting factor is the financial and economic capabilities of the state and the resources that the state can allocate for defence needs.

The main strategic direction of ensuring the MS is a concentration of efforts of security and defence sector on a phased and coordinated increase in operational capabilities of the security and defence forces and their level of readiness to respond urgently to the challenges and threats to the national security of Ukraine in the context of limited resources [18]. One of the main outstanding challenges of the security and defence sector is the defence of Ukraine, the protection of state sovereignty, territorial integrity and inviolability. In this context the defence capability of Ukraine should be at a level sufficient to prevent the armed conflict, and in the event of the armed conflict – to localize and neutralize it. It is necessary to review the concept of defence strategically taking into account the experience of the current crisis resolution, the introduction of new techniques of defence management which are based on the Euro-Atlantic experience and meet a single criterion – high efficiency at acceptable costs.

It is also necessary to improve the mechanism of formulating and implementing national policy on MS, to introduce new approaches to military-political, administrative and direct military command of the defence forces. First of all, we need to create an efficient management system of the national SDSU.

Taking into account the priority of peaceful means of conflict resolution, Ukraine will use all possible means to protect its territorial integrity, which do not contradict international law.

To carry out these tasks effectively, the main strategic direction of MS is the joint (integrated) use of military and non-military forces and means of the security and defence sector, which requires deep scientific substantiation, the development of theoretical foundations and scientific and practical recommendations to counteract the threats to the MS of Ukraine in these conditions.

The scientific problem that needs to be addressed in this study is to develop a methodology by which the methods and techniques for the integrated use of military and non-military forces and means of the security and defence sector to

counteract the current threats to the military security of Ukraine (MS) could be justified.

To deal with this problem, a scientific and methodical apparatus for the integrated use of military and non-military forces and means was envisaged to develop on the basis of the analysis of modern threats to the MS of Ukraine . The views of the leading countries of the world on the use of military and non-military forces and means for pursuing the national interests, security capabilities of the SDSU. This apparatus would ensure search and justification of effective ways of an adequate level of the state MS in the current geopolitical and military-political situation, existing and near-term predictable threats and justify appropriate recommendations to the management bodies of the MSS of Ukraine.

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Chapter 3

CONCEPT OF COMPLEX EMPLOYMENT OF MILITARY AND NON-MILITARY FORCES AND MEANS TO ENSURE THE SUFFICIENT LEVEL OF NATIONAL MILITARY SECURITY

3.1. Organizational and methodical bases of the security support to national interests

The policy of national security of Ukraine is based on respect for the norms and principles of international law. Ukraine will defend its fundamental values, as defined by the Constitution and laws of Ukraine, namely: independence, territorial integrity and sovereignty, dignity, democracy, human rights and freedoms, rule of law, prosperity, peace and security [1]. The protection of these values will be provided by the effective Armed Forces of Ukraine, other MF created in accordance with the laws of Ukraine, intelligence, counterintelligence and law enforcement agencies of the state, and the dynamic development of the Ukrainian economy. Minimization of threats to state sovereignty and creation of conditions for restoration of Ukraine's territorial integrity within the internationally recognized state border of Ukraine, guaranteeing the peaceful future of Ukraine as a sovereign and independent, democratic, social and legal state requires a qualitatively new state policy aimed at effective protection of national interests in the economic, social, humanitarian and other spheres, comprehensive reform of the national security system and the creation of an effective security and defence sector of Ukraine [1, 2]. It should be noted that all spheres are interconnected and interdependent. The sphere of security and defence (security interests) acts as a system-building in the system of ensuring the national security.

The basic terminology of national security was defined in the Law of Ukraine “On the Fundamentals of National Security of Ukraine” [4]. Some definitions were specified in the Law of Ukraine “On National Security of Ukraine” [3].

In our view, security interests at this stage prevail over other priorities, because it is on the basis of their implementation that national growth scenarios can be generated. Priorities of security interests are based on the country's strategic objectives for its development in the chosen perspective. The National Security Strategy of Ukraine is the basis for comprehensive planning of public authorities in the field of national security and defence, as well as development of other documents defining the goals, directions and mechanisms of activity of state authorities in the field of ensuring national security. In fact, the National Security Strategy of Ukraine defines the organizational foundations of security support for the implementation of national interests, including in the field of security and defence [1].

Protection of sovereignty, and in the future the restoration of territorial integrity can only be ensured by a strong Ukrainian state, and its accelerated strengthening

will effectively protect the rights and freedoms of citizens, create favorable conditions for the realization of their legitimate interests, enable the modernization of the economy and increase the level and quality of life of the population. That is why the strengthening of security capabilities must be carried out constantly and at different levels of government [2].

The development of the Armed Forces and other MFs should be based on the best achievements of the leading armies of the world, as well as its own combat experience of the last three years. It is necessary to ensure not only comprehensive study of the experience of combat operations in the anti-terrorist operation (ATO), but also comprehend it and take into account new directions and military charters.

The main non-military tools for implementing these tasks should be:

- prudent policy to ensure sufficient defence capabilities;
- the use of security guarantees provided to Ukraine for voluntary renunciation of nuclear weapons;
- mutually beneficial strategic partnership;
- energetic activities in the information space;
- effective cooperation with international organizations and unions on the basis of balance of interests;
- participation in the creation of a new system of collective security in the European space, etc.

The policy of adequate defence requires rapid and decisive action on the development of the security and defence sector of Ukraine[3]. The financing of the Ukrainian security sector per employee is three times less than in the Russian Federation and is much lower than in NATO countries, which should be taken into account during the normative determination of the level of adequate defence.

The Armed Forces of Ukraine are limited to being ready to perform their assigned tasks. Arms and military equipment are morally and physically obsolete. Necessary urgent measures, among which:

- strengthening the role of the National Security and Defence Council of Ukraine as the center of development and implementation of the policy of transformation in this sector;
- creation of appropriate conditions for the effective use of scientific and educational potential in the field of security and defence, incentives for the development of own defence-industrial complex and the “consolidation” of scientific personnel in Ukraine;
- changing approaches to budget policy in the field of national security and defence based on the experience of leading European states.

The Armed Forces of Ukraine must meet modern requirements and be confident in future challenges and threats. A clear program for the preparation of the Joint Rapid Response Force to accomplish assigned tasks should be established. It is necessary to focus efforts, financial, material and other resources on the

development of these forces. The state needs powerful Armed Forces, intelligence and counter-intelligence agencies that can protect society and the country from any external encroachment. We must ensure an adequate level of defence, the possibility of cooperation in this area with the European structures.

Consistent and purposeful application of these measures should significantly increase the potential of the SDSU agencies and strengthen their defence capabilities.

The main directions of the state policy on national security issues were first defined at the legislative level in the Law of Ukraine "On the Fundamentals of National Security of Ukraine". Thus, Article 8 stated: "taking into account the geopolitical and internal environment in Ukraine, the activities of all state bodies should focus on predicting, timely detection, prevention and neutralization of external and internal threats to national security, protection of the sovereignty and territorial integrity of Ukraine, the security of its border area, raising the economy of the country, the provision of personal security, the constitutional rights and freedoms of human and citizen, the eradication of crime, the improvement of the system of state power, strengthening of the law and order, maintaining the social and political stability of society, strengthening Ukraine's positions in the world, maintaining its defence potential and defence capability at a proper level, and radically improving the ecological situation" [5].

Among the main functions of the subjects, ensuring national security, the Article 10 of the Law [5] defines:

- planning and implementing the definite measures to counter and neutralize threats to the national interests of Ukraine;
- continuous monitoring of the impact on national security of processes taking place in the political, social, economic, environmental, scientific and technological, information, military and other spheres, religious environment, interethnic relations;
- forecasting, detecting and assessing possible threats, destabilizing factors and conflicts, causes of their occurrence and consequences of manifestation;
- the developing scientifically substantiated proposals and recommendations for the adoption of management decisions in order to protect the national interests of Ukraine;
- preventing and eliminating the influence of threats and destabilizing factors on national interests;
- assessing the effectiveness of actions to ensure national security and determining the costs for these purposes, etc.

Unfortunately, in practice, the scientific substantiation of proposals and recommendations for the adoption of management decisions is complicated by the imperfection of the necessary scientific and methodological apparatus for this. As a result, in the SDSU, in the course of substantiating numerous management decisions,

a known method of attempts and errors is used. That reduces significantly the effectiveness of public administration in the field of national security. In addition, even those meager resources that are allocated to protect national interests are spent uneconomically.

At the same time, the guidance documents on national security and defence give priority to the use of non-military methods and means of protection of national interests.

The most difficult task today is to justify the necessary military and non-military (hybrid) forces and means for the de-escalation of detectedmilitary threats within the allocated resources.

This indicates the need to develop a specific scientific and methodical apparatus for the security support of the implementation of national interests in the field of security and defence.

An analysis of the available methodological apparatus of this justification shows [6-9] that in Ukraine the basic methods are the method of generating ideas (the method of brainstorming) and the methods of expert assessment (forecasting). Taking into account the specific conditions for the ensuring the MS in Ukraine, its military and non-military capabilities, the methodical basis for security support, can form **a method of the forming an integrated potential for counteraction** the military threats [10]. The essence of this method is the consistent implementation of certain procedures aimed at obtaining the necessary information on military threats and their characteristics, with the subsequent determining the capabilities (the required potential) of the agencies of the SDSU for integrated use in the management of counteraction to these threat. The main hypothesis that forms the basis of this method is that the detected or predicted level of the MS should be eliminated or neutralized primarily by non-military (political, economic, information-psychological and other) methods and means, and in the case of their low efficiency – using military-political, military-technical, special, defence and other methods and means to ensure a sufficient level of MS of the state. This allows us to justify the rational composition of forces and means and their necessary capabilities to de-escalate detected(predicted) threats within the allocated resources of both the state and non-governmental organizations.

Thus, the proposed organizational and methodological foundations of security support for the national interests make it possible to carry out scientific justification of the tasks for the joint activity subjects of national security to eliminate or neutralize the detected threats to national interests at a certain time interval. Above-mentioned steps carried out in this way enables the distribution of tasks and allocate responsibility for their implementation in the national security system, improve governance and expand civilian control, switch to centralized implementation of a comprehensive process to ensure national interests, strengthen the influence of non-governmental organizations to ensure the defence capability of the state.

3.2. Principles, goals, forms and methods of integration military and non-military means of de-escalating tension at different stages of conflict development

One of the tendencies affecting the formation and development of a security environment in the world and around Ukraine is the transfer of weight in military conflicts to the asymmetrical use of military force by armed formations not provided by law, shifting the emphasis in the conduct of military conflicts to the integrated use of military and non-military instruments (economic , political, informational and psychological, etc.), which fundamentally changes the nature of the armed struggle and introduces new requirements for a MSS assuring [4].

The ways of forming national security and defence capabilities defined in the legislative documents [1, 2, 4] determine the joint use of forces and means of the security and defence sector. At the same time, uncertainties remain about the order, principles of integration of forces and means of the SDSU and possible forms and ways of their collaborative use.

The monograph [6] proposes a method for determining strategic tasks for the agencies of the MS system to neutralize military threats in conditions of non-aligned status, but options for integrating the efforts of individual elements of the system in the monograph are not considered. The publication materials [7, 9, 11] also do not provide answers to this question.

Therefore, it is important to propose principles, objectives, possible forms and methods of integrating military and non-military forces and means as tools for countering military threats.

It is known [4] that the security environment in the 21st century, formed by globalization, is qualitatively more complicated and requires readiness to counteract more complex threats to society. The analysis of the main trends in the development of the security environment in the world proves that in the overwhelming majority of them the use of military force is given an important role as an argument in the relations between the countries.

The current reality proves that the threats to the national security of Ukraine in the field of MS [1, 2, 4, 6], that is, the threat of the use of military force against Ukraine, not only exist, but some have turned into real events.

Although these threats have different names (defence threats, military threats, military security threats, threats of military force employment), they all reflect the essence of the appliance of armed violence to achieve the goal. In view of this fact, in the future, we will use the term “ military threats” as a reflection of a broader understanding of the nature of such threats and their direct impact on the military security of the nation. From other threats that, which in their consequences, have the same effect as the use of military means, they are distinguished by a purposeful nature, and not by some coincidence of circumstances with the same effect.

Thus, the character of the military threats considered as purposeful, adaptable to the target state and the specific political situation and combining purely military and civilian components, we think them to be the main feature. It is the focused nature and high dynamics of the transformation of these threats from the category of potential to the real implementation of them require careful preliminary processing at the state level with the development of measures to adequately counter them.

Therefore, we can formulate the main objective of measures to counter the military threats, as a timely detection of the threat and prevention of its transformation from the potential to the real consequences.

It is clear that modern MThs, which are formed not only by purely military factors, but also non-military, require the same comprehensive reaction. In other words, in the broad sense, we are talking about the integration of the efforts of military and non-military forces (the formation of integrated potential [10]) in countering the threats to the country's military security. The implementation of this counteraction lies with the security and defence sector of Ukraine.

Despite the declared need for the integration of efforts (joint engagement) of the components of the SDSU [2, 4, 7, 9, 11], the organization of the integration process (integration technology) is not defined. This indicates the emergence of both scientific and organizational problems. Therefore, in our opinion, the definition of the purpose, forms and methods of integration of military and non-military forces and means of the SDSU for counteraction to military threats can be considered as one of the stages of solving the above-mentioned scientific problem.

The complexity of its solution requires the application of a systematic approach, which by its nature is interdisciplinary, general scientific and aimed at integrating the achievements of social, natural sciences and engineering sciences, as well as practical experience, especially in the field of organization and management.

As it is known, the main objectives of the systems approach are:

- development of conceptual namely, informative and formal means of displaying objects being investigated as systems;
- construction of generalized models of systems, their features, purposeful behavior, development, hierarchical construction, control processes in systems, etc.

A system approach requires consideration of a possible totality of military and non-military forces and means of the SDSU to counteract military threats as a system. The basis of the formation (synthesis) of this system, its integrative qualities is the purposefulness of the system as a system-forming factor. It is the above-stated purpose (goals) of such a system, being an objective criterion for selecting from the environment of all elements and relations that create the system, will determine the necessary composition of the agencies of the SDSU and their functions. Subsequent decomposition and formalization of the goal create opportunities for its correct description.

For this purpose, a more comprehensive formulation of the goal of the integration of military and non-military forces and means is proposed, which

contributes to the synthesis of a system of these measures that would be able to effectively counteract the military nature threats. Essentially, we are talking about the creation of an appropriate system to counteract threats to war. It should be noted that for each threat it will be created its own counteraction system.

Thus, in view of the essence of the MThs, the purpose of integrating military and non-military forces and means to counteract these threats is the organizational combination of forces and means of the agencies of the SDSU that would be able to effectively reduce the effect of factors that create such a threat to acceptable values.

Decomposition of this objective with the use of one of the methods of constructing a system of goals, namely, *the construction of a "tree" objectives (sub-objectives) to counteract the threat of war*, will build relationships between objectives of different levels, divide large goals into stages, provide a clear overall picture of the goals system.

The number of components (sub-objectives) of the main objective and their hierarchical levels will depend on the chosen strategy of counteracting the threat and opportunities involved into counteracting the agencies of the SDSU and their subordinate structural subdivisions. Such "tree" goals bind together long-term and short-term goals, which allows you to see a general strategic picture of countering threats. It is possible to distinguish the following types of goals:

- *strategic* – are formed when determining the long-term process of counteracting threats;
- *tactical – are* formed for solving operational tasks for the agencies of the security and defence sector of Ukraine;
- *trajectory* – determine the general direction in which the object of influence (factor or group of factors, forming the threat) should change.

When forming the "tree" objectives, the following basic requirements are met: the exclusion of unimportant and ineffective measures and measures that are hampered by a lack of resources.

The basic system requirements for the list of sub-targets of the lowest level are classical – their completeness, non-redundancy and measurability. It is the measurability of the goals that allows finding the optimal (rational) distribution of efforts between the agencies of the SDSU and organizing control over the results of their actions at all stages of counteraction to threats.

However, taking into account the specificity of the agencies of the SDSU (different in terms of functions and subordination in the general system of state bodies, the presence of non-governmental organizations), it should be expected that, unlike technical and organizational systems, in the created system to counteract a particular threat by military and non-military forces and means the measurability of goals will be very difficult to ensure.

Thus, taking into account the formation of a "tree"of goals will be decisive for the organization of the process of integration of military and non-military forces and means to counteract threats to war, this issue requires more detailed consideretion.

Considering the above mentioned, it is possible to formulate the basic principles according to which the integration of military and non-military forces and means to counter threats of a military nature should occur:

- *systematic*, which is embedded in the goal of countering threats and implies the appearance of the effect of emergence from the integration of military and non-military forces and means;
- *the adequacy of the threat*, which requires the compliance of the involved agencies of the SDSU, the tasks assigned to them and allocated resources, to the factors that form the threat;
- *optimization of the distribution of efforts between the involved agencies of the SDSU and various kinds of resources;*
- *the scientific nature of the formation of the integrated potential of military and non-military means* [10], which requires a comprehensive analysis of threats and ensure the validity of measures to counter on the basis of complete and reliable information using scientific methods and approaches and modern software;
- *management activities* related to the adoption of organizational and management decisions.

Compliance with the principles of management activities ensures the achievement of the goal of counteracting threats. The main of these principles, which are proposed, are:

- the presence of one management center (body);
- the balance of rights and responsibilities of decision makers in the structure of the SDSU agencies, that is, responsibility must be consistent with their powers;
- the reality of the objectives and terms;
- economical efficiency, that is, taking into account available resources of different kinds and comparing them with a specific purpose;
- flexibility, in accordance with the already obtained intermediate results and the environment;
- concreteness and targeting, determining the performer of the of the event,
- consistency with other decisions to ensure MS;
- completeness of content as a systemic principle, that is, the solution should cover the threat as a whole, the possible directions of its development, the means and resources used to achieve the objectives to counter the threat, the timeline to achieve, the order of interaction between the agencies of the SDSU, at all stages of opposition;
- anticipation of risks and the desire to reduce them to the lowest possible level, which requires risk management, that is, early identification of uncertainties and forecasting their consequences for the activities of the SDSU for developing and implementing solutions to reduce them.

We believe that that the term “integration” can be regerded from several

positions when considering possible forms and ways of integrating military and non-military means to counter threats of a military nature:

- as a goal-oriented unification of some subjects into single whole for joint activities (a purely organizational task).purposeful unification of some subjects into one whole for joint activities (purely organizational task);
- a joint activity of some subjects with a corresponding goal.

Taking into consideration, that the union of subjects to ensure national security formally already exists in the form of the SDSU [2], in the future we will consider precisely the joint activities of the agencies of the SDSU to counter threats of a military nature.

Such activity of the agencies of the SDSU requires determination of the forms and methods inherent in the process of countering the military threats. Considering possible ways of integrating military and non-military means to counter the military threats, it makes sense to take as a basis the understanding of the ways of military (combat) actions, which by their nature can be compared with such activity. That is, by analogy, the order, and methods of using forces and means for solving the problems of countering military threats.

The methods of warfare are characterized by the following main components:

- sequence of defeating of the enemy;
- direction of the main strike;
- place of the main strike;
- troop formation;
- nature of the applied maneuver, and so on.

Considering that the methods of military (combat) action are chosen depending on the adversary, the current situation, available forces and means, etc., the integration methods will accordingly depend on the particular threat, characteristics of which should be included in the so-called “Passport of threat”.

As in the military art, the key factors are:

- capabilities of the forces and means that will be involved in counteraction as part of the integration of efforts;
- qualitative characteristics of personnel. Developments as well as a common strategy to counter the threat, and the development and tasks completing at the level of agencies of the SDSU will rely on them.

To sum up all of the above, one can suggest several basic ways of integrating military and non-military means to counter military threats:

- integration of military and non-military capabilities with the priority given to non-military means with the use of military for support;
- integration of military and non-military capabilities with the priority given to military means with the use of non-military for support.

It is clear that each of these integration methods can have many options for a specific list of the applied forces and means of the agencies of the SDSU and

the degree of their involvement in countering the threat over time.

We believe that a deeper consideration of how to integrate military and non-military capabilities to counter military threats requires particular studying.

As for the forms of integration of military and non-military means to counter threats of a military nature, we consider it expedient to use the military terms “operation” and “campaign”. At the same time, in our case, the essence of the term “operation” practically does not differ from that used in military art “coordinated actions of diverse forces and means united by purpose”.

As for the “campaign”, although this term is almost not used, however, the particulars of the threat as an object of study and the complexity of countering it provide grounds for its use. As noted above, the threat of a military nature is shaped by many factors, whose action is characterized by: dimensions of the problem; usually significant time limits; focus on various government agencies and subjects that affect the state of the nation’s defence and so on.

It is clear that an adequate response to such threats also requires considerable time, attracting to counteraction a large number of the agencies of the SDSU (and not only), financial and material resources and is impossible in the form of an operation that has a more specific, outlined nature. Therefore, in our opinion, the use of the term “campaign” will be sufficiently correct for this reaction to the threat of a military nature, that is, the “campaign” becomes a form of achieving the strategic goal of countering such threats. Then the operation as a form of achieving one of the tactical objectives of counteraction becomes its component, since it is local, specific in purpose or goals, and therefore a limited in time and players form of integration of military and non-military means to counter threats of a military nature. It is then that the counteraction to the threat of a military nature in the form of a campaign will consist in carrying out a set of operations united by a general strategic concept, which corresponds to the classical understanding of that term.

Since the military threats are formed by various factors, the outlined forms and methods for the integration of military and non-military capabilities may have a large number of options and not always be unquestionable.

Consequently, the above principles, objectives, forms and methods of integration of military and non-military forces and means for counteracting military threats can be considered as the further development of the methodology for ensuring MS.

3.3. Conceptual model of integrated potential development to neutralize threats to the national military security

In the conditions of reforming the the security and defence sector of Ukraineit is relevant the rational employment of available forces and means, the integration of which will eliminate the duplication of tasks and the inefficient use of the extremely limited resources allocated in Ukraine to ensure its military security.

The National Security Strategy of Ukraine [1] and the Concept of the development of the Security and defence sector of Ukraine [2] determine the need for joint use of forces and means of the security and defence sector to counteract the threats of the war, which necessitates the development of a conceptual model for the formation of an integrated capacity to counteract the military threats. It would have made it possible to form the necessary potential for countering threats to ensure the level of national military security determined in the legal space of the state and satisfaction accepted resource constraints.

The current state of the SDSU can not provide a guaranteed response to actual threats to the national security of Ukraine [2].

The Concept for the development of the Security and defence sector of Ukraine identified the following priority tasks for the reforming the security and defence sector:

- the integration of operational capabilities of the security and defence sectors to ensure timely and adequate response to crisis situations that threaten national security;
- creation of an effective system of management of the security and defence sector of Ukraineas an integral functional system;
- permanent maintenance of the designated security and defence forces in the readiness to perform assigned tasks;
- improvement of the planning system in the security and defence sector, ensuring the rational use of public resources.

Achieving the necessary capabilities of the security and defence sector to ensuew a determined level of national MS requires the development of an appropriate scientific-methodological basis and scientific-methodological support for this process.It should be noted that in modern conditions precisely because of the lack of systematic research and scientifically grounded practice in solving the problems of MS, the effectiveness of the implemented measures in the field of defence and created for their implementation by state and non-governmental organizations and structures is revealed. At the same time, with the increase of the latter, the effectiveness of their activities (through duplication of certain functions and struggle for “survival”) is reduced. At the same time, the economic and material costs of solving these problems are increasing significantly.

It stipulates carrying out the research using the appropriate methods (models). In order to assess the effectiveness of sharing the potential of the Security and Defence sector agensies for countering military threats, a conceptual model is proposed for creation an integrated capacity to counteract military threats.

The conceptual model of forming the integrated potential for counteracting (CMFIPC) military threats should be created on the following principles:

– *openness of the model*, which enables to increase the model by additional modules, if necessary, use a single database of the security and defence sector and guarantee reliable information protection from various kinds of informational actions;

– *generation of scenarios*, which enables to simulate the likely scenarios for the development of the military-political and geopolitical situation in the region;

– *filtering of the proposed measures*, which enables to justify the variants of integration of forces and means on the basis of certain criteria, priority of the use of non-violent methods of neutralizing threats to the national military security, existing safeguards and restrictions in the security and defence sector of Ukraine;

– *adaptation to the existing military-political situation*, which makes it possible to substantiate measures to ensure the national MS, relevant to the real level, direction, nature and extent of military threats to the state;

– *modularity*, which allows the replacement of certain partial models (modules) with more precise and advanced ones, as well as an increase in the overall model.

In connection with this, the following basic requirements are put forward to the CMFIPC [6, 10]:

- providing an objective assessment of the military-political situation in the region;
- assessing the (sufficient) potential of the forces and means of the security and defence sector to neutralize the detected (predicted) threats;
- forming various options for integrating the SDSU forces and and means, which meet the requirements for neutralization of threats, taking into account the existing restrictions in the system of ensuring military security of the state;
- forming of a priority number of ways of integration of forces and means by the size of their integrated potential;
- applying of logical and mathematical procedures for choosing a rational variant of the integration of forces and means that would provide support for a sufficient level of military security and comply with existing restrictions in the system of military security of the state;
- substantiation of a sufficient level of MS of the state to neutralize the considered military threats, if necessary, to determine the necessary financial and material resources;
- substantiation of recommendations for the adaptation of the military-political model of the state, its foreign, military-economic, and military-technical policy to the real MPS in the region for a specific time span and for the future.

The conceptual model of forming the integrated potential for counteracting military threats, based on the methodology of systems analysis, methods of operations research, analysis of hierarchies, probability theory and forecasting, expert evaluation and modeling, can use higher military-political leadership of the

state in situational control centers during the planning and conduct purposeful policy to provide the necessary level of the national military security, as well as in educational, scientific and research institutions during the crisis studying and ways out of them.

The CMFIPC generalized structural scheme of the the conceptual model of creation the integrated potential for counteraction is shown in Fig. 3.1.

A variant of the description of the model in relation to its purpose, requirements, tasks to be solved, input information, as well as basic output data for some of the most important modules of the conceptual model is proposed.

The adaptation is carried out at the expense of multichannel feedback, which determines the real possibilities of the existing variants of integration of forces and means to neutralize the detected (predicted) threats to ensure a sufficient standardized level of national MS [5].

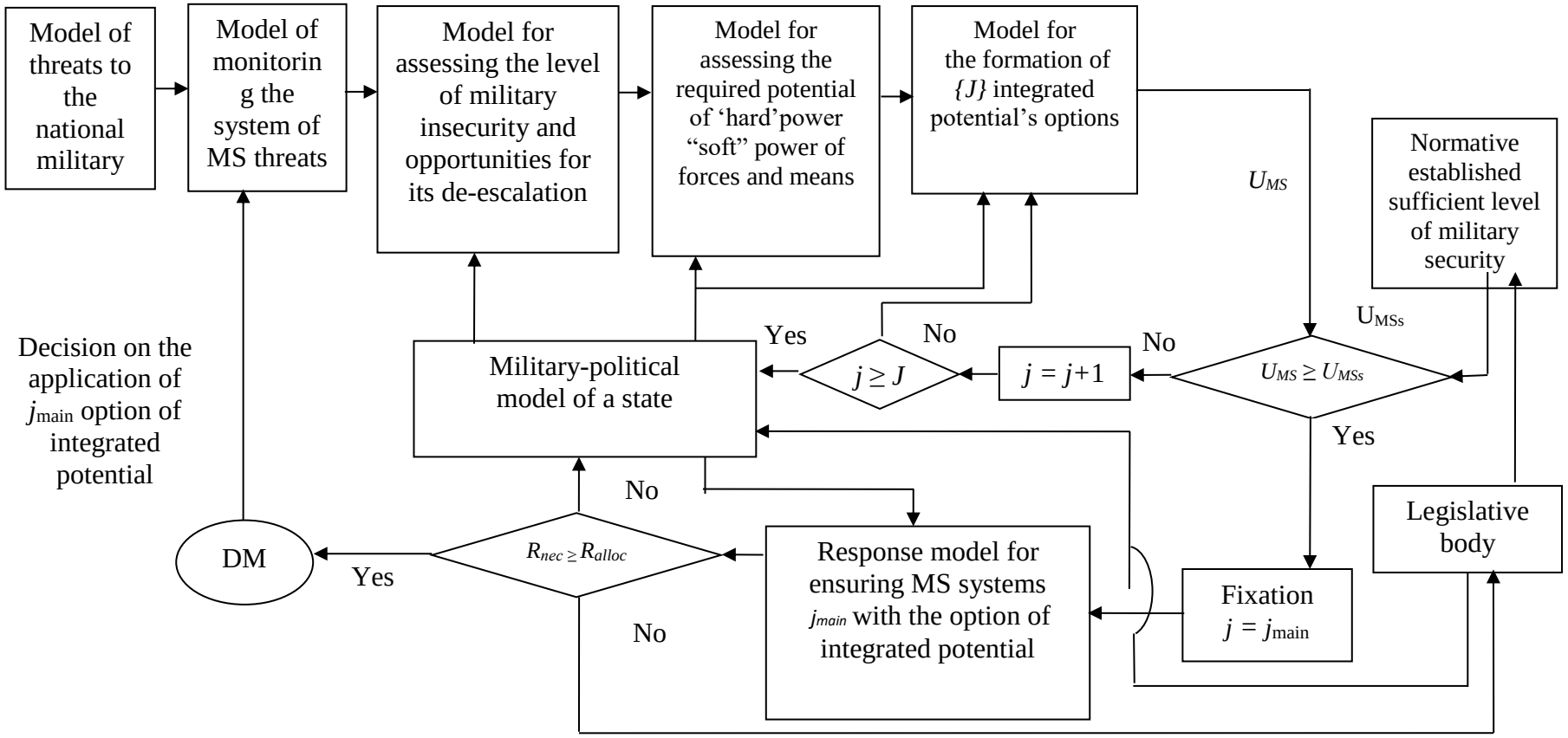

Fig. 3.1. Generalized scheme of conceptual model of creating an integrated potential for countering military threats

The conceptual model of creation the integrated potential for countering military threats allows carying out as a direct task on calculation of the real possibilities of the state for the provision of military security, as well as the reverse task, which provides the calculation of the necessary integrated capacity of forces and means to provide the normatively established level of the state MS [12] .

Consider the general description of the main modules of the CMFIPC.

Military-political model of the state. The basic data for the development of the national military-political model (MPM) are:

- Declaration on the State Sovereignty of Ukraine;
- Constitution of Ukraine;
- Military doctrine of Ukraine;
- National Security Strategy of Ukraine;
- Laws of Ukraine “On National Security of Ukraine”, “On the Principles of Internal and Foreign Policy”, “On the Defence of Ukraine”.
- other legislative acts on the functioning of the state and the defence of Ukraine.

Input data for the military-political model are:

- national interests of the state in the military sphere;
- scale, direction, nature of the possible use of military force, as well as possible strategic partners, allies (obvious and hidden), their possible respond to aggression against Ukraine (the state will pursue a policy of non-interference, an outside observer, support Ukraine, support the aggressor, etc.);
- possible levels of assistance or support from neighboring countries (blocking of approach to troops, refusal to provide airspace for flights of airborne attacks, readiness for acceptance and temporary deployment of refugees and provision of humanitarian assistance, readiness and ability to act as mediator in conflict resolution, etc.);
- the scale of the support of the aggressor (the provision of corridors for airborne attack and reconnaissance, the provision of airdromes, ports, territories for the deployment of bases, troops, etc.).

Model of threats to the national military security. This model is a database that has been detected at different times and predictable military threats, each of which is described by the characteristics of a typical passport of threats [6]. Under the *military threat*, we will consider a threat whose implementation is accompanied by the use of methods, forces and modern means of contact and non-contact wars or other influences that cause the same consequences (destruction, injury and death of people, violation of standard modes of functioning and life support of the agencies of the security and defence sector , defence industry and important infrastructure of the state).

Model of the monitoring system of threats to the national military security.

This model describes a state-established threat detection process that the MS system needs to respond effectively. The procedure is described in the monograph in details [6]. The peculiarities of this monitoring system are the formation of a priority number of detectedthreats, to neutralize which there are sufficient resources in the state, and to assess the effectiveness of the implementation of the chosen model of integrating forces and means to counteract the investigated threat.

Model for assessing the level of military in-security and opportunities for its de-escalation. The model makes it possible to quantify, within the limits of 0 to 1, the level of military insecurity by the set of detected threats (insecurities) both for a certain time interval and for the selected perspective. The model is based on an improved hierarchy analysis method, described in detail in the monograph [5]. The peculiarity of this model is that it enables us to conceptually assess the security and defence capabilities of de-escalating the identified level of military insecurity, and to identify the forces and means that are appropriate for integrating to form an integrated potential to counter detectedthreats.

Model for assessing the required capacity of military ("hard"power) and non-military ("soft"power) forces and means. The model makes it possible to determine the necessary capabilities of the military security system to neutralize the identified (predicted) level of military danger. By solving the inverse problem with the help of a model it is possible to determine the necessary forces and means (the required potential) that would ensure the formation of the necessary capabilities. These capabilities, in turn, depend on many factors, of which the military-political model of the state stands out.

Model for forming the set of integrated potential options. Since the required capabilities can be obtained by various variants of the combination of forces and means of the security and defence sector at the disposal of the state, then the model allows not only to form several variants (J), but also to rank them according to certain indicators, for example, on the effectiveness of the de-escalation of the detected level of military insecurity, duration of holding, number of involved people, etc. The choice of a combination of forces and means is the formation of an integrated potential for counteracting military threats by providing a sufficient level of MS by the resources whicht (R_{nec}) do not exceed the allocated (R_{alloc}). The option that best satisfies this criterion is taken as the main one (j_{main}), which, by decision of the DM, is being further implemented into the military (national) security system, and the effectiveness of its implementation is monitored by a threat monitoring system.

In case of impossibility to ensure de-escalation of threats on the chosen criterion, the model allows carrying out the procedures of adjustment of the national MPM, the normatively determined sufficient level of MS (U_{MSs}) and its subsequent comparison with real level that can be provide d by the military security system (U_{MS}) with a defined set of "hard"power and "soft"power forces and means, and the search for new opportunities to counter detected (predicted) threats.

Thus, the proposed conceptual model of creating the integrated potential for

counteracting military threats provides an opportunity not only to substantiate the rational composition of forces and means for de-escalation of detected (predicted) threats, to evaluate real possibilities for neutralization of specific military threats in accordance with the adopted national strategies to ensure the MS , but also to assess the effectiveness of the individual components of the forces and means of the security and defence sector, which are integrated to de-escalate the threats to the state. The considered conceptual descriptions of partial models contain doctrinal positions that should be used during the formation of technical tasks for the development of partial computer programs, that are in contact with the software of the Main Situation Awareness Center of Ukraine.

3.4. Methodological approaches to the creation of expert-valued scenarios and tasks to the forces of the security and defence sector on neutralizing threats to the military security of the state

An important requirement for reforming the Security and defence sector of Ukraineis the rational use of available forces and means, the integration of which eliminates duplication of tasks and unprofitable use of the extremely limited resources allocated in Ukraine to ensure its military security.

Practical implementation of this specified requires, in addition to the development of the methodical apparatus for designing (defining) the neutralization measures of military and non-military components involved in the common neutralization of threats to the national military security, as well as the development of ways for the joint use of of “hard”power and “soft”power agencies of the SDSU, improvement of methodological apparatus for determining tasks for these subjects and assessing the effectiveness of their implementation.

Basic guidelines in the field of provision of national and MS [1-4] orient the agencies of the security and defence sector of Ukrainefor the primary use of the “soft”power structures and non-military measures to eliminate or neutralize threats of military nature, but do not include methods, methodologies and practical recommendations on principles and order of integration of “soft” power agencies, defining their tasks, necessary capabilities and forms of application.

Consequently, it is necessary to develop a cognitive approach to defining the tasks of the integrated potential of counteracting military threats in order to neutralize the detected(predicted) threats in the system of ensuring the national MS.

In armed conflicts at the beginning of the twenty-first century. there is an established tendency for the complex use of military (“hard” power) and non-military (“soft” power, hybrid) means, which fundamentally changes the nature of the confrontation of the conflicting parties. Thus, one of the peculiarities of the armed conflict in the East of Ukraine is, that it can not be settled without force and requires significant resources and the involvement of “soft”power agencies of

security and defence sector of Ukraine.

Ukraine's military security in the conditions of resource constraints is proposed to provide by integrating the capabilities of the agencies of the SDSU in order to timely and efficiently respond to existing and potential threats, which in turn requires the development of ways to create an integrated potential for countering threats, comprehensive support and management of its practical implementation based on the use of non-military methods and means, and if necessary to use “hard” power support.

The most difficult task at present, is to justify the necessary military and non-military (hybrid) forces and means and determine their tasks for the guaranteed within the allocated resources of detected military threats de-escalation.

An analysis of the available methodological apparatus of such justification shows that the basic methods in Ukraine are the trial and error method, the method of generating ideas (the method of brainstorming) and the methods of expert estimation (forecasting), which do not allow to solve this problem with a sufficient accuracy for practice.

The paper [10] proposes a method of managing the integrated potential of counteracting military threats, by which one can justify the rational composition of forces and means and their necessary capabilities for de-escalation to an acceptable level of detected (predicted) threats within the resources allocated by the state and non-governmental organizations. However, the practical application of this method requires a detailed elaboration of its individual stages and procedures.

The integrated potential of countering threats is the formed rational composition of forces and means of the SDSU and their determined capabilities that are planned to be realized with the sole intention to de-escalate to an acceptable level of detected (predicted) military threats within the resources allocated by the state and non-governmental organizations.

Under the *creation of the integrated potential for counteraction to the military threats*, it is proposed to understand the iteration process of forming the rational composition of forces and means of the SDSU and determine their necessary capabilities to create the necessary “neutralization shift”$\Delta K_{NSh}(T_{pr})$. The process of forming a hypothetical necessary “neutralization shift” to neutralize the detected level of military insecurity (threat) by entities belonging to the political, economic, informational and military spheres, using the Ishicawa method [13] is shown in Fig. 3.2. To reduce the calculation of the designation in Fig. 3.2 discussed on the example of the information sphere. For other areas of calculations are similar, only the indexes of names of spheres are changing.

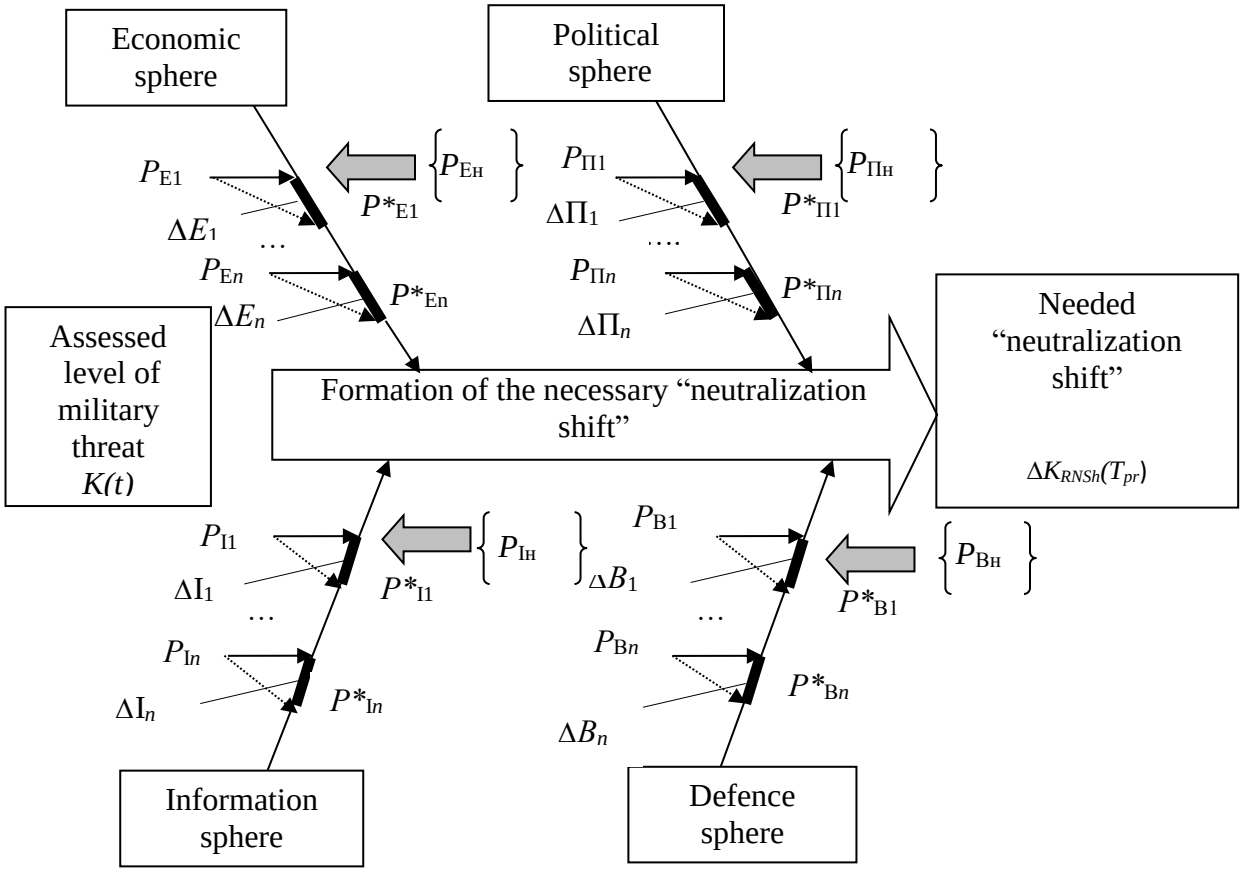

Fig. 3.2. An example of formation of a hypothetical desired "neutralization shift" to neutralize the revealed military threat using the Ishikawa method

For information sphere:
– $P_{I1}\ldots P_{In}$ – indicators of the threat and their "weight" in the information sphere;
– $P^*_{I1}\ldots P^*_{In}$ – indicators of the threat and their permissible residual "weight" after the implementation of the required level of "neutralization shift";
– $\Delta I_1\ldots\Delta I_n$ – the minimum allowable reduction in the "weight" (priorities) of the Saati scale threats [13] after the implementation of the desired level of "neutralization shift";
– $\{P_{In}\}$ – the set of tasks of the subject of the informational sphere regarding the neutralization of the indicators of threats.

Defined set of tasks to the subjects that formed the integrated potential of counteraction are necessary for the minimum allowable capacities of these subjects and are considered as their partial operational tasks.

Traditionally, a task is considered to be fulfilled if a sufficient number of executors with the capabilities that ensured its implementation were determined, the resources involved did not exceed the allocations, and the losses did not exceed the permissible.

Since the proposed method of forming the integrated potential of counteraction is the highest level of system use of the the SDSU agencies in order to neutralize the threat in the system of ensuring military security the target function of the

“neutralization shift” should be oriented towards achieving the synergetic effect as a result of the use of a complex system [15, 16].

For the practical implementation of this requirement, different from the traditional cognitive approach to the preparation and execution of particular operational tasks is offered. It is based on the theory and techniques of expert systems [17], expert-valueted provisional scenarios (EVPS) [18], and analytical hierarchy process [14] and etc.

The cognitive approach involves the formation of eight EVPS, which are understood by the experts in relation to independent stages of task definition (Fig. 3.3), without which it is impossible to develop an operational task. We will briefly describe the partial tasks that are being solved on each of the specified EVPS.

Scenario No.1 – making the decision to neutralize the *z* threat, identified during monitoring, the level of which exceeded the response threshold by the MS system. The response threshold should be determined in the national legal framework. For each state which is considered as an eventual opponent, its threshold of response is determined by law, which is entered into the corresponding database of the expert system.

Scenario No. 2 – the choice of subjects for the formation of the integrated potential of counteraction. It is carried out through the method of brainstorming by experts in the field of national and military security using databases of the relevant expert system (ES).

The option of forming the integrated potential of agencies representing different spheres of national security is similar to that shown in Fig. 3.2. It is recommended to select the subjects concerned with the areas in which the most significant signs of the revealed MS appeared. In that case, the passports of threats can be used [6].

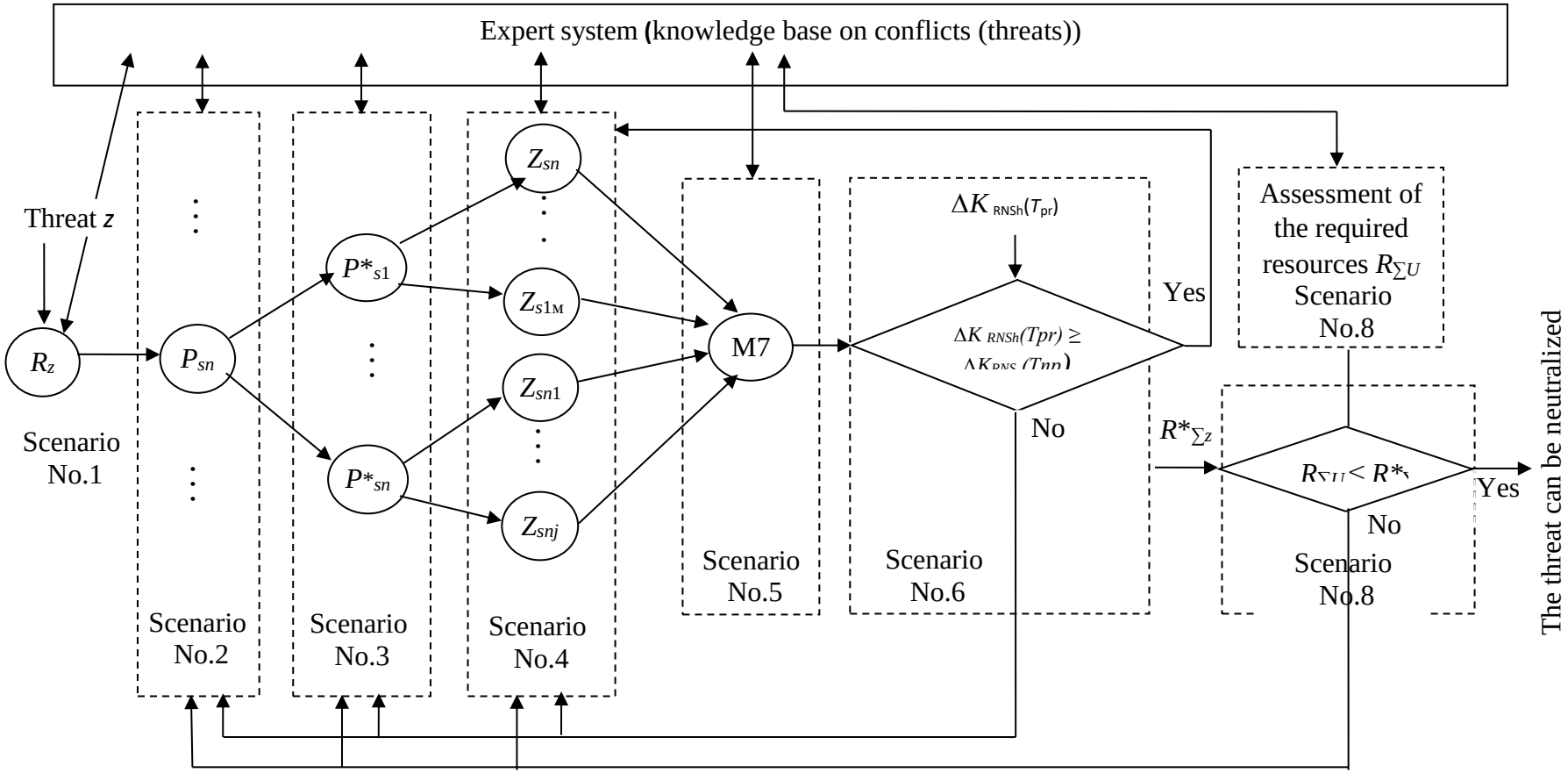

Fig. 3.3. Sequence of task determining components of the integrated potential of de-escalation of military threats using the expert-valued provisional scenarios method

Scenario No. 3 – assessment of the required "neutralization shift" $\Delta K_{rNSh}(T_{pr})$. The required "neutralization shift" is estimated using the ES knowledge base on threats (if it is established) and computer technology M7 [15, 17] in an iterative way by reducing in "weights" (priorities) threats on the scale of Saati until it reaches the condition

$$\Delta K_{rNSh}(T_{pr}) = K_d \Delta K(t_1), \tag{3.1}$$

where K_d – de-escalation coefficient (acquires fixed values: in the case of using "soft"power means $K_d = 1{,}1$; in the case of using "hard" power means $K_d = 1{,}2$ [14]);

$\Delta K(t_1)$ – change in the level of military insecurity as the difference between the current level of military insecurity (threats) $\Delta K(t_1)$ on the time t_1 and the threshold K_{thd} (defined in the national legal framework).

Scenario No. 4 – defining the neutralization tasks for each *s*-subject, forming the integrated potential of counteraction and their weight indicators ($P^*_{S1} \ldots P^*_{Sn}$). It can be implemented using the ES knowledge base on threats, advanced hierarchy analysis, expert assessment and M7 computer technology. Practice shows that achievement of the necessary "weight" of P^*_S indicator can be provided by a certain set of individual tasks (measures) implemented in the s-sphere. The more such measures are implemented, the faster the desired result is achieved, but at the same time (and not always proportional) resources for their conduct are increasing, which could be blocked in scenario No. 8.

A set of such measures for each *s*-sphere experts in the same field should form the brainstorming method using the ES knowledge base on threats. In addition, experts should be prepared to assess the resource requirements for the implementation of the proposed measures.

Scenario No. 5 – assessing the level of current (predicted) "neutralization shift" $\Delta K_{prNSh}(T_{pr})$. [19].

The scenario No. 4 specified in the set of tasks (measures) for each sphere (the third level of the three-level hierarchical model) is introduced into the computer technology M7 and using it to calculate the current (predicted) "neutralization shift" $\Delta K_{prNSh}(T_{pr})$. At the same time, the "weight" (priority) of each sphere can be specified, which will be considered during reallocation of resources if necessary.

Improvement of prediction accuracy can be achieved by using the ES, by specifying factors and conditions that will have the greatest impact on the dynamics of the level of the threat under consideration.

Scenario No. 6 – verifying the adequacy of the current obtained (predicted) "neutralization shift"

$$\Delta K_{cNSh(Tpr)}(T_{pr}) \geq \Delta K_{prNSh}(T_{pr}). \tag{3.2}$$

If condition (2.2) is carried out, then for each *s*-sphere in Scenario No. 4, the corresponding sets of tasks$\{Z_S\}$ and their "weight" (priorities) are fixed. If the above condition is not fulfilled, using the ES a new iteration of the choice of subjects in Scenario No. 2 is selected, or a new option for lowering the "weight" (priorities) of the Saati scale threats in Scenario No. 3 is chosen, or a new version of the set of neutralization tasks in Scenario No. 4 (see Fig. 3.3).

*Scenario No 7*taking into account the accumulated experience and relevant methodological material that is included in the relevant ES knowledge base, they evaluate the required resources $R_{\sum z}$ to fulfill the Scenario No. 4 set for the task set by all subjects to neutralize the detectedthreat *z*.

Scenario No 8 – verification of the required resources R∑z in the Scenario No. 7 to meet allocated resources $R^*_{\sum z}$.

If the condition $R_{\sum z} \leq R^*_{\sum z}$ is not carried out, then a new iteration is performed either in Scenario No. 4, or in Scenario No. 3 or in Scenario No.2 (see Fig. 3.3).

Якщо умова $R_{\sum z} \leq R^*_{\sum z}$ is fulfilled, then the DM is given to approve the draft management decision to neutralize the detectedthreat by the specified composition of subjects with substantiated tasks for each actor.

The practical implementation of the described expert-critical scenarios requires specific management in the security and defence sector, as well as appropriate information, analytical and resource support. To implement this method it is expedient to use information resources, technologies and involve analysts (experts) of the Main Situation Awareness Center [2].

The proposed cognitive approach for defining the tasks of military and non-military components involved in the joint neutralization of military threats by integrating their capabilities under conditions of resource constraints enables them to adapt to the level and nature of threats and thereby rationally use existing military and non-military (hybrid) means for ensuring its MS.

3.5. Basic foundations for assessment of the effectiveness of ensuring a sufficient level of the military security of the state

The Military Doctrine of Ukraine [4] has defined one of the main trends in the formation and development of the security environment in the world as the transfer of gravity in military conflicts to the asymmetrical use of military force by armed formations without a legal provision, shifting the emphasis in the conduct of military conflicts to the comprehensive use of military and non-military instruments (economic, political, informational psychological, etc.). All those mentioned above fundamentally changes the nature of war fighting.

Taking into account those circumstances, Ukraine is strategically reviewing the concept of defence, considering the experience of overcoming the current crisis, introducing new methods of defence management. The methods are based on the

Euro-Atlantic experience upon the following criterion - high efficiency at acceptable costs. At the same time, the provision is made for creating an effective mechanism for the formation and implementation of the state policy on the issues of ensuring the MS, implementing the military-political, administrative and direct military command of the defence forces. The primary task is to create an effective system of management of the security sector and state defence.

The formation of national defence capabilities involves improving the interaction and coordination of government bodies and agencies of the security and defence sector, taking into account the peculiarities of modern war fighting, in which not only conventional military forces and means but also various non-military means are widely used.

The main requirements for the ensuring the of MS are to guarantee the reliable protection of the nation from external and internal threats, to prevent the emergence of an armed conflict. In case of the armed conflict outbreaking, the military security system must provide its localization and neutralization.

Proceeding from the principles of domestic and foreign policy and the nature of the current threats to national security, the main objectives of Ukraine's military policy in the nearest future and in the midterm as well have been determined as follows: to create a holistic national security and defence sector as the main element of the MS system, to integrate the capabilities of its components for timely and effective response to existing and potential threats, to provide increasing capabilities of the defence forces necessary to achieve the objectives of the military policy considering the existing state capacities and resources.

The updated defence concept implies the introduction of new methods of defence guidance [4], based on the Euro-Atlantic experience.

Acceptable expenditures are considered mainly by the developed democratic countries, where civil society acts as the main socio-political force that determines the internal and external policies of these countries, including the military sphere, and exercises public control over the authorities. Civil society defines human life, their rights and safety as the main value. Civil society does not accept a military solution of foreign policy issues if the hostilities involve significant losses of their citizens. However, this provision only is applied to the situations that do not threaten the existence of these states. In the case of aggression against them, the attitude towards the losses of their troops will be completely different, and without a doubt the states will sacrifice in order to preserve their sovereignty and independence.

Since the current geopolitical situation is such that the developed countries and their unions dominate in economical, political and military spheres, there is no direct military threat to them [9]. Although there is a real threat of terrorism [7], fighting which the West can sacrifice to a certain extend. To employ the military force in

situations that do not threaten the existence of the state, is becoming more difficult during the formation of civil society.

Thus, for the developed democratic countries, the civilization factor is gaining the increasing importance in the military sphere and is determining the level of acceptable manpower losses when solving foreign-policy problems by military means.

The experience of military conflicts of different scales in the last decade indicates that the level of acceptable losses is counted in tens, if not ones, of human lives and is becoming one of the most important factors of the prohibition of the use of military force [20]. The Euro-Atlantic experience suggests that, when planning the emplementation of military force, the expected losses of personnel have the status of a resource limitation of $M_{\text{e.m/p}\,z}$ 0,5…1,0%. Taking into account the above-mentioned, the expected effectiveness of complex employment of military and and non-military forces and means $E_{\text{c.e.}z}$ to neutralize the detectedthreat *z*, provided that a sufficient level of the national MS U_{MS} is ensured in case of reasonable expenditures of resources G_{az} and acceptable personnel losses $M_{e.m/p.z}$, can be determined by the formula

$$\mathrm{E}_{c.e.z} = \frac{K_{NTh}(\mathrm{T}_{pr})}{K_{NThr}(\mathrm{T}_{pr})G_{az}};$$

$$G_{az} = \frac{G_{cz}}{G_{cnz}}; \tag{3.3}$$

$$\mathrm{M}e.\frac{m}{p}.z \leq (0{,}5\ldots1) \text{ where } U_{MS} \geq U_{MSs}, \tag{3.4}$$

where $K_{NTh}(T_{pr})$ – “neutralization shift” formed by the integrated composition of “hard” power and “soft” power forces and means regarding the threat *z*;

$K_{NThr}(T_{pr})$ – “neutralization shift” required to neutralize the threat *z* to an acceptable level;

G_{cz} –cost of resources planned (allocated) to neutralize the threat *z* by the formed (integrated) composition of “hard” power and “soft” power forces and means;;

G_{cnz} – estimated amount of expenditures claimed to neutralize the threat *z* by the formed (integrated) composition of “hard” power and “soft” power forces and means;

$M_{\text{в.о/cz}}$ – acceptable personnel losses planned to be used to provide the necessary “neutralization shift” regarding the threat *z*;

U_{MSs} – level of MS, which is ensured during the employment of the selected version of “hard” power and “soft” power forces and means of the “neutralization shift” $K_{NThz}(T_{\text{pr}})$ regarding the threat *z*;

$_{UMSs}$ – ltheLaw established sufficient level of the national MS of the state.

If it is planned to neutralize two or more threats at the same time, the overall level of these threats and the required general “neutralization shift” for their neutralizing are calculated. The other calculations remain unchanged.

It should be noted that in case of impossibility to provide the conditions (3.3) and (3.4), the DM takes on the political and legal responsibility for achieving the final result in neutralizing the *z* threat.

3.6. Methodology of construction, employment and adaptation of the national military-political model to the military threats

Political processes, that take place in the world, are characterized by high dynamism and a wide range of applications of different ways and means, which are realized by the states to meet their national interests, in international relations. The formation of a multipolar world is one of the most difficult of these processes. An urgent ongoing problem is the task of balancing the multi-polar system, especially in its modern transitional version. The geopolitical position of Ukraine at this stage is determined by the fact that it is located between the equilibrators of the system in Europe (the European Union and the Russian Federation).

Against the background of growing threats and increasing instability in the world, new challenges to international security are encountered in the raw materials, energy, financial, information, environmental and technological spheres. Such threats as proliferation of weapons of mass destruction, international terrorism, transnational organized crime, illegal migration, piracy, escalation of interstate and civil conflicts, which, in their negative consequences, may have a potential for global influence, are being activated and gaining irresistible proportions. The tendency to use military force and force pressure in international relations is increasing.

Unfavorable geopolitical influences on Ukraine in the conditions of low effectiveness of its national security system, present at the border groups and military bases of the enlarged NATO bloc, “frozen” conflicts, as well as the critical external dependence of the national economy, cause Ukraine's vulnerability, and weaken its role in international affairs.

The transitional nature of the modern world system requires from Ukraine an active and, at the same time, balanced behavior in international relations, aimed at fairly equal cooperation in neutralizing and blocking the tendencies that could put it in a difficult position in the future. These tasks should be solved by policies, in particular military ones.

The experience of the leading countries of the world shows [22-24] that the existence, self-preservation and progressive development of a sovereign state are impossible without the formation and operating a purposeful policy to protect its national interests. With this object in mind, the system of providing national security

is created in the state. As a rule, the following specific functions are assigned to the system:

- forecasting, detection and asssment of possible threats and their levels, the analysis of destabilizing factors and conflicts, causes of their occurrence, as well as the evaluation of their consequences;
- forming the organizational structures of the system, state authorities and ensuring the national security, justifying the functions and requirements to the efficiency of their activities;
- preventing and eliminating the influence of the revealed threats and destabilizing factors on the realization of their national interests;
- localizing, de-escalating and resolving the crisis situations and conflicts;
- eliminating the consequences of conflicts or negative influence of destabilizing factors, etc.

The scientific analysis of world processes and tasks regarding the implementation of certain tasks is being complicated by the lack of sufficient and accurate information, the imperfection of the scientific and methodical apparatus for modeling these processes, and the inability to predict the precise scenarios for the development of the geopolitical situation in certain regions.

One of the most important components of the national security system is the MS system. The basic principles of its creation and functioning are determined by the military policy, which in turn acts as an integral part of the policy of the state national security.

The main task of the military policy is to prevent a full-scale military clash and to provide a sufficient level of military security of the state. This is the rational element of military policy as a science, and for the state it is the ability to function normally and realize their national interests [21].

The essence of military policy is revealed through its foundations, principles of development and implementation, military-political views, military-political relations, objects and subjects of military policy, goals and means of their achievement, military-political activity.

Military policy affects all spheres of public life, as if it accumulates all other activities related to the creation and use of military force. In this regard, military-technical, military-social, military-economic, military-spiritual and other policies are defined.

Taking into account the experience of the leading countries in shaping the military policy, its main content is the desire to strengthen its MS [22, 23], which should include:

- formation and implementation of a unified state policy in the MS sphere;
- maintenance of the internal political stability;
- protection of the constitutional order, integrity and inviolability of the country;

- development and strengthening of friendly relations with neighboring and other states;
- establishment and maintenance of the natioal defence system at the required level;
- qualitative improvement of the Armed Forces of Ukraine, other military formations of the security and defence sector, ensuring their readiness for the direct employment;
- protection of important entities in various spheres, etc.

In order to make the right decisions in the system of providing national (military) security, it is most appropriate to use such methods of systematic research [21] that would not require complex mathematical calculations and would be comprehensible to a wide range of specialists. The methods of complex systems analysis, simulation and game theory are the most developed for the mean time.

Practice shows that the main differences in the results of the analysis arise mainly because of the hypothesis accepted by the researchers. The hypothesis suggests the importance of the identified aspects and their view of the role of performed calculations (conservatism or optimism).

Public administration in the military sphere is carried out by the authorized entities of state power, the main of which are [4]: the President of Ukraine who is the Supreme Commander-in-Chief of the Armed Forces of Ukraine, the Verkhovna Rada of Ukraine, the Cabinet of Ministers of Ukraine, ministries and other central bodies of executive power according to their activity profile.

In accordance with the principles of democratic civil control, political parties, public organizations, MM and citizens of Ukraine take part in public processes connected with the formation of the military policy (the definition of the basics, priorities, main directions of development and functioning of the Armed Forces of Ukraine); the general, political and legal culture of the militaries, civil servants and citizens; supervision on the implementation of the defence policy.

The activities of the state administration bodies on the issues of forming and conducting military policy and the leadership of the Armed Forces are carried out in accordance with the legislation of Ukraine covering all areas of national activity in the sphere of military construction, security and defence. Based on the principles of internal and foreign policy activities, public administration bodies form the legal framework for security and defence policy, regulate the activities of the Armed Forces and other MFs, and create conditions for the development of defence industry.

The state administration bodies provide the legal and regulatory framework for the social protection of servicemen and their families, the participation of the Armed Forces in international peacekeeping activities, cooperation with other states, ensuring law and order in the Armed Forces, and their employment in the accomplishment of internal objectives.

The main *principles of state administration in the military sphere* are the following:

- rule of law;
- combination of sole command and collective leadership;
- centralization of administration;
- responsiveness to the changes in the military-political situation and the promptness in a decision-making process;
- continuity;
- separation of powers and the interaction of the administrating authorities;
- transparency of democratic-civilian control;
- personal responsibility of the authorities and commanders for the decisions made.

The changes that take place in the international environment in the security sector can have a significant impact on solving the problematic issues of military-political relations, the most urgent of which are the following:

- interference in internal affairs with the use of informational influences, political and economic pressure (for example, the International Monetary Fund), moral and financial support of the internal opposition political forces, non-governmental organizations for destabilizing the internal political situation, discrediting the state power and political leadership in the minds of society and the international community;
- incomplete legalization of the state border of Ukraine, that may contribute to the emergence of disputes in economic activity in the border areas;
- existence of unresolved military-political conflicts and the possibility of new armed conflicts near the borders of Ukraine;
- separatism, generated by dissatisfaction with the cultural and other needs of national minorities and low living standards of the population;
- problems of energy security, the use of economic competitive advantages for achieving political goals, caused by high level of monopolization in the sphere of consumption, extraction and transportation of energy resources, and by the considerable potential of political and economic influence of large transnational corporations.

The effectiveness of state administration in the military sphere is largely determined by the state of implementation of advanced achievements in the military science, which has been developing very slowly in recent years.

The experience of practical use of scientific developments in the military-political sphere indicates the need for an integrated approach to research in favor of improving the effectiveness of functioning of the system related to ensuring the national (military) security of the state. Thus, it reveals broader opportunities for studying the dynamics of the interaction of political, economic, informational, military and other factors. Solving this complex problem in accordance with the

methodology of system analysis [21] should begin with the development of the state MPM.

The **military-political model of the state**, is proposed to understand as the formalized reflection of the implementation of a targeted policy to provide its MS [38]. It characterizes the state's ability to counteract the emergence of a war, and in case of its occurrence is able to minimize the amount of damage and devastating consequences for the national security (figure. 3.4).

In order to ensure a sufficient level of MS, it is necessary to maintain the military potential at a level sufficient for the defence in case of a crisis situation in the immediate vicinity of the state border. The sufficient level of MS can be achieved both with the whole complex of structural components namely purely military, political-diplomatic, economic, ideological, and other, and the purposeful and coordinated efforts of the state institutions.

Military component includes the state defence forces created to ensure MS based on military force.

Military component implies the presence of such quantitative and qualitative indicators:

- strength of the Armed Forces with control systems and other MF of the security and defence sector;
- training of troops and forces which determines their combat readiness and operational capability;
- technical equipmwnt status of the Armed Forces and other military formations and LEA with military vehicles, ammunition, military-technical property, etc.;
- availability of AME that is allocated in armories, on bases and in warehouses;
- ensuring the training of troops (forces), strategic and operational deployment and conduct of combat actions.

Political and diplomatic components of MS is provided by [23]:

- high potential of the system of collective (international) security;
- guaranteed implementation of international treaties and agreements involving Ukraine;
- high efficiency of the strategic partnership institute in which Ukraine participates;
- effectiveness of the regime of international arms control, the non-proliferation of weapons of mass destruction and their means of delivery;
- perfection of the mechanism for the use of warranties and indemnities granted to Ukraine for the nuclear disarmament.

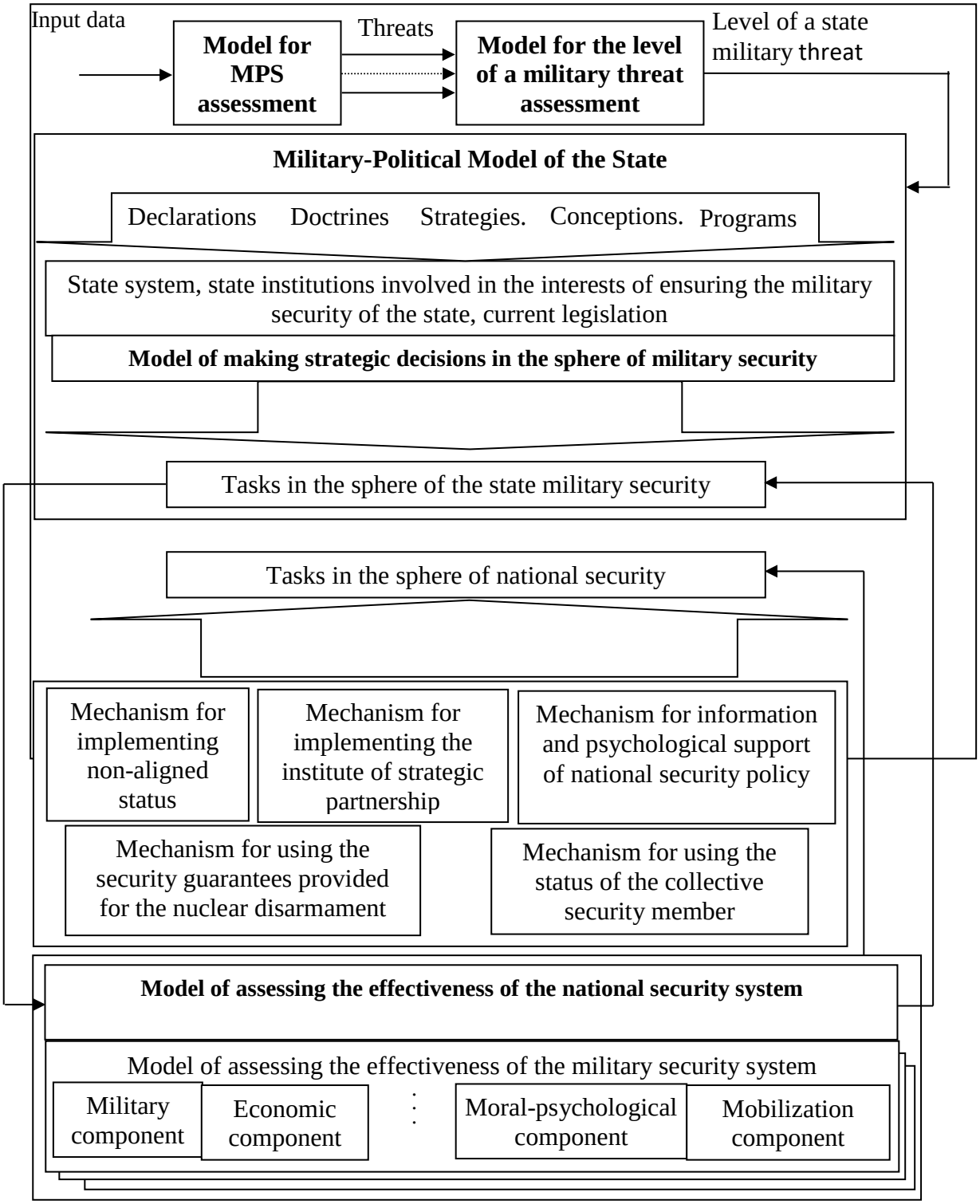

Fig. 3.4. The place of the state military-political model in the general model of formation the state policy of the national security

Economic component includes [24]:

- material and financial capabilities that ensure the country's defence capability;

- quantitative and qualitative characteristics of the Armed Forces and other MF of the MS ensuring system;
- the defence-industrial complex that provides the Armed Forces and other MF with all necessary stuff, creates a mobilization reserve of AME;
- scientific and technical potential, which makes it possible to create new samples of armament and military equipment;
- mobilization capabilities of the industry (in case of need supplying the Armed Forces and other MF with the required number of AME).

Moral-psychological component, which is closely related to the military one, includes:

- spiritual capabilities of the the country's population, which are determined by the level of moral and psychological readiness for the armed defence of the nation;
- social position of servicemen, which is a set of their rights and responsibilities, their social status, prestige in society and the state;
- moral and psychological state of the main categories of personnel in the Armed Forces and other MF.

Application of the military-political model enables:

- to determine the possibilities, expediency and limits of the use of military force to ensure an adequate level of MS;
- to assess the qualitative and quantitative characteristics of the necessary and sufficient military force, to determine the ways and means of its employment;
- to substantiate the judicious mix of “hard”power and “soft”power forces and means for ensuring military security and recommendations on the use of security guarantees given to Ukraine for the nuclear disarmament;
- to investigate different variants of the structure of the defence forces, its capacity and capabilities for preventing, eliminating and neutralizing military threats.

Military-political model should act as a reliable “tool” in addressing the following priority tasks:

- substantiation of requirements for creation mobilizable resources and the degree of the state power readiness, economy, transport, and communications for solving the problems of military security provision;
- determination of tasks and priority directions of the military-economic ensuring the MS, the development of military infrastructure to support the readiness of the Armed Forces, other military formations and law enforcement agencies of the state in peacetime and to guarantee the fulfillment of tasks during a threatening period;
- substantiation of the tasks of the Armed Forces, other MF and law enforcement agencies to counter force pressure and repulse any armed aggression

against Ukraine;

- studying the protection level of vital interests of a person, society and the state from military threats in the general system of the state national security providing;
- substantiation of the required level of the state defence that would correspond to a certain level of a military danger (threat) and the tendencies in the development of a MPS in the region;
- synthesis of the rational structure and evaluation of the effectiveness of ensuring the state MS system;
- substantiation of the complex measures aimed at increasing the efficiency of the national security system ensuring in the defence sphere;
- substantiation of the requirements to the agencies of the SDSU and other state structures that function aiming at ensuring the state MS system;
- the substantiation of the recommendations for attracting efforts of regional and universal security systems in the region, the choice of directions of military-political partnership and possible allies in case of repulsion of armed aggression, etc.

While solving these and other problems, it is proposed to reject the MPM of the state for a specific task [23], which means completing the structure of the model, the amount of initial and target data, definition of current legislation and other adopted state acts related to the task. Carrying out resection of MPM gives the chance to form system of restrictions and constants. Examples of such constraints and constants can be:

- the conditions of compliance with international agreements;
- the presence or absence of nuclear weapons;
- limitation of the number of personnel and main types of armaments of the Armed Forces and other MF of the SDSU, the nature of the Military Doctrine, the approved or non-approved strategy for the preventive (preemptive) strike, the procedure of making decisions on the Armed Forces emplementation and mobilization, the size of the approved defence budget, etc.

Those and other restrictions determine the basic characteristics of ensuring the state MS system:

- number of structures and levels of management hierarchy involved in process of making relevant decisions;
- legal regulatory framework that is a basis for making strategic decisions;
- minimum time and organizational resources necessary for preparation and decision-making, as well as measures to ensure the military security at different levels of the state control system;
- types of documents that are develop by each structure, at each level of the hierarchy and the time standards for their development, coordination, approval and delivering to executive bodies;

- types, scope and procedure for monitoring the implementation of the made decisions within the national MS system;
- set of indicators for assessing the effectiveness of ensuring the national MS system and its components, etc.

The specified basic characteristics of providing the national MS system are the basis for substantiating the specific requirements for the agencies of the SDSU and other structures involved in ensuring the national MS system . At the same time, the following main options for practical implementing of national MPM (solving a direct and inverse problems) are possible:

1. *Direct task* (Fig. 3.5) - The enemy and the level of his military threat are determined at the state level. The state's abilities to resist possible armed aggression are being evaluated. At the same time the state's provided defence capability is being predicted. Possible human, economic and environmental losses, financial and material costs are being assessed. A plan to repulse possible aggression is being developed.

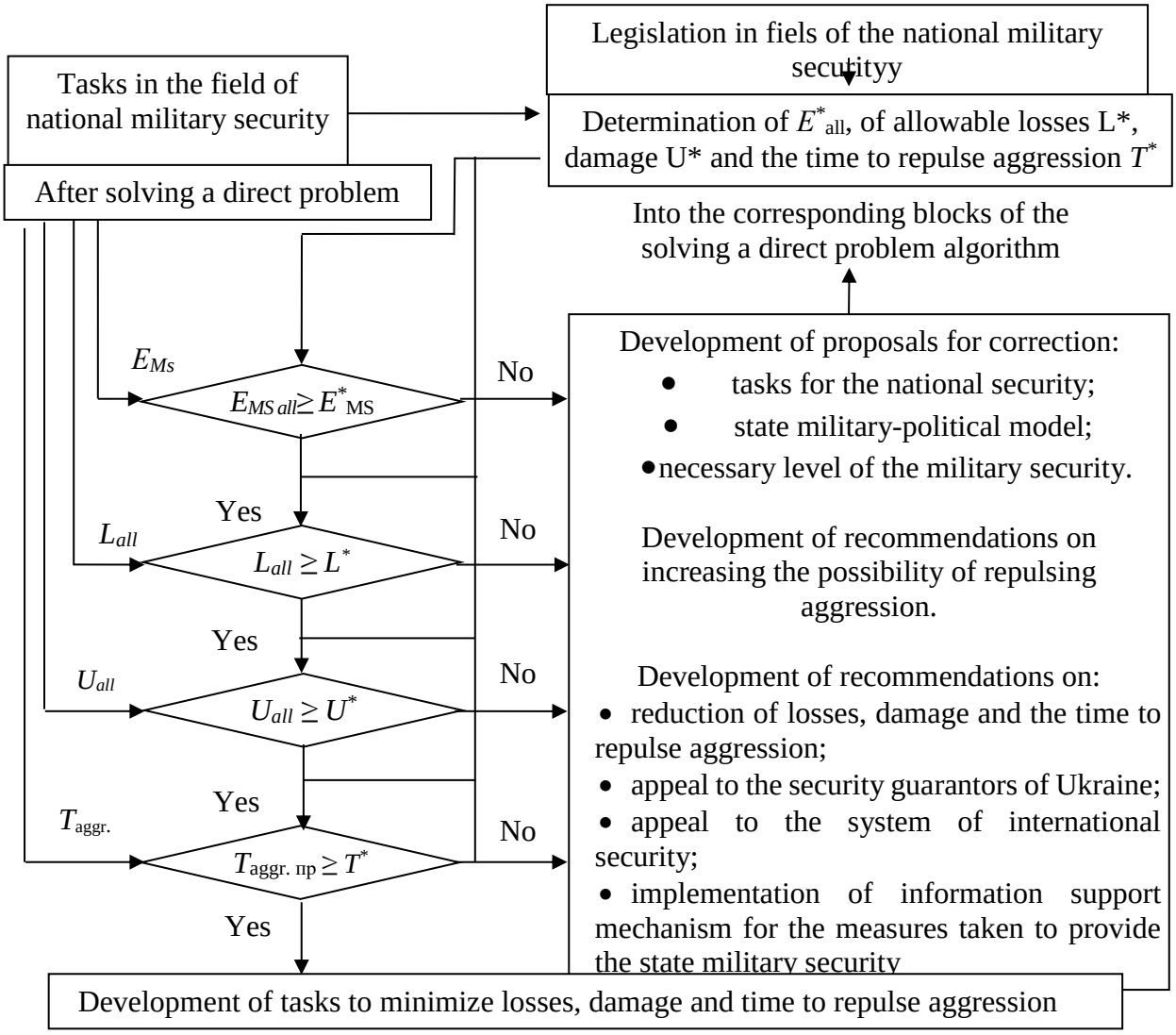

Fig. 3.5. Solution algorithm for the direct problem

2. *Inverse task* (Fig. 3.6) - The algorithm for solving this problem is similar to the solution algorithm for the direct problem, but additionally check the compliance of the predicted level of MS E_{MSpr} with the given legally approved level of E_{MSrec}, and the compliance of the anticipated losses L_{an} and the damage U_{an} with the acceptable losses of L^* and the allowable damage U^*.

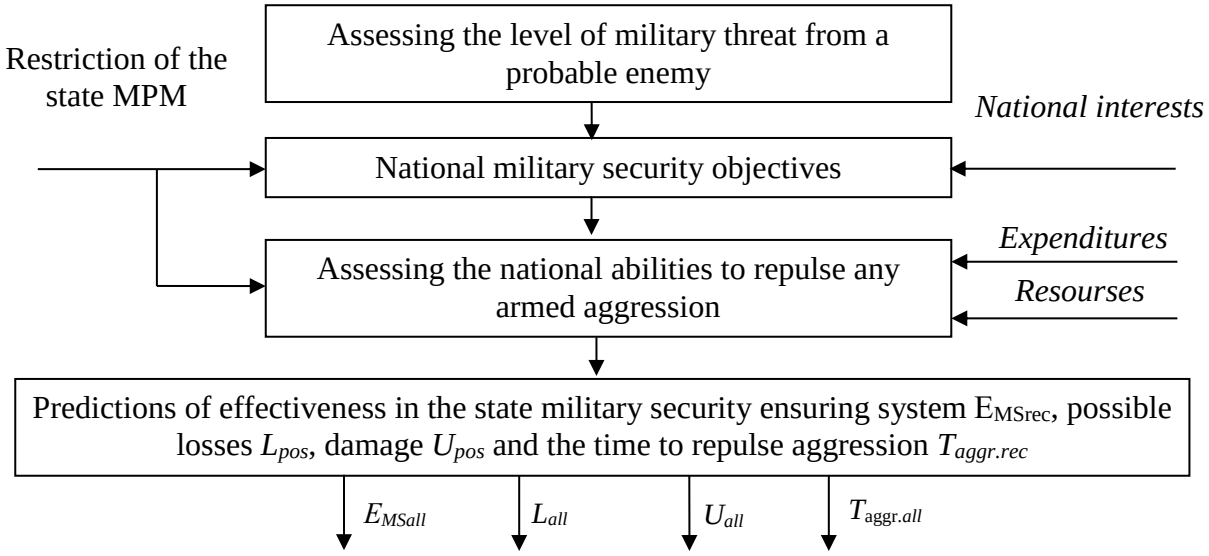

Fig. 3.6. Solution algorithm for the inverse problem

In the case of fulfillment of these requirements, it is possible to take measures to minimize anticipated losses and damage.

In the case of non-fulfillment of the specified conditions, the recommendations for adjusting tasks in the sphere of national security, or the national MPM, or the necessary level of its MS are prepared. In addition, the recommendations to increase the capabilities to repulse aggression with the simultaneous reduction of losses, damage and allocated for the repulse time are made.

When carrying out the national security policy, the following priorities should be given to:

a) *mechanism that provides* [5, 25]:

- priority of participation in the improvement and development of the European collective security system, further constructive partnership with the North Atlantic Treaty Organization and other military-political blocks on all issues of mutual interest;
- participation in international peacekeeping and anti-terrorist activities, multilateral measures to counter global and regional challenges and threats, taking into account the interests of Ukraine;
- defence-political, military and military-technical cooperation with all states on mutually beneficial conditions;
- participation in security programs of the OSCE, CIS, CSTO, BSEC,and other international organizations;
- maintaining the international image of Ukraine as a contributor to security.

b) *mechanism for implementing the institute of strategic partnership,* which means the existence of fundamentally important strategic goals for partner countries, the achievement of which within the framework of normal cooperation is impossible [26], but possible only by bringing the relationship to the level of strategic partnership. Such goals may be to provide the economic complex with vital

resources (energy, commodity, financial) and joint solutions to security problems (combating organized crime, illegal migration, arms and drug smuggling, aggressive separatism, terrorism).

Similar views and approaches to key issues of international politics, global and regional development will contribute to the achievement of these goals. Strategic partnership involves the in-depth development of interstate contacts, usually not in one but in several important areas.

Mechanism of strategic partnership is created on the following *principles* [26]:

- mutual interest of partners in the long fruitful cooperation, mutual recognition of the strategic nature of relations;
- willingness to take into account the interests of the other party, compromise to achieve strategic goals, even if such actions are ambiguous in terms of their own benefit;
- mutual rejection of discriminatory (and, ultimately, ultimatum) actions against each other;
- legal consolidation of the content and mechanisms of strategic partnership in bilateral documents, discipline, consistency and predictability, unconditional fulfillment of partners' obligations.

c) *mechanism for using the security assurances* provided for the nuclear disarmament. Such mechanism is a matter for the future. At the time of the signing the Budapest Memorandum, it was expected that the received security assurances would become an appropriate substitute for nuclear weapons, but this did not happen [27]. The form of security assurances was not chosen in the best legal format [28]. The Budapest Memorandum was signed only by the Russian Federation, the United States and the United Kingdom, while France and the PRC confirmed those assurances in the form of unilateral statements without signing the Memorandum. The requirement of the Law of Ukraine “On Ukraine’s Accession to the Treaty on the Non-proliferation of Nuclear Weapons” dated 01.07.1968 (No. 168/94- BP dated 16.10.1994) was not fulfilled. This Law clearly stipulates that the mandatory condition for coming into effect of the Law is “… the nuclear states are providing Ukraine with security assurances, issued by signing the relevant international legal document”.

In the current situation, the only “achievement” of this document in practical terms is Article 6, which provides the possibility of advisory assistance on the fulfillment of obligations by the guarantor countries. In order to make this mechanism work, in the nearest future, Ukraine needs to focus on the legal consolidation of the security assurances of the Budapest Memorandum [28];

d) *mechanism of informational and psychological support* of the national security policy, which envisages, in particular, the prompt world public provision of objective and accurate information about Ukraine's position on major international issues, foreign policy initiatives and measures to counteract the use of military force or force pressure against the nation, and, if a conflict starts, the activation of actions

in the international information space to clarify the unjust regarding Ukraine nature of the military conflict, the recognition and condemnation of the act of armed aggression, and clarifying Ukraine's political positions and actions to resolve the armed conflict;

e) *mechanism for using the status of a member of the collective security system* means that, as a member of the United Nations and a member of the Organization for Security and Cooperation in Europe, Ukraine should as far as possible use its capabilities and constructively cooperate in the use of the full range of opportunities of the UN and the OSCE to prevent conflicts and the use of military force or power politics against Ukraine.

Consequently, the proposed MPM of the state provides an opportunity to reflect and explore the processes of formation and implementation of a targeted policy of providing the state MS within the conditions of modern threats in a formalized form.

The proposed method of rejection of the MPM of the state under the specific task of the study enables to form the system of associated with it constraints and constants. This provides a possibility to determine the main characteristics of the ensuring the state MS e, to justify the specific requirements to the elements of the defence forces and other structures that are involved in the ensuring the state MS.

3.7. Scientific and methodological apparatus for assessing and forecasting the level of military insecurity and the rationale for its de-escalation

Due to limited financial and material resources, measures that are developed in the interests of ensuring the MS should correspond to the nature and extent of the MS to the state. The scientific substantiation of strategic decisions in the field of military security and the determination of priority directions for the formation of military policy should be carried out from the position of a system approach with their contribution to the overall effectiveness of the national security system ensuring [29].

To model and study these processes, the MPM of the state is used as a separate module of an integrated system research model of the state's MS problems [30]. Information support for the functioning of the MPM is carried out with the help of a block of models, among which the models for assessing the geopolitical and military-political situation and the level of military threat (insecurity) to the state deserve the most attention.

Methods of assessing the military-political situation in the region and forecasting its possible development on the basis of expert-significant intermediate stages. The creation of a system for ensuring the national MS is aimed primarily at preventing the use of military force against it or the resolution of armed conflicts with its participation. It is obvious that the effectiveness of the functioning of this system will be determined by methodological support, taking into account

factors that directly affect the MS of the state. One of these factors is the military-political (military-strategic) situation in the region and its possible development in the future. The basis of its assessment is information about the state of relations with the states of the region in the political, economic, military, religious, historical, territorial, ethnic, ideological and other spheres [31].

The quality of the assessment of the state of the military-political, military-strategic situation and the depth of its forecasting directly influences the effectiveness of military construction and the ensuring MS of the state, providing, first of all, proper directions of development of the Armed Forces of Ukraine during the formation of the military and military-technical policy of the state. This concerns the justification of modern methods of conducting military (combat) actions, the development of promising AME samples, and directions for increasing combat readiness and combat capability of the Armed Forces of Ukraine.

In general, the state and trends in the development of the MPS are determined by the complex influence of stabilizing and destabilizing factors. Therefore, the purpose of the MPS evaluation methodology is to develop such an order of using different methods of analysis, which would allow to base the proposals on the provision of MS of the state on the basis of the integrated influence of stabilizing and destabilizing factors.

During the development of the methodology, it was taken into account that proper assessment of the MPS is possible only on the basis of a comprehensive consideration of causal relationships, separating from all their dominant varieties. The main thing in the assessment of the MPS was the determination of the level (degree) of the threat of a war resolution, for which the following parameters were defined:

- block policy;
- intelligence and diplomacy activity;
- level of arms sales to neighboring countries;
- direction of socio-political campaigns;
- level of current military expenditures and the tendency to increase them;
- the degree of militarization of the economy;
- level of elaboration of plans for preparation for war;
- readiness of offensive strategic forces, groups of troops (forces) and their degree of combat readiness, etc.

It is accepted that in assessing the situation in a particular state, first of all, it is necessary to determine its political and military-strategic place in the world and the region, and then to find out at what stage of development is the state, what events in the long term can change the MPS as the state, and around it.

The system of interethnic relations and the level of political stability are analyzed and its influence on the formation of military policy is predicted. In the general sense, during the assessment of the military-political situation in the state,

an analysis of its military power, foreign policy, strategic partners, compliance with the foreign policy course, the system of relations with other states, the presence of contradictions between them, and willingness to solve them by the armed way is conducted.

During the MPS assessment, special attention is paid to military-economic opportunities, while the economy is considered in such aspects:

- basis for the formation of military policy;
- basis for the creation of modern weapons;
- object of influence from the side of the probable aggressor.

It is important to determine the level of militarization of the economy, its knowledge and technological capacity, the ability to serial production of modern means of armed struggle, the degree of dependence on economic relations with other states, the strengths and weaknesses in the deployment of productive forces, etc.

The methodology involves assessing the scientific potential of the state. For this purpose, the costs of research and development work (R & D), the state and level of development of fundamental sciences and their capabilities in meeting the needs of the Armed Forces of Ukraine, the use of significant scientific discoveries in the military affairs are analyzed.

We propose a methodology for using by the highest military-political leadership of the state with the involvement of the necessary analysts and experts.

The proposed methodology for assessing the MPS in a region that has fourteen main stages is shown in Fig. 3.7.

Input information for the assessment of the MPS in the region is information on the state of relations, especially with neighboring states, in the political, economic, military, religious, historical, territorial, ethnic, ideological and other spheres.

At *the first stage*, the definition of a plurality of states is carried out $\{I\}$ (their coalitions, blocks), which, in principle, can potentially constitute a military threat (threat).

At *the second stage*, the *i-th* state from the set $\{I\}$, in relation to which analyze the interests and develop alternative scenarios of their achievement, are determined. Possible losses or benefits of the state in case of realization of these interests by the *i-th* state are assessed. The information obtained becomes the source for the next third stage.

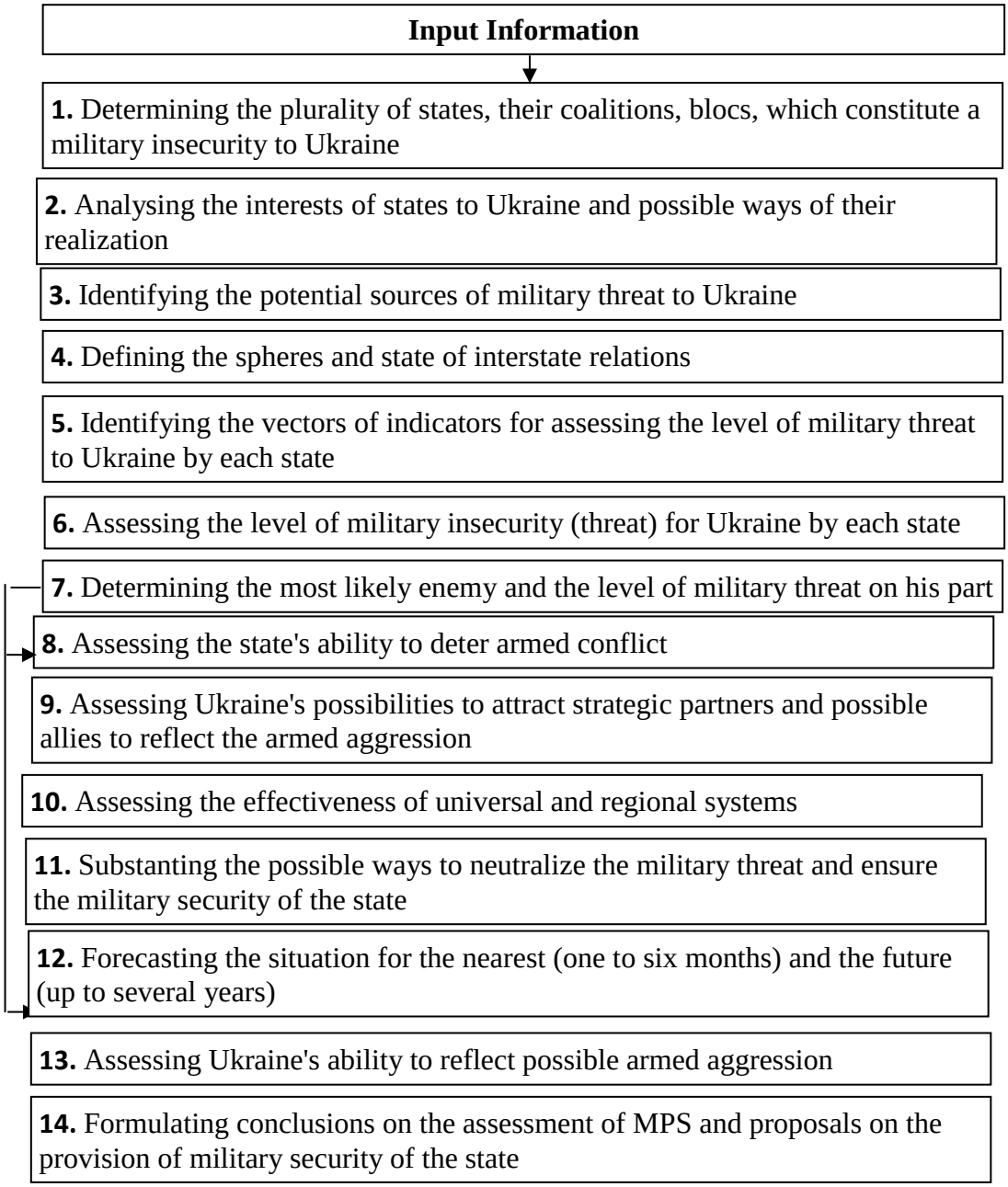

Fig. 3.7. Structure of the methodology for assessing the military-political situation in the region

At *the third stage*, a priority number of potential sources of military threat are determined, with the estimation of the scale of damage for each of them.

The fourth stage provides for the definition and analysis of the state of mutual relations with each state from the set *{I}* (coalition, block) taking into account the features of a possible theater of military operations. For analysis, political, economic, military, religious, historical, territorial and ethnic spheres of mutual relations are usually taken.

In each sphere, *S* analyzes the nature of contradictions and evaluates the possibility of solving them using military force methods.

Information technology of such evaluation, developed at this time, allows for the simultaneous consideration of nine spheres of relations *(S = 9)* [23]. If at first the number of spheres exceeds nine, they are united on the principle of closest proximity.

The fifth stage analyzes the relationships with each *i-th* state ($i \in I$) (coalition, bloc) in each sphere and generates a vector of indicators for assessing the level of military insecurity (threat) $\{U(t_1)\}$ at time t_1 with the assessment of their tendency changes (deteriorate, improve, remain at the same level).

The number of indicators for each sphere of relationship should also be no more than nine. In case of such an excess it is necessary to unite them or to build a multilevel hierarchy, taking into account their interdependence.

At *the sixth stage*, assessing the level of military insecurity (threat) from the *i-th* state (coalition, block) ($i = 1, I$) is conducted. For this purpose, information obtained in the previous stages is used, which is processed by a separate method of defining the enemy and assessing the level of military insecurity [31].

A comprehensive indicator of the level of military insecurity $Ki(t_1)$ was chosen as a criterion for assessing the level of military insecurity on the part of the *i-th* state, and is determined by the formula.

$$K_i(t_1) = F\{(U_{s1i}(t_1), U_{s2i}(t_1), \dots U_{sSi}(t_1))\}, \qquad (3.5)$$

where $(U_{s1i}(t_1), U_{s2i}(t_1), \dots U_{sSi}(t_1)) = U_i(t_1)$ – vector of indicators for each of the S spheres of interrelations describing the state of relations with the *i-th* state (coalition, bloc), whose influence may lead to the resolution of armed aggression on the part of this state (coalition, bloc);

S – the number of spheres of relations with the *i-th* state (coalition, bloc) selected for analysis.

At *the seventh stage,* the level of confrontation of the *i-th* state is determined by the method of comparing the values of the complex indicator of the level of military insecurity $K_i(t_1)$ obtained in the sixth stage, with the limit levels corresponding to the different state of relations (see formula (3.5)).

Thus, with $K_i(t_1) \leq P_{1i}$ (where P_{1i} – a threshold for cooperaton with the *i-th* state) the *i-th* state can be seen as an eventual opponent.

When $P_{1i} < K_i(t_1) < P_{ri}$ (where P_{ri} – a threshold of aggravating the relations with the *i-th* state) the *i-th* state can be seen as a possible opponent.

When $P_{ri} < K_i(t_1) < P_{2i}$ (where P_{2i} – a threshold of aggression from the *i-th* state) *i-th* state can be considered a probable opponent.

At $K_i(t_1) \geq P_{2i}$ *i-th* state in the event of launching an aggression becomes a real opponent.

Taking into account the tendency of changing the complex indicator of the level of military insecurity $K_i(t_1)$ with the help of the known method of forecasting the

escalation of the conflict [33] estimate the forecast time of the most probable beginning of aggression by the *i-th* state:

$$T_{aggr}(P_{2i}) = \underset{t}{aggr}\{K_i(t) = P_{2i}\}. \quad (3.6)$$

At *the eighth stage*, the state's ability to deter armed conflict from the *i-th* state (coalition, bloc) is being evaluated, Atthey are developing recommendations for a complex of measures in priority areas, first of all in the military. The requirement for a list of measures is to provide the task of the aggressor to unacceptable damage to him and to disrupt the implementation of the goals. Such measures may include building up military capabilities, bringing the armed forces to an increased level of combat readiness, redeploying troops, removing AME from prolonged storage, etc.

The ninth stage examines the state's ability to engage strategic partners to reflect possible aggression, explore opportunities and conditions for the creation of military-political alliances or a coalition of states to repulse aggression.

The tenth stage develops possible scenarios for using the capabilities of universal and regional collective security systems to prevent armed conflict; assesses states that can act as intermediaries in conflict resolution; studies the prospects, opportunities and scale of UN peacekeeping forces to resolve the conflict.

At *the eleventh stage,* a complex of possible measures and ways to neutralize the military threat in all spheres are formed; they are considered with an assessment of the costs of resources and the consequences of each of them. Proposals for the content of tasks are prepared, their communication to the subjects of the state security system, deadlines, information support, interaction and other issues of ensuring the national MS.

At *the twelfth stage* (according to the results of the fifth to seventh stages), they forecast the development of the situation for the nearest (one to six months) and long-term perspective (up to several years depending on the likely opponent and the level of military threat on his part). To do this, you need to involve analysts or use the model of forecasting the escalation of the conflict, which is considered at the seventh stage of the methodology.

Analysts are involved in forecasting by using the method of possible development of the situation on the basis of expert-significant intermediate stages. [23].

Since the processes of enhancing the defence capabilities and preparing the state for the protection of their national interests are rather inertial in time, there is a need for a timely prediction of the dynamics of a potential military threat. The timeliness is manifested in the sense of the prediction horizon, in which the defence industry and the SDSU would have had enough time to respond appropriately to changes in the the MPS. That is why it is important to predict the dynamics of changes in the MPS and scenarios for the development of conflict situations in the early stages of their inception.

Under the **forecast of the MPS dynamics**, we understand a certain set of scenarios of possible actions of parties or changes in its state due to the complex influence of different conditions, factors or forces.

Forecasting the dynamics of the the MPS requires complete and reliable information on its current state, intentions of the states, conditions and efficiency of the process of realization of national interests. At the same time, the availability of information that greatly affects the accuracy of the results obtained becomes the main feature of forecasting.

That forecasting method is based on the *methodology of scenario analysis of socio-economic systems* [32].

The essence of the method is to create a baseline scenario of the the MPS dynamics (hereinafter – scenario), which is considered as a consistent choice of EVPS in the process of implementing national interests or the system of ensuring the national security of the state without which this process or system can not achieve the goal, on which forecasting is carried out. In this case, the definition of what preceded the process before the start of forecasting, becomes of fundamental importance.

In the future, for each of the selected expert-valued provisional scenario (EVPS):

- form the plurality of key players, forces, factors, etc., which, according to experts, will affect the deviation of the forecast scenario from the base;
- capture a set of facts that describe or relate to the forecast scenario, create possible micro-scenario and evaluate the extent of their deviation from the baseline scenario using multidimensional analysis technology, for example, the *Hierarchy Analysis Method (HAM).* At the same time, they analyze the restrictions (political, social, economic, etc.).

Application of the HAM is explained by the incompleteness of the information on which the forecasting is carried out, its qualitative character, unknown by the subsequent dynamics of changes as a result of the complex influence of factors of different nature.

Application of the HAM is carried out in several steps.

The *first step* involves the construction of a three-tier hierarchy for each *i-th* EVPS ($i = 1, I$, where $I < 9$) (Fig. 3.8).

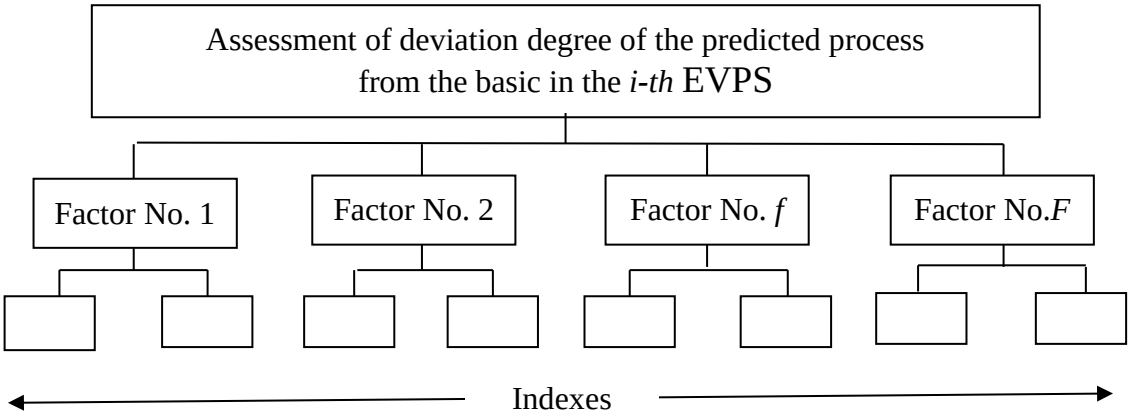

Fig. 3.8. Hierarchy of formation of the task of assessing the deviation degree of the predicted process from the basic in the the *i-th* EVPS

At the first level of the *i-th* hierarchy formulate the goal – the evaluation of the degree of deviation of the forecast process (system) from the basic in the *i-th* EVPS.

At the second level of the *i-th* hierarchy group factors (objects, subjects, forces, etc.), which affect the *i-th* expert-significant process. It is desirable that the number of factors does not exceed nine ($F \leq 9$).

At the third level of the *i-th* hierarchy, for each *f-th* selected factor ($f = 1, F$), group the impact indicators (events characterizing the manifestation of factors) on the deviation of the predicted process from the basic in the *i-th* EVPS.

In *the second step*, the application of the HAM evaluates the degree of deviation of the forecast process (system) from the basic in the *i-th* EVPS according to the method [23], according to which first factors of level 2 hierarchy are compared with each other on a special scale [33] by the degree of their influence on the purpose defined in the first level of the hierarchy (Fig 3.9).

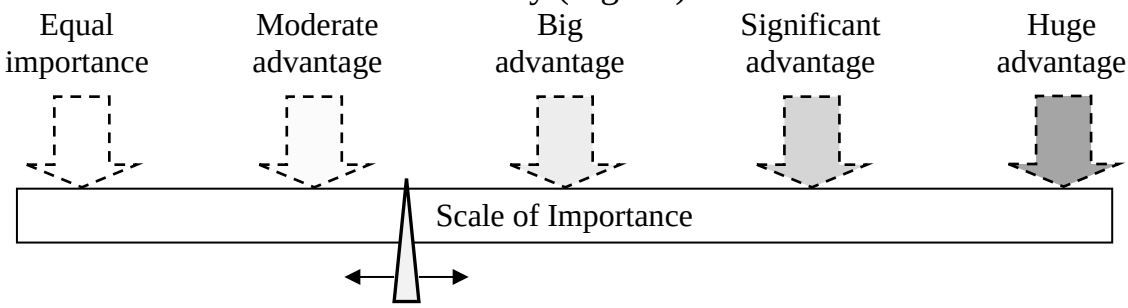

Fig. 3.9. Scale to assess the importance of factors

The obtained values (numbers) are entered into the matrix of pair comparisons (Fig. 3.10) and according to the technology [33], calculate the priorities of factors P_f.

	Factor No. 1	Factor No. 2	…	Factor No. *F*
Factor No. 1				

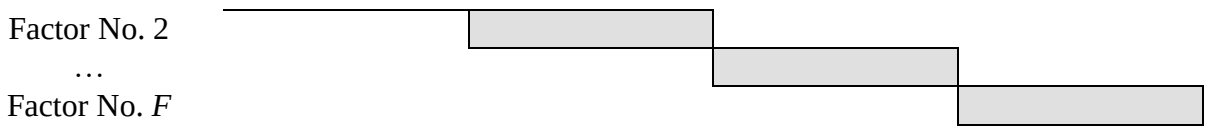

Fig. 3.10. Matrix of paired comparisons of factors

In the future, for each *f*-th factor similarly calculate the priorities of the indicators. The option of using the linear scale of factors and indicators is shown in Fig. 3.11.

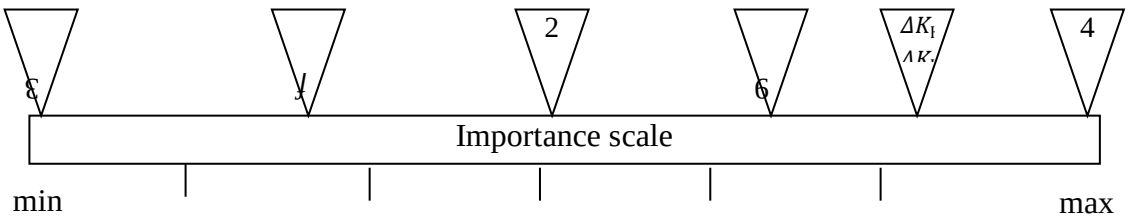

Fig. 3.11. Option of using the linear scale for assessing the priority of factors (factor No. 3 has a minimal effect on the degree of deviation, factor No. 4 – the maximum)

In *the third step*, the technology [23] calculates the degree of deviation of the forecast process from the basic in the *i-th* EVPS. With the help of the "forecast" mode, the most probable, according to experts, micro-scenarios of the process dynamics (systems) in relation to the basic in the *i-th* EVPS, create an integral estimation of the deviation of predicted microscripts from the basic and their ranking according to the integral degree of deviation in the EVPS. The same technology defines the priorities of the microscripts for each EVPS.

Generation and ranking of the microscripts by their degree of deviation from the basic to the forecasting period takes place taking into account the determined priorities of the EVPS.

The feature of the proposed method is the possibility of refining the micro-scenarios after receiving the actual state of the process in any EVPS. The accuracy of the results obtained is most affected by the accuracy of the information on the forecast process.

According to the results of forecasting, several most likely scenarios are being developed for the development of the situation in the region for which the complex of necessary measures is planned.

The purpose of *the thirteenth stage* of the methodology is to assess the state's ability to reflect possible aggression. Such an assessment is made for each scenario developed for the development of the situation in the region. In doing so, the necessary costs, resources, as well as the total possible damage to the state and possible losses for each of the *S* spheres of relations are subject to assessment.

The *fourteenth stage* of the methodology is the final one, which formulates the conclusions of the evaluation of the MPS:

- sources of military insecurity;
- the state (coalition, bloc) is determined, from which there is a military insecurity (threat), level of this insecurity (threat), tendencies of its change. If there is information about its growth, the possible time of the beginning of aggression is predicted;
- probable scale of the conflict and the level of armed aggression;
- most likely scenarios for resolving the conflict;
- priority directions in interstate relations;
- complex of priority measures to reduce the level of military insecurity (threat) and the peaceful settlement of the conflict;
- possible mediators, partners and allies in case of repulsion of armed aggression;
- possible degree of influence of universal and regional collective security systems on prevention of armed conflict;
- possible scale of participation of UN peacekeeping forces in resolving armed conflict;
- the state's possibilities for a peaceful settlement of the conflict, defensive capabilities.

Thus, the proposed methodology makes it possible to assess the MPS around the state. According to the results of the evaluation it is possible to come up with relevant conclusions and to substantiate proposals for decision-making at the state level. Such proposals are primarily concerned:

- terms of martial law in the state;
- terms of increasing the combat readiness of the Armed Forces and other MF;
- concentration of the efforts of the intelligence services to identify targets, plans, plans, deadlines and the process of preparing the potential adversary to use military force;
- direction of the state’s foreign policy towards compliance with the military-political situation;
- timely adjustment of the state’s military-economic policy towards preparation for repelling armed aggression and achieving the required level of defence capability;
- options and the scale of attracting universal and regional systems of collective security to prevent a solution to an armed conflict;
- choice of possible intermediaries, partners and allies in case of repulsing possible armed aggression;
- participation of UN peacekeeping forces in the event of armed aggression.

When solving specific questions on the assessment of the MPS, the conclusions on assessment and proposals for decision-making can be supplemented and expanded.

Methodology of forecasting the level of military insecurity for the state, taking into account the dynamics of the development of the military-political situation. The MSS is an important component of the general system of the national security. The quality of the functioning of this system depends to a great extent on the methodological principles laid down in the organization of the process of ensuring the MS of the state.

An important aspect of ensuring the MS is to determine the level of military security.

One of the most important methodological tasks while developing new ones and improving the effectiveness of the existing mechanisms for the providing of military security is the development of a methodical apparatus, which could not only streamline the actions of those responsible for ensuring the military security of individuals, but also reflect the quantitative indicators, which are issued by these or other solutions in this area. The experience of developing theoretical positions on the above question shows that the solution of the problem of determining the level of military insecurity is not yet completed.

Methodological issues of providing the military security of the state are reflected in many specialized and open publications [34, 35].

However, most of them have suggested methods for determining the level of military insecurity of the state at a fixed time point (at the time of evaluation). With regard to the forecasting of further changes in the level of military insecurity, it should be noted that this issue is being underestimated and this greatly reduces both the theoretical and practical significance of the evaluation.

Combination of various techniques in the field of ensuring the MS in a single methodological complex, which would allow assessing the level of military insecurity both at certain time intervals and in the perspective, constitute the essence of the proposed methodological apparatus.

With the help of a single methodological complex, it is possible to assess and predict the levels of military insecurity for the state, taking into account the dynamics of the development of the MPS around the state.

For the current MPS in Ukraine, the issue of establishing its own effective MSS is relevant. The effectiveness of the functioning of this system, namely, the timeliness, objectivity and compliance of the adopted decisions with the situation in the field of interstate military-political relations, especially with the Russian Federation, directly depends on the methodological support of making those decisions. At the same time, the main efforts to develop such methodological support are aimed at determining the level of military insecurity as the main complex indicator, which is made on the decision to ensure the MS of the state and immediate measures to neutralize or counteract military threats.

In view of the above, the method proposes to carry out the assessment and forecasting of the level of military insecurity for the state, taking into account the dynamics of the development of the MPS and have its following functional

components (partial methods and methodologies):

- methodology for identifying the states that may pose a military threat to Ukraine;
- methodology for assessing the level of military insecurity;
- method of forecasting the level of military insecurity, taking into account the dynamics of the development of the MPS.

The purpose of partial methodology for identifying the states that may pose a military threat to Ukraine is to obtain information about the states in respect of which the procedure of assessing the level of military insecurity becomes relevant and necessary.

To identify the nations that can potentially constitute a military insecurity to Ukraine, you need:

- take into account geopolitical realities and the existing distribution of national interests in the world;
- take into account the potential military power of states and the influence of military – political block "power centers";
- analyze the internal situation of nations that may be potentially dangerous for Ukraine.

Those strategies form the three stages of the procedure for identifying the states that may pose a military insecurity to Ukraine.

At *the first stage* there are states whose national interests intersect with the national interests of Ukraine. The basis for this is a complex definition of global (world) and regional interests.

To the global interests it is advisable to consider, first of all, the economic interests of the most developed countries of the world, which consist in the interest in energy and raw materials (oil, gas, ore, etc.), in expanding the markets for their products. Economic interests give rise to a desire to expand the global network of transport communications, free access to raw materials, including on the sea shelf.

In addition to economic, increasingly important are the demographic and environmental interests.

Demographic interests are characterized by an increase in migration processes, outflow of population, and others like that.

Environmental interests stem from current environmental problems, such as environmental pollution, the disposal of toxic waste, etc.

Although the uneven development of the states of the world leads to an aggravation of contradictions between the nations while advocating their interests, but this imbalance does not necessarily stimulate an increase in military tension.

The result of an analysis of economic, demographic and environmental relations with the states whose interests are intersected (affecting) with the interests of Ukraine, is the set of states, relations with which can lead to increased military tension.

The *second stage* of the procedure for identifying the states that may pose a military insecurity to Ukraine is to assess the military capabilities of the states identified at the first stage and to compare them with the military potential of Ukraine. The comparison is based on identifying the following features:

- to maintain and improve the Armed Forces of Ukraine, to increase their combat readiness;
- to replenish troops (forces) by highly qualified military personnel;
- to supply modern AME to the troops (forces);
- to provide comprehensive support to the Armed Forces of Ukraine in peacetime and in a special period;
- to ensure the achievement of the objectives of the war.

Since military potential is variable, its level depends on a set of indicators. The collision of global interests and the growth of military potentials are signs of a state that can be a military insecurity to Ukraine.

The *third stage* is aimed to identify the states that potentially create a military insecurity to Ukraine. This option is formed by the selection of states from the list of those defined at the second stage. The selection is carried out by analyzing the internal situation in each of them. During the analysis, it evaluates:

- the state of the society, the mood of social groups and strata of the population who have claims to Ukraine;
- directions of foreign policy;
- the state of economy, trade, financial system;
- the state of interethnic relations;
- historical experience of interstate relations, etc.

For assessing the level of military insecurity (current), a *methodology for assessing (current) level of military insecurity* is used, based on the system approach to the functioning of the national MSS. The application of the principle of systematicity requires consideration of the relationship and interaction between the components of this system. An important component of the MSS of the state is the subsystem of information support. The effectiveness of the use of this subsystem depends on indicators that characterize volumes, completeness, authenticity and timeliness of receiving and processing information. However, the process of determining the values of these indicators is complicated by the difficulties of their formalization, the lack of appropriate methods of processing information, which makes in real estimates and forecasts significant errors and subjectivism.

The *Hierarchy Analysis Method*, which is offered for use in the methodology for assessing the level of military danger to the state, is considered to be largely free of the above-mentioned disadvantages [33].

The basis of the HAM is a hierarchy construction with K levels. For its use and assessment of the level of military insecurity, the process of accumulation of conflicting potential of the *i-th* nation against the nation, for example D, can be

provided as a *K*-level hierarchy.

Taken into account this, the process of determining the level of military insecurity (current) from the i-th state will have the following stages:

- *the first* is the formulation of the purpose of the assessment;
- *the second* is the construction of a hierarchy of spheres and indicators of assessment;
- *the third* is the construction of a matrix of pair comparisons of domains;
- *the fourth* is the construction of a matrix of pair comparisons of indicators;
- *the fifth* is the identification of the priorities of the spheres;
- *the sixth* is the identification of the priorities of indicators;
- *the seventh* is the calculation of the current level of military insecurity;
- *the eighth* is the comparison of the current level of military insecurity with the set reaction thresholds.

At *the first stage*, the aim of the assessment is formulated and the spheres of interstate relations are described, in which there are manifestations of the growth of military insecurity from the *i-th* state.

At *the second stage*, they build a hierarchy of spheres and indicators of assessment (Fig. 3.12). The purpose of the assessment is placed at the first level, at the second – the selected areas, which are associated with the purpose of assessment.

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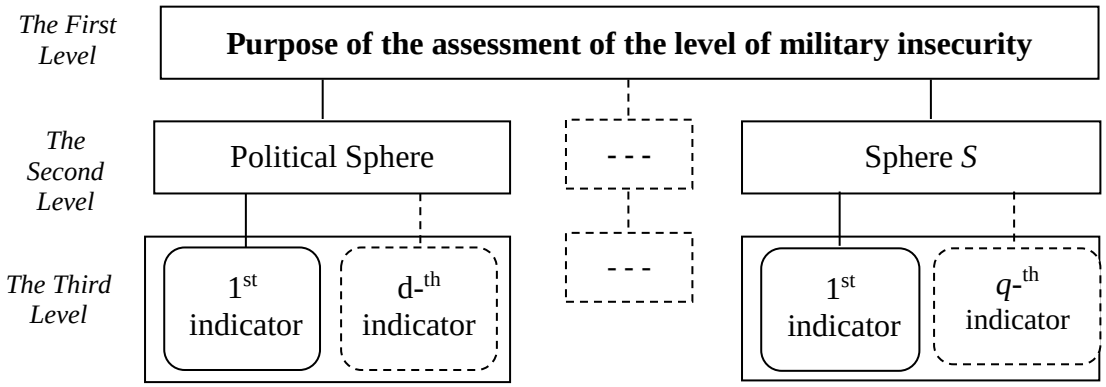

Fig. 3.12. Hierarchy construction of spheres and indicators of assessment

They select those areas of interstate relations, where the signs of increased military insecurity are being observed or can be identified (according to experts' polls). At the same time they impose on their numbers certain restrictions and it is advisable to have no more than nine indicators [33]. The third level is occupied by the selected indicators of the assessment of the level of military insecurity.

The third and *fourth stages* involve the formation of matrices of pair comparisons of spheres (second level) and indicators (third level). In figure 3.13, it is shown a template of matrix for comparing spheres with identification of the

importance of each of them.

	Sphere No.1	…	Sphere No. *S*
Sphere No. 1			
…			
Sphere No. *S*			

$$\begin{matrix} a_{11} & \cdots & a_{1s} \\ \cdots & \cdots & \cdots \\ a_{s1} & \cdots & a_{ss} \end{matrix}$$

Fig. 3.13. Matrix form of comparisons (example) and the matrix itself

A formsheet of pair comparisons for the indicators and corresponding matrix will be different from the shown ones in Fig. 3.13 only with its dimensionality.

The peculiarity of constructing matrices for assessing the level of military insecurity is influenced by information which circulates in the information support system and has predominantly qualitative character. To give it a quantitative character, one can apply the methods of expert evaluation according to a scale of relative importance (Table 3.1) [33].

Table 3.1

Scale of relative importance

Intensity of importance	Definition	Explanation
1	Equal importance	Equal input of two elements
3	Insignificant advantage of one element over another	Experience and reasoning give the slightest advantage of one element over another
5	Important or great advantage	Experience and reasoning give a great advantage to one element over another
7	Significant advantage	One element has such an advantage that it is almost meaningful
9	Pretty great advantage	The obvious advantage of one element over the other is confirmed quite strongly
2, 4, 6, 8	Intermediate solutions	Applied in a compromise case
1/2, 1/3, 1/4, 1/5, 1/6, 1/7, 1/8, 1/9	Contained by a revers comparison	Applied in case of reverse prevailing

At *the fifth* and *sixth stages*, they determine the priorities of the respective spheres and indicators. To do this, they use the matrices of pair comparisons developed at the previous stages. In the process of determining, the focus is on indicators with the highest importance (weight).

Then from the group of previously constructed matrices they form a set of local priorities that show the relative influence of the plural of elements adjacent to the top of the hierarchy. Such local priorities will be the eigenvector of the matrix (for a square inverse symmetric matrix), normalized to unity. The priorities of the chosen

(global) spheres of interstate relations will be the priorities of the world.

The global priorities of L_S, $s = 1, S$, in relation to the matrix of the second level of the hierarchy are calculated from the known formulas of the matrix computation [33]:

$$\boldsymbol{r_1} = \frac{\boldsymbol{W_1}}{\boldsymbol{W_1}}\frac{\boldsymbol{W_1}}{\boldsymbol{W_2}}\cdots\frac{\boldsymbol{W_1}}{\boldsymbol{W_s}}; \boldsymbol{L_1} = \frac{\boldsymbol{r_1}}{\sum_{j=1}^{s}\boldsymbol{r_j}},$$
$$\boldsymbol{r_2} = \frac{\boldsymbol{W_2}}{\boldsymbol{W_1}}\frac{\boldsymbol{W_2}}{\boldsymbol{W_2}}\cdots\frac{\boldsymbol{W_2}}{\boldsymbol{W_s}}; \boldsymbol{L_2} = \frac{\boldsymbol{r_2}}{\sum_{j=1}^{s}\boldsymbol{r_j}},$$
$$\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$$
$$\boldsymbol{r_s} = \frac{\boldsymbol{W_s}}{\boldsymbol{W_1}}\frac{\boldsymbol{W_s}}{\boldsymbol{W_2}}\cdots\frac{\boldsymbol{W_s}}{\boldsymbol{W_s}}; \boldsymbol{L_s} = \frac{\boldsymbol{r_s}}{\sum_{j=1}^{s}\boldsymbol{r_j}}, \tag{3.7}$$

where $r_1, r_2, \ldots, r_s$ – value of calculations of the priorities of the matrix of the second level of the hierarchy;

$L_1, L_2, \ldots, L_s$ – normalized to the unit of priority values;

S – number of priorities (number of rows and columns of the matrix of spheres).

In the course of calculations, an important fact is the consistency of expert considerations, which is determined through the index of consistency of this kind:

$$I = \frac{IFS_{max}}{S-1} \tag{3.8}$$

where $I_{max}F$ – the greatest value of the matrix of pair comparisons;

S – the number of items to be compared.

The next step is to compare the resulting index of coherence I with average consistency for random matrices of different order (Table 3.2) [33].

Table 3.2

Average consistency for random matrices of different order

Matrix size, S	Average consistency, S_n	Matrix size, S	Average consistency, S_n
1	0	6	1,24
2	0	7	1,32
3	0,58	8	1,41
4	0,9	9	1,45
5	1,12		

The comparison is carried out according to the formula

$$V = \left(\frac{I}{S_n}\right) 100\%. \tag{3.9}$$

If $V < 10\%$, comparisons and calculations can be continued in matrices of the

third level. If $V > 10\%$, experts should check their views or view the hierarchy of spheres.

The size of the matrix (see Table 3.2) limits the number of compared items to nine. If the construction of the matrix for the second level of the hierarchy is simple, then for the third level it has its own peculiarities. These peculiarities are that for each sphere it is expedient to construct a separate hierarchy of indicators (threats), and to make paired comparisons taking into account the influence of comparable indicators (threats) on dynamics of the level of military insecurity only in relation to the given sphere. At this level, the number of matrices is equal to the number of spheres.

The procedure for determining the priorities of indicators P_k of the third level is similar to that for the spheres.

At *the seventh stage*, it is supposed to have have a calculation of the final scaled value of the level of military insecurity on the part of another state at the time of evaluation t_0 according to the formula [23]

$$K(t_0) = \frac{\sum_{i=1}^{k} L_i P_i}{\sum_{i=1}^{k} max(L_i P_i)}, \tag{3.10}$$

where L_i – the global priority of the *i-th* sphere of relations;

P_i – the priority of the *i-th* indicator.

At *the eighth stage*, they compare the final value of the level of military insecurity with the pre-set reaction program for the chosen state. Depending on the excess of the obtained level $K(t_0)$ of one threshold or another, an appropriate set of measures for the required response is proposed (Fig. 3.14). The obtained values of $K(t_0)$ become the source data for the next method.

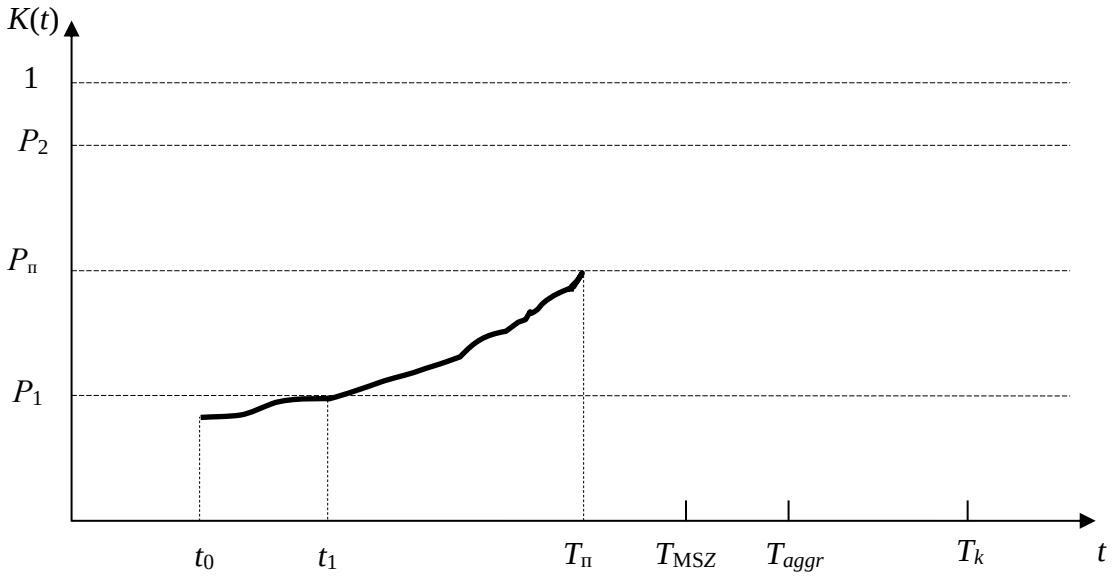

Fig. 3.14. Dependence of changes in the level of military insecurity over the time

The purpose of the partial method of forecasting the level of military insecurity, taking into account the dynamics of the military-political situation is to provide the user with the opportunity to make a reasonable forecast of changes in the level of military insecurity depending on the dynamics of MPS development.

In the methodology**, the forecast of the dynamics of the MPS,** is treated as a certain set of scenarios of possible actions of the parties or changes in its state under the influence of various conditions and factors.

Due to the complexity of manifestation, influence and interconnection of the conditions and factors in which military-political relations develop, it is practically impossible to describe the fully and unambiguously changes in the state of these relations and the dynamics of the MPS in time and space.

In addition, measures to ensure MS in the conditions of limited material and financial resources must be compared with the level of military threat.

Since such measures are quite inertial in time, the problem of timely prediction of the dynamics of a change of a potential military threat becomes of particular relevance. It is desirable that the forecast periods provide sufficient time for the proper reaction of the defence industry complex and the SDSU to the changes of the MPS.

The basis of this methodology is the assessment of the impact of destabilizing factors of the MPS on the level of MS of the state and their possible changes in time.

The methodology is based on the methods of scenario analysis of socio-economic systems [32]. The essence of the methodology is the development of the baseline scenario of the MPS dynamics as a consecutive choice of expert intermediate states of the system for ensuring MSS, without which, according to experts, the system cannot achieve the purpose of the operation in relation to which the forecasting is carried out. The methodology contains *eight* basic stages.

At *the first stage*, based on the results of a partial methodology for identifying states that may pose a military insecurity to Ukraine, they form the necessary initial data in the form of a plurality of such states.

At *the second stage*, they distinguish the most important factors in the political, military, economic and other spheres that have an impact on military security. It is desirable that the number of spheres does not exceed nine.

Using the HAM, they build a two-tier hierarchy of "spheres–factors", and by means of an appropriate expert evaluation determine the priorities of the areas of importance of factors in these areas.

At *the third stage*, with each factor, the experts "associate" probable threats to the military security of the state, which in the formalized form are recorded as a "factor – threat" matrix.

The fourth stage involves the calculation of the priorities of threats in the coordinate system "factor – threat" and the subsequent overall "weight" ranking in the coordinate system "priority – threat" using the results of the expert survey and technology the HAM .

At *the fifth stage* they analyze the possibility of "chain" destabilization of the situation and the most critical scenarios for the development of events in time and geopolitical space. A critical scenario is the appearance of at least one event or situation that can have severe consequences.

At *the sixth stage*, a comprehensive assessment of the impact of possible threats to change the level of military insecurity for the state is conducted. To do this, they refer to a *methodology for assessing the risk of an outbreak of a conflict situation in an armed conflict* [36].

By the acquired value of the level of military insecurity $K(T_п)$ at the moment of assessing $T_п$ and the previous value of $K(t)$ at the timepoint $t \in (t_0, T_п)$, the change in the level of ΔK is determined.

So, when $K_i(t_1) < P_{1i}$ (where P_{1i} – is the threshold of cooperation with the *i-th* state), *i-th* state can be considered an eventual opponent.

When $P_{1i} < K_i(t_1) < P_{пi}$ (where $P_{пi}$ – the threshold of aggravation of relations with the *i-th* state), *i-th* state can be considered as a possible opponent.

When $P_{пi} < K_i(t_1) < P_{2i}$ (where P_{2i} – the threshold of aggression by the *i-th* state), *i-th* state can be considered as a probable opponent.

When $K_i(t_1) > P_{2i}$ *i-th* state becomes a real opponent when solving the aggression.

To predict the most probable start of aggression by the *i-th* state, an approach is used which involves an analysis of the trends in the comprehensive indicator of the level of military insecurity. The forcasted time of the most probable beginning of aggression by the *i-th* $T_{\text{aggr.forc}}$ (P_{2i}) is calculated by the formula (3.6)

$$\boldsymbol{T_{aggr}(P_{2i}) = \underset{t}{arg}\{K_i(t) = P_{2i}\}}.$$

At *the seventh stage*, according to expert assessments, a list of possible negative consequences of the influence of destabilizing factors on the level of MS of the state is being formed. To do this, build a two-tier hierarchy of “factors – consequences” and with the help of the HAM determine the “importance"’ of predicted negative consequences. For greater visibility of “importance” they display a graph in coordinates “weight – consequence”.

At this stage, they give the characteristic of each predicted negative effect, which reveals the object of the impact of the effect, its duration, possible damage from it, the expected trends of change, how it can be neutralized, or entails a “chain reaction”, etc.

At *the eighth stage* they form conclusions, prepare generalized assessments, conduct substantiation of appropriate behavioral strategies, develop recommendations to prevent the most severe consequences, further monitoring and etc.

The suggested methodical apparatus can be used for evaluation of military insecurity to the state from other states as the main evaluation stage of MPS in the region, taking into account the dynamics of its development.

Combination of different methodologies in a single set which are used in the theory and practice of providing MS will enable to assess the level of military threat at set time and predict its change depending on the dynamics of the MPS development. In addition, such combination of techniques facilitates the necessary procedures through more efficient organization of the work of experts; there appears a possibility to engage them practically simultaneously in solving a set of issues. However, this will require careful preparation of all necessary forms of documents used for conducting an expert survey, appropriate training of specialists in processing and analyzing the received information. It is necessary to emphasize that all obtained information with the help of the proposed methodology has a recommendation character for a person who makes strategic decisions.

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Chapter 4

METHODOLOGICAL APPARATUS FOR DE-ESCALATING THREATS TO MILITARY SECURITY WITH INTEGRATED MILITARY AND NON-MILITARY FORCES AND MEANS EMPLOYMENT

4.1. Formalization of the problem of de-escalating threats to military security and creating a system of indicators to evaluate the effectiveness of military and non-military forces and means employment

According to the current guidelines on national security issues [1-3], the reform of the security and defence sector of Ukraineshould be directed at the rational use of available forces and means. Practical implementation of this requirement requires the development of ways of joint use of ("hard" power and "soft" power agencies of the SDSU, improvement of the methodical apparatus for determining tasks for these subjects and evaluating the effectiveness of their implementation. It is for this that the formalization of the task of de-escalating threats to military security and the formation of a system of indicators for assessing the effectiveness of the integrated use of military ("hard" power) and non-military ("soft" power) forces and means is necessary.

The task of de-escalating threats to the state MS is one of the most important. The experience of preparing decisions on crisis management suggests the need to have a significant amount of incoming information (idea of the essence of the conflict, motivation and driving forces of the conflict; conflict factors of different origins (political, economic, national, ethnic, ideological, socio-cultural) and their importance; information on the policy of international security institutions regarding this crisis situation, etc.).

Without this, an array of information in a form that is acceptable not only for comprehension, but also for the necessary calculations, the development of well-founded solutions becomes problematic.

The issue of national security of the state, in particular the provision of military security of the state, was considered in many publications of specialized and general purpose [4-10]. However, in most of them, problems of a methodological nature, especially with regard to formalizing the process of de-escalating threats, are not given enough attention.

Formalizing the task of de-escalating threats to military security and defining a system of indicators for assessing the effectiveness of the integrated use of military and non-military forces and means is a necessary step for the formation of an integrated potential for neutralizing threats to the state's military security, which in

its essence defines a strategy for counteracting military threats using non-military and force methods and means.

The quality of the operation of the MSS depends on the methodological principles laid down for the organization of this process.

The term "**organization**" in this case is considered in the aspect of a set of actions leading to the formation and improvement of relationships between parts of a whole, that is, a complex of measures on the use of military and non-military means agencies of the SDSU while participation in the de-escalation of military threats state security. So, we can assume that we are talking about the provision mentioned above set of signs the system with the corresponding system properties. This allows for further consideration of the problem of formalization of the process of ensuring military security system approach with its important principles.

One of these principles is the *principle of formalization* [11], aimed at obtaining quantitative characteristics, creating methods that limit the variety of concepts, definitions, assessments, etc. Therefore, objects (processes), their properties and relations need to find stable, equal and available for perception indicators in order to identify and fix the essential aspects of the object (process). Formalization clarifies the content by detecting its form and can be carried out with varying degrees of completeness.

The term **formalization of the process of ensuring military security of the state**, it is proposed to understand the identification and description, both verbal in certain terms, and numerical, components of this process and their relationships [11].

It is believed that without determining the quantitative characteristics (indicators) it is impossible to fundamentally build some efficiently functioning complex object, which, in our case, is the aforementioned complex of military and non-military actions. These characteristics, in our opinion, should be counted among those who leverage subject (individual components) of the SDSU regarding the execution of its tasks and provide the best representation of their essence.

In general, the possibilities of the subjects (separate components) of the SDSU for purposes of de-escalation of threats to the state's military security are determined by their function in the system of state institutions (the spheres of vital activity of the state, which they take care, political, economic, military, media, etc). It becomes the basis for the formation of a set of indicators that can further formalize the process of de-escalating threats to military security, the so-called "military threats".

Among the specified set of indicators, it is proposed to have the following groups:

- list of spheres of vital activity of the state Π_{is}, which are gone about by the agency of SDSU (for example in the form of a matrix of spheres $\|\Pi_{is}\|$, where

i –is an agency of the security and defence sector of Ukraine, $i = \overline{1, I}$; s is the sphere of vital activity of the state, $s = \overline{1, S}$;

- the priorities of each of the spheres for the *i-th* agency, if there are some several spheres;
- a list and possible scope of tasks that can be performed by the *i-th* agencyy of the SDSU for each of its *S* spheres inherent in it;
- indicators characterizing the threat itself (in accordance with the Passport of threats), regarding which a decision was made on de-escalation, and expert estimates of the expected time intervals of the "response" to the impact of the i-th agency of the SDSU on the factors that constitute this threat;
- indicators providing a description of the task (tasks) to the *i-th* subject of the security and defence sector of Ukraineregarding the de-escalation of the threat (the amount of the specific task, the time and order of the beginning of the impact on the factors of the threat, the timing for countering the threat, required the "neutralization shift" $\Delta K_{\text{NShc}}(T_{\text{нбз}})$ of military imsecurity level of threat $K(t)$ during its de-escalation, etc.

Given indicators reveal the essence of the de-escalation of the MThs, which consists in reducing or ending the action of forming the threat of factors by the targeted influence on them by the security and defence sector of Ukraineagencies, which should reduce the level of military insecurity $K(t)$ from the current $K(t_1)$ to the threshold K_{Thd}, in order to prevent its unacceptable (dangerous) value, in which the military conflict becomes the reality $K(T_{I\,NS})$ (see Fig 3.2).

The value of the reduction in the current level of military insecurity $K(t_1)$ to the threshold is called "neutralization shift"[4].

Thus, a "neutralization shift", which is needed $\Delta K_{NS}(T_{eNS})$, of the level of military insecurity (threat) $K(t)$ during its de-inclination can be presented as follows:

$$\boldsymbol{\Delta K_{NSh}(T_{eNS}) = f(I, S, \Pi)}. \tag{4.1}$$

The main phases (stages) of the development of a military conflict and some possible military and non-military measures (forms) for its prevention at different stages of development are shown in Fig. 4.1 [12–14].

It is clear that the greatest effect of the use of forces and means of the SDSUcan be achieved only if the implementation of the complexity, systematic, coherence, reach, specificity, flexibility and acceptability of the tasks to be put (in advance) by the performers, who are the agencies of the SDSU, is to be achieved.

In the case of compliance with the above conditions, it is possible to make the optimal set of tasks for the agencies of the SDSU having the appropriate forces and means to provide the required synergistic effect at each stage of the de-escalation of the threat (see Figure 4.1).

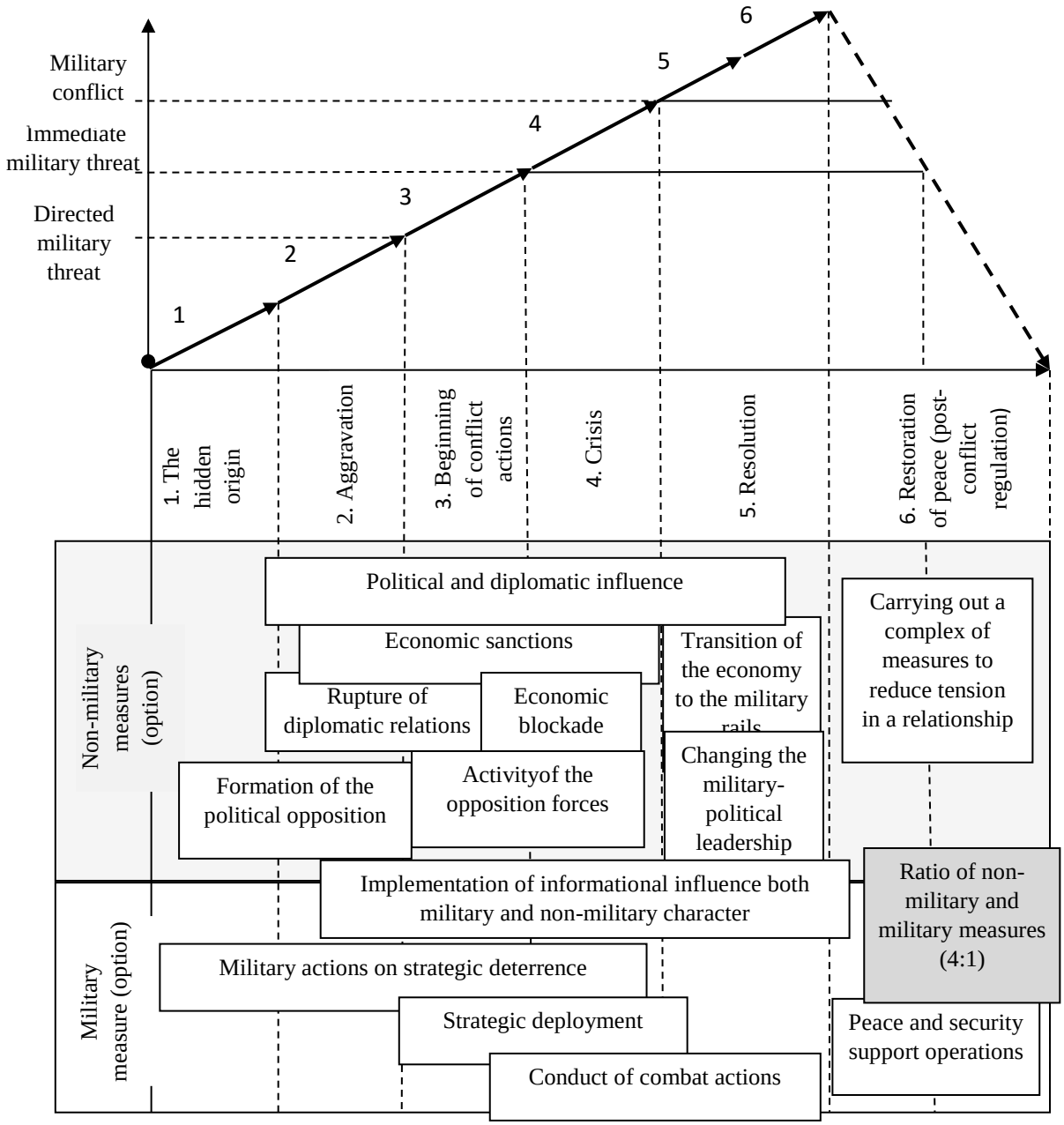

Fig. 4.1. Main phases (stages) of the military conflict development and some possible military and non-military measures (forms) for its prevention at different stages of the development:

1 - manifestation of conflict of interests; 2 - transformation of differences in contradictions and their awareness by the military-political leaders; 3 - deepening contradictions; 4 - crisis response;5 - localization of military conflict;
6 - de-escalation of military conflict

Timeliness, adequacy of the decisions taken and the tasks assigned to the SDSU agencies/actors complement the general requirements for the organization of the process of de-escalating the military threats.

Naturally, all of the above requirements will be specific in nature, depending on the characteristics of a certain threat and the quality of the formalization of the whole process of de-escalation, which is part of the formalization of tasks for the agencies of the SDSU.

The general scheme of formalizing objectives to the agensies of the SDSU during the de-escalation of the MThs by employing military and non-military means is shown in Fig.4.2 [11].

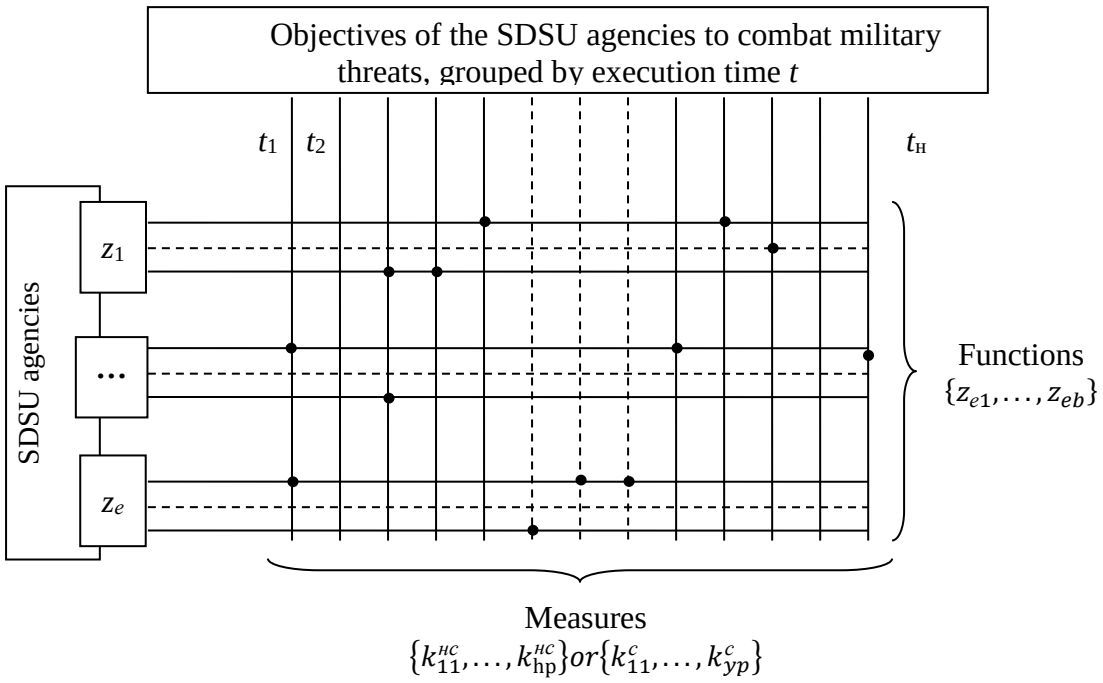

Fig. 4.2. Scheme of formalizing objectives to the SDSU agencies in the course of de-escalation of the military threat z

In practice, a “neutralization shift”, which is needed $\Delta K_{NSh}(T_{ins})$ can be assessed using computer technology M7 [15–16] in an iterative way to reduce the “weight” of the *z* threat due to the comprehensive use of military and non-military measures of individual SDSU agencies (“soft” power, primarily).

In our case, it is important for SDSU agencies of Ukraine to formalize the tasks necessary to assess their required capabilities for completing the inverse task using computer technology M7 under the condition (3.1) given in the second section of the monograph.

The required “neutralization shift” can be provided by various options (j = 1, J) involving forces and resources (within the capabilities of x_s), individual S actors that require the appropriate resources, the limitations of which should be taken into account when making a final decision.

Thus, the general hierarchy of the task of forming the necessary “neutralization shift” during de-escalation of the military threat will have the form shown in Fig. 4.3.

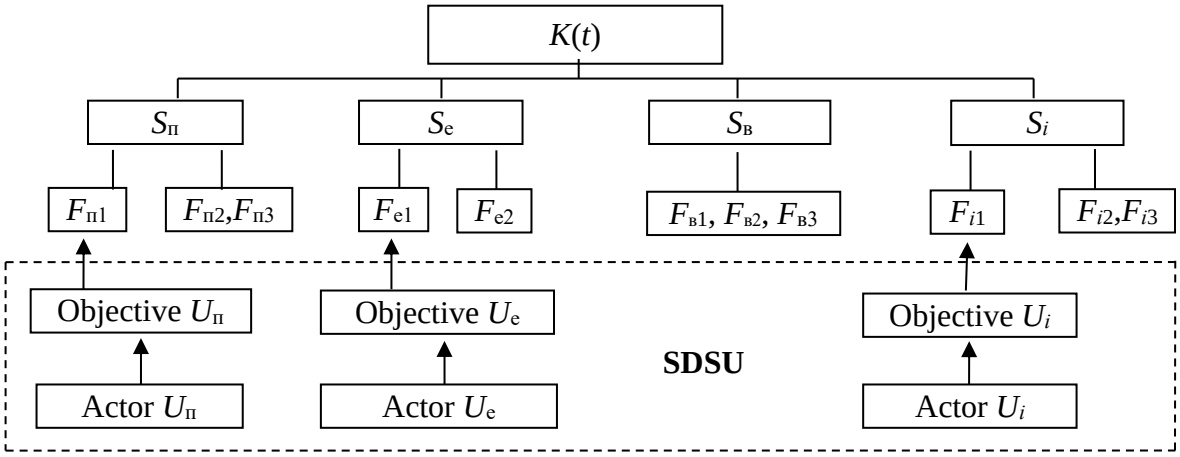

Fig. 4.3. Example of the objective hierarchy of forming the necessary “neutralization shift” during the de-escalation of a military threat

That’s why, at this stage of de-escalation the problem arises to find the optimal variant of assignment of tasks to the SDSU agencies at the time of completing, the areas of relations with the manifestations of the threat (contradiction) that are subject to influence (conflict factors that need to be influenced) by successive or simultaneous tasks.

The formalization of tasks to the SDSU agencies contributes to the completeness and objectivity of identifying the manifestations of the threat (contradiction) in the areas of the relations of the opposing sides.

It is clear that at each stage of the development of the threat the effects of the impact, their intensity, strength, “weight” will be different. That is why, ideally, the assignment of tasks should also be carried out at each of the stages of the development of the threat (see Fig. 4.1), taking into account the results of the impact of the SDSU on this development in the previous stage. Such an approach enables the implementation of the above-mentioned requirements for the security and defence sector of Ukraineto ensure effective de-escalation of the threat and the timely provision of priority to non-military or military means.

The determining and envolving of the forces and means of the SDSU agencies while completing tasks, is carried out according to the same logic as at the higher levels of the hierarchy.

Neutralization task for the SDSU agency, which is responsible for the defined sphere, in quantitative terms is necessary to reduce the impact of the proposed indicator, in other words, to neutralize its impact on the formation of the integral level of military insecurity on one or several gradations of the assessment scale (scale from 1 to 9), tab. 4.1.

Table 4.1

Table of neutralization tasks for agencies of the Security and Defence sector

Sphere	Priority of sphere	Value of the indicator during the evaluation of $K_{i\text{пр}}(T_{\text{пр}})$	Value of the indicator for forming the necessary "neutralization shift" Δ $\Delta K_{dsi}(T_{\text{пр}})$	Necessary reduction of influence on a 9-point scale
Political (S_1)	$\Pi_{\text{п}}$	$m_{\text{п}1}$	$m_{\text{п}1s}$	$m_{\text{п}1} - m_{\text{п}1s}$
		$m_{\text{п}2}$	$m_{\text{п}2s}$	$m_{\text{п}2} - m_{\text{п}2s}$
		$m_{\text{п}3}$	$m_{\text{п}3s}$	$m_{\text{п}3} - m_{\text{п}3s}$
Information (S_2)	Π_i	m_{i1}	m_{i1s}	$m_{i1} - m_{i1s}$
		m_{i2}	m_{i1s}	$m_{i2} - m_{i1s}$
		m_{i3}	m_{i1s}	$m_{i3} - m_{i1s}$

However, such a degree of formalization of objectives for the SDSU agencies is not sufficient for practical implementation, since it essentially defines a strategy for counteracting military threats using ‘soft’power and ‘hard’power methods and means.

Each of the E state agencies of the SDSU z_e (e = 1, E) has b functions, which it must perform, – $\{z_{e1}, \ldots, z_{eb}\}$. The mechanism of planning for the implementation of tasks by each SDSU agency involves the development of a set of concrete measures aimed at reducing the impact of the largest “weight” of the indicator. The number of events, their combination and scale must be such as to reduce the impact of the indicator (for example, the intensity of the information impact of the opposing side on our troops (forces)) per scale grading (see Table 4.1).

4.2. Method and complex model of adaptive management of integrated potential of counteraction to the detected (predicted) threat for ensuring a certain level of military security of the state

Method of adaptive management of the integrated potential of counteraction to the detected(predicted) threat to ensure a certain level of MS of the state. The necessity of joint use of the forces and means of the SDSU to counteract the military threats and at the same time the absence of procedures for the selection of certain elements of the military security system to neutralize the military threats and the integration options of their efforts determine the need to develop an adaptive management method for the integrated potential of countering the detected (predicted) a threat to ensure a certain level of MS of the state.

This method should enable to justify the rational composition of forces and means for de-escalation to an acceptable level of detected (predicted) threats, taking into account the adopted resource constraints.

When developing the adaptive management method for integrated potential of counteraction to the detected (predicted) threat we will take into account the basic requirement of the guiding documents in the field of providing national security and defence – the necessity of using non-military methods and means of protection of national interests [1–3, 18, 19].

The most difficult task at this time is the substantiation of the necessary military and non-military (hybrid) forces and means for the guaranteed within the allocated resources of de-escalation of the revealed threats of a military nature [5, 7, 20].

An analysis of the available methodological apparatus of this justification shows that in Ukraine the methods of generating ideas (brainstorming method), trial and error, expert estimation (forecasting) are the main ones. In developed countries, primarily in NATO member countries, methods of scenario analysis are used predominantly. Taking into account the specific conditions for ensuring military security in Ukraine, its military and non-military capabilities, the method of adaptive management of the integrated potential for counteraction to military threats is proposed, which enables to justify the rational composition of forces and means (group of actors) and their necessary capabilities for de-escalation to an acceptable level detected (predicted) threats within the allocated resources both by the state and non- governmental organizations.

The method, the block diagram of which, is shown in Fig. 4.4, is the consistent implementation of certain procedures aimed at obtaining the necessary information on the military or hybrid threats and their characteristics.

Such a diagnosis of threats will help to identify a minimal group of the SDSU agencies and their required capabilities (the required capacity) for integrated use in the management of counteraction to these threats, which will ultimately provide an opportunity to substantiate the rational composition of forces and means and their necessary capabilities for the de-escalation of detected (predicted) threats within the resources allocated by the state and non-governmental organizations. Adaptation is carried out to the level and nature of the detectedthreat.

Adaptation to the nature of the detectedthreat is carried out by the definition of a minimum of sufficient group of the SDSU agencies, able to neutralize the threat to the required level. Adaptation to the assessed level of the detected (predicted) threat is carried out by determining the necessary capabilities of the individual entities of the designated group to de-reveal the detected (predicted) threat to the required level within the allocated resources.

Stage 1. Monitoring of military threats (threats, insecurities and other destructive factors), military and hybrid ones from each state considered as an eventual opponent.

Output information for further processing: the list of threats,formed passport of threats.

↓

Stage 2. Assessment of the level of military insecurity (threat of warfare), determination of necessary "neutralization shift" of the level of military insecurity, and assessment of capabilities for its de-escalation through the integrated use of 'hard'power and 'soft'power means.

Output information for further processing:

value of the level of military insecurity $K(t)$;

projection of the growth of the level of military insecurity $\Delta K(T_{pr}) = f(K, t)$;

required "neutralization shift" of the military insecurity level $\Delta K_{NShr}(T_{pr})$;

possibilities of the SDSU agencies with executive functions in countering the P_k threat (de-escalation)

↓

Stage 3. Creating the set of V_j variants of integration of "hard"power and "soft"power means to create from them the integrated potential of counteraction (de-escalation) of detected threats.

Output information for further processing: the set of V_j variants of integration of hard"power and "soft"power means $\{V_j\} = f(P_k, \Delta K_d(T_{pr}))$

↓

Stage 4. Construction for each *j-th* ($j = 1, J$) variant of the integration of V_j of "hard"power and "soft" power actors of "optimistic" scenario of achieving the goal, assessing its integrated capacity and efficiency, required resources, checking for the possibility of providing a certain level of military security.

Output information for further processing: "optimistic" scenarios for achieving the goal, assessment of its integrated capacity and efficiency, required resources, the ability to provide a certain level of military security

↓

Stage 5. Selection of the option for which a certain level is provided and involves minimal resources. The selected version is given the status of the main one.

Output information for further processing: basic version of the integration of 'hard'power and 'soft'power means to counteract the threats

↓

Stage 6. Preparation of a draft management decision on the response for ensuring the MSS (NSS) to the detected military threat, taking into account the limitations on the country's resource capabilities and verification of the possibility of securing a certain level of MS.

Output information: draft of administrative decision to respond to the identified military threat

Fig. 4.4. Block - diagram of the method of adaptive managing the integrated potential of counteraction to the identified (predicted) threat to ensure a certain level of military security of the state

Let us consider the essence of the method.

At the *first stage*, monitoring the military and hybrid threats is being carried out. During it they detect and record the threats (insecurities and other destructive factors) from each state which is considered as an eventual enemy.

At the *second stage*, using *the Ishikawa method* (Fig. 4.5), the experts decompose the threat and evaluate its impact on the defining areas of national security,

serving as the main argument during the first iteration of the choice of a group of subjects (the initial stage of adaptation) to form an integrated potential for counteraction to the detected (predicted) threat.

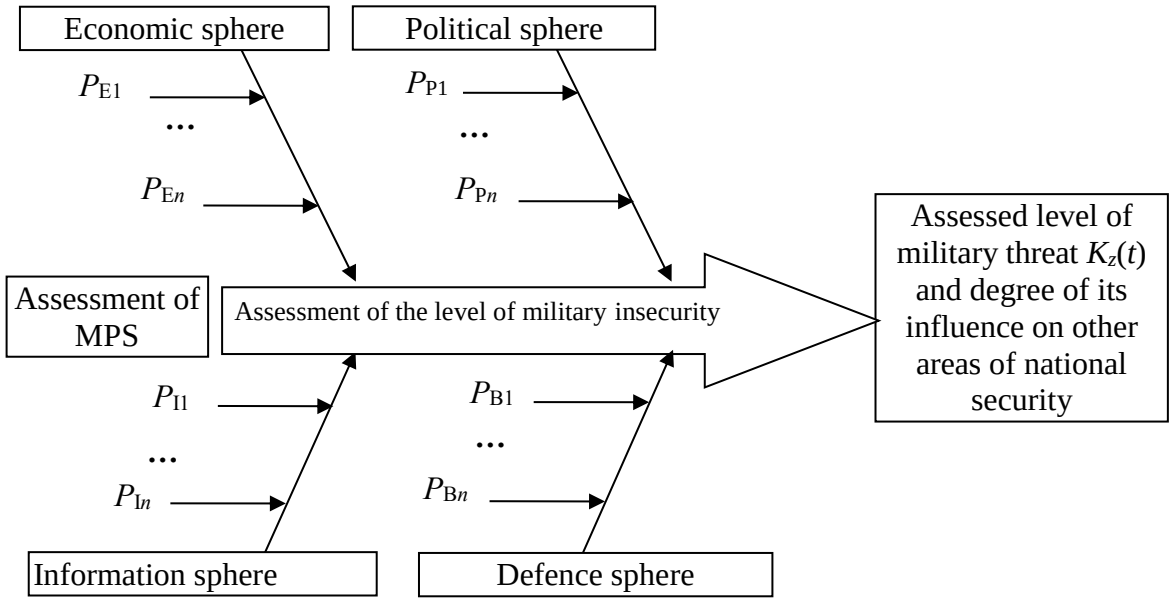

Fig. 4.5. Decomposition of the threat and assessment of its influence on the defining areas of national security using the Ishikawa method

According to the experts, the impact indicators using the M7 [4] method, the integral level of the $K_z(t)$ threat is determined, which is compared with the permissible (threshold) level of military threat for the forecast period of K_{thd}, requires a "neutralization shift" of the $\Delta K_{NShp}(T_{pr})$ level of military threat and justify the capabilities of the selected agencies are needed to achieve the necessary “neutralization shift” of the military threat level (see Figure 3.2) through the integrated use of “hard”power and “soft”power means.

At *the third stage*, experts form a plurality of variants of integration of selected J agencies to form an integrated potential of de-escalation (neutralization) of the detectedthreats.

At *the fourth stage*, for each j-th ($j = 1, J$) variants of integration of selected agencies build an "optimistic" scenario for achieving the goal, assess its integrated potential and resources, evaluate its expected efficiency and verify the possibility of providing a certain level of MS.

At *the fifth stage*, the option selected, which provides a certain level of MS, attracts minimal resources. The selected version gives the status of the main one.

At *the sixth stage*, a draft management decision is being prepared for responding MSS (NSS) to the detectedthreat to MS, taking into account the constraints on the country's resource capabilities.

Resource capabilities of the state are the amount of material and human (highly intellectual) resources that can be used to ensure the functioning of the NSS. Material and human resources, from the point of view of the system, should be minimized.

For each sphere chosen to neutralize the threat, for example, the method of brainstorming, those indicators of threats (indicators) are selected, the impact of which must be neutralized at least one degree on a 9-point scale [4]. Taking into account the possibilities of the SDSU agencies to counter the specific military threat and the functions entrusted to them in the security and defence sector of Ukraine (Table 4.2), the possible effectiveness of de-escalation of the identified level of military threat, the duration of counteraction to the $T_{pr,}$ number of involved people, etc., are being completed for obtaining such integral potential that maximally provides the required "neutralization shift" $\Delta K_{NShp}(T_{pr})$. In this way, adaptation of the system of counteraction to the level of threats is provided.

Table 4.2

General characteristics of non-military means

Non-military means	Functions	Agencies of the SDSU responsible for the use of means
Political-diplomatic	Formation of favorable MPS, strengthening the international position of Ukraine	The President of Ukraine, the Cabinet of Ministers of Ukraine, the Verkhovna Rada of Ukraine, the Ministry of Foreign Affairs, the National Security and Defence Council of Ukraine
Legal (international and internal state)	Strengthening the legal framework for peace and security, legal barriers to wars and conflicts	Cabinet of Ministers of Ukraine, Verkhovna Rada of Ukraine, Ministry of Foreign Affairs, Ministry of Justice, Ministry of Justice of Ukraine
Economic	Development of economic, trade and financial, scientific and technical resources, strengthening the defence of the country	Ministry of Finance and other departments responsible for the development of key sectors of the national economy
Information psychological	Confirmation of views, ideas and re-constructions that strengthen the peace and defence of the state	Ministries, departments committees, etc. in the affairs of science, culture, education, religion, the Ministry of Foreign Affairs
Humanitarian	Overcoming spiritual and cultural antagonisms, development of social, interpersonal connections	Ministry of Education and Science, Committee on Religious Affairs, public organizations
Intelligence	Detection of aggressive intentions, accrued operations, protection of defence secrets	Foreign Intelligence Service of Ukraine (FISU) Main Intelligence Directorate of the MoD of Ukraine (MID MoD)

Public (public, non-governmental) defence	Deterrence and expulsion of aggressors by nonviolent strife	NSDC of Ukraine, Ministry of Defence of Ukraine, Security service, self-defence public organizations

Neutralization tasks for each *s-th* subject and their weighting ($P^*_{s1},\ldots,P^*_{sn}$) [7, 8, 21] can be determined using the Ishikawa method (see Figure 4.5), the advanced method of hierarchy analysis, expert evaluation and computer technology M7.

Practice shows that the achievement of the necessary "weight" of the P^*_s indicator is provided by a certain set of individual tasks (measures) implemented in the *s-th* sphere. The more such measures are implemented, the faster they achieve the desired result, but at the same time they increase (and not always proportionally) the resources for their conduct, which can be further blocked (see Fig. 4.4) [8].

It is advisable that the set of such measures for each *s-th* sphere, experts of the same sphere formed the method of "brainstorming". In addition, experts should be prepared to assess the resource requirements for the implementation of the proposed measures [22].

The defined variant of the set of tasks (measures) for each sphere (the third level of the three-level hierarchical model) is introduced into the computer technology M7 and using it calculate the current (predicted) "neutralization shift". At the same time, the "weight" (priority) of each sphere can be specified, which, if necessary, will be taken into account during the redistribution of resources.

The check on the adequacy of the predicted "neutralization shift" $\Delta K_{\mathrm{NSh}}(T_{\mathrm{pr}}) \geq \Delta K_{\mathrm{NSh\,p}}(T_{\mathrm{pr}})$. is carried out. If the condition is satisfied, then for each *s-th* sphere, the corresponding sets of the $\{Z_s\}$ tasks and their "weight" (priorities) are fixed. If this condition is not fulfilled, then a new iteration of the choice of agencies is made, or a new option is proposed to reduce the "weight" (priorities) of the Saati scale threats or form a new variant of the set of neutralization tasks (see Figure 3.3). In the future, evaluate the required resources (R_{req}) to perform the selected option set of tasks by all actors to neutralize the detectedz threats. Check the relevancy of the estimated required resources (R_{req}) виділеним (R_{alloc}).

If the $R_{\mathrm{req}} \geq R_{\mathrm{alloc}}$ stipulation is not satisfied, then perform a new iteration of the tasks (see Fig. 4.1).

If the $R_{\mathrm{req}} \geq R_{\mathrm{alloc}}$ stipulation is satisfied , then the DM is given to approve the draft management decision to neutralize the detected threat to a certain composition of agencies with reasonable tasks for each entity.

The general scheme for identifying specific tasks for SDSU agencies regarding the implementation of measures to counteract threats to the military (construction of a task matrix for agencies of the security and defence sector of Ukraine) corresponds to the scheme of formalizing tasks to security and defence sector of Ukraine agencies during de-escalation of military threats to employ the militaryand non-military means and forces indicated in Fig. 4.2.

In this case, the following situations may occur:

- no any SDSU agency is not able to perform tasks (there is no corresponding function). In this case, they review the tasks or expand the functions of the agencies;
- several security and defence sector of Ukraine agencies (the presence of related functions) can perform the same task. In this case, the task is entrusted to an entity that is capable of performing it with greater efficiency (less resources), tasks are performed by several agencies (in the part relating to them), or functions are reviewed to exclude related several security and defence sector of Ukraine agencies (the presence of related functions) can perform the same task. In this case, the task is entrusted to an entity that is capable of performing it with greater efficiency (less resources), tasks are performed by several agencies (in the part relating to them), or functions are reviewed to exclude related.

As a result, a set of V_j variants of integration of power and non-power agencies is formed. $\{V_j\} = f\,(P_k, \Delta K_д(T_{пр}))$.

Such a scheme, unlike what is currently being used, will contribute to the scientific substantiation of tasks for integrating the efforts of the agencies ensuring the MS of the state in countering the threats to the military character. The division of tasks thus carried out makes it possible to distribute and responsible for their implementation in the MSS, to streamline the functions of the security and defence sector of Ukraine agencies, to improve management and to expand the possibilities for civilian control, to move towards a centralized comprehensive provision of the process of realizing national interests, to strengthen the influence of civil society through the Institute of Public Expertise administrative decisions on the effectiveness of the operation of the MSS.

In the future, constructing for each j-th (j = 1, J) variants of integration of V_j “hard”power and “soft” power forces and means the “optimistic” scenario, achieving the goal, evaluating its integrated potential and efficiency, required resources, checking for the possibility of providing a certain level of MS. The “optimistic” scenario is developed from the point of view of ensuring the best possible involvement of Security and defence sector of Ukraine agencies with executive functions and their forces, due to ensuring compatibility at the legislative level, the sequence of engagement of the SDSU agencies, taking into account their different subordination in the system of public administration, etc. The advantage is given to the option, which provides a certain level of MS and involves minimal resources. The selected version gives the status of the main one. The scheme of the order of forming an action plan is shown in Fig. 4.6.

The final result is a draft management decision to neutralize the detectedthreats of a defined composition of agencies with substantiated tasks for each entity submitting for approval to the decision maker.

The practical implementation of tasks defined in this way requires specific management in the security and defence sector, appropriate information, analytical and

resource support. In order to implement the proposed method, it is expedient to use information resources, technologies and analysts (experts) of the Main Situation Awareness Center (MSAC) of Ukraine as a software and hardware complex for collecting, collecting and processing information necessary for preparing and taking decisions in the field of national security and defence [19].

The final result is a draft management decision to neutralize the detectedthreats of a defined composition of agencies with substantiated tasks for each entity submitting for approval to the decision maker.

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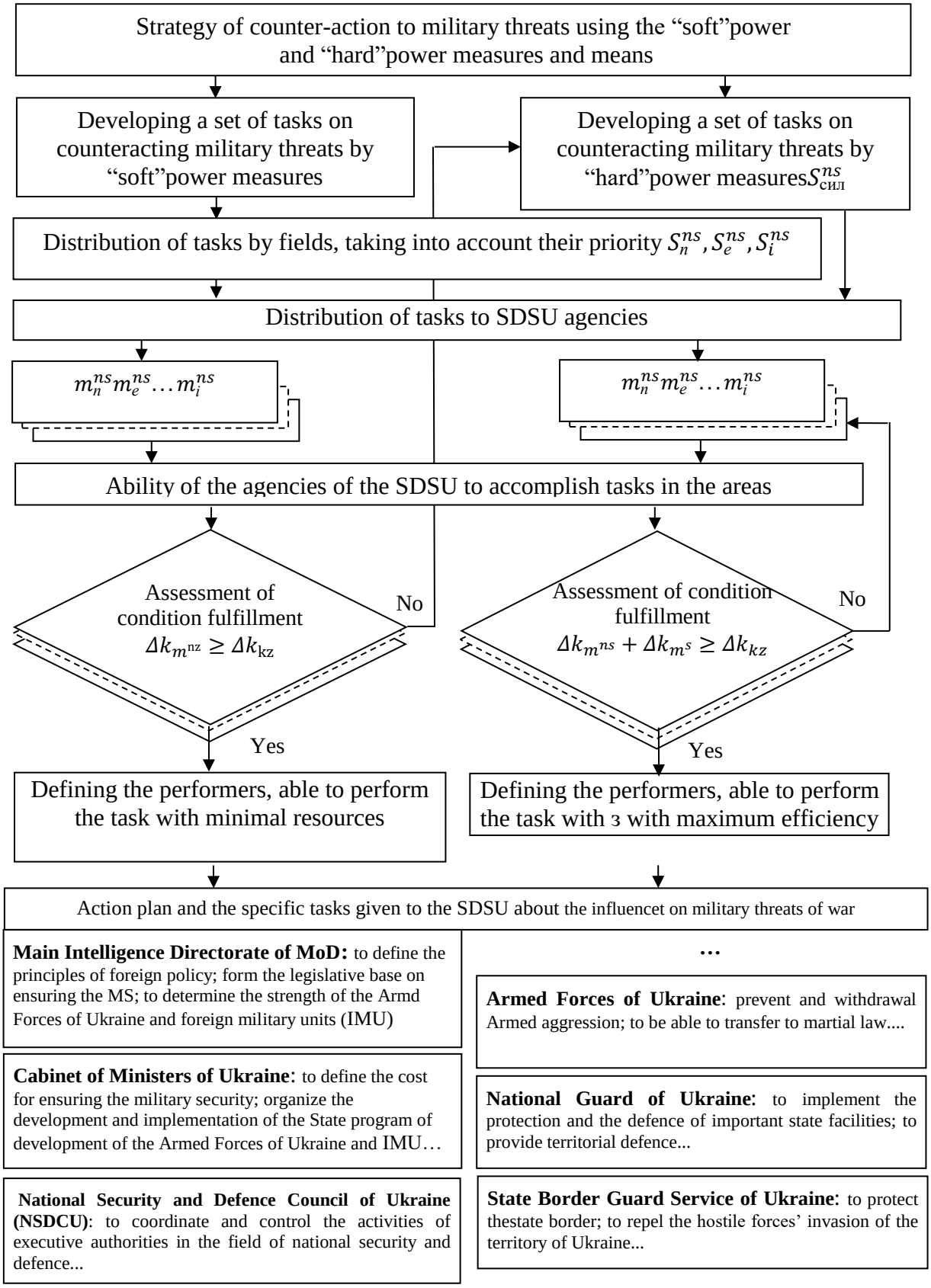


Fig. 4.6. Scheme of creating variant of actions to counter the military threats

Practical implementation of tasks, defined in this way, requires specific

management in the security and defence sector, appropriate information, analytical and resource support. In order to implement the proposed method, it is expedient to use information resources, technologies and analysts (experts) of the Main Situation Awareness Center (MSAC) of Ukraine as a software and hardware complex for collecting, collecting and processing information necessary for preparing and taking decisions in the field of national security and defence [19].

Therefore, the developed method of adaptive management an integrated counter potential discovered (projected) threat to ensure a certain level of MSof the state allows a justification on the composition of forces and means for purposes of deescalation threats, assess the capabilities needed to neutralize a specific threats of martial law or the hybrid nature of the individual components of the capabilities (agencies) defence and security sector in terms of resource limitations under single management, adapt to the level and the nature of the threats, and thus conserve the non-military measures of providing military security.

This method provides the most rational definition and implementation of partial neutralizing task by agencies within allocated resources.

Implemented in this way, the distribution of tasks enables you also to distribute responsibility for their execution in the system of providing military security, streamline the functions of the SDSU agencies, to improve management and expand opportunities for civilian control, to go to a centralized comprehensive ensuring the process of implementation of national interests, to strengthen the impact of civil society through the Institute of civic expertise of management decisions on the effectiveness of the functioning of the MSS.

The proposed method of adaptive management is integrated counter potential discovered (projected) threats to ensure a certain level of military security of the state and based on the basis of a comprehensive model of adaptive management of integrated potential to counter discovered (projected) threats to ensure a certain level of MS of the state.

Complex model of adaptive management of the integrated potential of counteraction to the detected(predicted) threat to ensure a certain level of military security of the state. As it was already mentioned in the first section of the monograph, in conditions of reforming the SDSU, the rational use of the available forces and resources, material, human and other resources, the integration of which will eliminate the duplication of tasks and the inefficient use of the very limited resources allocated in Ukraine to ensure its MS.

Consequently, it is necessary to develop a comprehensive model for managing the integrated potential of countering the military threats in order to form an integrated potential for countering threats, the main task of which is to ensure the level of military security determined in the legal space of the state and to take into account the adopted resource constraints.

As it was analysed in the first chapter of the monograph, the current state of the SDSU agencies does not provide an opportunity to ensure guaranteed response to the

actual threats to the national security of Ukraine.

Unresolved issues in the security and defence sector remain:

As the analysis conducted in the first section of the monograph showed, the current state of the components of the security and defense sector of Ukraine does not allow to ensure a guaranteed response to current threats to Ukraine's national security.

The unresolved issues in the security and defense sector remain:

- ineffectiveness of the mechanism of modern threats prevention to the national security of Ukraine and their neutralization;
- imperfection in the process of formation, coordination and interaction of the SDSU agencies while solving common tasks for ensuring the national security;
- incompleteness of the process of creating an effective resource management system in crisis situations that threaten national security;
- imperfect system of planning and joint use of troops (forces) and means, their training and provision, etc.

The main efforts to develop the SDSU are to focus on a phased and coordinated building-up operational capabilities of the security and defence forces and on their readiness to respond promptly to the challenges and threats to Ukraine's national security. In particular, it is necessary:

- to improve the conceptual and doctrinal principles of training and emplementing the SDSU troops(forces) and means;
- to centralize the SDSU command and control in peacetime, in crisis situations that threaten national security, and in a special period;
- to increase the level of interagency coordination and interaction;
- to improve the system of state forecasting and strategic planning, the system of planning of eplementing the Security and defence sector of Ukrainetroops(forces) and means.

Major directions of achieving the necessary capabilities are:

- rational distribution of tasks in the SDSU, the formation of system for security and defence forces command and control, depending on the type of crisis situation (threat) and taking into account the diversity of the risks to national security;
- improvement of the planning system for the employment, management and interaction of the security and defence forces during the elimination (neutralization) of actual threats;
- creation of a unified system of situational centers of state agencies that are part of the security and defence sector of Ukraine, as well as other agencies of the state and local government, ensuring its effective coordination with the use of the capabilities of the Main Situation Awareness Center of Ukraine;

- creation of a system for monitoring, analyzing, forecasting, modeling and supporting decision-making in the field of national security and defence on the basis of common methods prepared using the capabilities of the MSAC of Ukraine.

It stands to reason, the decisions that are made in the interests of defence capability providing, are accountable. They require systematic consideration of the influence of many factors. It is possible only with a preliminary study of their impact on the level of military security provided in the state.

The practical implementation of the directions of the SDSU development plan specified in the Concept of development for the achievement of the necessary capacities to ensure a certain level of MS of the state is complicated due to the lack of appropriate scientific-methodological base and scientific and methodological support.

In the second section of the monograph it is shown that in modern conditions precisely because of the lack of systematic research and scientifically grounded practice in solving the problems of military security, the effectiveness of the implemented measures in the field of defence and created for their realization by state and non-governmental organizations and structures is revealed. At the same time, with the increase of the latter, the effectiveness of their activities (through duplication of certain functions and struggle for “survival”) is reduced. At the same time, the economic and material costs of solving these problems are increasing significantly.

The results of conducted researches show that the set goals in the field of ensuring the state MS can not be achieved without the development and consistent implementation of a single flexible state policy, the integration of forces and means of the security and defence sector, the creation and implementation of a single system of mutually agreed and well-balanced measures of economic , political, informational and organizational character, adequate to the threats to the vital interests of society and the state.

There is no doubt that a comprehensive study can only be carried out with appropriate models, among which the integrated model of adaptive management of the integrated potential of counteracting military threats (IPCMT) is of central importance.

The complex model of adaptive management of the integrated potential of counteracting military threats is developed on the methods of system analysis, methods of research of operations, analysis of hierarchies, probability theory and forecasting, expert estimation and modeling. It can be used by the highest military-political leadership of the state in situational control centers during planning and conducting purposeful policy to ensure the necessary level of military security of the state, as well as in educational, scientific and research institutions during the study of crisis situations and ways out of them.

The generalized structural scheme of the complex model of adaptive management of integrated potential for counteracting military threats corresponds to the conceptual model of the creating the integrated potential of counteraction to the MThs, which is shown in Fig. 3.1.

Adaptation of the complex model is carried out at the expense of multi-channel feedback, which determines the real possibilities of the existing variants of integration of forces and means to neutralize the detected (projected) threats to ensure a sufficiently standardized level of MS of the state. The specific feature of the complex model of adaptive management of integrated potential for counteracting military threats is that this model allows accomplishing as a direct task the calculation of the real possibilities of the state for the ensuring of MS, as well as the reverse task of calculating the necessary integrated capacity of forces and means to provide the normatively established level of MS of the state.

The essence of the appointment, requirements, fulfilling tasks, input information and output data for the most important modules of the complex model is similar to the conceptual model of the creating of the integrated potential of military threats counteraction, the description of which is given in paragraph 2.3.

Thus, the proposed complex model of management of the integrated potential of counteraction enables not only to substantiate the most rational composition of forces and means for de-escalation of detected (predicted) threats, to evaluate the real possibilities for neutralization of specific military threats in accordance with the adopted in the state strategies for ensuring military security. It enables to evaluate the effectiveness of the individual components of the SDSU forces and means that are integrated for de-escalating threats to the state, as well. The considered conceptual descriptions of partial models contain doctrinal strategies that need to be used while completing technical tasks for the development of partial computer programs that are information-related to the software of the Main Situation Awareness Center of Ukraine.

4.3. Methodology for adaptive management of the integrated potential of counteracting military threats aimed to provide a certain level of military security of the state

A rational application of available forces and means to counteract military threats in order to ensure a certain level of MS of the state becomes an urgent issue in the face of limited financial and human resources. It is the integration of the efforts of all agencies of the Security and defence sector of Ukrainefor such a counteraction that must be one of the key issues in the reform of the SDSU. Its practical implementation requires, besides other issues, the development of a new and improvement of existing methodological apparatus in the field of ensuring the MS.

This is stipulated by:

firstly, the current regulations [1-3, 19] define only the general ways of forming the national security and Defence capabilities of the state and the necessity of joint application of forces and means available in the SDSU;

and *secondly*, there is not only a methodology for selecting a group of military and non-military agencies of the SDSU to be engaged in a joint counteracting military and hybrid threats, but also particular methods on this issue.

There are some scientific publications elaborating those issues [21, 24, 25]. But the lack of a methodological apparatus, which could be used to allocate tasks and substantiate necessary for their implementation forces and means, procedures for substantiating such tasks does not allow to manage effectively the integrated potential of counteracting military threats to ensure a certain level of military security of the state.

The above mentioned issues confirm the urgent need to develop a methodology for managing the integrated potential of counteracting military threats in order to ensure a certain level of military security of the state (hereinafter - Methodology) as a component of the methodological apparatus in the field of military security providing.

The methodology is based on the abstract theorems outlined in the paper [21] and reveal the method of forming a group SDSU agencies for a comprehensive counteractivities to a detected (predicted) threat, and on the method proposed in this monograph and the integrated model of adaptive management of the integrated potential of counteracting a detected (predicted) threat. In addition, the Methodology implements general strategies on the integrated capacity of the SDSU to counteract the military threats in terms of its formation and management.

The Methodology organizes and formalizes only a part of the overall respond process of the military security system of the state to a detected or predicted military threat. However, this part of the process is considered to be more important, since the effective implementation of the specified tasks by the SDSU agencies will stipulate the final outcome of the neutralization (elimination) of the threat, as well as the time and resources that should have been engaged.

The Methodology does not take into account the different subordination of the SDSU agencies to distinct branches of state administration (power) (presidential, parliamentary, Cabinet of Ministers of Ukraine). The Methodology assumes that the issue of management has been resolved, and the interaction between the agencies of the SDSU is thoroughly organized.

The main source data for the Methodology is:

- characteristics of the detected or predicted MS z;

- determined “neutralization shif”, which is needed, $\Delta K_{\mathrm{NShN}}(T_{\mathrm{pr}})$ for neutralization of the detected or predicted threat;
- available capabilities x_{s} and resources of agencies (M) of the SDSU, determined level of military security.

The project capabilities of the entities which are considered to be candidates for the formation of the integrated potential for the neutralization of the threat are determined by solving the inverse problem (see formula (3.1)) with the use of computer technology M7 [25].

The Methodology assumes that each *s-th* agency of the SDSU has a purpose. Its realization requires the appropriate capabilities which can not be duplicated. The choice of the entity is determined by the nature of the *z* threat. Since the nature of the threat is determined by the areas in which conflicts are manifested, the agencies chosen to neutralize the threat must be able to influence the conflicting state in these areas in a way leading to reduction of the threat indicators.

It should be noted that according to the method of management of integrated potential of counteraction [26] at the organizational level, the *s-th* agency is tasked to reduce the threat at a necessary level, and the choice of necessary means and forces, tactics and actions at the implementation level is determined by the *s-th* agency. However, all actions of each agency are controlled from the point of view of the achievement of a defined “neutralization shift” $\Delta K_{\mathrm{NShN}}(T_{\mathrm{pr}})$ and timely adjustment of tasks to other agencies in case of non-fulfillment of such a condition by any of the agencies.

The methodology consists of ten stages (Fig. 4.7). The proposed methodology for the formation and management of the integrated potential for counteracting military threats to define a certain level of military security of the state is based on the method of expert intermediate scenarios [27], the improved method of analysis of hierarchies [24], methods of expert evaluation, brainstorming, Ishikawa and comparison.

At *the first stage*, monitoring of the security environment for the detection of threats *{z}* to the military security of the state is envisaged. The organization of monitoring is disclosed in works [24, 28]. The result of the monitoring is the detection of a military threat (z) (or threats *{z}*) that can significantly affect MS of the state. A generalized monitoring scheme for threats to the MS of the state is presented in Fig. 4.8.

This influence is evaluated by the level of military insecuruty $K_z(t)$. In case the threat reaches or exceeds a threshold level of insecuruty K_{thrd} (Fig. 4.9) it is recommended proceeding to the second stage of the Methodology.

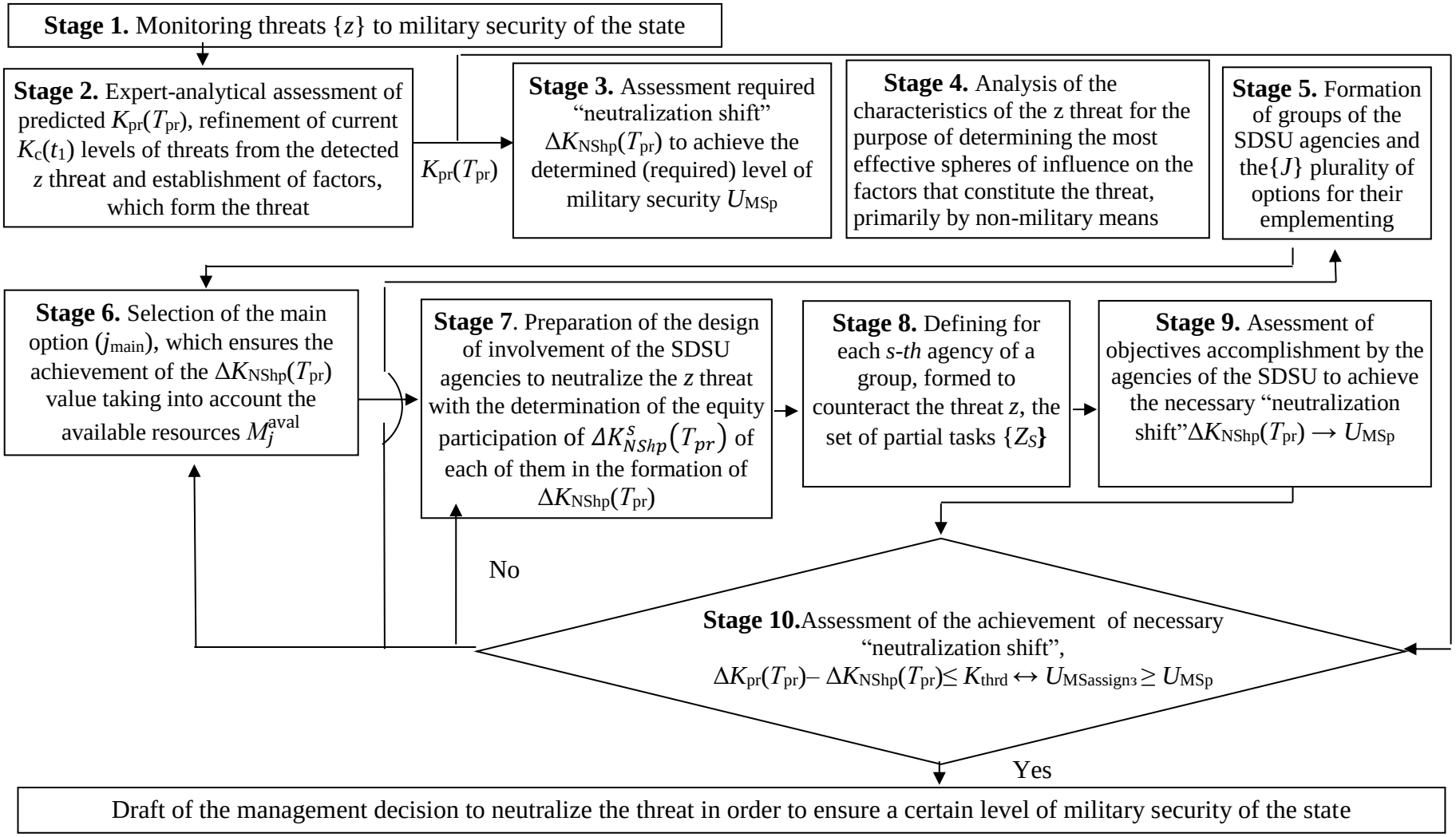


Fig. 4.7. General scheme of a complex methodology of managing the integrated potential for counteracting military threats to ensure a certain level of military security of the state U_{MScer}

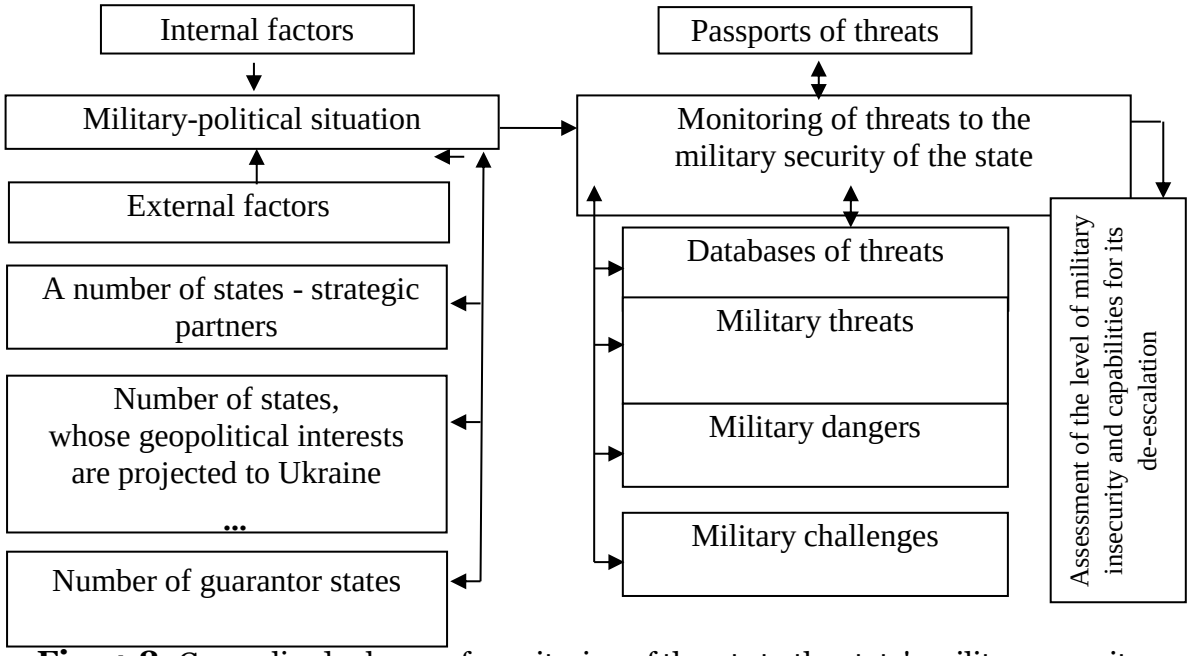


Fig. 4.8. Generalized scheme of monitoring of threats to the state's military security

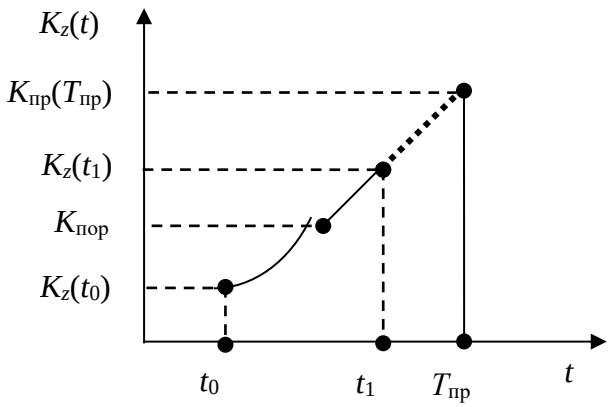


Fig. 4.9 Variant of dynamics of the level of military insecurity from the threat *z* according the result of monitoring

At *the second stage*, the expert-analytical estimation of the predicted $K_{PR}(T_{PR})$ and the refinement of the current $K_{п}(t_1)$ levels of insecurity from the detectedthreat *z* and the establishment of factors that constitute the threat are carried out. This stage is key to the further organization of counteraction to the threat *z*, since the accuracy of prediction of the level of military insecurity and the completeness of the factors forming it will affect the effectiveness of all subsequent steps to neutralize the threat. Factors forming the threat will determine the spheres of the state's activities, which should be used to organize the counteraction to the detectedthreat.

At the third stage, the desired "neutralization shift" $\Delta K_{NShp}(T_{pr})$ to achieve a reduction in the level of military insecurity slightly below its threshold level (see fig. 3.2).

At *the fourth stage*, an analysis of the factors that create the threat is carried out in order to establish the most appropriate spheres of influence on them, primarily by "soft" poer means (Fig. 4.10).

The detectedareas (where the implementation of measures are the most appropriate to neutralize the detectedthreat) will determine the number of SDSU

agencies $\{S_z\}$, whose competence and capabilities enable them to act in these areas with appropriate forces and means.

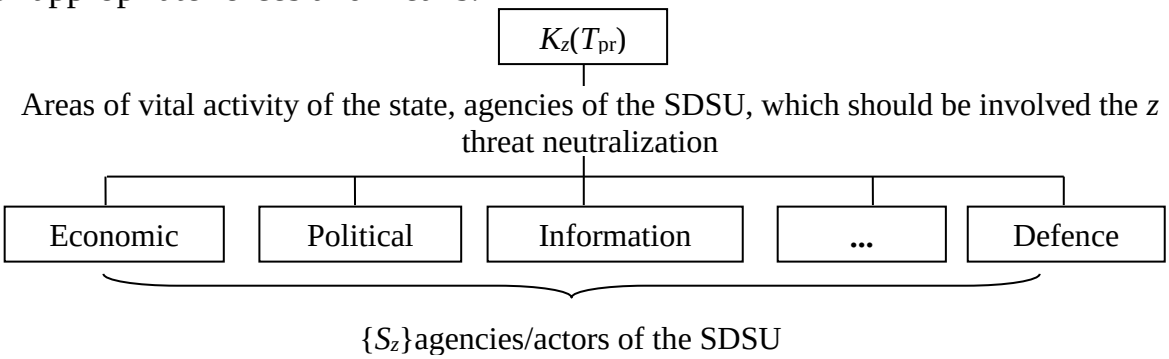


Fig. 4.10. General view of the approach to the formation of a plurality of SDSU agencies $\{S_z\}$, that have an impact on the factors that constitute the threat z

At *the fifth stage*, the formation of groups of the SDSU agencies and $\{J\}$ plurality of variants of their application is considered. Formation of a group of the SDSU agencies for the creation of an integrated potential of military and non-military means of the SDSU in the interests of a complex counteraction to the detected(predicted) threat is carried out according to a separate methodology.[6].

The existence of a number of variants of use of forces and means of the SDSU to neutralize the detected (predicted) threat is explained by various possibilities of the SDSU agencies, the availability of resources, necessary for execution of the tasks of time, etc.

At *the sixth stage*, the main version of J_{main}, is chosen. According to experts, it provides the necessary amount of "neutralization shift" $\Delta K_{NShp}(T_{pr})$ to neutralize the detected (predicted) threat, based on available resources $M_{j\ avail}$.

At *the seventh stage*, an intent (proposals) with regards to involvement of the SDSU agencies in order to neutralize the detectedthreat by determining the equity participation of each agency $\Delta K_{NShp}(T_{pr})$ in the formation of the necessary "neutralization shift" ΔK_{NShp} (T_{pr}).

The plan (proposals) determine:

- factors that create a threat and choose the factors that are primarily aimed at the main efforts of the SDSU agencies;
- sequence of certain activities;
- responsible executors from the involved SDSU agencies;
- deadlines for their implementation, etc.

At *the eighth stage*, in accordance with the plan approved by the DM, the proposal to each *s-th* subject of the group formed to counter the detectedthreat, $\{Z_S\}$ a set of partial objectives is determined. The basis of the task definition is the assessment of the expected degree of reduction of the impact of the detected threat Δ on the execution by the s-th SDSU agency (determined on the Saati scale) and the results of assessment of required capabilities (table 4.3).

Table 4.3

Required neutralizing impact on the indicators of the detected (predicted) threat in the *s-th* sphere (by the *s-th* agency) on the Saati scale

Agencies (spheres)	"Value" (priority)P_{sn}	Indicator of required capability P_{spn}	Degree of reducing the impact of the threat indicator Δ_{SN}
1	P_{1N}	P_{1p1}	$-\Delta_{11}$
		…	…
		P_{1pN}	$-\Delta_{1N}$
…	...	…	…
S	P_{SN}	P_{Sp1}	$-\Delta_{S1}$
		…	…
		P_{SpN}	$-\Delta_{SN}$

At *the ninth stage*, they assess (predict) the ability to execute the task by SDSU agencies to achieve the desired "neutralization shift" under certain conditions and available resources, that is, they believe that achieving the desired "neutralization shift" by each SDSU agency will provide the necessary (determined) level of the state MS regarding to the detected(predicted) threat:

$$\Delta K_{\mathrm{NShp}}(T_{\mathrm{pr}}) \rightarrow U_{\mathrm{ВБп}}. \tag{4.2}$$

At *the tenth stage* of the Methodology, the achievement of the necessary "neutralization shift" by the system of ensuring the military security of the state, that is, achieving a determined level of MS is prognostically evaluated U_{MSdet}:

$$K_{\mathrm{pr}}(T_{\mathrm{pr}}) - \Delta K_{\mathrm{NShp}}(T_{\mathrm{pr}}) \leq K_{\mathrm{п}} \leftrightarrow U_{\mathrm{MSdet}} \geq U_{\mathrm{MSp}}. \tag{4.3}$$

If this condition is not fulfilled on projections, then they return consistently to steps 7, 6, 5, and if not, they begin to carry out the planned measures to neutralize the detectedthreat.

Therefore, the proposed methodology of management of integrated potential for counteracting military threats to provide a certain level of military security of the state creates a methodological basis for the organization of neutralization of the detected(predicted) threat (reduction of the level of military insecurity to an acceptable value) by a reasonable choice of a group of non-military and military agencies of the SDSU and defining partial tasks for each of them. Due to the complex employment of the forces and means that the SDSU agencies possess for neutralization of the detected (predicted) threat, and provided that they have a unified management, they achieve a synergistic effect of neutralizing the threat and more economical consumption of state resources.

Thus, the Methodology is based on the method of expert intermediate scenarios, the improved method of analysis of hierarchies, methods of expert

evaluation, brainstorming, Ishikawa and comparison, envisages carrying out an evaluation of the level and nature of the threat to the military security of the state, determining the necessary "neutralization shift" of this threat, formation of groups of agencies in the security and defence sector (mainly non-military), substantiation of tasks for each entity in such a way that their joint execution, subject to a unified command, fosters de-escalation of the detected (predicted) threat to a reasonable level.

4.4. Method of creating a group of the security and defence sector agencies for complex counteracting the detected (predicted) threat

Analysis of recent researches suggests that considerable attention is being paid to the challenges of complex threats. Thus, in the monograph [4] the theoretical foundations of formation, legitimization and realization of national interests have been studied, problems of their protection have been identified. However, the scientific and methodological apparatus for substantiation of the necessary forces and means for their protection is not considered in the research; methods and methodologies that could be used to evaluate the level and nature of the threats to the realization of national interests have not been given.

The research [20] substantiates the need for a division of tasks and resources to ensure the national security and a conceptually outlined approach to the division of work in security and defence structures. However, the methodological apparatus that can be used for the division of tasks and the substantiation of the forces and means necessary for their execution is not given.

The research [29] suggests that in real conditions some states face extremely negative "public opinion" and possible international sanctions in their attempt to use military force to solve the tasks of providing security. It has become one of the factors that prompts accelerated development of non-military means and methods of warfare, for which the concept of irregular warfare has been developed. The latter implies the widespread use of partisan, sabotage and special forms and methods of warfare.

The research [30] states that the important characteristic of modern wars is multidimensionality, which is formed by combining informational, military, financial, economic and diplomatic influences on the enemy in real time.

Multidimensionality is fully inherent in the hybrid conflicts of the non-conventional nature, with the participation in the combat actions of such armed formations of non-state actors as international terrorism, private military companies (PMCs) with their blurring of national and ideological affiliation. In addition, the ratio of military and non-military methods of actions, used by the parties to the conflict, are changing. Non-military means in the hybrid warfare include traditional and public diplomacy, legal, economic, ideological and psychological, information,

humanitarian, intelligence, technological and some other tools of actions. It is emphasized that the right choice of the strategy of using such a set of means makes it possible to achieve a cumulative, systemic (synergetic) effect. However, the publication does not address the theoretical justification of the use of non-military meanss, both independently and in conjunction with the military ones.

The comprehensive research [8] suggests a method for substantiating tasks related to security support for the implementation of national interests in the system of ensuring national security. According to the method, the threat (threats) of national interests detectedduring monitoring, is expected to be eliminated or neutralized by joint efforts of the entities of the national security system without the use of “hard” power methods and means, and in case of their ineffectiveness, to justify the tasks to the relevant agencies for the use of “hard” power methods and means. However, the procedure for tasks substantiation is not provided.

As it can be seen from the analysis of the above publications, they do not include approaches to the selection of a group of “hard” power and “soft” power agencies/actors to engage in a joint counteracting the military and so-called hybrid threats. They have recently become massively used in the realization of national interests both with the use and without the use of military force.

Consequently, it is necessary to develop a method of forming a group of SDSU agencies for a comprlex counteractivity to the detected(predicted) threat.

One of the main conditions for effective integrated use of “hard” power and “soft” power means of the Security and defence sector of Ukraineduring the neutralization of military threats is the requirement for a detailed study of the nature of the created insecurity (threat). It has to be subsequently considerated when assessing the level of military insecurity $K(t)$ and the formation of the group of the SDSU agencies for organizing a comprehensive counteractivity.

The experience of armed conflicts over the last decade shows that non-military (hybrid) instruments are used by victim states that suffered from aggression to counteract the military threats, including the means of information confrontation, military-political influence, military-economic pressure, as well as asymmetric measures, such as the use of Special Operations Forces (SOF) to form the “necessary” public opinion and provide support from the local population, etc.

The peculiarity of these conflicts is that globalization, the hybridization of world politics and the development of information and communication technologies are key factors that cause radical changes in their forms and methods and shape their new qualities. The combined, integrated action of these factors leads to the emergence of a new type of conflict – the hybrid war [30] as an important stage in the transformation of quantitative changes in the forms and methods of warfare, which witnessed the transition from the linear paradigm of war to nonlinear.

It should be emphasized that the preservation of nuclear and conventional high-precision weapons stimulates the development of new, modern warfare technologies that make it possible to significantly limit the direct military-power impact that was

characteristic of past conflicts. However, the classical military-power arsenal of the state is maintained and improved.

Under these conditions, there is an objective need for an adequate response to the above-mentioned factors due to the complex use of “hard” power and “soft” power means of the state. The effectiveness of such an integrated use of “hard” power and “soft” power means of the SDSU during the neutralization of the war and hybrid threats depends on the capabilities of the agencies involved in counteraction, the effectiveness of the tasks assigned to these agencies, the resource provision and the effectiveness of managing the process of de-escalating threats, and so on.

It is natural, that the employment of this or that agency should be based on the assessment of the party from which the threat is detectedor predicted, the scale and nature of this threat, as well as other factors which form it, or intensify and destructively affect the significant spheres of the vital activities of the state. Unfortunately, at this time, the subject is chosen without proper justification with a large degree of subjectivity, usually by the decision maker (the leader). Automating such an approach to selecting subjects and defining their tasks is still impossible due to the lack of development of the corresponding methodological apparatus and specialized information technologies.

In our opinion, *the method of forming a group of agencies (MFGA) of the the security defence and sector for a comprehensive counteracting the detected(predicted) threat* may be one of the practical steps towards solving this problem.

The method is in the consistent implementation of certain procedures aimed at obtaining the necessary information on the MThs and its characteristics, determining the rationale (necessary) in terms of attracting available resources the level of de-escalation (“neutralizing shift”) of the threat and the formation of the necessary Sj group of “hard” power and “soft” power means of the the security and defence sector of Ukraine:

$$\{\boldsymbol{S_1},\ldots,\boldsymbol{S_j},\ldots,\boldsymbol{S_J}\} \Rightarrow \boldsymbol{\Delta K_{NSh}(t)} \text{provided that } \sum \boldsymbol{R_j} \leq \sum \boldsymbol{R_j^*}, \qquad (4.4)$$

where J – number of agencies in the group;

R_j – the resource involved by j-th agency;

R_j^* – resource allocated to j-th agency.

Thus, the purpose of the proposed method is to form a group of SDSU agencies $\{S_J\}$, that is capable of preventing the level of insecurity from the detected (predicted) MS above acceptable, provided sufficient resources supplies.

The block diagram of the method is shown in Fig. 4.11.

Carrying out mentioned procedures of the method can be combined in several stages.

At *the first stage*, monitoring is carried out, during which military and hybrid threats (insecurity and other destructive factors) are revealed by those states that consider them as potentially dangerous.

At *the second stage*, for each detectedz-th threat an assessment of its level of insecurity $K_z(t)$, is carried out, which is compared with the predicted allowable (threshold) level $K_{\text{thrd}}(t)$, of the nature and degree of influence on other areas of national security. Based on the information received, the DM decides how to respond to the detectedthreat. Mandatory elements of such a decision should be:

- proposals for the creating an operational management body to counteract the threat;
- defined required level of de-escalation ("neutralization shift") of the $K_{\text{NShr}}(t)$threat;
- a list and volumes of resources that can be pre-allocated to neutralize the threat;
- - a list of agencies, which are expedient to involve into creation of the integrated potential of counteraction to *z*-th threat.

At *the third stage*, a number of variants of integration of militaryand non-military means (measures) of the SDSU are formed to create the integrated potential of counteraction (de-escalation) of detected threats.

Each agency is given its own vector of neutralization tasks $\{P_{Sn}\}$. For each *j-th* variant of the SDSU agencies, involved in counteracting the threat, using the M7 model [2] by solving the inverse problem the required level of objective completing by each agency is determined so that the predicted level of de-escalation of the threat reaches the required level:

$$K_{\text{NSh}}(t) \geq K_{\text{NShc}}(t). \tag{4.5}$$

An option that ensures the fulfillment of the condition (4.5) is taken as the main one. Agencies that ensured the realization of the condition (4.5) by the decision of the DM form a threat neutralization group, which is subordinated to the operational management body for the entire duration of the counteraction to the *z-th* threat. In the future, the leaders of the groups, by their decision, form the quantitative composition of their group, complete the group with the necessary AME, communication facilities, specialized non-military means and other resources, conduct coordination and other necessary measures for the preparation for task accomplishment.

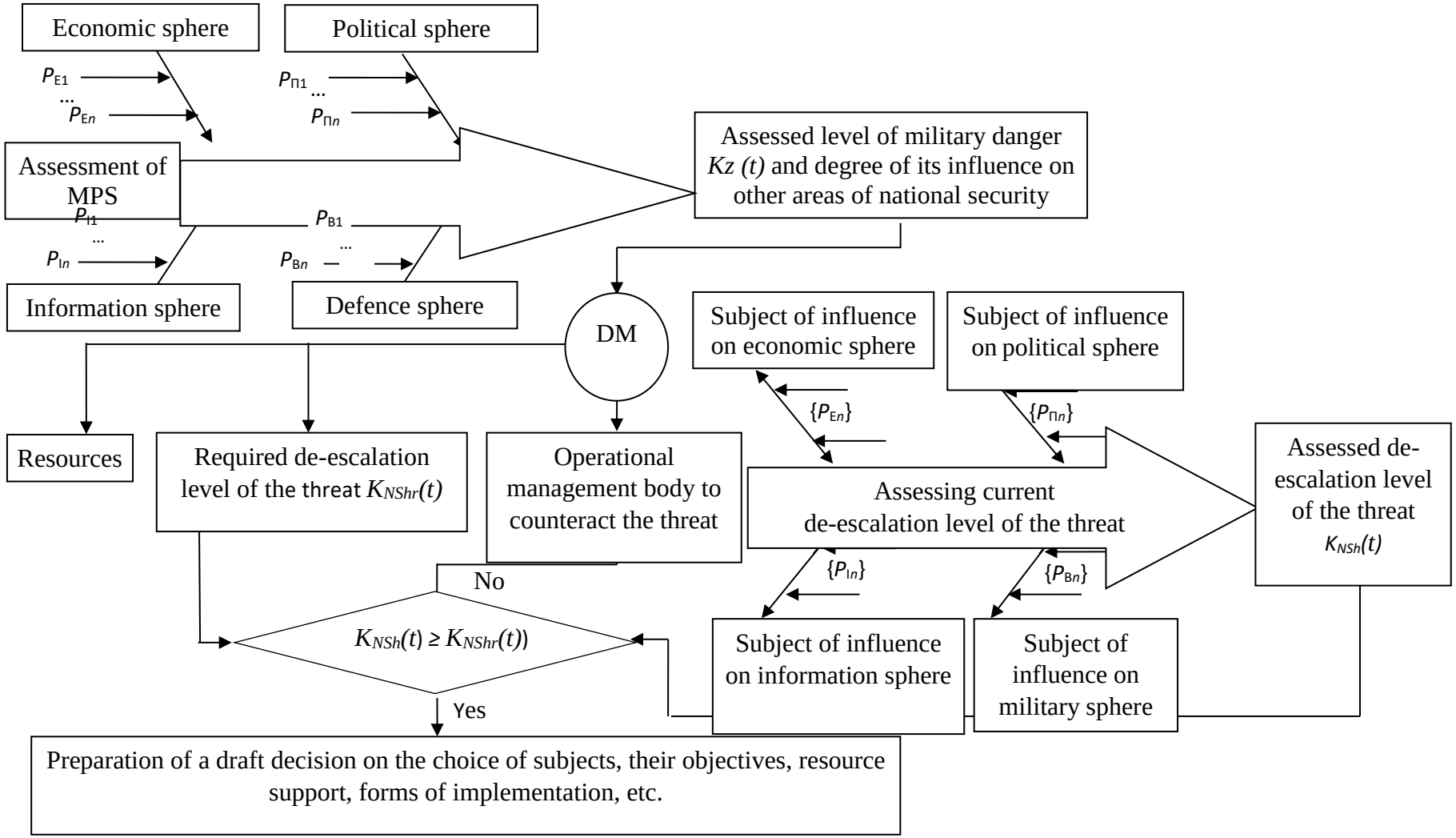


Fig. 4.11. Block diagram of formation of a group of SDSU agencies for a complex counteraction to the identified threat

Thus, the above method determines the sequence of procedures for obtaining the necessary information about the military or hybrid threats, their characteristics, the definition of the threat, in terms of attracting available resources, the level of de-escalation ("neutralizing shift") of the threat and creating necessary for this task group of "hard" power and "soft" power means (measures) of the SDSU. Each agency in the created group is given its vector of neutralization tasks and the required level of their implementation in such a way that the predicted level of de-escalation of the threat reaches the required (sufficient) level.

The proposed method of formation of a group of SDSU agencies for a complex counteraction to the detected(predicted) threat makes it possible to form a group of agencies, with the joint efforts of which, first of all, 'soft' power methods, to ensure de-escalation (neutralization) of the threat to an acceptable level within the allocated resources. In the case of inefficiency of "soft" power methods and means, the method provides substantiation of tasks to the relevant SDSU agencies regarding the use of "hard" power methods and means for the joint tasks completing, aimed at de-escalation of the detected (predicted) threat.

Proposed method is the basis of a complex model of adaptive management of the integrated potential of counteraction.

4.5. Methodology of creating a group of the security and defence sector agencies for complex counteracting the detected (predicted) threat

Analysis of recent studies on the joint involvement of certain agencies of the Security and Defence sector to counteract threats [2, 4, 5, 7, 20, 30] indicates that considerable attention is being paid to the challenges of complex threats. Thus, in the monograph [4] there has been proposed a method for determining the strategic tasks for the agencies of the ensuring MSS in relation to the neutralization of military threats in the conditions of a non-aligned status, but there are no variants of integrating the efforts of individual elements of the system in the monograph.

The theoretical bases for the formation, legitimation and realization of national interests and the problem of their protection has been investigated in papers [4, 5], but the methodical apparatus for substantiating the necessary forces and means for their protection has not been considered, methods and techniques that could be used for evaluating the level and nature of threats to the realization of national interests has not been described.

According to the method described in the paper [7], the increase in the threat to the realization of national interests (threat) identified during monitoring is supposed to be eliminated or neutralized by joint efforts of the national security system

agencies without the use of military methods and means. In the case of their ineffectiveness, the method involves setting tasks to the relevant agencies to use “hard” power methods and means. However, the procedure for substantiating tasks is not defined.

In general, it may be noted that the methodical apparatus that can be used for assignment of tasks and the substantiation of the appropriate forces and means necessary for their implementation needs to be improved. Currently, there is also not enough work on the theoretical justification of the use of non-military means both independently and with military ones.

Consequently, the lack of a methodology for choosing a group of military and especially non-military agencies to engage in counteracting joint military and so-called hybrid threats and certain techniques on this issue in order to jointly combine threats to this issue necessitates the development of a methodology for creating a group of SDSU agencies to create an integrated potential of military and non-military means of the SDSU in the interests of complex counteraction to the detected(predicted) threat as part of the relevant methodology.

It is clear that under such conditions it is not possible to automate the existing approach to selecting agencies and defining their tasks. In our opinion, the proposed methodology for creating a group of SDSU agencies can increase the degree of justification of the choice of SDSU agencies and the sharing the objectives between them for a comlex counteraction to the detected(predicted) threat.

General strategies of the methodology. The purpose of proposed Methodology is to determine the order to create such group SDSU agencies ({*Sj*}) that are capable of preventing exceeding the level of danger from the detected (predicted) MS in comparison with the permissible, as long as sufficient resources are provided.

This methodology is the method of forming a group of agencies of the defence and security sector for a complex counteraction to the detected(predicted) threat, given in item 4.4 of this monograph.

Structurally, the methodology for forming a group of defence and security sector actors for a complex counteraction to the detected (predicted) threat comprises several stages (Fig. 4.12).

At the *first stage*, based on the results of the security environment analysis, military and hybrid threats *{Z}* are detected by those states considered potentially dangerous from a military point of view.

On the basis of the monitoring of detectedthreats, the assessment of the level of military danger from the selected threat $K_z(t)$, identification of the factors that shape it and their connection to the S_j spheres of life of the state.

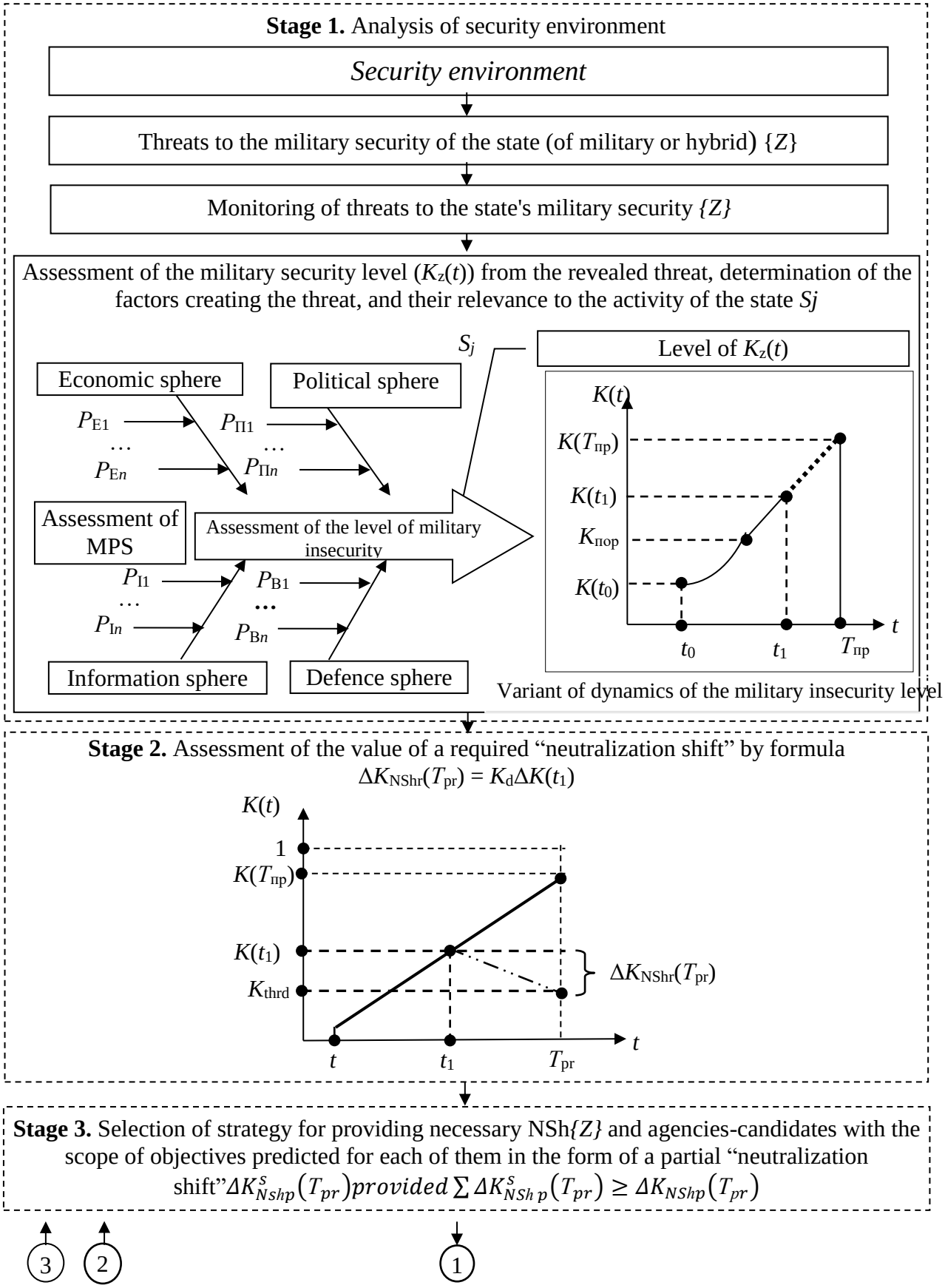
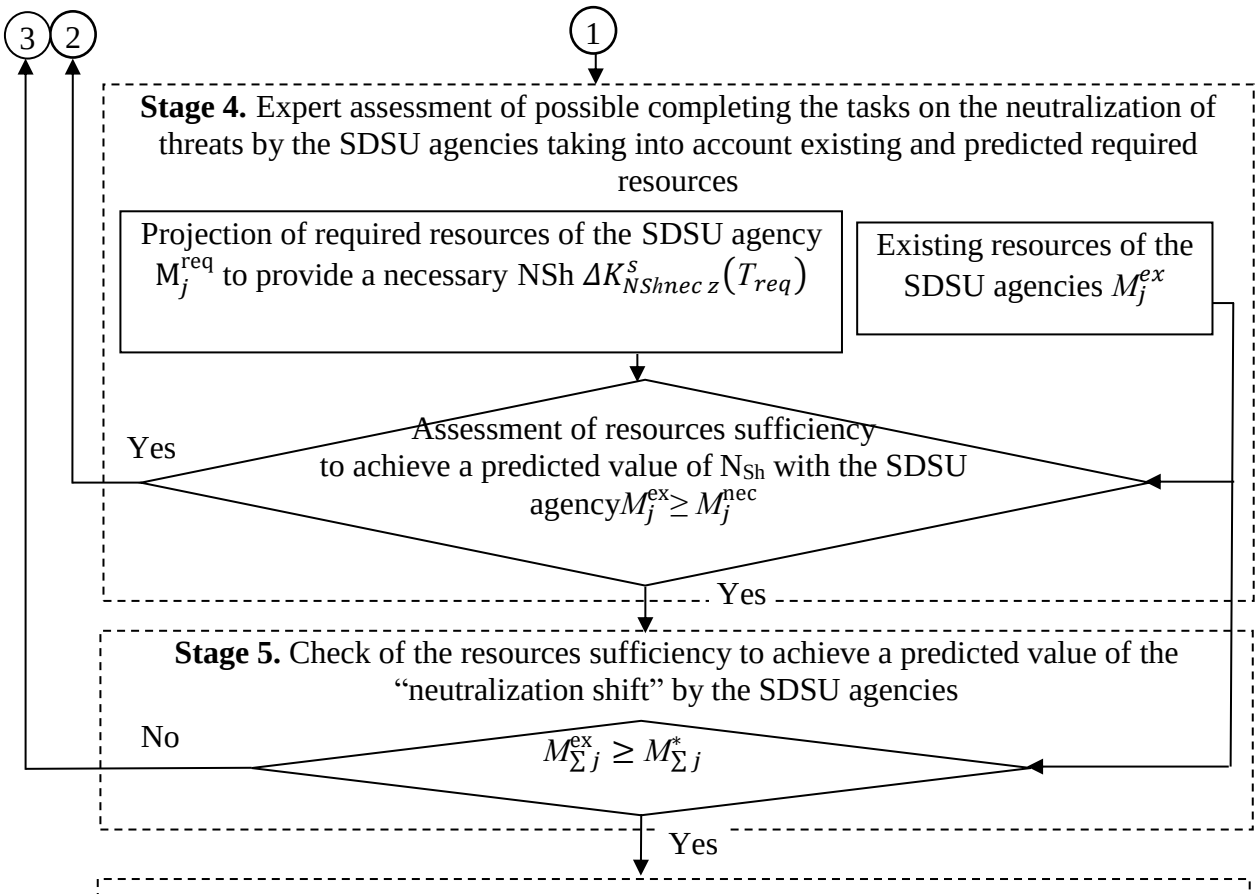


Fig. 4.12. General structural scheme of the methodology of creating a group of SDSU agencies



Stage 6. Preparation of draft decisions on the choice of agencies, their tasks, resource support, forms of implementation, etc.

Stage 7. Formalization of the decision on the creating a group of SDSU agencies for a complex counteracting the detected (predicted) threat, their required neutralization capabilities

Agency (spheres	"Value" (priority) P_{sn}	Required neutralization effect on the indicators of threats загроз *z* in *s*-th (by *s-th* agency) on the T. Saati scale	
		Indicator of required capability	Degree of reducing the impact of the threat indicator Δ
1	P_{1N}	P_{1p1}	$-\Delta_{11}$
		…	…
		P_{1pN}	$-\Delta_{1N}$
…	…	…	…
S	P_{SN}	P_{Sp1}	$-\Delta_{S1}$
		…	…
		P_{SpN}	$-\Delta_{SN}$

for a complex counteraction to the detected (predicted) threat

At the *second stage*, using the computer technology M7 [4, 24], in an iterative way, the value of the required "neutralization shift" ΔKNShreq(Treq) is estimated by decreasing the "weight" (priorities) of the threat z on the Saati scale until the value is reached

$$\Delta K_{\mathrm{NSh}}(T_{\mathrm{req}}) = K_{\mathrm{d}}\Delta K(t_1), \tag{4.6}$$

where T_{req} – is the time required to obtain the required "neutralization shift" from the beginning of the threat neutralization (may range from the several months up to the several years);

t_1 – is the time to begin to neutralize the threat.

The resulting "neutralization shift" thus becomes the basis for the comprehensive use of military and non-military means of the particular SDSU agencies.

At the *third stage*, they choose the strategy of providing the necessary "neutralization shift" taking into account the possibilities of the agencies, which provides for the use of the most effective forces and means of the SDSU in those or other spheres of influence on the factors that create military (hybrid) threat. Agencies, that are supposed to be candidates for that, experts in the field of national and military security selected by the method of "brainstorming".

At this stage, the scope of tasks for each chosen SDSU agencies is predicted in the form of a partial "neutralization shift".

It is recommended to select the entities concerned with the spheres in which the signs of the revealed threat of military (hybrid) nature are mostly manifested.

Forecasting the scope of tasks for each SDSU agencies occurs when the following condition is fulfilled

$$\sum_s \Delta K_{NSh}\left(T_{req}\right) \geq \Delta K_{NShpr}\left(T_{pr}\right). \tag{4.7}$$

The project capabilities of the entities considered as candidates for the formation of an integrated potential for neutralizing the threat can be determined by solving the inverse problem using computer technology M7 [4, 9], taking into account the condition (3.1).

At *the fourth stage*, an expert assessment of the ability of the SDSU agency to complete the threat neutralizing task, taking into account the M_j^{nec} projected (necessary) resources and available M_j^{ava} resources for the neutralization of the threat.

$$\mathrm{M}_j^{aval} \geq \mathrm{M}_j^{nec}. \tag{4.8}$$

If the condition (4.8) is not fulfilled, then a new iteration at the third stage takes place.

At the *fifth stage*, the sufficiency of the$M^{*}_{\sum j}$ allocated resources to achieve the predicted value of the "neutralization shift" is checked by the SDSU agencies:

$$M^{aval}_{\sum j} \geq M^{*}_{\sum j}. \tag{4.9}$$

If the condition (3.9) is fulfilled, the DM submitted for the approval a draft management decision to neutralize the detectedthreat by a certain group of agencies with substantiated tasks for each agency.

At the sixth stage, a draft decision on the choice of agencies, their objectives, resource provision, forms of implementation, etc. for a complex counteracting to the detected (predicted) threat is developed.

At *the seventh stage*, the decisions on the formation of a group of the defence and security sector agencies for a complete counteraction to the detected (predicted) threat, their necessary neutralization capabilities are formalized.

Of course, the practical implementation of the described steps of the Methodology requires specific management in the defence and security sector, relevant information, analytical and resource support.

4.6 Methodology of projecting the required capabilities of the integrated potential components of the threats de-escalation at the implementation level

Requirements for reforming the security and defence sector of Ukraine, which are defined in the existing legislation on national security issues [1, 2, 18], namely, the primary use of "soft" power structures and non-military measures to neutralize the military threats, necessitate the development of methodical apparatus to plan the necessary capabilities of the agencies of the security and defence sector of Ukraine, that are involved in the joint neutralization of threats to the state's military security. It is known that the use of the capabilities of the SDSU (military and non-military) to neutralize the military threats is possible due to the integration of the capabilities of some agencies of the security and defence sector of Ukraine, taking into account the nature of threats and existing scarcity of resources [4].

Availability this methodical apparatus gives us the possibility to eliminate or neutralize the detected (predicted) military and hybrid threats with the most rational use of resources that are available in the state, military and non-military (hybrid) means for proiding its MS.

Basic principles for substantiating the required capabilities of the security and

defence sector to counteract the military threats are outlined in the Concept of th e development of the security and defence sector of Ukraine [1]. While planning the required capabilities of the the security and defence sector of Ukraine it is necessary to take into account the enemy, the threat is identified or predicted from, the scale and nature of this threat, as well as other factors that enhance it and destructively affect the significant spheres of the vital activities of the state. It is desirable the process of planning the required capabilities of the SDSU at the implementation level to be formalized, accompanied by quantitative assessments and implemented with the use of appropriate information technologies.

The main essence of the proposed method of designing the necessary capabilities of the components of the integrated potential for de-escalation of threats at the implementation level is to form a target function F_z, which formally describes the reduction of the level of z to an acceptable level (that is the achievement through the joint use of military and non-military means of various SDSU agencies the necessary "neutralization shift" threat [27]).

The "neutralization shift" $\Delta K_{\mathrm{NSh\ des}}(T_{\mathrm{dwsr}})$, that is being designed, can be assessed using the M7 computer technology [4, 24] by the iterative method of reducing the indicators of "weight" (priorities) of the threat due to the integrated use of military and non-military means of some SDSU agencies.

The planning capabilities of some agencies of the Security and defence sector of Ukrainethat are considered to be the possible candidates for the formation of the integrated potential for the neutralization of the threat are proposed in the methodology to determine the solution of the inverse problem with the use of computer technology M7 [6-7], based on condition (4.7).

A hypothetical example of determining the required "neutralization shift" of the threat is shown in Fig. 3.2.

Since the required "neutralization shift" can be provided by various variants (j = 1, J), the involvement of S – some SDSU agencies and their capabilities x_s and requires appropriate resources; when making the final decision by the DM to form an integrated potential, it is necessary to take into account, first of all, the scarcity of resources.

Each *s-th* agency of the SDSU agency has its function and tasks for which it should have the appropriate capabilities. Usually, these capabilities should not be duplicated or do not exist at all. In addition, the agency needs to be provided with sufficient resources to perform specified objective. The choice of the actor must be determined by the nature of the threat. Since the nature of the threat is determined by the areas in which conflicts emerge, those agencies that are chosen to neutralize the threat should have the ability to influence the conflicting state in these areas in order to reduce the indicators of the threat that characterize it.

It is necessary to reduce the indicators of threat in selected areas, which is achieved

by the joint efforts of SDSU agencies, which are defined for its neutralization. It will be the "neutralization shift" that we need to achieve. It should be noted that according to the method of adaptive management of the integrated potential to counteract at the organizational level the tasks are set to the agencies, and as soon as those objectives are reached, the required level of threat reduction is received. The choice of necessary means and forces, the sequence of their application at the implementation level is the prerogative of the agency itself.

At the organizational level, a scientifically-methodical apparatus for determining the necessary "neutralization shift", that is described in detail in the paper [27], has been already developed. At the level of the agencies the methods of expert evaluation, brainstorming, ideas generating are currently being used, but all of these methods are characterized by poor accuracy, and the results obtained through them are subjective, as it is shown in the monograph [4].

Fundamentally new paradigm based on multidimensional research, the widespread use of mathematical models and methods, a multivariate analysis of development scenarios, and voluminous computing experiments and the latest information technologies that are informally compatible with situational centers serving the agencies of the state security and defence sector and the MSAC of Ukraine must be developed [31].

Proposed methodology for designing the objectives for the components of the integrated potential of counteraction to the military threats as for the neutralization of detected (predicted) threats, the structural scheme of which is shown in Fig. 4.13, is based on the method of expert-meaningful provisional scenarios [24], improved method of hierarchy analysis [4], methods of expert evaluation, brainstorming, Ishikawa's method and the method of comparison. The content of this methodology corresponds to the algorithm of designing the tasks of the components of the integrated potential of de-escalation the threats to the military security of the state, the scheme of which is shown in Fig. 3.3 and contains eight steps [32]. The partial objectives that are reached at each of these stages are as follows:

Stage No.1 Making a decision to neutralize the z threat identified during monitoring, which exceeded the ensuring MSS response threshold. It is assumed that the response threshold is determined according to the state's legislation. For each state that is considered as an eventual adversary, the level of the response threshold is defined based on normative standards.

Stage No.2 Choosing the agencies as the candidates for the creation of an integrated counteraction potential. It is carried out by the experts in the field of national and military security due to the method of brainstorming. It is recommended to select the agency that deal with the spheres where the signs of the detected military (hybrid) threat are the most evident.

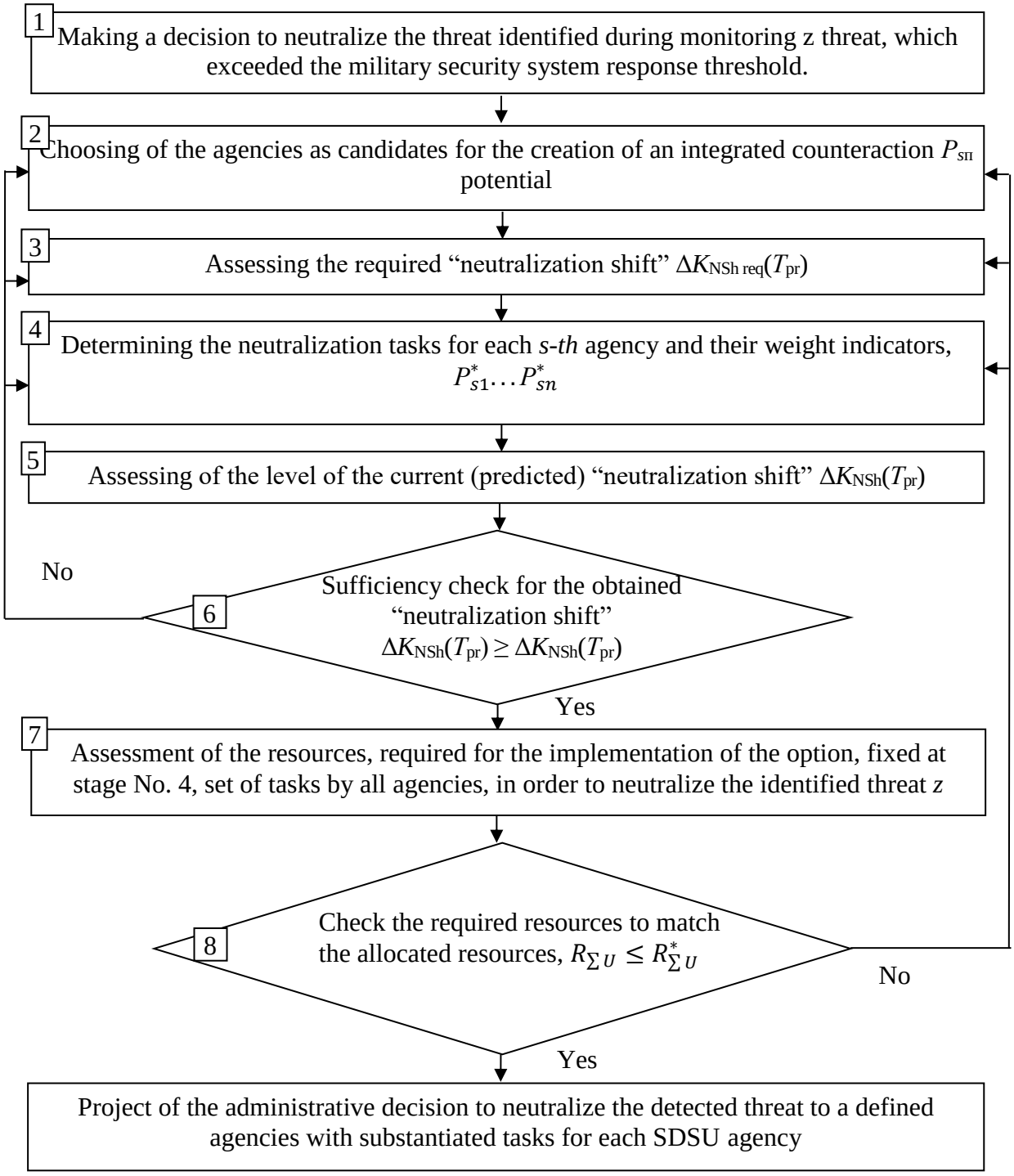


Fig. 4.13. Structural scheme of the methodology for planning the required capabilities of the integrated potential components of the threats de-escalation at the implementation level

Stage No.3 Assessment of the required "neutralization shift" $\Delta K_{NSh\ reqz}(T_{pr})$. The required "neutralization shift" is evaluated due to the computer technology M7 [4, 24] by the iteration way through the reducing the "weight" indicators (priorities) of the threats according to Saati scale until the condition (4.6) is achieved. The

change of the level of military insecurity is defined:

$$\Delta K(t_1) = K(t_1) - K_{\text{thrd}}, \qquad (4.10)$$

where $K(t_1)$ – obtained current value of the military insecurity level (threat) at time t_1;

K_{thrd} – threshold level of the military insecurity (threat), that is defined according to the state's legislation.

Stage No. 4 The evaluation of the level of current (predicted) "neutralization shift". During the fourth stage, the variant of the set of tasks (measures) for each sphere (the third level of the three-level hierarchical model) is introduced into the computer technology M7 and the current (predicted) "neutralization shift" Determining the neutralization objectives for each *s-th* agency and their indicators' weights $P^*_{s1}...P^*_{sn}$ can be carried out using the advanced method of hierarchy analysis, expert evaluation and computer technology M7. Practice shows that the achievement of the required "weight' of the indicator P^*_s is ensured by a certain set of tasks (measures) that are implemented in the *s-th* sphere.

The more such measures are implemented, the faster the desired result is achieved, but at the same time the resources for their implementation increase (and not always proportionately), so it can be blocked at Stage No. 8. It is advisable that the set of such measures for each s-th sphere to be formed by the experts of the same sphere due to the method of brainstorming. In addition, experts should be prepared to assess the resource requirements for the implementation of the proposed measures.

Stage No. 5 Assessment of the level of current (predicted) "neutralization shift". During the fourth stage, the variant of the set of tasks (measures) for each sphere (the third level of the three-level hierarchical model) is introduced into the computer technology M7 and the current (predicted) "neutralization shift" is calculated ($\Delta K_{\text{NSh}}(T_{\text{pr}})$) in such a way. At the same time, the "weight" (priority) of each sphere can be specified, which will be taken into account during the redistribution of resources, if necessary.

Stage No. 6 The examination as for the sufficiency of the obtained current (predicted) "neutralization shift" in accordance with the condition (4.7). If the condition (4.7) is met, then during the fourth stage for each s-th sphere the corresponding sets of tasks *{Us}* and their "weight" (priorities) are fixed.

If the condition (4.7) isn't met, the new iteration of choosing the entities during the Stage No.2 is carried out, or the new option of reducing the indicators' "weight" according to the Saati scale at the Stage No. 3, or the new option of the set of neutralization tasks at the Stage No. 4 is formed (Fig. 4.13).

Stage No. 7 Conduct the assessment of the resources needed to fulfill the set of tasks that was fixed at the Stage No. 4 by all entities in order to neutralize the detectedz threat.

Stage No. 8 Conduct an assessment of the estimated required resources at the Stage No.7 to match the resources allocated to neutralize the detectedz threat.

$$R_{\Sigma U} \leq R^{*}_{\Sigma U}, \tag{4.11}$$

where $R_{\Sigma U}$ – resources required to perform the tasks set during the Stage No. 4 of an option of tasks by all agencies in order to neutralize the detectedthreat;

$R^{*}_{\Sigma U}$ – resources allocated to perform a specific variant of the set of tasks by all agencies in order to neutralize the detectedthreat.

If the condition (4.11) is not met, so the new iteration is performed during the fourth or third or second stages (see Fig. 4.13).

If the condition (4.11) is met, the DMs submits for approval a draft of the managerial decision as for the neutralization of the detectedthreat by a certain composition of entities with substantiated tasks for each agency.

Practical implementation of the described expert-meaningful scenarios requires specific management in the security and defence sector, relevant information, analytical and resource support that goes beyond the scope of this section. To implement the proposed method it is expedient to use information resources, technologies and analysts (experts) of the Main Situational Awareness Center of Ukraine [31] and situational (crisis) centers of some SDSU agencies.

Thus, the methodology for designing the required capabilities of the military and non-military components of the integrated potential to de-escalate the threats at the implementation level makes it possible to achieve adaptability to the level and nature of threats, to use the existing integrated potential more coherently and more rationally and to use military and non-military (hybrid) instruments and resources allocated by the state in order to ensure the MS.

The consecution of manage decisions on planning the required capabilities of the integrated potential to de-escalate the threats at the executive level has been developed using the method of adaptive management of the integrated potential of counteraction to the detected (predicted) threat, specifies the method of distribution the tasks (activities) between military and non-military agencies and responsibility for their fulfillment without the detailed elaboration at the level of the agencies of the Security and defence sector of Ukraine [32].

A prepared managerial decision to integrate the efforts of military and non-military SDSU agencies in order to neutralize military threats at the implementation level will help to harmonize the functions of the SDSU, improve governance and civil control and move towards a centralized comprehensive support of the process of realizing national interests in the defence sphere.

The results of a quantitative experiment as for the assessment of the effectiveness of the de-escalation of the threat to Ukraine's national security that is coming from the deployment of US missile Defence systems in Romania and Poland are presented in the annex.

4.7. Method of assessing the effectiveness of the complex employment of military and non-military forces and means in the system of ensuring the military security of Ukraine

In our opinion, the most difficult task for the complex employment of SDSU agencies is to substantiate the necessary military and non-military (hybrid) forces and means for the de-escalation of detectedmilitary threats guaranteed within the allocated resources.

According to the legislation referred to the ensuring of national security is the protection of state sovereignty, territorial integrity, inviolability of state borders and the prevention of interference in the internal affairs of Ukraine. It can be possible due to the effective functioning of the MSS established in the state.

The Concept for the Development of the Security and defence sector of Ukraine, that was adopted in 2016 [1], specifies the ways for the creation of national security and defence capabilities that will enable Ukraine's territorial integrity to be restored within the internationally recognized state border of Ukraine, guarantee the peaceful future of Ukraine as a sovereign and independent, democratic, social and legal state, as well as provide the creation of a national crisis response system, the timely detection, prevention and neutralization of external and internal threats to national security.

Along with this, as it is declared in the Law of Ukraine “On National Security of Ukraine” the National Security Strategy of Ukraine is the basis for all the documents that regulate the planning in the security and defence sector. The realization of this strategy is carried out based on the national defence, security, economic, and intellectual potential using the mechanisms of public-private partnership as well as the involvement of international advisory, financial and logistical assistance [19].

The Ukrainian military security strategy is developed by the Ministry of Defence of Ukraine in accordance with the decision of the National Security and Defence Council of Ukraine, that is introduced by the decree of the President of Ukraine after the adoption of the National Security Strategy of Ukraine and the results of the Defence review.

A comprehensive review of the security and defence sector is conducted according to the decision of the National Security and Defence Council of Ukraine, that is brought into force by the decree of the President of Ukraine and includes the inspections:

- defence and civil protection, public safety;
- military-industrial facilities;
- intelligence agencies of Ukraine;

- national counter-terrorism sector;
- the state of the cyber defence of the national information resources and critical information infrastructure.

According to the results of the reviews, as it is specified in the law [19], a long-term model of the SDSU is formed through the steady increase of the capabilities of its components in order to carry out the tasks and to form capable, mobile, well-trained, well-equipped security forces for providing security and defence. These forces must have enough capabilities to protect national interests of Ukraine and to participate in providing international peace and security. The main criteria for changing the number of components of the security and defence sector are changes in the security environment and the real economic and financial capabilities of the state.

Par. 2, Art. 28 of the Law of Ukraine "On National Security of Ukraine" states that "The military security strategy of Ukraine determines ways of achieving the goals and the realization of the priorities of the state policy in the military sphere, defence and military construction spheres, in particular:

- the security environment (global, regional and national aspects) in the context of military security;
- goals, priorities and tasks of the state policy in the military sphere, defence and military construction spheres;
- socio-political, economic and other conditions for the implementing the state policy in the military sphere, defence and military construction spheres, as well as military-political and military-strategic restrictions;
- ways to achieve the goals of state policy in the military sphere, in the sphere of defence and military construction spheres;
- resource supply of the defence sphere;
- long-term model of the organization of defence, the Armed Forces of Ukraine and other components of the defence sector relating to the certain tasks for the defence of the state, strategy and criteria for achieving common defence capabilities;
- possible scenarios of the use of the security and defence forces for the objectives of the state defence with the distribution of responsibilities among the security and defence sector components for the organization of the defence of Ukraine, protection of its sovereignty, territorial integrity and national security;
- risk-management in the field of military security" [19].

The above-mentioned strategies and requirements of normative legal documents stipulate the necessity to conduct an effectiveness assessment of the use of military and non-military forces in the MSS to neutralize threats, especially the hybrid ones that require the complex involvement of the of the SDSU components.

Taking into account the specific conditions for the military security providing, the strategies and requirements of normative legal documents, the real military and non-military capabilities of Ukraine and the available resources there is an urgent

need for a scientific and methodical apparatus for the assessment of the effectiveness of the use of certain non-military forces and means in order to de-escalate the detected threats. As a component of such a scientific and methodical apparatus a method for the effectiveness assessment of the integrated use of military and non-military forces and means in order to de-escalate of detected (predicted) threats (hereinafter method) using the available resources by the state and non-governmental organizations is proposed.

The method is based on the postulate that the ensuring the MSS has to ensure the security of the state from the military threats in such a way that doesn't affect the sustainable development of the state [4, 7, 8, 33].That is, the MSS ensuring should neutralize the threats to an acceptable (sufficient) level, when the sustainable development of the state isn't violated [4]. The block diagram of the method is shown in Fig. 4.14.

Proposed method is the consistent implementation of the special procedures aimed at obtaining the necessary information on military threats, their characteristics and assessment of the effectiveness of the integrated use of military and non-military forces and means that form the integrated potential of counteraction to the detected threat.

Initial procedure is the monitoring of the threats with further evaluation of their level, nature, components and indicators in the decisive areas of national security according to known methods [4].

The next procedure is the prognosis of the destructive impact of the detectedthreats on the state of the national security in selected areas by the well-known expert methods. The information received is used to assess if the level of neutralization of detected threats is sufficient. In Ukraine due to a catastrophic lack of resources, a low level of modern AME, high level of corruption, insufficient level of social guarantees for servicemen, unceasing armed conflict in the East and other destructive factors it is becoming more and more problematic to provide the sufficient level of the threat's neutralization.

So, in order to search for internal reserves to increase the effectiveness of counteraction to military threats, it is proposed to clarify of the "diagnosis" of threats, for which it is expedient to implement a complex assessment of the level and nature of the threats in accordance with the technology that is described in the papers [4, 5], as well as, probable situational analysis of the impact of detectedthreats on the areas of national security.

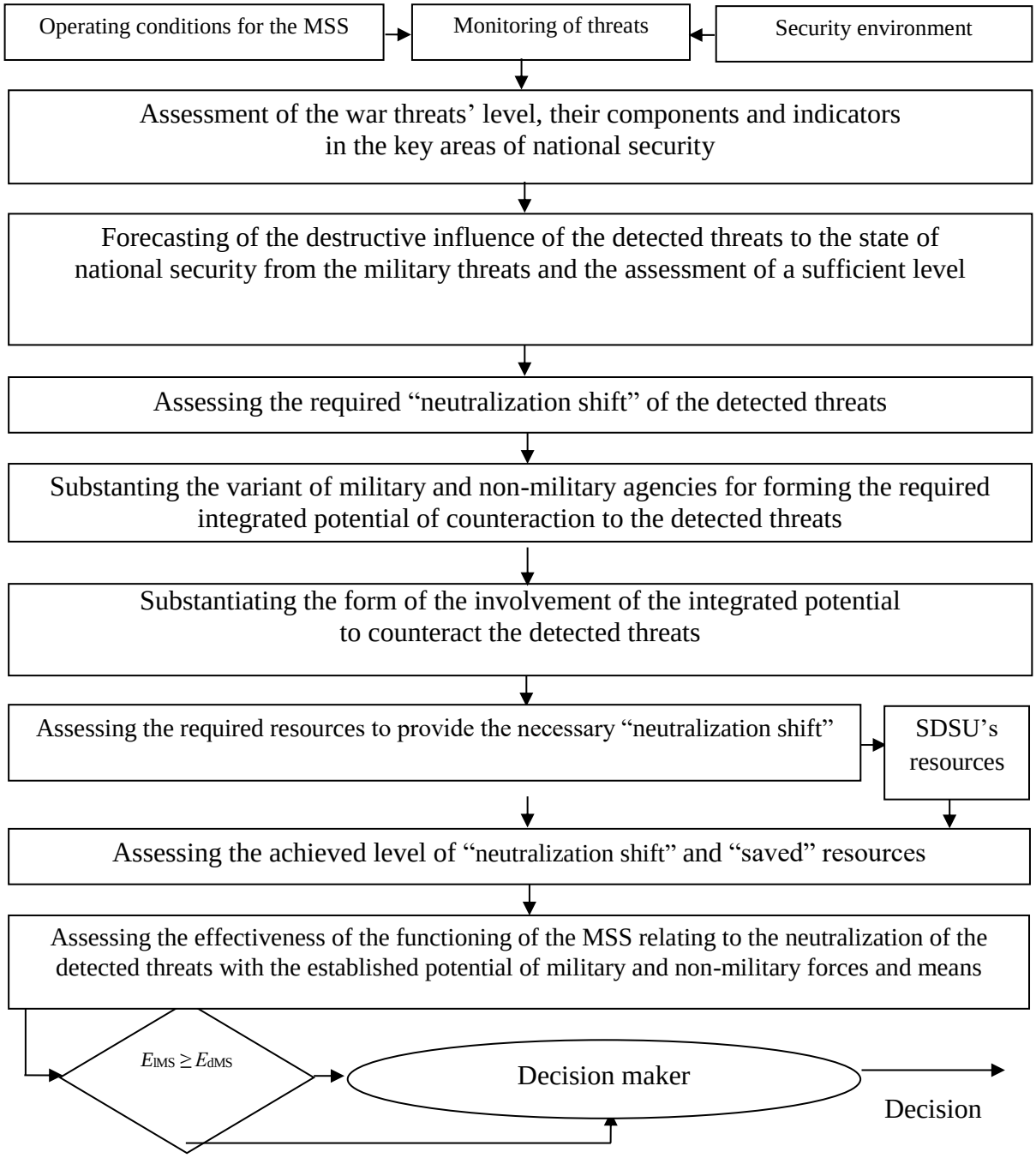


Fig 4.14. Block diagram of the method for evaluating the effectiveness of complex employment of military and non-military forces and means in order to de-escalate the detected (predicted) threats

In order to assess the sufficient level of neutralization of threats at the specific moment of forecasting and the required "neutralization shift" and, also, the necessary resources for its provision, it is expedient to use the computational procedures presented in the [7].

The obtained value of the required "neutralization shift" is used in the procedure of the substantiation of the most rational version of the military and non-

military agencies j_{main} for the formation of an integrated potential to counteract the detected threats in accordance with the model shown in Fig. 3.1 [8].

The next procedure involves the allocating of resources from the national resources that the SDSU poses. The resource support agreed upon by the security and defence sector of the chosen form of the use of the integrated counteraction potential is necessary for the next procedure.

Subsequently, using the M7 model [4], the achieved "neutralization shift" and "saved' resources are assessed. This procedure is described in detail in the [5, 7]. In this case, the four possible situations are shown in Fig. 4.15.

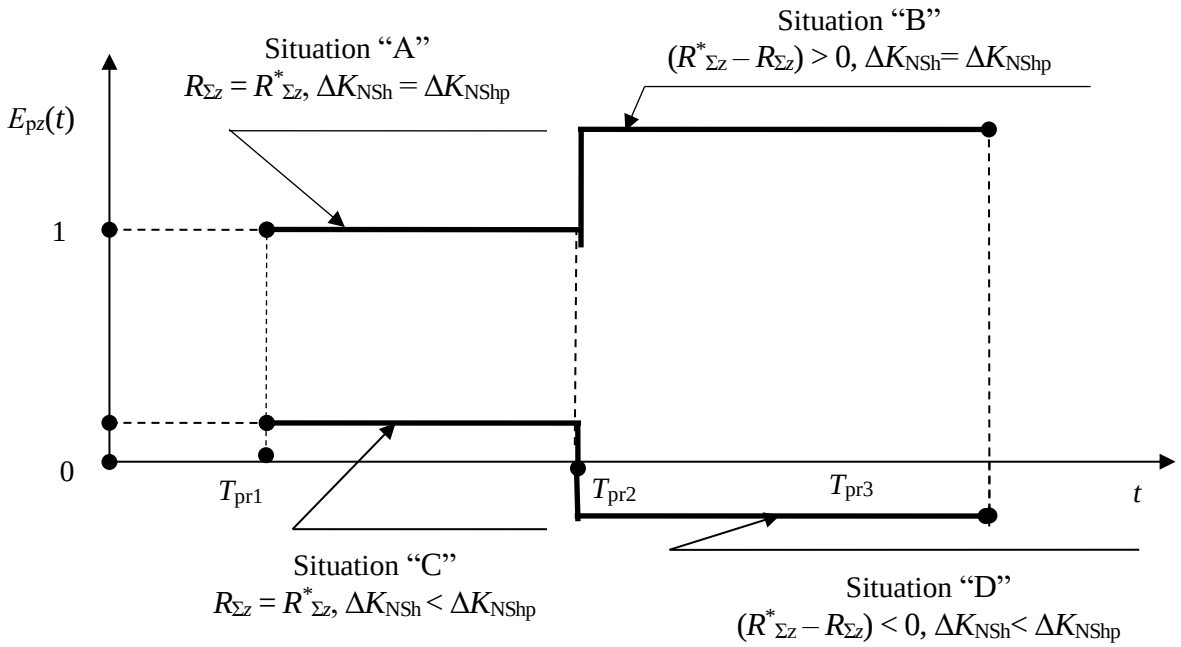


Fig. 4.15. Examples of the effectiveness evaluation of functioning of the ensuring MSS to neutralize the detected threat by a formed group of military and non-military agencies of the SDSU (for variants of the formation of a "neutralization shift" in the situations "A", "B", "C","D"

1. *Situation "A".* The involved agencies of the SDSU have successfully achieved the objectives and provided the achievement of the required level of threat neutralization *z*

$$\Delta K_{NSh}(T_{pr1}) = \Delta K_{NShreq}(T_{pr1}),\ R_{\sum z} = R^*_{\sum z}, \tag{4.12}$$

where $R_{\sum z}$– current level of recources that have been allocated to neutralize the threat *z*.

Effectiveness of the integrated use of such an option for the integration agencies of the SDSU is as follows:

$$E_p^A(T_{pr1}) = \frac{\Delta K_{NShp}(T_{pr1})}{R^*_{\Sigma z}} = 1. \tag{4.13}$$

2. *Situation "B".* The involved agencies of the SDSU have successfully achieved the objectives and provided achieving the required level of neutralization of the threat $\Delta K_{\mathrm{NSh}}(T_{\mathrm{pr1}}) = \Delta K_{\mathrm{NShreq}}(T_{\mathrm{pr1}})$. At the same time, the less (saved) resources $(R^{*}_{\sum z} - R_{\sum z}) > 0$ were used.

Effectiveness of the integrated use of such an option for the integration of the agencies of the SDSU is as follows (the most desirable situation):

$$E_p^B(T_{pr1}) = \frac{\Delta K_{NShreq}(T_{pr1})}{1-\frac{R_{\Sigma z}}{R^*_{\Sigma z}}} > 1. \tag{4.14}$$

3. *Situation "C".* The involved agencies of the SDSU have achieved the objectives partially, but the required level of threat neutralization $\Delta K_{\mathrm{NSh}}(T_{\mathrm{pr1}}) < \Delta K_{\mathrm{NSHp}}(T_{\mathrm{pr1}})$. hasn't been reached. At the same time, the allocated resources $R_{\sum z} = R^{*}_{\sum z}$ were used completely.

The effectiveness of the integrated use of such an option of the integration of the agencies of the SDSUis as follows:

$$E_p^C(T_{pr1}) = \frac{\Delta K_{NSh}(T_{pr1})}{R^*_{\Sigma z}} < 1. \tag{4.15}$$

Such a situation is accompanied by the emergence of a risk ($0 < R^{\mathrm{ВБ}}_{z} < 1$) when MS of the state can't be provided.

4. *Situation "D".* The involved agencies of the SDSU have achieved the objectives partially , but the required level of neutralization of the threat $\Delta K_{\mathrm{NSh}}(T_{\mathrm{pr1}}) < \Delta K_{\mathrm{NSh}}(T_{\mathrm{pr1}})$ hasn't been achieved due to the lack of the allocated resources (actual resources $R_{\sum z}$ were insufficient comparing with the calculated required ones $R^{*}_{\sum z}$).

The effectiveness of the integrated use of such an option of the integration of the agencies of the SDSU is as follows:

$$E_p^D(T_{pr1}) = \frac{\Delta K_{NSh}(T_{pr1})}{1-\frac{R_{\Sigma z}}{R^*_{\Sigma z}}} < 0. \tag{4.16}$$

This situation is accompanied by a significantly higher risk when the state's military security can't be provided and is undesirable.

The following procedure completes the assessment of the effectiveness of the MSS in neutralization the detected *z-th* threat by the formed potential of the military and non-military forces and means E_{pz} according to the chosen criterion of relative "economy" of the resources $\Delta_{\sum z}$ to provide the required "neutralization shift" $\Delta K_{\mathrm{Nshreqz}}$ at the moment of forecasting T_{forc1}:

$$E_p(T_{pr1}) = \frac{\Delta K_{NShforc}(T_{pr1})}{\Delta_{\Sigma z}}, \tag{4.17}$$

where $\Delta_{\Sigma z} = \frac{R^*_{\Sigma z} - R_{\Sigma z}}{R^*_{\Sigma z}}$.

As the criterion of a sufficient level of the neutralization of the threat *z* it is appropriate to choose (situation "*A*")

$$E_{sMS}(t) = E_p^A(T_{pr1}) = \frac{\Delta K_{Nshforc}(T_{pr1})}{R^*_{\Sigma z}} = 1. \quad (4.18)$$

Ensuring the sufficient level of the MSS effectiveness $E_{dMSz}(t)$ can be conducted either extensively (quantitatively increasing of the forces and means), or through the use of internal reserves (improvement of military management, adaptation of the agencies of the MSS ensuring to the level and nature of threats, the complex employment of military and non-military instruments , formation of integrated potential to counteract the threats, the implementation of asymmetric measures, the use of advanced weapons, etc.). At the same time, the positive effect will be shown in the "saving" of the resources that are involved in the formation of the necessary level of "neutralization shift".

If it is planned to neutralize simultaneously two or more threats, then the overall level of these threats and the required general "neutralization shift" to neutralize them are calculated. Other layouts remain unchanged.

If it is impossible to provide the necessary "neutralization shift" and allocate the sufficient resources (conditions (4.13) and (4.14), the DM takes political and legal responsibility for reaching the final result for neutralizing the *z-th* threat.

Thus, a method for the effective assessment of the complex employment of military and non-military forces and means in the MSS of the state providing gives an opportunity to assess the quality of command and control decisions, regarding the options for involving military and non-military forces and means to counteract the threats to the military security of the state on the criterion of relative "economy" of resources, to predict the effectiveness of asymmetric and other military or hybrid measures that can be proposed to eliminate or de-escalate the detected threats, as well as to substitiate the resources required to achieve a given level (degree) of the threat neutralization.

In addition to the above, the method provides the necessary information on the MS, their characteristics and gives the possibility to assess the effectiveness of the integrated use of military and non-military forces, to predict the effectiveness of asymmetric and other "hard" power or hybrid measures that can be proposed to eliminate or de-escalate the detected threats, as well as to substantiate the required resources to achieve a given level (degree) of neutralization of the detected threat.

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Chapter 5

RECOMMENDATIONS FOR ENHANCING THE EFFICIENCY OF COUNTERING THREATS TO THE STATE MILITARY SECURITY WITHIN LIMITED RESOURCES

5.1. Recommendations for clarifying the objectives and improving technologies for monitoring threats to the national and the military security of Ukraine

The National Security Strategy of Ukraine defines a set of strategic tasks to improve the efficiency of public administration in crisis, state of emergency and special period. It aims at the task of increasing the effectiveness of monitoring in the sphere of national security (NS) in order to timely detect existing and new types of internal and external threats, and develop effective measures for their prevention and neutralization. This, of course, points out to imperfection of the existing system for monitoring threats to the national security of Ukraine.

Monitoring is best understood in a broad sense as the planned collection of data on specific problem, the processing, assessment and presentation of the results and formulation of guidelines to all stakeholders [1]. Among the agencies of the ensuring national (military) security, the only National Security and Defence Council (NSDC), which, in accordance with Article 107 of the Constitution of Ukraine, acts as the coordinating body for national security and defence under the President of Ukraine, can be the customer for monitoring threats.

Among the main functions of the agencies ensuring the NS are not only the continuous monitoring of the impact on national security of the processes taking place in the political, social, economic, ecological, scientific, technical, information, military and other spheres, religious environment, international relations, but also forecasting, detecting and assessing of possible threats, destabilizing factors and conflicts, as well as their causes and consequences [2–4].

In accordance with the Concept for the Development of the Security and Defence Sector [5], it is envisaged to create a system for monitoring, analyzing, forecasting, modeling and supporting decision-making in the field of national security and defence using unified methods. The methods are prepared with the use of capabilities of the Main SituationalAwareness Centre of Ukraine (MSAC) as a software hardware complex for collection, accumulation and processing of information necessary for preparation and decision-making in the national security and defence sphere.

At the same time, the guidance documents do not define the methods, mechanisms and technologies of monitoring, as well as the structure and functions of the monitoring system, etc.

The issue of monitoring threats is disclosed more thoroughly in scientific publications. Thus, in the papers [1, 6], the basics of organizing integrated monitoring of military threats (MThs) which define the purpose and the main tasks of their monitoring are outlined, the necessity of developing a program (plan) for its implementation is justified, the conceptual model of information monitoring system of the national security is given. Paper [7] considers prospects for the development of the state monitoring system in the context of positive foreign experience and Ukrainian realities. The content of the integrated IAS of strategic planning in the sphere of ensuring national security, its features, challenging issues and approaches to their solution are considered in the publications [8, 9]. The appointment of forces and facilities of IAS is determined and the essence of procedures of strategic monitoring and assessment is disclosed in the papers [10-12]. The list of requirements for the threat monitoring system is defined and its goals and functions are formulated, the general structure and content of the passport of the national security threats is outlined, the role of situational centers of central executive bodies in the threat monitoring system to national security of Ukraine is shown.

Despite the value of these publications, insufficient attention has been paid to the issues of creating a state monitoring system, organization of monitoring of threats to national security and its implementation mechanisms. All this necessitates the development of solutions on clarifying tasks and improving the structure and functions of the system for monitoring threats to national and military security of Ukraine.

In a rapidly changing military-political and military-strategic situation, national and military security is a complex problem of state authorities. The relevance of the security ensuring has increased significantly after the annexation of Crimea and the beginning of the conflict in the east of Ukraine. The experience of the leading nations shows that the capabilities of the security and defence sector in the security support of national interest realization largely depend on the effectiveness of the process management, which is based on the quality of information, scientific and methodological support. This is especially true for such an important element of the process of receiving and processing information, as monitoring of national security threats.

Threats to the NS are phenomena, trends and factors that make it impossible, difficult, can eliminate or impede realization (implementation) of national interests and preservation of the national values of Ukraine [5].Threats to national security of Ukraine and the corresponding priorities of state policy in the areas of national security and defence are defined in the National Security Strategy of Ukraine, the Military Security Strategy of Ukraine, the Cybersecurity Strategy of Ukraine and other documents on national security and defence issues that are approved by the National Security and Defence Council of Ukraine and confirmed by President of Ukraine. But these documents are of a generalized and long-term nature and therefore require constant system monitoring and assessment.

The impact assessment of threats that have arisen or may arise in any area of the national security (for example, economic, political, military) on other areas and the functioning of state institutions in general is understood **as the system-based monitoring of threats to national security.**

The nature of individual threats, which are defined in the normative legal acts of the state, requires the use of both existing and proven methods and software for their evaluation, as well as the development (improvement of existing ones) and the implementation of new, more effective ones. This is primarily due to the amount of information that needs to be tracked during the monitoring of changes in the internal and external environments that are determinant in the occurrence of threats in a particular area. It is also necessary to take into account that certain events or phenomena that arise in one of the spheres may have not only indirect, but also direct impact on other areas of national security. Given this, it is important to understand that the nature of threat determines its monitoring priority.

The dynamics of changes in modern world and regional situation, the process of formation of the national interests and the identification of threats to their implementatio, determines the continuity of monitoring threats. This can be achieved through the use of modern information technology and the involvement of qualified experts on national security issues.

To organize timely detection of threats to national security, it is necessary to provide a formalized, interconnected and integrated description of the subject area. The essence of complex monitoring of threats to national and military security is the logical and informational process of prediction and recognition of the conditions of emerging threats. The mechanism of integrated monitoring serves as a pre-emptive monitoring of the situation in all areas of national security. It consists in comparing a standard-setting model with the reality, providing feedback from reality and benchmark by assessing the effectiveness of the measures taken for neutralization of the emerging threat.

According to the paper [7], the effectiveness of strategic management in the field of national security depends on the quality of information-analytical and expert support for management decisions development. Thus, the creation and proper functioning of expert-analytical decision support systems (situational, crisis, information-analytical and other centers) is a necessary condition for the establishment of an effective monitoring system. The basic elements of expert-analytical decision support system are modern information and communication technologies, and their integration into a single complex.

Currently, in many European countries, statistical organizations conduct monitoring in a broad sense. Thus, according to [12], such tasks as short-term forecasting and visualization of monitoring results, as well as their presenting to a specific user, are added to the tasks of observation and analysis. So, monitoring refers to the system of observation, evaluation and forecasting. The main functioning

purpose of such a monitoring system is to provide governing bodies with timely, complete and reliable information about the processes taking place in various fields.

Traditionally, any monitoring system should include the purpose, objectives, principles, objects, subjects, information base (database), monitoring indicator system (criteria), and methods of monitoring, assessment and warning (development forecasting), as well as monitoring directions.

Thus, the structural arrangement (improvement) of the system for monitoring national security threats includes three main subsystems: observation, assessment and forecasting of the situation dynamics to develop proposals for responding to a threat that is increasing (exceeding the limit values of indicators).

The analysis of foreign experience and the actual state of monitoring of threats to national security has shown that for the effective functioning of the monitoring subsystems, it is advisable to have complementary subsystems — regulatory (purpose-oriented), informational, and data protection and transferring (Fig. 5.1).

The purpose-oriented subsystem includes a scientific-methodological apparatus and appropriate monitoring mechanisms, as well as goal-oriented regulations for its implementation that are common to all areas of national security. This subsystem should define the purpose, objectives, principles, objects and subjects of monitoring, which will ensure planned nature of its implementation. Physically, this subsystem is a set of normative acts, instructions, guidelines, regulations on the hierarchy of entities for monitoring threats, including, among other things, the unity of approaches to the formalization of information used in monitoring and its (information) sources.

The information subsystem provides directions (spheres), results of threats monitoring on selected indicators (criteria) that require a summarized analysis (interaction of various spheres of national security), identifies sources of information in certain directions (spheres) and contains a database of threats to national security. In addition to the information considered, the information subsystem may include materials on the experience of monitoring threats from other countries for the last period, statistics on some of the most important indicators (criteria) of threats in various spheres and the dynamics and trends of their change over a certain assessment period.

The subsystem of monitoring data protection and transferring ensures timely dispatch of information to consumers, preservation and protection of data from unauthorized access, archiving of monitoring data in case of loss during transferring and reliable operation of the software for monitoring threats.

Existing threat passports in various areas of NS are the key element for monitoring [11]. At the same time, it is important to determine the sources of information that (in the direction) correspond to the threat passport, and their formalization. The creation of situational centers of ministries and departments, which are structurally and functionally subordinate to the MSAC, somewhat simplifies information obtaining from monitoring subjects. At the same time, the

theoretical basis or (goal-oriented) regulations for the formation of a unified state system for monitoring threats to national and military security needs to be improved. Therefore, it is advisable to develop and implement a nationwide system for determining and monitoring threshold levels of indicators (criteria) characterizing the level of protection of national interests in various spheres in order to improve the threat monitoring system.

It is also important to establish a set (system) of indicators (criteria) that may affect the values of characteristics (indicators) in other spheres of national security, especially in the military. Large volumes of input data for threats assessment, the complexity of assessing individual indicators (criteria), the emergence of threats and the uncertainty of information circulating in the monitoring system necessitate the creation of separate structural units (analytical groups, centers) within the agencies of SDSU of different hierarchy levels. The units are responsible for the systematic monitoring of the state of national security threats, providing of comprehensive information on the scale, level of threats, growth dynamics (neutralization), proposals development for decision making on neutralization, etc. (Fig. 5.2).

Primarily, such structural units is advisable to create on the base of existing situational (crisis) centers. It is important to organize both vertical links between units of different hierarchy level, as well as horizontal links between units of the same hierarchy level. Centers (groups) of the MSAC of command and control should be able to use the intellectual and technical (software complexes, models) potential of non-state institutions and organizations, individual experts in the field of national security.

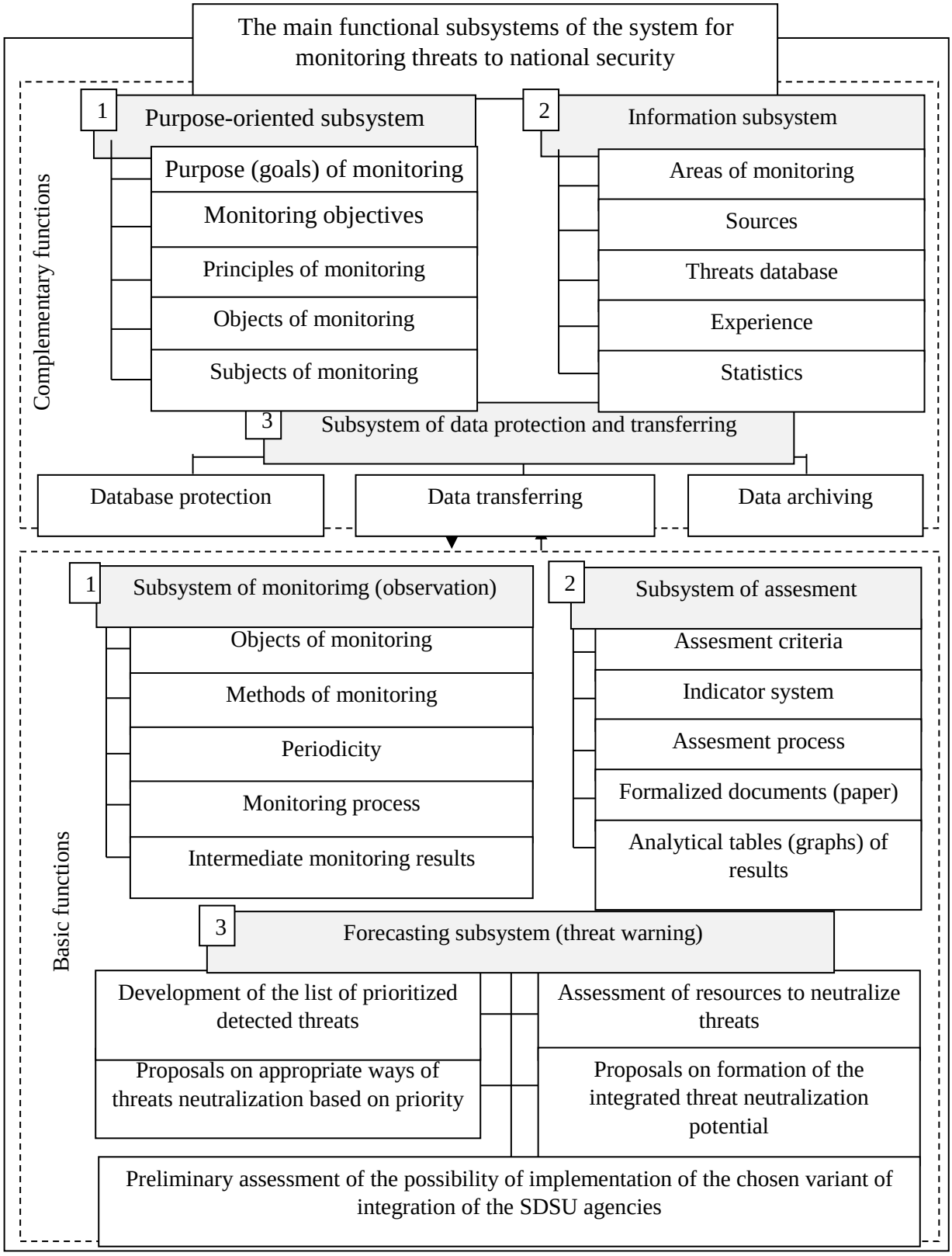

Fig. 5.1. Proposals on the functional subsystems development within the framework of main monitoring system of threats to national security

The number of structural units (both monitoring and analysis, and assessment and forecasting) in the general system of monitoring threats to national and military security should correspond to the number of monitored areas of the Main Situation Awareness Center of Command and Control. These elements must be combined with a single database for automated data exchange.

So, given the complex organizational structure of the monitoring system (see Fig. 5.1), the following are proposed to have as the main subsystems: observations (collection, summary, classification, grouping, sorting and preliminary analysis of information), assessments (threat assessment and data preparation in a formalized form) and forecasting (making solutions on neutralizing the identified threats and necessary resources assessment, the force composition).

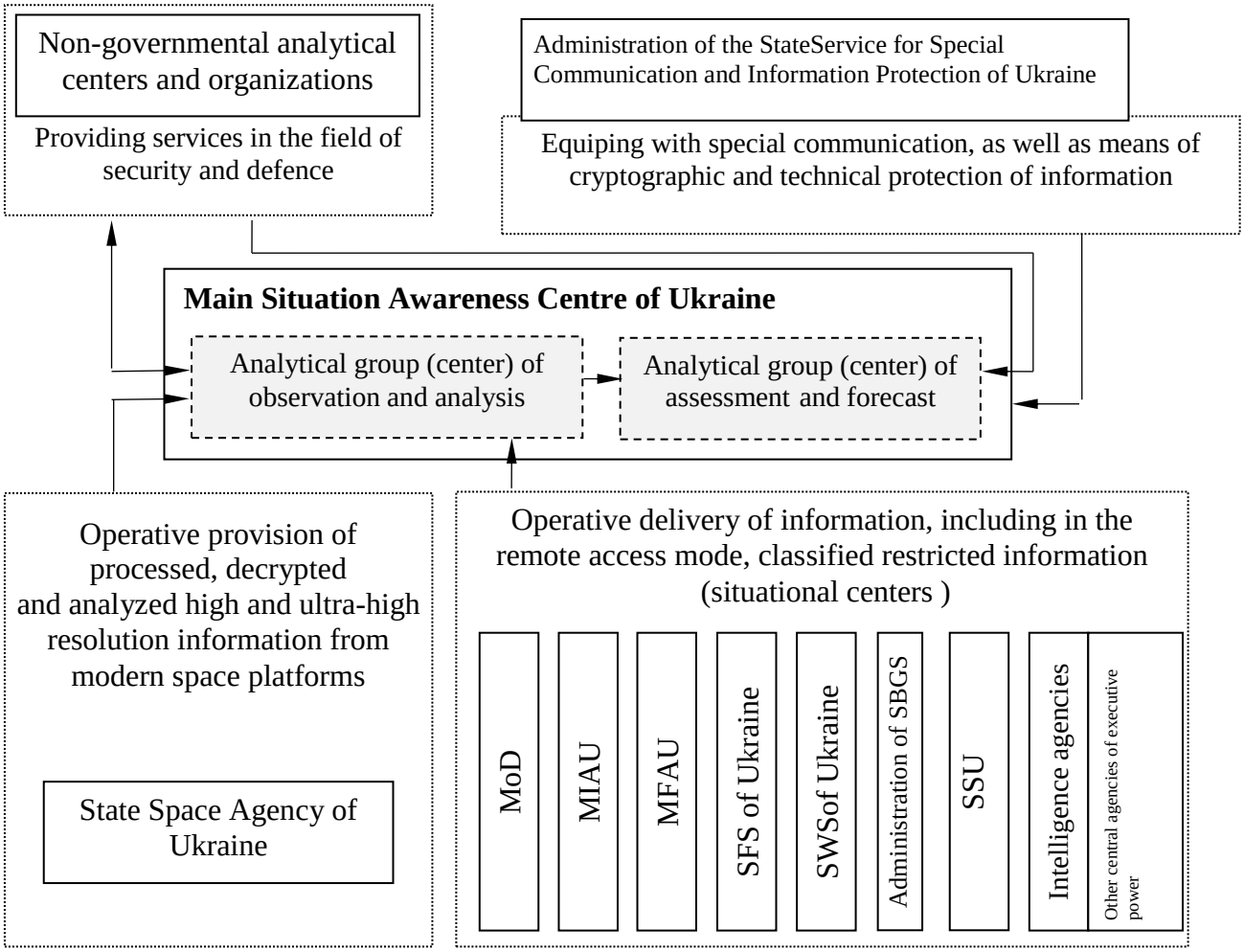

Fig. 5.2. Recommendations on establishment of analytical groups (centers) for monitoring threats of the NS of Ukraine within the Main Situation Awareness CenterAnalytical groups (Centers)

First of all, the objects and subjects of monitoring should be elements of the

national monitoring system which interacting due to a certain organizational structure of relations. It is also confirmed by the results of the study [7].

Thus, the object of monitoring is the threats to national and military security in any sphere. The subjects of monitoring are state authorities, local governments vested with public powers in matters of ensuring national security. At the same time it is necessary to take into account that not only threats, but also sources and causes of their occurrence, as well as measures for their neutralization are the objects of monitoring with the highest priority [10].

The hierarchy of threats monitoring entities (NSDCU, ministries and departments with information-analytical, and organizational and managerial functions) makes it possible to establish responsibility for the development of appropriate decisions by lower level entities with the use of analysis results of the information obtained during the monitoring process. This can be done through the normative definition and monitoring of the threshold values of individual indicators (criteria). The entities (subjects) of threats monitoring at various hierarchy levels have to use them to develop decisions.

The effectiveness of monitoring threats to NS also depends on adherence to the principles of its organization. The organization of monitoring includes the monitoring objectives setting, the monitoring program (plan) development, the interaction issues among monitoring entities (subjects), management and support (provision) (Fig. 5.3).

The enhancement of the monitoring planning is advisable. It implies the existence of a program or plan (scheme) for its implementation. The development of a monitoring program increases the threats monitoring focusing, the goals and objectives detailing, and requires some key points to be taken into account.

Monitoring tasks are determined as specific actions or stages towards the achievement of the defined goals.

Setting out the goals and objectives of monitoring is carried out in the monitoring system in compliance with certain requirements:

- specificity, attainability and possibility of their verification, which is important for supervising the monitoring program implementation and making adjustments;
- taking into account the specifics of the NS sector in which monitoring is carried out;
- focus on obtaining reliable and complete information related to threats to national security, and timely communicating it within the NSS (agencies of the system of ensuring national (military) security).

The monitoring program should determine the objects of observation and their features (characteristics) that are subject to measurement (assessment and forecasting), as well as the list of monitoring entities - state or non-state institutions, which are assigned or may be assigned the tasks of assessment of the information obtained during the monitoring in all national security spheres.

Objects of observation defined in the passports of threats - objects of threat (vital national interest) and sources of threat (processes, phenomena, actors that endanger the national interest realization).

The main methodical (organizational) task of the monitoring program (plan) is to streamline the flow of information between agenciess (subjects) of monitoring at different hierarchy levels. In this case, the requirements for completeness, objectivity, timeliness, and efficiency of communication of information should be a саме:

The duration of the program is an obligatory part of the monitoring program. Although it is considered that monitoring should be continuous, planning for activities in various spheres of the state's life, including military, has a definite time frame. In this part of the monitoring program, it is also advisable to determine the frequency of the procedure for assessing the level of threats to NS, taking into account their priority (importance).

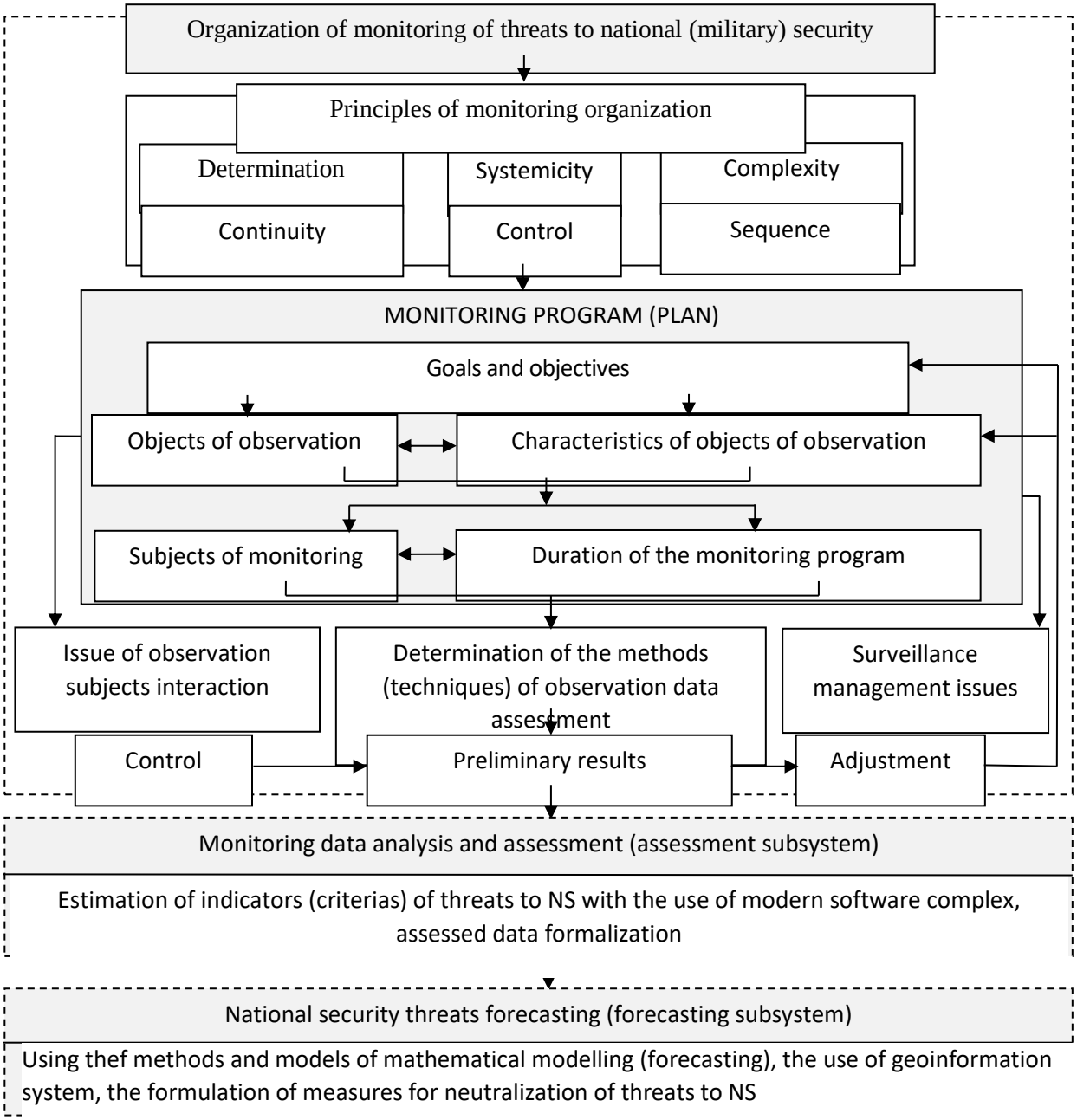

Fig. 5.3. General scheme for monitoring threats to national (military) security of the state

It is proposed to consider the development of methods (techniques) for obtaining information and its assessment as an important stage in the organization of monitoring threats to national and military security. The purpose of this stage of the monitoring organization is to ensure the completeness and accuracy (reliability) of the information obtained during the observation and appropriate preparation of the input data (statistics) for further analysis and evaluation. The outputs obtained at this stage should be adapted to the appropriate methodologies for assessing the indicators (criteria) of threats.

A feedback mechanism must be implemented during monitoring. It allows us to adjust the program, identify its weaknesses and correct data on the characteristics of objects and sources of threat causing doubt, by re-examining (assessing). This will enable us to timely adjust the content of passports of threats to national security. According to [10], it is a key factor for the implementation both an effective system of integrated analysis and comprehensive monitoring of threats to national security and a system of strategic planning in the sphere of national security.

Summarizing:

1. The role and place of the threat monitoring system in the national security system determine the importance of the developed solutions. The efficiency (operability), quality and adequacy of decision-making by the military-political leadership of the state is determined by the effectiveness of the national security system functioning.

2. The main purpose of the functioning of the proposed monitoring system is to provide decision makers with timely, complete and reliable information about the processes taking place in various areas and affecting the state of national security.

3. Given the complex organizational structure of the system, it is proposed to have such the main subsystems as monitoring (observation), evaluation and forecasting. It is also suggested to have complementary subsystems - normative (purpose-oriented), information, and data protection and transfer.

4. To enhance the effectiveness of the monitoring system, it is proposed to improve the individual components of the process of monitoring threats to national security. Thus, the development of a program or plan (scheme) of monitoring ensures the planning of monitoring. The main methodical (organizational) task of the monitoring program (plan) should be streamlining of the process of the flow of information between entities (subjects) of monitoring at different hierarchy levels. In this case, the requirements for completeness, objectivity, timeliness, and efficiency of communication of information should be met. The basis of the monitoring mechanism is the defined sequence of monitoring, assesssment, and forecasting procedures.

5.2. Recommendations for integration of efforts of military and non-military agencies of the security and defence sector to neutralize military threats

The main objective of the integration of military and non-military means and forces of the Security and defence sector of Ukraineis to avoid duplication of tasks entrusted to its individual subjects and unprofitable use of the extremely limited resources allocated in Ukraine for providing its MS.

This principle emphasizes the need to formulate recommendations on the goals, standarts, conditions and possible forms and ways (variants) of integrating the efforts of the forces and capabilities available in the state in order to neutralize the

military threats.

Reccomendations should also take into account the principles of Art. 10 of the Law of Ukraine “On the Fundamentals of National Security of Ukraine” [13], which defined the main functions of the subjects responsible for of ensuring national security.

The analysis of recent research and publications shows that considerable attention is paid to the problems of counteraction and neutralization of military threats. The guidelines on the issues of ensuring the national and military security guide the SDSU agencies on primary use of “soft” power fornations and non-military measures for the elimination or neutralization of military threats [3, 5, 13]. Many scientific papers are dedicated to the theoretical and methodological basis of ensuring national and military security [1], the development of methods, models and methodological approaches and techniques for substantiating practical recommendations for strengthening MS of the state [14–20].

At the same time, in the national scientific-methodical literature and foreign scientific publications on the problem of ensuring the security, there are few publications, which deal with practical recommendations on the integration of the efforts of military and non-military agencies of the security and defence sector to neutralize military threats, that stipulates their development.

It is known [1, 18], that the effectiveness of the joint use of military and non-military forces and means in the neutralization of military threats depends on the capabilities of individual SDSU agencies envolved in counteractivities, the effectiveness of the tasks performing by the agencies, the resource provision of integration as an organizational process and the use of certain forces and capabilities as a joint activity, as well as the effectiveness of managing the process of neutralizing threats, etc.

Conceptual views on the creation of systems for counteracting military threats presented in [20] and the developed scientific and methodological apparatus [16–19] became the basis for the development of recommendations on integrating the efforts of themilitary and non-military agencies of the security and defence sector to neutralize the military threats. At the same time, creating the integrated potential of counteracting military threats is based on the integration of efforts of the SDSU agencies.

The term *“military threat”* is proposed to be understood as one that reflects the nature of such threats and their direct impact on the military security of the state. From other threats, which in their consequences have similar effects in the case of employing military capabilities, they are distinguished by having a purposeful nature, and not an accidental coincidence of circumstances.

Taking into account that the Concept of the Development of the Security and defence sector of Ukraine [5] identifies the ways of forming national security and defence capabilities to ensure counteraction to the military threats by integrating the efforts of the Security and Defence Sector, but no conditions and principles for their

joint use have been made. The important are the recommendations on the conditions and procedure for the integration of military and non-military SDSU agencies. [5]

Analysis of the events, that took place in Ukraine in recent years, shows the existence of directed, adaptive threats to our country, which combine both military and non-military means (measures) of a systematic and complex nature. The objective of this influence is not only the sovereignty and territorial integrity of Ukraine, but also psychological pressure on the population and authorities. Its directed nature and high dynamics of transformation from the category of potential to real require careful and preliminary study at the state level, with the development of appropriate comprehensive countermeasures.

Carrying out a set of measures for adequate counteraction to military threats, which have already become real, requires the creation of appropriate integrated capability, which means the most appropriate composition of forces and means of the SDSU, which has the capacity to perform certain tasks (measures) [20].

Implementation of those tasks (measures) is proposed to be carried out on a unified basis, usually as a special operation (campaign) to neutralize the detected (projected) MThs within the resources allocated by the state and non-state organizations.

The complexity of determining the purpose, forms and methods of integrating military and non-military SDSU agencies is due to the nature of threats and requires a systematic approach, which involves consideration of a possible set of military and non-military SDSU agencies to counter the MTh as a system. The creation basis of this system, its integrative qualities is the targeting of the system as a system-forming factor.

Consequently, the determined purpose (goals) of such a system is an objective criterion for selecting the required set of SDSU agencies and their functions in counteracting the threat that has emerged. Further decomposition and formalization of goals allows to give it a proper description. To this end, it is proposed to define the goal of the integration of military and non-military forces and means, which will contribute to the synthesis of the system of these measures, to effectively counteract the military threats. It is proposed to create an appropriate system of counteracting the MThs. It should be noted that each threat must create its own system of counteraction (neutralization).

Thus, in view of the essence of the MTh, *the aim* of integrating the efforts of military and non-military SDSU agencies is their organizational combination, which for a unified management and appropriate planning will contribute to the effective reduction of the factors forming the threat to acceptable values.

Taking into account the nature of the threat, concerning which the general goal of integration of the efforts SDSU agencies is determined, it is proposed to build a system of goals. The number of goals for reaching the general aim and their hierarchical levels is determined by the chosen strategy of counteraction

(neutralization) of the threat, opportunities of SDSU agencies and their subordinate departments involved in counteracting. This set of goals allows combining long-and short-term goals and building the overall strategy of counteracting the MTh (see item 3.2). It is proposed to determine the following types of goals:

Taking into account the specifics of tasks that can be assigned to SDSU agencies to respond to different types of MThs, it is expected that, unlike the technical and organizational systems in the system of threats counteraction which is proposed to establish at operational level, dimension goals can not always be provided with the help of analytical calculations. As the result, according with the methodology [19], it is proposed to use an approach which is based on the formation of the objective *Fz* function, which formally describes the de-escalation of a threat to an acceptable *z-th* level. The description of the process of forming the target function of reducing the threat level in an iterative way is detailed in the article [10]. It should be noted that its essence is to reduce the "weight" (priority) of a certain *z-th* threat by the integrated use of the military and non-military agencies of the for neutralization of MTh.

It is important that the choice of the SDSU agencies should be based on the nature of the threat, which in its turn, is determined by the areas of conflict. In this case, SDSU agencies (military and non-military) selected to neutralize the threat should have the ability to influence the conflicting state in these areas in such a way as to reduce the threat indicators.

Consequently, the set of objectives (tasks) for the neutralization of the MThs decisive in the organization of the process of integration of efforts of military and non-military SDSU agencies to counter the MTh.

Thus, it is possible to recommend the following basic principles by which it is expedient to integrate the efforts of the SDSU agencies to counter the MThs.

Recommendation to integrate the efforts of military and non-military SDSU agencies to counter the MThs is proposed to consider the sequence of the development of a administrative decision on the employing individual agencies in the interests of neutralizing a certain MTh. This recommendation is based on the use of methodology [19] and taking into account the principles of the concept [20].

The core of this recommendation is to prepare defined sequence of reasonable suggestions (basic procedures) to a DM to integrate the efforts of the SDSU agencies to counter the military threat (Fig. 5.4).

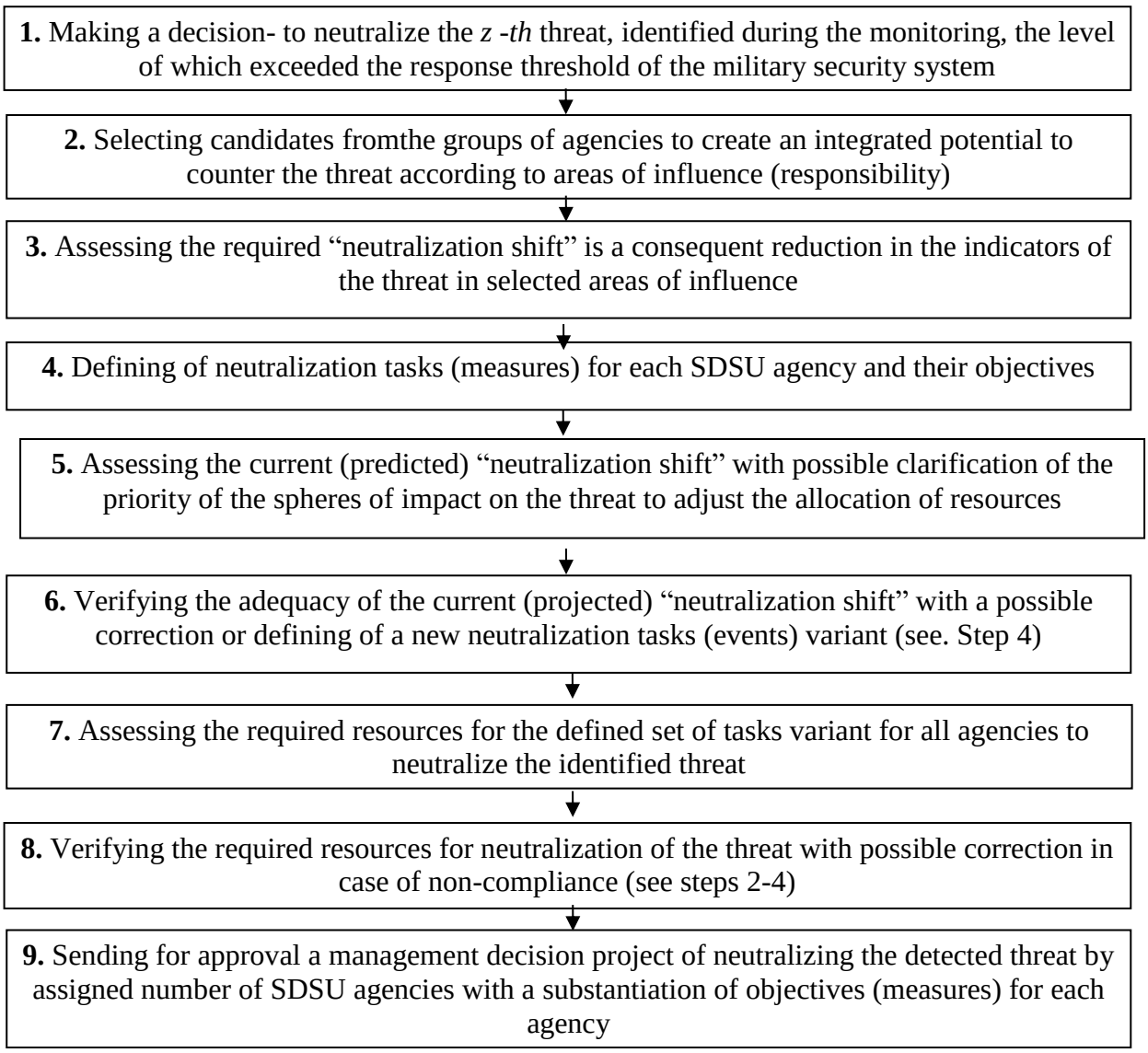

Fig. 5.4. Sequence of developing proposal for a decisions on integration of efforts of the SDSU agencies to neutralize the detected military threats

The procedures and calculations, performed on the stages of the preparing the decision to integrate the efforts of military and non-military SDSU agencies to neutralize detected MTh, allow to adapt to the level and character of the identified (predicted) threat and flexibly use existing military and non-military resources and capabilities to provide MS of Ukraine.

Proposed sequence of decision-making to integrate efforts, in addition, will enable to obtain the necessary capacities to neutralize the MTh with a help of comparing the various combinations of forces and capabilities of the SDSU agencies on the basis of their assessment according to indicators such as the duration of neutralization threats measures by the personnel of SDSU agencies, the amount of assigned personnel and capabilities. An important criterion for the efficiency is the

appropriateness of the resources that are allocated or can be allocated by the state to neutralize the resources.

It is important to remember that an appropriate and prompt analysis of threats stupilates having an appropriate model of threats to the state's MS and an appropriate model of the monitoring system. The first model is a database of detected at different times and predicted MT, each of which describes the characteristics of a typical passport of threats, and the second one describes a state-specified detection procedure of threats, that are considered to be those the MSS must respond effectively to [1].

Integration of SDSU agencies formally already exists in the form of the Security and Defence Sector of Ukaine, the integration of the efforts of individual agencies (military and non-military) is aimed, at the neutralization of the MThs and the rational use of state resources and the capabilities of the SDSU to obtain the effect of the emergency from their integration, which is the essence of the principle of system.

The experience of involving of the SDSU agencies in the ATO, the analysis of the requirements for the integration of the efforts of military and non-military SDSU agencies to neutralize MThs cause the increase of state leadership's administrative capacity. This requires the creation of a new system of strategic leadership of the Security and Defence Sector in accordance with current conditions and needs. Integration of the efforts of military and non-military SDSU agencies on the basis of a single data-based guide [21] provides for a clear division and delegation of responsibilities in the formation, making and implementation of decisions in the entire system of governance – from the military-political leadership to individual units of agencies, involved in the neutralization of threats. The option of the strategic leadership of the Security and defence sector of Ukraine for integrating the efforts of military and non-military agencies of the SDSU for neutralizing MThs is shown in Fig. 5.5.

During a special period, the General Staff of the Armed Forces of Ukraine serves as the strategic command of the Armed Forces of Ukraine and other components of the defence forces.

Taking into account the proposals of the Joint Forces Commander, the General Staff of the Armed Forces of Ukraine carries out planning, coordination and control over the preparation of all components of the defence forces for acquisition of appropriate joint capabilities.

The Chief of the General Staff of the Armed Forces of Ukraine is subordinated to the Supreme Commander-in-Chief of the Armed Forces of Ukraine and is responsible for the accomplishment of the tasks and functions assigned to the General Staff of the Armed Forces of Ukraine, in particular as regards defining the requirements for the capabilities of the defence forces, the requirements for the resources necessary for the proper performance of the tasks of the Armed Forces of Ukraine and other components of the Defence forces, strategic planning of the use

and development of the Armed Forces of Ukraine, their technical equipment, training and comprehensive support.

The Joint Force Commander subordinates to the Commander-in-Chiefof the Armed Forces of Ukraine and performs operational control functions through Joint Operational Headquarters of the Armed Forces of Ukraine of achieving operational (military) capabilities, planning of use and direct command and control functions over joint forces and capabilities of the Armed Forces of Ukraine and other components under his command, as well as the national contingent and national personnel involved in international peace and security support operations.

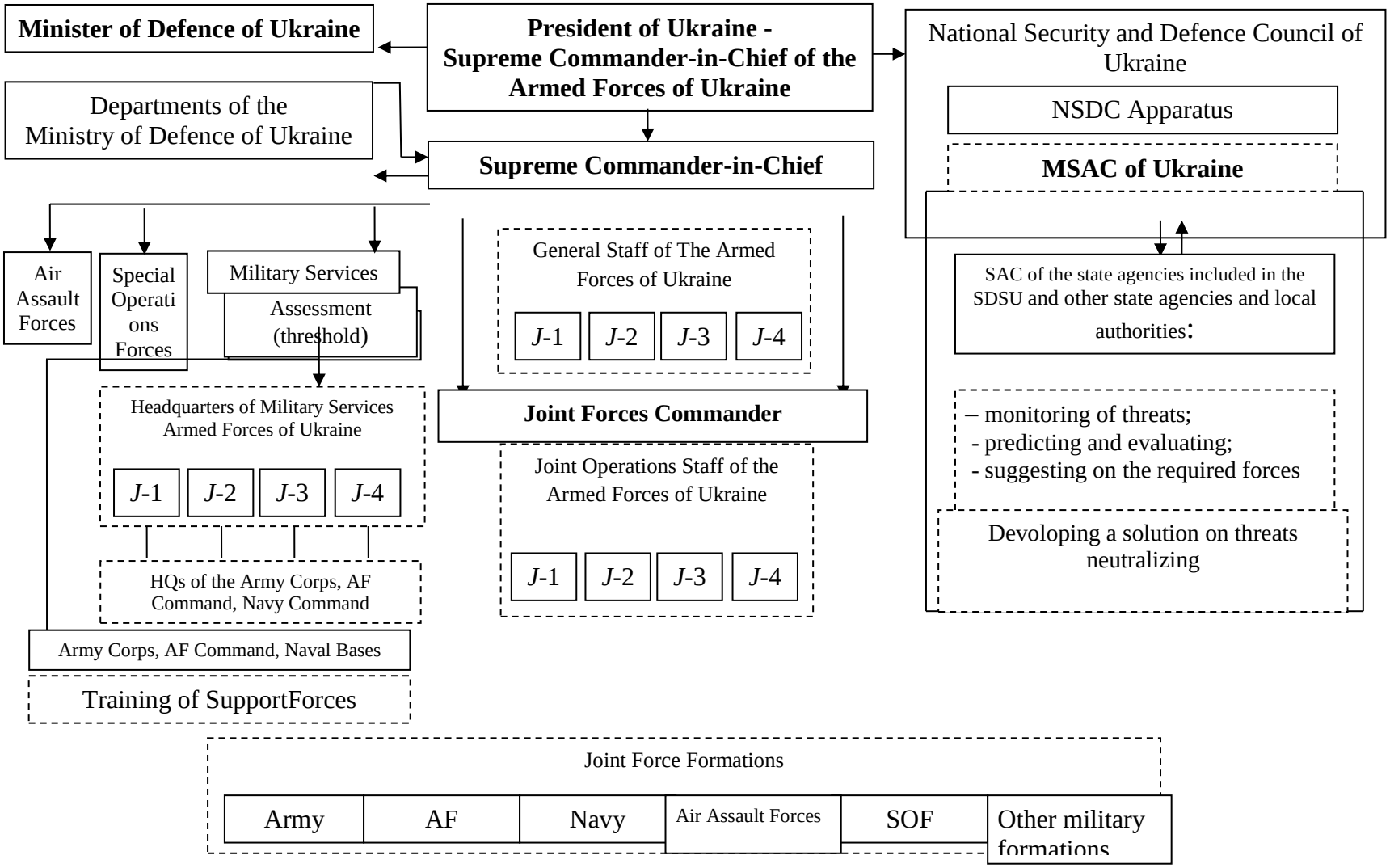

Fig. 5.5. System of strategic command of the SDSU on integration of efforts of military and non-military agencies to counter the military threats (*option*)

The leading role in providing centralized management of the Security and defence sector of Ukraine in peacetime, in crisis situations that threaten national security and the special period, increased levels of interagency coordination and cooperation is on the Main Situation Awareness Center of Ukraine (MSAC). An important function of strategic management of the SDSU is rational distribution of tasks in the SDSU and the formation of defence and security forces command and control system, depending on the type of crisis (threats) and taking into account the diversity of risks to national security.

The joint, under single management activities of the SDSU agencies to neutralize the threat requires the definition of recommendations on the forms and methods of such integration.

Considering possible ways of employing military and non-military agencies of the SDSU, and in particular the forces and means available to counteract the military threats, it is proposed to use, by analogy, an understanding of the methods of conducting military (combat) actions - the procedure and methods of use of forces and means for solving the problems of counteraction to the MThs .

Usually, the methods of military (combat) actions are characterized by the main components (the direction of concentration of major efforts, the sequence of of the enemy defeating, the formation of troops, the nature of the maneuver, etc.), the content of which is determined by the combat situation, the characterof the enemy's actions and available forces and capabilities. Accordingly, the choice of method of efforts integration will depend on the nature of the specific threats and timeliness of detection.

It is proposed to consider as determinative ways of integrating efforts:

- capabilities of the forces and means involved in counteractinging within the selected SDSU agencies to form an integrated potential for countering the threat in accordance with the spheres of influence;
- qualitative characteristics of personnel, as a basis for the development of a general strategy for countering the threat and the development and fulfilling the tasks (measures) at the level of the SDSU agencies.

The main ways of integrating the efforts of military and non-military agencies of the SDSU to neutralize the military threats are proposed:

- integration of military and non-military agencies of the SDSU and capabilities with the given priority to non-military ones with the use of force in case of need;
- integration military and non-military agencies of the SDSU and capabilities with the given priority to the military means.

Each of the above-mentioned integration methods may have many variants of a specific list of applied forces and means of the SDSU agencies and the level of their participation in achieving the main goal (threat neutralization strategies) of their integration.

The forms of integration of the efforts of the SDSU agencies to neutralize threats are to orm of integration of the efforts of the SDSU will be determined by

the chosen method of neutralization of threats, which depends directly on the characteristics of the threat (or several threats), to neutralize the integration of the SDSU agencies.

The tetm “operation”, which is considered as a main form of countering any threat, corresponds to the definition of “campaign”, which is used in operational art. Adequate response to the threat (threats), which must be neutralized by joint efforts, requires significant time, involvement in the counteraction of various agencies of the SDSU, financial and material resources.

An important recommendation for the integration of the efforts of military and non-military agencies of the SDSU to neutralize the MTh, in our opinion, is to improve strategic communications in the SDSU of the state

Today, *strategic communications in the military sphere* are primarily activities aimed at harmonizing all activities in the field of public diplomacy, public relations and military (information) operations. Strategic communications in the military sector today are primarily activities aimed at harmonizing all measures in the field of public diplomacy, public relations and military (information) operations.Strategic communications are aimed to undermine and delegitimize the enemy by gaining support and recognition from the local population, the electorate of a country, international organizations and civilians [22]. In the context of the Joint Forces Operation in the East of Ukraine, it is the most important for the restoration of peace.

From NATO experience, strategic communications allow to guide a variety of different activities and their subordinate activities in one vector for ensuring national security. This confirms the importance of strategic communications in the neutralization of MTh, especially according to the requiremnets of the guiding documents on the issues of ensuring national and military security regarding the priority of non-military actions. Thus, the difficulties encountered during The Security Support in Afghanistan led to the decisicon by the Supreme Allied Commander Europe that work in the field of strategic communications should be included in the list of tasks of Supreme Headquarters Allied Powers Europe. The initiative was also taken by the political headquarters in Brussels, where the Public Diplomacy Division joined strategic communications to its core tasks [22].

Taking into account the proposed recommendations in the SDSU practical work will help integratethe efforts of military and non-military agencies of the SDSU in the conditions of resource constraints under the joint command and control and adapt to the level and nature of threats.

The sequence of making management decisions for the integration of efforts of military and non-military agencies of the SDSU to neutralize MThs is developed by the use of adaptive management method of integrated combat potential of countering a detected (predictable) threat which is essentially determines a way of distribution of tasks (actions) between military and non-military agencies and responsibility for their implementation without detailization at the level of individual SDSU agencies.

Prepared management decision on the integration of efforts of ‘military and

non-military agencies of the SDSU to neutralize MThs will help arrange functions of the Security and Defence Sector andimprove command functions and civil control, for ensuring of the full, centralized, comprehensive process of national interests realization in the military sphere.

5.3. Recommendations for automation and information-analytical management support of integrated potential for countering military threats to provide a certain level of military security of the state

The multifaceted and dynamic changes in the modern world require constant improvement of the existing system of ensuring the military security of Ukraine. In order to develop and take decisions on the formation and management of an integrated potential for counteracting military threats, reliable and timely information is needed on the actual state of the SDSU agencies and the threats that need to be neutralized. Those issues are now given sufficient attention. This is manifested in the development of appropriate concepts for ensuring national security in various areas, based on the results of research conducted by government agencies and individual researchers. Thus, the works [23-27] cover issues related to the process of information and analytical support (IAS) in the system of public administration.

The paper [28] analyzes the existing theoretical basis for the IAS of public administration, substantiates its content, essence and role in the overall process of information provision and functioning of the modern system of public administration.

In the works [29, 30] conceptually outlined the methodological foundations of systemic research on the problems of NS of Ukraine, the theoretical foundations of the organization of information and analytical support and evaluation of the effectiveness of strategic planning in the field of public administration for ensuring national security were developed.

In general, publications [23-30] confirm the need to improve IAS and automate management of the integrated potential to counteract military threats. According to experts, in the activity of state administration bodies there was not a holistic system of IAS for a decision-making support for ensuring a certain level of national (military) security. Existing information and analytical structures of the state are not merged into a single information network, use different methods for calculations and have insufficient level of automation of the process of management of the subjects of the security sector and defence in crisis situations.

At present, in the conditions of the situation in the Autonomous Republic of Crimea and in the East of Ukraine it is expedient not only to conduct analysis and monitoring of the existing state of IAS and automation of integrated potential of the

SDSU, but also to develop practical recommendations for its introduction into the activity of state bodies authorities, non-governmental institutions that deal with the problems of the NS, in order to achieve (maintain) the appropriate level of national (military) security of the state, which ensures its sustainable development.

Depending on the availability of threats to the NS, the nature of the information required for decisions by public authorities to maintain the necessary level of national (military) security of the state is rapidly changing, and an array that needs to be processed and analyzed may be unlimited. All this requires the creation of a national system of IAS and automation of the management process of integrated potential for counteracting the threats to the NS and military threats.

Such an approach will enable to expand the capabilities of the SDSU to maintain stability in a wider spectrum of threats, not only MThs. Accurate calculations, simulation of the situation and a forecast for its further development will allow us to make informed decisions to eliminate the threat of a military character, primarily by non-military measures, and in the event of their ineffectiveness being neutralized using military-political, military-technical, military-economic, informational and other measures.

Proceeding from the essence of IAS as one of the types of information support [28], the system of IAS organizationally should be the only contour of interacting structures that will carry out informational and analytical support for decision-making [30].

Functions of such a system are determined primarily by the existing opportunities of information technologies:

- reliable storage and operational access to large volumes of documentary and background information;
- automated support for information processing (analysis, modeling, forecasting and expert assessment);
- external and internal communications, as well as support for access to remote information sources and funds;
- automated support for technological procedures for working with documents (registration, sorting, reproduction, editing, printing, design and publication);
- support for individual and collective work with information.

The purpose of functioning of the system should be to identify in advance the causes, conditions and signs of threats of war and hybrid nature and inform the DM in order to ensure timely implementation of adequate military and non-military measures for their neutralization.

In the general sense, at this time there are two levels [31] of IAS (Fig. 5.6).

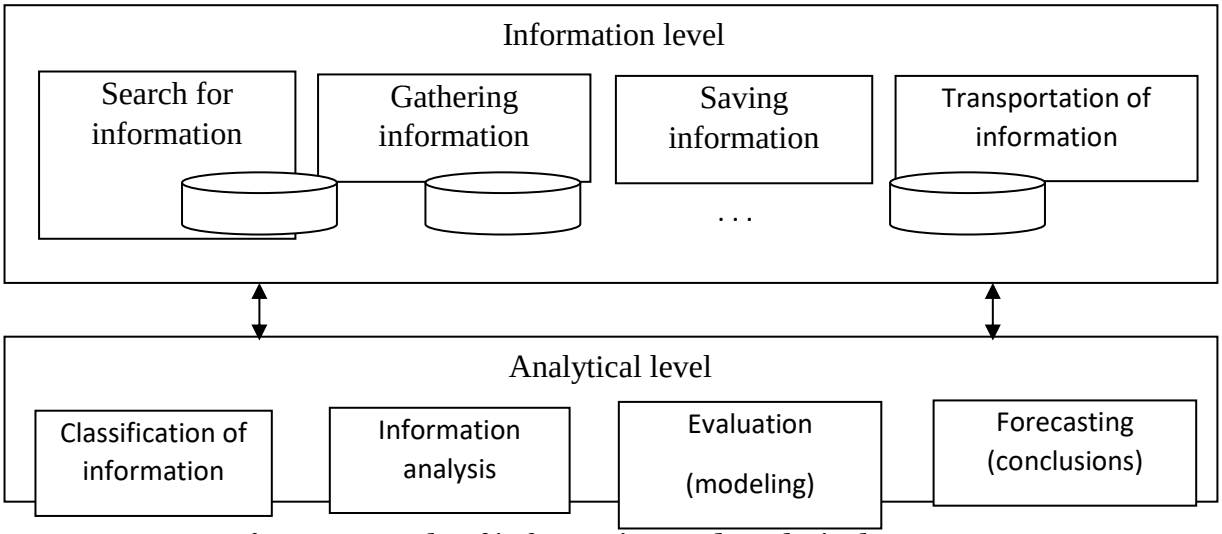

Fig. 5.6. Levels of information and analytical support

Information and analytical support, which is used today in the interests of determining the level of MS, is mainly informational and reference, and not information-analytical. The state and military authorities are mostly engaged in the preparation and implementation of operational solutions to the current MS issues. There are no long-term forecasts for the development of the situation, but the medium-term ones are descriptive, there are no scenarios for the development of the situation in certain areas of national security and their impact on the military sphere, based on well-founded criteria and indicators.

And this is primarily due to the fundamental theoretical difficulties caused by the absence of objective models and techniques that would provide a high level of reliability and adequacy to describe and explore complex processes under conditions of incomplete, inaccurate and inaccurate information (data). In addition, in the information and analytical structures of state authorities, specialists who do not have practical experience, knowledge and skills of analytical work in the conditions of military threats work.

At the same time, the potential of existing situational centers is inadequate, and the possibilities of modern technical means of processing and transporting data in a single format in the interests of all actors in the security and defence sector are insufficient.

In view of this, there is a need for the development of recommendations for the implementation of a full and adequate IAS for the process of managing the integrated potential of countering the military threats.

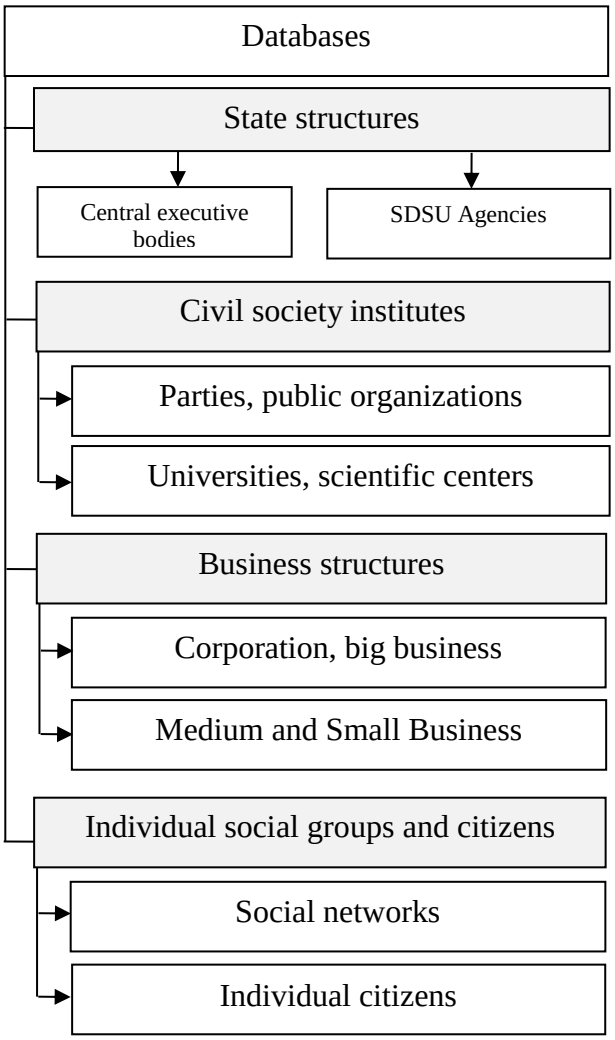

Fig. 5.7. Block-diagram of completing the databases (*option*)

An analysis of the information component of security in the structure of IAS for providing a certain level of MS has shown the necessity of its construction at the national level. Consequently, work at this level (no data in the databases) should be organized, including not only the possibilities of state authorities, individual agencies of the security and defence sector, but also the whole society and personal intellectual resources of individual citizens. This structure must include the organizational elements included in Fig. 5.7.

However, in the general database and database of elements of the system, it is proposed to have information units that are grouped according to passports of threats to national security and used to form and manage the integrated potential of counteracting the emerging threat.

Within the framework of a single automated information system, the formation of a database is possible in the following areas:

- military-political;
- military-strategic;
- military-economic;
- military-technical;
- military-cybernetic;
- information and psychological influence and others.

The indicated directions for the creation of the database should correspond to the list of threats to the national security of Ukraine and the relevant priorities of the state policy in the areas of national security and defence, defined in the National Security Strategy of Ukraine, the Strategy of Military Security of Ukraine, the Strategy of Cybersecurity of Ukraine, other documents on national security and defence medium- and long-term prospects.

Also important is the analytical component of IAS of integrated potential of counteracting threats to war, which should provide [8]:

- reasonableness of the decisions due to application of effective methods of processing and analysis of information, including fuzzy;
- efficiency of achieving the objectives of the analysis, estimation and forecasting of any situations.

To do this, in the structure of the analytical level of the system of IAS and automation of integrated potential management (see Fig. 5.6) in the conditions of the military and hybrid threats, it is proposed to have a set of interconnected models, namely:

- *military-political model of the state;*
- *model of threats to the state's military security* (a model of data revealed at different times, and predictable war threats, each of which is described by the characteristics of a typical passport of threats);
- *model of the system for monitoring the threats to the state's military security* (the procedure for identifying the threats to which the MSS must respond effectively);
- *a model for assessing the level of military insecurity and opportunities for its de-escalation* (the model makes it possible to assess, within a range from 0 to 1, the level of military insecurity by the set of threats detected both for a certain time interval and for the selected perspective);
- *a model for assessing the level of military insecurity and opportunities for its de-escalation* (the model makes it possible to quantify, within a range from 0 to 1, the level of military insecurity by the set of threats detected both for a certain time interval and for the selected perspective);
- *a model for assessing the required capabilities of "hard" power and "soft" power forces and means* (it enables to determine the necessary capabilities of the MSS to neutralize the identified (predicted) level of military insecurity. By solving the inverse problem, the model enables to determine the required forces and means (the required potential) for ensuring the formation of the necessary capabilities, which, in turn, depend on many factors, of which the military-political model of the state stands out);
- *a model of the formation of a plurality of options for integrated potential* (the model allows not only to form several options, but also to rank them according to certain indicators, for example, the effectiveness of de-skeletons of the identified level of military insecurity, duration of the conduct, the number of people involved, etc.).

Consequently, the current state of IAS and automation of management of the integrated potential for counteraction to military threats does not allow to fully implement the potential of the security and defence sector to neutralize the military threats. That is why it is necessary to organize the information work (completing the databases) at all levels, including not only the possibilities of state authorities, some agencies of the security and defence sector, but also non-state structures and citizens.

To organize the analytical component of the system of IAS, one needs to have a set of interconnected models for developing adequate solutions, in particular to ensure a certain level of MS of the state.

5.4. Recommendations for the creation of non-military action's database, which can be used to form an integrated potential for de-escalating threats at different phases of conflict development

The problem of finding effective methods for resolving military conflicts is relevant and of great importance for the strengthening of MS of any nation [8, 16, 32-34]. Neutralization of war and hybrid threats through military measures is achieved by the task of material damage to the opposing side in various fields. It is believed that military actions have a greater impact on the conflicting parties. However, the greatest shortcoming of military measures to neutralize the war and hybrid threats is that their use is associated with large material costs of economic potential and losses among the personnel of the armed forces and the civilian population.

In order to increase the flexibility and efficiency in choosing one or another military measure aimed at neutralizing threats of war, it is advisable to distinguish military measures of direct and indirect action. In Fig. 5.8 the variant of the structural division of measures, which can be used by the agencies of the SDSU during the neutralization of the MThs is given. Simultaneous or sequential use for counteracting a specific or predicted threat presented in Fig. 5.8. The set of measures (both military and non-military) determines how to neutralize the threat.

At present, according to the views of scholars [19, 35-37], approaches to the settlement of military conflicts are virtually confirmed by a significant reduction in the role of military action, especially in the early phases, in a situation where a state in respect of which a military conflict is resolved undergoes serious economic, scientific, technical and demographic problems.

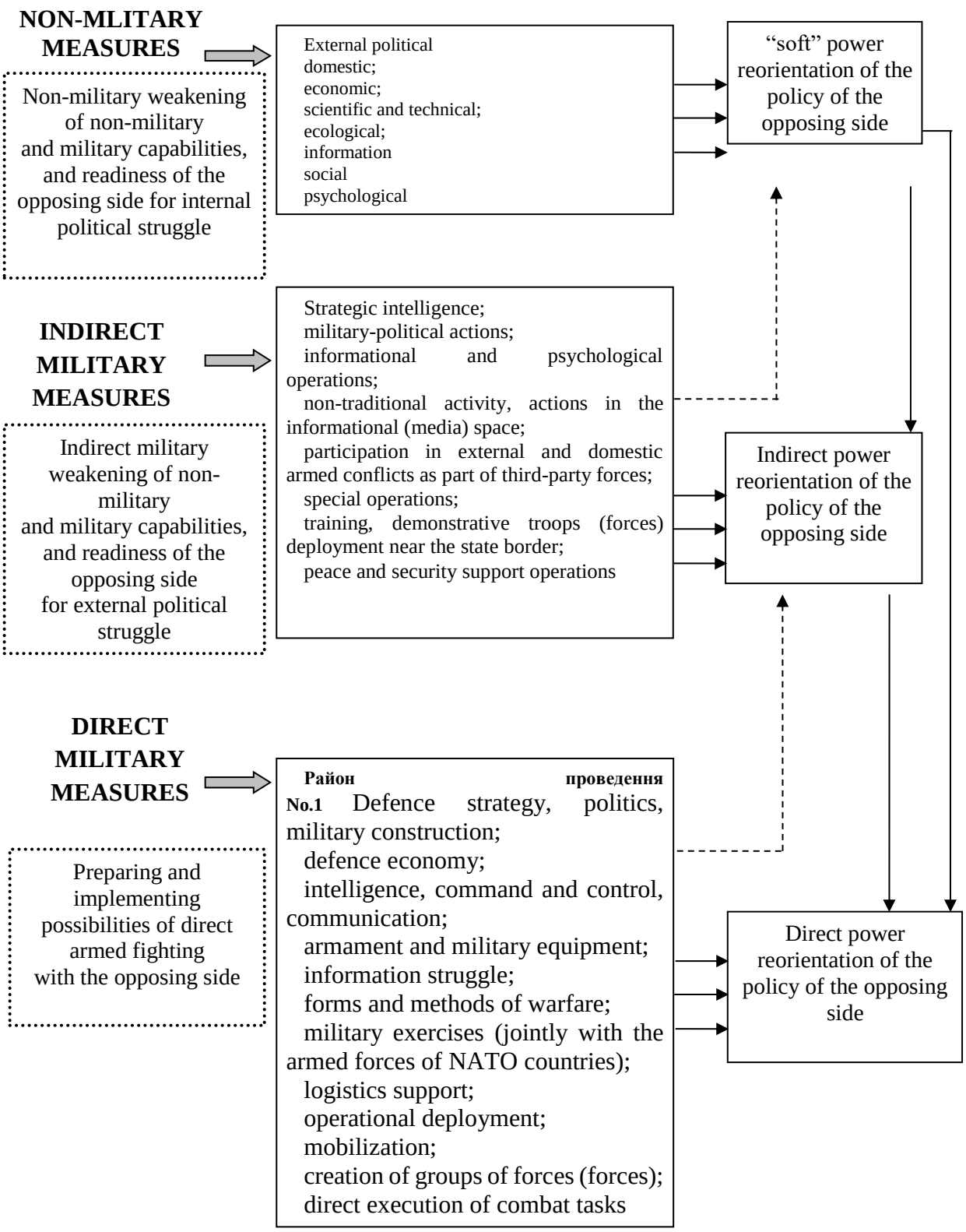

Fig. 5.8. General structure of national defence of the state (*option*)

Scientists in the field of conflictology have developed approaches to the peaceful settlement of a military conflict [36, 37]. However, the problem is not the development of universal ways of resolving a military conflict, but the need for an integrated and consistent use of all available in the state and international security organizations is non-military measures that are adequate to the threat that has arisen or may arise.

At present, many publications outline possible non-military measures and indirect military measures that can be used to neutralize MTh. At the same time, they have a fragmentary (in separate spheres) list of these measures. The aggregate of these measures is not grouped according to the possible phases of the development of a military conflict, as well as the areas of responsibility of the Security and defence sector of Ukraine, which have the appropriate capacity to implement them.

This can significantly impede the formation, especially in the event of a sudden emergence of such a need, an integrated potential for an adequate response to the threat, especially the emerging hybrid nature, and the definition of tasks for the agencies of the Security and defence sector of Ukraine involved in its neutralization.

Consequently, an analysis of existing non-military measures is required, their classification taking into account the phases of the development of a military conflict and the development on this basis of recommendations for the creation of databases of non-military measures taking into account the indirect military measures that can be used to form an integrated potential for countering military and hybrid threats.

At the end of XX century non-military means of countering the military threats and, especially, hybrid ones, in their effectiveness, not only equaled the military, but in some cases surpassed them. Non-military means began to achieve those goals that were previously achieved only by conducting military (combat) action. However, the list of non-military measures that can be effectively applied at different stages of the development of a military conflict is not developed. And the need to develop such a list is obvious. This list should include such measures as are appropriate to the nature of the threats, the capabilities of the state regarding their formation and have sufficient effectiveness in counteracting the military and hybrid threats. In order to develop a mechanism for emplementing a set of non-military measures and control over their ensuring, the appropriate databases are needed.

Under the **databases of non-military measures**, it is proposed to understand (by analogy with labor [38]) a unified set of data (information units) that are grouped according to spheres and phases of the development of a military conflict and used to form an integrated potential for combating military and hybrid threats within a certain unified automated information system.

The database contains the following non-military measures: military-strategic, military-political, military-economic, military-technical, military-cybernetic, information-psychological influence and others (like social, or demographic ones).

A systemic approach to the ensuring MS of the state requires a substantial clarification of the views on the role of central executive bodies and other public

authorities in addressing the military and hybrid threats. At the stages of the birth and exacerbation of the military conflict, when intensive use of political-diplomatic, economic, information-psychological, legal and other measures against state institutions of power is observed, the role of the armed forces is auxiliary and consists in the deterrence of the opposing side from the adoption of hasty, reckless decisions aimed at “hard” power solution of contradictions.

The role of the armed forces is becoming more pronounced during the crisis, when it is necessary, through the demonstration of force, the decisive cessation of armed provocations or other military actions by the opposing side, to convince them of the readiness and ability of the state to use military force and effective non-military measures.

Depending on the features and typology of modern military conflicts, modern researchers [33, 36, 37] offer different approaches to defining the phases of their development. Thus, A. A. Bolshakov believes that the development of the conflict has five phases: the emergence, exacerbation of tension, immediate threat, crisis, conflict resolution. In this case, non-military measures to resolve the conflict are applied in the first three phases. Military measures in these phases are deterrent and begin to operate only from the third phase. However, it should be noted that such a division is provisional It is obvious that for each phase of the development of a military conflict, a specific set of measures for its settlement is required, the application of which at various phases should be complex and consistent with the phase of the development of the ongoing conflict.

Based on these considerations, it is proposed to use the following phases of the development of a military conflict: initial (hidden), visible (armed warfare) and restoration of peace. Consider the first two phases.

For the *initial phase of the conflict evelopmentt*, the following list of measures (information units) of the database is proposed:

- *military-political* – making the political decisions by the highest military-political command of the state, regarding the situation, meetings (official, unofficial) the heads of states and governments, negotiations and consultations on improving (maintaining) intergovernmental relations, meetings of the authorities of military-political unions on issuesassessing the threat and developing recommendations for joint actions, announcing ultimatums to aggressors, terminating negotiations, meetings and other contacts with aggressor states, activization of political activity with the countries, which are not involved in the conflict, using international institutions to take measures on the states, that destabilize the international situation;
- *military-strategic* – forecasting of options of the MPS development, prompt equipping of the territory, carrying out the reconnaissance of possible areas of troops employment, developing deployment routes to the areas of combat use, accumulation and transportation of materiele reserves, preventive deployment of

troops (forces), advance planning of operations (combat actions), settlement of border issues in areas near the conflict zone, verification measures, disarmament of illegal armed groups, blocking of zones (separate areas), coordination of actions with allies;

- *military-economic* – expanding the external economic ties, negotiations on trade and economic problems, conclusion (continuation) of long-term agreements on a mutually beneficial basis, suspension of all (or certain) types of trade and economic dialogue, curtailment of programs on long-term cooperation and other economic relations, termination of negotiations on the expansion of trade and economic cooperation, reduction (termination) of loans, investments, introduction of an embargo on the supply of raw materials and energy recourses, imposition of other trade and economic sanctions, complete or partial rupture of economic relations;
- *military-technical* – terminating the scientific and technical (military-technical) cooperation, raising the issue of a possible termination of supplies (including weapons) to the states to deter them from providing assistance to the aggressor;
- *information and psychological influence* – broad propaganda on the comprehensive observance of international treaties and agreements, adoption of measures to neutralize psychological operations, formation of public opinion on the intentions of the opposing side, information propaganda, holding of international conferences aimed at condemning the world public potential aggressors, information- psychological impact on states to deter them from providing any assistance to countries preparing for the conflict;
- *military-cybernetic* – hacker attacks on computer networks, communication systems and airlines that are able to instantly paralyze society and cause panic, anonymous cybernetic attacks;
- *others* – creating social tension in society, complication of food and environmental situation, problems of refugees, ethnic problems, the problems of urbanization, factor of demographic pressure or vice versa, declining birth rate.

After the start of the already uncovered phases of the development of a military conflict, the role of military action becomes decisive. However, non-military measures, as military conflicts in Georgia, Syria and the East of Ukraine show, play an important role in these phases.

For the uncovered phases of conflict development, a list of measures (information units) of the database is proposed:

- *military-political* – statements of the president (head of government) in connection with the beginning of aggression, convening of an extraordinary session of the UN Security Council to discuss the situation, the appeal to regional security and non-governmental organizations (OSCE, EU, etc.) to unite efforts to condemn the aggressor and to take joint measures to neutralize the conflict, to break the diplomatic relations, to form a military-political

block to stop aggression, to hold political campaigns in friendly countries in support of the party that was the victim of aggression the introduction of martial law in the country;

- *military-strategic* – bringing troops (forces) at higher levels of combat readiness, concentration of forces (forces) in certain areas, deploying troops (forces) in the relevant operational structure, adopting in operational subordination forces and means from other areas, other military formations and law enforcement agencies, formation of new parts and connections, strengthening the areas of the state border, increasing the composition of duty forces and means, supplies of materiele support, relocating and dispersing forces and means of air and naval forces, regrouping of troops (forces) during operations (combat actions), protecting communications (rock and fronts), emplementing the mobilization measures;
- *military-economic* – transiting the country's economy to a state of war, terminating the supplies to the aggressor country, as well as closing all types of communication, assisting to the countries that joined the bloc against the aggressor, texpansing the external economic relations, negotiating and concluding long-term agreements on a mutually beneficial basis, cancelling all types of trade and economic dialogue with the countries that acted on the side of the aggressor, the embargo, economic sanctions, economic blockade, the destabilization of the economy of the aggressor;
- *military-technical* – termination of military-technical cooperation, creation of additional capacities for the production of new types of weapons and military equipment, military technical assistance;
- *information and psychological influence* – informing the population and troops about the causes and real goals of the aggressor, the need to reject aggression, conducting propaganda and counter-propaganda in the public consciousness of the enemy's population and troops, disrupting information and psychological operations of the enemy, deploying propaganda on the need to comply with international treaties and agreements, information and psychological influence on states to deter them from assisting countries involved in the conflict, conducting ideological, propagandistic and psychological influence on the opposing side, neutralizing the negative consequences of information and psychological operations of the enemy at different levels;
- *military-cybernetic* – actions, attacks, operations on the elements of the enemy's information infrastructure, reconnaissance actions in cyberspace, protection of its own infrastructure from the cybersecurity of the enemy;
- *others* – destabilizing the socio-political situation, taking measures aimed at protecting the civilian population in the zone of armed conflict, assisting the international civil society organizations in providing the civilian population

with material and medical assistance, eliminating the consequences of ecological catastrophy.

Thus, the current state of creating the databases of non-military measures that can be used to automate the processes of forming the integrated potential for combating military and hybrid threats is fragmentary. In addition, non-military measures as information units are not classified depending on the phases of the development of a military conflict. The above version of the classification of databases of military and non-military measures to counteract the military threats is proposed to be used as a basis for further research.

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Part II

METHODS AND TECHNOLOGIES FOR ASYMMETRIC RESPONSE OF THE SECURITY AND DEFENCE SECTOR TO THREATS TO THE MILITARY SECURITY OF UKRAINE

Chapter 6

ANALYSIS OF THE VIEWS OF COMMAND ECHELONS OF THE WORLD'S LEADING STATES ON THE IMPLEMENTATION OF ASSYMETRIC ACTIONS IN THE ARMED CONFLICTS AT THE BEGINNING OF THE 21st CENTURY

6.1. Transformation of views, concepts and methods of symmetric and asymmetric counteraction to the state military security threats at the beginning of the 21st century

The foreign policy of states in the international environment is always carried out through two defining means , they are diplomacy and armed violence, which have never been opposites, but as the history shows, have complemented each other

Politicians have traditionally preferred diplomacy, as it has always been cheaper and less risky for the state than war. However, this does not deny at all that armed violence has been, is and will be a decisive means of influencing situations of critical contradictions in relations between states. The vast majority of modern countries in the world have a large and fairly well-equipped armed forces. The armed forces are not only the guarantor of the sovereignty and territorial integrity of states, but also a powerful factor of political pressure, a determinant of the degree of their prestige and place and role in the international system.

Military force has always been derived from politics, because its possession or implementation is one of the most important attributes of the state and instruments of foreign policy, even when it is not implemented directly.

Modern international law regards any use of force as repression and categorically prohibits it, unless the state exercises its right to defence against aggression or acts in accordance with a UN Security Council resolution.

In all other cases,an act of the armed violence is perceived as aggression, or an action incompatible with the UN Charter, against which appropriate measures must be taken by all members of the organization. A detailed definition of an act of aggression by one state against another is contained in Article 3 of the resolution adopted by the XXIX session of the UN General Assembly dated on December 14, 1974 [5].

The nature of the armed conflicts is also changing. If in the 21st century. these were mainly conflicts between states, today they are mostly internal conflicts, often with the intervention of foreign armed forces of one or more states (coalitions); asymmetric conflicts involving non-state armed groups; transnational conflicts flowing across state borders; conflicts with a variety of belligerents, which may involve forces of international organizations, armed forces of states, insurgent groups, private military campaigns and terrorist organizations. Accordingly, the legal regimes of such conflicts are complicated [6].

The development of military thought in the early 21st century. was associated with preparation for the future war. In general, we can identify German and French areas of its development.

German Chief of General Staff Alfred von Schlieffen in his works, published under the general title “Cannae”, developed the idea of encircling enemy troops.

Schlieffen also affirmed that a future war could not last long for economic reasons, as states could not maintain multimillion armies for a long time. It should be noted that this view was shared by the military leaders of all the leading armies of the time.

French military theorists Ferdinand Foch, Leval, and Granmeson developed a theory of decisive offensive, but, unlike the Germans, who planned to bring the main forces into battle immediately, the French recommended that they first take a wait-and-see position and only then, depending on the situation, conduct an offensive.

Russian military thought split into French and German supporters. At the same time, the Russian general Mikhnevych in his work “Fundamentals of Strategy” (1913) rejects the idea of lightning defeat of the enemy in a decisive battle and the rapid end of the war. He emphasizes that future wars will be fought by multimillion armies that can recover quickly, as evidenced by the experience of the Franco-Prussian War of 1870-1871. Thus, victory requires not only the defeat of enemy armies, but also the capture of vital centers of the country, and this requires considerable time and effort of all state forces.

After the end of the First World War, military theorists were faced the task of understanding its experience, as well as developing a theory of the implementing of new weapons, such as tanks, aircraft and submarines. The United Kingdom, Germany, the USSR and France worked most persistently in these areas.

The main problem of the First World War was overcoming enemy fortified lines. New means of the armed struggle, such as tanks, made it possible to solve this problem. As a result, theories of creation mechanized armies based on tanks began to emerge . John Fuller in England, Charles de Gaulle in France, and Heinz Guderian in Germany made the correct assumption that future war would be maneuverable.

In the USSR in the 30's of the twentieth century. the theory of a deep offensive operation was actively developed, the essence of which was to break through the enemy's defence to a considerable depth and implemeny the immediate breakthrough of tank and mechanized troops, while the aviation blocked the approach of enemy reserves. The decisive role in the breakthrough was given to tank troops and artillery.

In parallel, Germany developed the theory of blitzkrieg , the essence of which was the massive use of Land forces (most of which were tank and mechanized troops) and aviation in the direction of the main strike to quickly break through the enemy's defence and advance rapidly into its territory. The goal is to surround enemy groups, destroy the interaction of enemy troops and capture important strategic points. The concentration of mobile forces on the main direction of the offensive

made it possible to break through the enemy's defence. The key point of the blitzkrieg was the speed, which made it difficult for the defending party to adequately respond to the actions of the troops conducting the offensive.

At the same time, remembering the experience of the First World War, there was an active search for ways to minimize losses. Italian General Giulio Douhet ,who was the first theorist of air warfare, in his work Il Dominio dell'Aria (1921) put forward a thesis that aviation was the most powerful weapon that could win wars by destroying population, roads, and industrial centers.

Thus, according to Giulio Douhet,only with aviation, destroying the troops and industry of the country, it is possible to paralyze the will of the enemy to resist. Although the "Douhet doctrine" did not become the basis of military planning in any country, its elements were actively used during World War II. World War II and the wars of the second half of XX century. proved the falsity of Giulio Douhet`s theory of victory only due to military aviation. No country has won a war without the occupation of enemy`s territory by the Land forces.

The invention of nuclear weapons has significantly changed military doctrines. The key point was to understand the futility of nuclear war, which can destroy civilization, that is why nuclear weapon was considered exclusively as means of deterring a possible aggressor. Although American military theorists developed concepts for the implementing of tactical nuclear weapons in local conflicts until the late 60's of the twentieth century.

In these circumstances, the British military theorist Basil Liddell Hart formulated his concept of "indirect actions". The essence of Liddell Hart's concept was that a direct engagement on the battlefield of enemy armies is not an effective way to win, because the hostile parties will inevitably take measures to block each other's action.

Later the United States supplemented this concept with the idea of economic superiority. Liddell Hart rejected the strategy of direct powerful blows. He considered it is most appropriate to use unexpected and unpredictable "indirect actions." You need to throw the enemy off balance, deceive him about your strength and direction, force him to disperse his forces in several directions, and finally act like the enemy did not anticipate. Liddell Hart opposed solid fronts and exemplified the action of German General Erwin Rommel's mobile units during the 1940-1943 North African campaign.

Also in the last third of the 20th century through the use of high-precision weapons, space reconnaissance, and electronic combat control systems, the American military theorist J. Warden proposed an improved version of the "Douhet doctrine" . In his publication "Air Campaign: Planning for Combat" (1988), he affirmed that the air force could achieve its goal with minimal losses and high efficiency if it struck at the "centers of power"- the enemy's most vulnerable areas. Warden argued that it is not necessary to directly attack the enemy's armed forces,

because it is ineffective, but it is necessary to destroy industrial facilities and communications.

At the end of the 20th century. in the United States a theory of “air-ground combat” began to develop, which is based on the widespread implementing of high-precision weapons, “single battlefield”, that means that command and control of troops is carried out with digital technology, the concept of “long-range battlefield” has been developed,that is the implementing of long-range units armed with long-range means . It can be noted that in fact this is the development of the ideas of the Soviet theory of deep offensive operation and the German theory of blitzkrieg, taking into account new technologies of defeat and command and control of troops [7].

The implementing of force has been and remains a leading component and basis of American foreign policy. This can be seen from the document “Assessment of the Strategic Situation in 1997”, prepared by the National Defence University and the Institute for National Strategic Studies, working for the US Department of Defence, which, in particular, states that with the new system of international relations the central principle of the implementing the US Armed forces has changed. This was the principle of “deterring aggression”, and if aggression cannot be avoided, “the task of defeating the aggressor and ending hostilities on US terms”. President Clinton's 1997 Memorandum on a “National Strategy for the New Century” lists three categories of US national interests:

1) physical ensuring the security of territory of the United States and its allies, protection of citizens and the economic condition of the country;

2) minimization of possible threats to US national interests;

3) the humanitarian interests of the United States.

To secure the first group of interests, the United States has the right to implement military force and resolve situations that pose a threat to their national interests. It should also be noted that the picture of the evolution of US military policy in the late nineteenth - early twentieth century, would be far from complete without mentioning such an important instrument of military policy as nuclear weapon. In the last decade of the twentieth century nuclear weapon played a key role, remaining one of the indicators of US “supranationalism” and the importance of the state's military capabilities. One of the turning points in the development of the US nuclear strategy after the Cold War was the signing by President Clinton in 1997 of the Defence Directive (PDD-60). The central provision of this directive was the abandonment of plans for a long-term nuclear war. According to the criterion of “cost-effectiveness”, the preservation of nuclear weapons, which are capable of having a disarming effect,it is more profitable than maintaining in good condition all the strategic nuclear weapons that were previously created for a long-term nuclear war [8].

The specifics of the wars of the 21st century is that the role of traditional weapons is no longer leading, but significantly increases the role of such tools as

political, diplomatic, economic, informational, ideological, psychological, humanitarian, intelligence, which are often more effective and more destructive. Direct military confrontations between states are becoming less frequent, giving way to internal conflicts, civil wars, which are primarily due to internal causes, but are provoked and supported by non-state actors. Non-state actors, or actors who act as a key tool and guide in the foreign policy of a state that pursues its geopolitical interests, are playing an increasingly important role in the hostilities of such wars.

The world history shows that military-political conflicts are often preceded by trade and economic confrontations. One of the economic means of this confrontation is economic warfare. Among the economic warfares, the leading place is occupied by the trade warfare, which according to classical economic theory is defined as the struggle of the state for markets through economic and procedural instruments of public policy.

21st century is marked by a large number of international conflicts with a change in the political leaders of states, primarily the method of "color revolutions". Many of them escalated into armed conflicts or local wars.

Unlike classic actions in past wars with a diplomatic note at the beginning of the war and a peace treaty at the end of it,on-going wars are never declared or end. Historical experience shows that almost all international wars and conflicts are based on economic (territorial) interests of leading states. Nowadays, when natural resources has been reduced and climate has been changed, economically developed countries seek to gain access to energy resources and routes for their transportation to the other countries, without or with implementing the military force .

The aggressor country is putting pressure on the chosen target state, increasingly implementing a non-traditional model of confrontation, which includes direct and indirect actions, while the legitimacy of the world community to resolve the armed conflict should not be challenged.

For that reason, a certain scenario of such a process has been developed in recent years. Initially, irrefutable evidence of the threat to regional security by the target state is searched, organized and presented to the international community. An active information campaign is launched to convince the world community of the inevitability of the military force implementation.

Political, economic and other forms of pressure are exerted on states that interfere the aggressor country's policy. A coalition of interested states is being formed,which is ready to support the aggressor.

The peculiarity of indirect action is that on the eve of war between the parties in conflict may not be hostility. However, some "third forces" which may be state or non-state, artificially form and inflate contradictions, and thus provoke the parties to armed conflict in their interests. Such "third forces", and in fact the customer of war, can be individual countries or blocs of states, influential international structures, transnational companies, certain political forces within the state, international extremist organizations – all those who are interested in such a war,

who are politically and economically profitable. Usually the “customer” does not resort to direct implementing of force,as he tries to secure his interests by acting “through the veil”, provoking the parties in conflict to active hostile actions, feeding one side or another with money, weapons, advisers, information. The true role, place, interests and goals of the “customer” are taken out of the public sphere, hidden behind “information pressure” in the form of political campaigns against human rights violations, accusations of tyranny, production of weapons of mass destruction or lack of democracy.

The information confrontation is intensifying, with the help of which there is an opportunity to destroy the foundations of statehood, to solve military-political problems of changing the ruling regime in the country. Falsification, substitution of information or its distortion, these are the most effective ways of conducting information confrontation. Classic wars of the 20th century usually consisted of 80% of violence and 20% of propaganda, and most modern wars are 80 - 90% of propaganda and 10 - 20% of violence. The effect of information action can be compared with the results of large-scale implementation of military force [10]. In the future, a civil war is waged in the victim country on national, religious or any other grounds between the indigenous groups of the state. In such a war, food supplies, energy, industry, and life-support objects could be deliberately destroyed. The country is gradually slipping into a state of complete chaos, internal political turmoil and economic collapse. All this creates an excuse for the coalition members to intervene in the conflict under the guise of preventing a humanitarian catastrophe, stabilization, etc. [4]. Through the implementation of indirect actions and methods of modern warfare, it is possible to achieve the necessary military results, such as demoralizing the enemy, inflicting economic, political and territorial damage on him without the explicit employment of their armed forces.

Along with the implementation of indirect action in military conflicts, militarily powerful states are implementing new approaches to achieving global superiority in space and information, increasing the military capabilities of the armed forces by developing bases abroad and global missile defence architecture. In addition, the algorithms and technical basis of reconnaissance and strike systems are being improved. There is a transition from large-scale, exhausting actions to the dynamic task of high-precision, electronic, informational strikes on the most important targets and critical objects of groups of troops and infrastructure of the state. New technologies are being tested in numerous armed conflicts and are constantly being tested during operational training activities.

Thus, thanks to the technologies used nowadays, the above mentioned goals can be achieved without the implementing the lethal weapons. An example of this is the so-called “cold” war, as a result of which the West, without implementing traditional lethal weapons, won the victory over the USSR, which led to the collapse of the Warsaw Pact, Yugoslavia, and Czechoslovakia.

Another tool for the realization of their geopolitical interests is to force the country to an armed conflict with the chosen enemy for destruction (weakening). In this case, the diplomatic factor begins to play a significant role. Recent hybrid conflicts have shown another way to achieve geopolitical interests,they are the formation and implementation of the government's fear with employment of the armed forces to pursue its national interests (protection of state sovereignty, restoration of territorial integrity, repulsion of aggression and punishment of the aggressor), paralyzing foreign policy. and dependent on those who have no such fear.

The tendency to expand the scale of wars in the mental space should be singled out. The state can be destroyed without declaring the war on it and without conducting traditional military operations against it, but only by implementing political, informational and psychological means. There are many such ways. For example, the revolution, the reprogramming of the consciousness of the ruling elite on the anti-state course, regime change and the establishment of a puppet government, which, following the will of the aggressor, acts in anti-national interests and destroys statehood.

Every year, the *Global Firepower* web resource publishes an assessment of the total military power of each country in the world, table. 6.1. Thus, according to it, in the ranking of the strongest military powers in the world, Ukraine took the 27th place out of 138, and among European countries it took the 9th place out of 50 [11].

Table 6.1

Ranking 2020 of the world's military states according to the Global Firepower version

STATE	Rating factor	A place among the countries of the world	Note
The USA	0,0606	1	
Russion Federation	0,0681	2	
China	0,0691	3	
India	0,0953	4	
Japan	0,1501	5	
Southern Korea	0,1509	6	
France	0,1702	7	
Great Britain	0,1717	8	
Egypt	0,1872	9	
Brasilia	0,1988	10	
Poland	0,3397	21	
Ukraine	0,4457	27	
Romania	0,6177	39	
Bielorussia	0,8179	53	
Hungary	0,8213	54	
Slovakia	0.8466	58	

Moldova	2,1291	112	

In their research, *Global Firepower* experts assessd countries on 55 indicators (number of weapons, military equipment and army size). Transport infrastructure, military budget, access to oil, etc. were also taken into account. However, the calculations did not take into account such an important factor as the combat experience of the armies.

In 2019, all countries in the world spent $ 1917 billion on defence. This is stated in the report of the Stockholm Institute for Peace (SIPRI). This is the largest amount spent on defence since the beginning of the research in 1988. Last year, total defence spending on the planet was 2.2% of world GDP, or about $ 249 per person.

Ukraine rose from 41st to 35th place in terms of expenditures. According to SIPRI, Kyiv spent $ 5.2 billion on defence in 2019, an increase is of 9.3% compared to the previous year.

Poland, Slovakia, Hungary, Romania, Moldova, Belarus and Russia are actively equipping and renewing their armies. Their spending on troops is constantly rising. Against the background of such active rearmament, first of all of Russia, Ukraine's defence capabilities need to be constantly increased.

The history of human existence can be divided into the history of peace and the history of wars. At the same time, it was the twentieth century, with its unprecedented scale and brutality of the world wars, that became the apogee of the evolution of this socio-political phenomenon. It was in the twentieth century.when radical changes in the socio-political content of the war underwent, the degree of its destructive impact on society, the nature of the weapons imployed. Without exaggeration, the terrible face of war became even more terrible.

After the events of the First World War, which in the past was perceived by society mostly as a heroic affair, it lost this aura, becoming an impersonal mechanical process. Nuclear weapons were invented in 1945, and this invention made a special contribution to the evolution of wars, because, paradoxically, the victory that could be won with these weapons, at the same time, would most likely preclude the further survival of the victor.

Thus, weapons of mass destruction became weapons of deterrence, world relations found their basis for decades to come, which consisted of nuclear parity between the USSR and the United States, and the armed confrontations that took place in the second half of the twentieth century were mostly no longer total wars. but military conflicts. At the turn of the 21st centuries,humanity has entered the information age, with its rapid global communications and extensive information networks, which has also left its mark on the nature of military conflicts, which have also entered a new phase of development. Along with the weapons of physical destruction, the technologies of symbolic destruction aimed at the spiritual and value-motivational spheres began to be implemened extremely widely, and the task

of gaining strategic control over the consciousness of the enemy population came to the fore.

The concept of information warfare began to be taken seriously as a substitute for military conflicts in their usual sense, with the implementing of numerous armed forces and military equipment, whereas previously information propaganda played only a concomitant role. The media and the Internet have become the basis of the latest information weapons, which have begun to prove their extraordinary effectiveness. It is worth mentioning the American corporation RAND, with its developments in the field of information technology, whose specialists in 1951 first proposed the term “information warfare” as a special kind of propaganda, and in 1996 it was the term “strategic information confrontation” (*Strategic Information Warfare*), which is “the use by states of the global information space and infrastructure for strategic military operations and reducing the impact on their own information resources”.

In modern conflicts, information is no longer just an additional tool. Analyzing the phenomenon of information warfares, we can distinguish three general types: mental (or psychological) warfare, cyber warfare, behavioral warfare (another term - behavioral wars).

Mental warfares are not a new phenomenon, but it is the information possibilities of modern times that have made it possible to wage these wars on a qualitatively new level. In the process of mental warfares there is a struggle for values and attitudes.

The goal of cyber warfare is the destructive impact of information flows (such as software codes) on material objects and systems.

Behavioral warfares are aimed at achieving and supporting through manipulative methods a certain type of human behavior. Behavioral weapons are based on the manipulation of behavioral algorithms, habits, stereotypes of activities that are embedded in a person's cultural environment and biography. This weapon is not aggressive, on the contrary, the object of influence will ideally not feel any interference, but they will even be pleasant to him. In general, behavioral warfares as non-lethal warfares and the corresponding software and hardware platforms and complexes are currently considered by some researchers to be the weapon of tomorrow, to which the world is trying to move.

Thus, confrontation in the information space is one of the characteristic features of on-going conflicts, and given the degree of informatization of the real world, domination over this space can be one of the determining factors for the parties of conflict in their pursuit of their interests. It should be borne in mind that the world is constantly changing, which determines the need to implement more sophisticated tools that will have real effectiveness in such a confrontation. In general, over the last 100 years, wars have evolved from “wars between armies” to “wars between people”. Given the recent trends in the development of means of confrontation, we can assume that in the future these means will become less and less obvious, and the

stakes will be on the prevention of clear, open military confrontation. At the same time, although the poisonous gases of the First World War were replaced by high-tech behavioral interventions, this in no way affected the very essence of wars, which remains unchanged ,that is the attempt to impose one's will on the enemy (s) in the struggle for resources [12].

In the military conflicts of the 20th - 21st centuries. their property as asymmetry is shown. An example is the Lebanese-Israeli armed conflict (July 12-August 14, 2006) between the Shiite Hezbollah and the Israeli Armed Forces (IDF), which has discovered new approaches and features of combat in yhe 21st century armed conflicts. [13].

Asymmetry as a property of military conflicts reflects the phenomenon of the defeat of sufficiently militarily developed countries to a weaker enemy. Although the term “asymmetric conflict” was introduced into scientific circulation in 1975 by E. Mack [14], it requires a more substantial analysis of strategies and tactics used by militarily weaker parties to the conflict to develop adequate strategies for action in such situations [15]. The results of such analysis of military conflicts should provide an idea of possible “asymmetric threats” to Ukraine, which should be taken into account when formulating national security policy. For example, taking into account the fact that in military conflicts, in addition to the state MF, one should expect the use of non-state armed groups, in particular private military companies.

Thus, the trends characteristic of on-going military conflicts will allow us to conclude that the future asymmetric actions will be the main content of hostilities.

6.2. Formulation of the scientific problem and partial objectives of the research

In the context of a war waged by a state that significantly exceeds in military terms victim state of military aggression, the SDSU aims to deter the aggressor from occupying territory, preserve vital infrastructure facilities, protect personnel and civilians.For these purposes, the state develops an appropriate mechanism of the state defence and strategic directions of its provision.

In these conditions, the MS of Ukraine has to be ensured by all available forces and means, united in the security and defence sector of Ukraine (SDSU).

In general, the problem of ensuring the MS in Ukraine has many political, economic, social, legal, informational, psychological, and, merely, military aspects, most of which need to be solved during developing the SDSU [18]. Unfortunately, this process is very slow now.

This is because the state does not have both theoretical and material preconditions. Primarily, there is a lack of developed theoretical basis for the use of asymmetric measures to counter a much stronger military adversary.

Strategic direction in ensuring the MS of Ukraine is to concentrate the efforts of the security and defence sector of Ukraine in the gradual and coordinated

enhancement of operational capabilities of the SDSU forces and their readiness level to respond to challenges and threats to the national security of Ukraine, in the context of limited resources and political pressure from states with stronger military potential in comparison with the combat potential of the Armed Forces of Ukraine. [18]. The threats to Ukraine come from a stronger in military terms adversary, the range of the SDSU tasks should be expanded to include asymmetric counteraction. At the same time, the defence capabilities of Ukraine must be at a sufficient level to prevent the emergence of an armed conflict and, in case of one, to localize and neutralize it. It is necessary to revise strategically the concept of defence, taking into account the technologies of asymmetric actions of the military and non-military agencies of the defence forces.

The mechanism of formation and implementation of the state policy on the ensuring the MS needs to be improved, and the created command and control system of the SDSU should be adjusted to the organization and implementation of asymmetric measures to counter the aggressor. At the same time, measures of asymmetric counteraction should not contradict the international law.

The practical achieving the objectives in providing MS with the use of asymmetric actions requires a deep scientific study, development of theoretical bases, scientific and practical recommendations for counteracting threats to the military security of Ukraine in this environment.

The scientific problem of this study is to develop a methodology that could substantiate the approaches and methods of the complex employment of SDSU military and non-military forces and means in the asymmetric counteraction to the modern adversary to the military security of Ukraine. To achieve the purpose of the study and solve the scientific problem, it is necessary to consider the following partial objectives:

1. To analyze the views of the military leaders from developed countries on the asymmetric actions in the armed conflicts of the 20th-21st centuries.
2. To develop the Concept of asymmetric counteraction to an opposing state for neutralizing its influence on significant spheres of the vital activities of the state.
3. To develop a scientific and methodological framework to substantiate the required potential of asymmetric response, agenciesof the defence forces and their efficient capabilities to achieve a necessary effectiveness level of asymmetric counteraction, in particular, the methodology and technique:
    - substantiation of the management decision on the asymmetric response to threats to the state MS;
    - to form a group of SDSU agencies to implement the Concept of asymmetric counteraction to a detected (predictable) threat;

- effectiveness eassessment of asymmetric counteraction with ensuring the MSS .

4. To substantiate recommendations for improving the effectiveness of de-escalation of threats to the military security of Ukraine by asymmetric actions of the SDSU, including:
    - concerning the choice of vulnerabilities of an aggressor state to inflict unacceptable damage on it;
    - concerning thedetermining of tasks for the components of the integrated potential in the Local Special Operation of Asymmetric Counteraction (LSOAC);
    - concerning the automation and IAS management of integrated potential of asymmetric counteraction (IPAC);
    - concerning the improving regulatory support for the asymmetric employment of defence forces.
5. To clarify and systematize of the conceptual apparatus of the state MS theory.

The selection of initial data is based on the current geopolitical and geostrategic situation in the world and trends in its development until 2030. The basis for conducting the study is the existing legislation on the National Security and Defence of Ukraine with a focus on the use of conventional armament.

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Chapter 7

CONCEPT OF ASYMMETRIC COUNTERACTING THE ENEMY STATE TO NEUTRALIZE ITS INFLUENCE ON THE SIGNIFICANT SPHERES OF NATIONAL SECURITY OF UKRAINE

7.1. Organizational and methodological bases of ensuring a sufficient level of military security of the state with the use of asymmetric actions to de-escalate the certain military and hybrid threats

Protection of sovereignty and, in the prospect, restoration of territorial integrity can be provided only by the strong Ukrainian state. The accelerated enhancement will allow to protect the rights and freedoms of citizens, create favorable conditions for their legitimate interests, modernize the economy and improve the quality of life.

However, no document on national security refers to the rights and freedoms of citizens on the territory of an armed conflict, although the Minsk agreements specify the adoption of the law on the special status of LPR and DPR and the law on amnesty for conflict participants.

The development of the Armed Forces and other MFs should be based on the best achievements of the world's leading armies, as well as their own combat experience in recent years. It is necessary to comprehend it and creatively take it into account in the new instructions and combat statutes/regulations.

The current legal basis on the national security issues determines that the detected MThs should be eliminated or neutralized primarily by non-military (political, economic, information-psychological and other) methods and means, and, in case of their low efficiency, by using military-political, military-technical, special and other methods and means to ensure a sufficient level of the state MS [1, 2].

The main non-military instruments that achieve these objectives are:

- balanced policy to ensure sufficient defence capabilities;
- renewal security guarantees provided to Ukraine on a voluntary renunciation of nuclear weapons;
- mutually beneficial strategic partnership;
- conducting actions in cyberspace;
- effective cooperation with international organizations and unions on the balance of interests, etc.

These non-military means can be used in planning asymmetric counteraction to the threats which interfere with the realization of national interests.

It is necessary to define the following basic principles of using non-military means for asymmetric counteraction:

1. Sufficiency of the formed potential of asymmetric counteraction
2. Complex vulnerability of the state - the sources of threats.
3. Increasing the “capacity” of counteraction through the use of coalition counteraction to an unfriendly state.
4. The rapidity of the implementation of asymmetric measures.
5. Maximizing the damage to an unfriendly state in various spheres of life to a level that would motivate an unfriendly state to abandon hostile actions against a target state.
6. Hypertrophy of damage to an unfriendly state in the eyes of the international community.
7. Concealment and minimizing signs of state ownership (creating a legend) of asymmetric operations.

A policy of sufficient defence capabilities requires swift and decisive actions to develop the security and defence sector of Ukraine.

Funding for the Ukrainian security sector per employee is three times less than in the Russian Federation and much lower than in NATO countries, which should be taken into account when determining the level of sufficient defence capabilities.

The main focus should be on the automation and management of asymmetric counteraction to military and hybrid threats in the interests of ensuring a certain level of the state MS.

To develop and make decisions on asymmetric counteraction to the military security threats it is necessary to hold accurate and prompt information about the real condition of the state and defence sector subjects and the threats to neutralize.

According to the experts [3, 4], in the activities of public administration bodies have not been developed an integrated system of IAS decision support to ensure a certain level of national (military) security. The existing information and analytical structures of the state are not integrated into a single information network, and use different methods for calculations, and have an insufficient level of automation of the managing process of the security and defence sector in crises. Depending on the threat to military security, the nature of the information that public authorities need to make decisions to maintain the required level of national (military) security changes rapidly. However, the amount of information that needs processing and analyzing may be limited.

This approach will expand Ukraine's MSS capacity to maintain stability in the face of a wider range of threats. Based on the essence of IAS as one of the information support types [3], the IAS system should be the only contour (in organization terms) of interacting structures that will provide information and analytical support in the decision-making process [5, 6].

The purpose of the system is to identify in advance the causes, conditions, and signs of military or hybrid threats and to inform a DM (decision maker) to take prompt steps of military and non-military nature in order, to neutralize the threats.

Public and military administration bodies are mostly engaged in the preparation and implementation of operational solutions to current MS problems. There are no long-term predictions of the situation, and medium-term ones are descriptive. There are no scenarios for the development of the situation in certain areas of national security and their impact on the military sphere based on the criteria and signs. This is primarily due to the fundamental theoretical difficulties caused by a lack of objective models and methodologies that would provide an opportunity to explore and describe (with a high-reliability level and adequacy) complex processes under conditions of incomplete, unreliable, and inaccurate information.

At the same time, the capacity of the modern situation centers is not fully used, and the capabilities of modern technologies of data processing and transportation in a single format under the interests of all actors in the security and defence sector are insufficient. Accordingly, there is a need to develop recommendations for the implementation of a full and adequate IAS process of counteraction to modern threats.

The analytical component of the IAS management of the integrated potential for counteracting military threats is also important. It should provide [1]:

- argumentation of decisions which were made by using effective methods of information processing and analysis;
- performance efficiency of the analysis, assessinmg and forecasting the scenarios of carrying out special operations of asymmetric nature.

To achieve this, it is proposed to have a set of interconnected models in the structure of the analytical level of the IAS system and automation of asymmetric action control, which includes:

- a military-political model of a state;
- a model of threats to the military security of a state;
- a model of the system of monitoring threats to the military security of a state;
- a model for assessing the level of military threat and possibilities for its de-escalation;
- a model for assessing the necessary capability of "soft" and "hard" power units and means for the implementation of the SO plan;
- a model of formation of an option set of groups of agencies that are involved in asymmetric counteraction to detected threats.

The set of interrelated models it is necessary to implement through the developed tools of analysis for modeling processes of formation and distribution of strategic tasks between the subjects of the national security system (NSS) for their use during asymmetric counteractions.

Unfortunately, in practice, the scientific substantiation of proposals and recommendations for managing decisions, including asymmetric response to threats, is complicated due to imperfection of the necessary scientific and methodological mechanism.

As a result, in the Security and defence sector of Ukraine, a well-known method of trial and error is used to substantiate many managing decisions. This significantly reduces the effectiveness of public administration in the field of national security. In addition, even those little resources which allocated to protect national interests are wasted uneconomically.

At the same time, the guiding documents in the field of national security and defence highlight the requirement to use asymmetric measures and give priority to non-military means to protect national interests.

This indicates the need to develop a specific scientific and methodological mechanism to justify the required potential for asymmetric response, executive actors and their necessary capabilities to achieve a given efficiency level of asymmetric counteraction.

The analysis of available analytical tools of such substantiation testifies [6] that in Ukraine the method of generating ideas (a brainstorming method) and methods of expert evaluation (forecasting) are considered as the basic.

Taking into account the military and non-military capabilities of Ukraine, the specifics of providing its MS, the methodological basis of the system of counteraction to threats that is unable to ensure the required level of MS by symmetric methods can be:

- building asymmetric counteraction system to a threat from a highly developed state;
- substantiating the management decisions on asymmetric response to the state`s military security method;
- forming a group of agencies of the defence forces to implement the idea of asymmetric counteraction to the identified (predicted) threat;
- assessing the effectiveness of asymmetric counteraction of MSS system system?;
- a set of models and methods to form and manage the potential of asymmetric counteraction to threats to the military security of a state.

Thus, the proposed organizational and methodological bases for ensuring the required level of MS of a state with the use of asymmetric counteractions allow to perform scientific substantiation of the organization and formation of a system of counteraction to threats, de-escalation of which is impossible by using symmetric methods to ensure the required level of MS.

In the following paragraphs, the components of the methodical apparatus of substantiation of the necessary potential of asymmetric reaction, the components of executive subjects/entities and their necessary capabilities for achieving the required efficiency level of asymmetric counteraction will be considered in detail.

7.2. Goals, forms and methods of organizing and conducting asymmetric actions aimed at reducing the impact of certain threats on significant spheres of the vital activities of the state

One of the tendencies influencing the formation and development of the security environment in the world and around Ukraine is the transfer of weight in military conflicts to the asymmetric use of military force by illegal armed groups, shifting the emphasis in military conflicts to integrated use of military and non-military instruments (economical, political, informational and psychological, etc.), which fundamentally changes the nature of the armed struggle and puts forward higher requirements for MSS. [7].

The main purpose of measures to counteract military threats is to detect the threat in a timely manner and prevent its transformation from a potential factor to real consequences of the action forming the threat.

As the analysis of the security environment has shown, modern MThs are formed not only by purely military factors, but also by non-military ones. They are characterized by different “capacities” and require the same comprehensive and adequate response, to which the target state cannot always find the necessary resources. In a broad sense, it is about integrating the efforts of military and non-military instruments of the defence forces (formation of integrated capabilities [1]) to counter those threats to the military security of the state, to which it lacks resources in responding symmetrically. The solution of this problem is entrusted to the SDSU.

Despite the declared in the Concept of Development of the Security and defence sector of Ukraine the need to integrate efforts (joint involvement) components of the SDSU, the organization of the integration process (technology of forming the integrated potential of asymmetric counteraction) is not defined, which indicates the emergence of both scientific and organizational problems. In our opinion, the definition of the purpose, executive subjects, forms and ways of formation of the integrated potential of asymmetric counteraction to military threats can be considered as one of the stages of the decision of the above-mentioned scientific problem.

The complexity of solving this problem requires a systematic approach. Since the system approach provides consideration of the studied objects as a system, as well as the construction of a generalized model of the system, justification of requirements for its properties, purposeful operation, development, hierarchical construction, management processes, it can be used to build a system to counter the threats described above.

A systems approach requires considering the possible combination of military and non-military forces and means of the SDSU to asymmetrically counter military threats as a complex system. The basis of the formation (synthesis) of this system, its integrative qualities is the purposefulness of the system as a system-forming factor. It is the purpose of such a system, being an objective criterion for choosing from the environment of all elements and relations that create the system, will

determine the necessary composition (set) of SDSU agencies and their functions in the organization of asymmetric counteraction. Further decomposition and formalization of the goal create opportunities for its formal correct description. In essence, it is a question of creating the corresponding system of counteraction to military threats. It should be noted that each threat has its own system of counteraction.

Thus, given the essence of MTh, the purpose of integration of military and non-military forces and means for asymmetric counteraction to these threats is such organizational combination of forces and means of SDSU agencies which, in case of application under the unified management and the corresponding planning, would be capable effectively reduce the effect of factors that create such a threat to acceptable values.

Decomposition of this goal using one of the methods of building a system of goals is *building a "tree" of goals (subgoals) to asymmetrically counter the military threat*, gives the opportunity to form relationships between goals of different levels, divide large goals into stages, provide a clear overall scene of the goal system .

The number of components (sub-goals) of the main goal and their hierarchical levels will depend on the chosen strategy of counteraction to the threat, the capabilities of the SDSU and their structural subdivisions involved in counteraction, which allows to see the general strategic picture of asymmetric counteraction.

Since the agencies of the SDSU in the general system of state bodies have different functions and differ in subordination, it should be expected that in contrast to technical and organizational systems, in the created system of counteraction to a specific threat it is very difficult to ensure measurability.

Thus, given that the formation of a "tree" of goals will be crucial for organizing the process of integration of defence forces to asymmetrically counter military threats, this issue needs to be considered in more detail.

It should be noted that countering military and hybrid threats is a complex process, due to the large number of threat-generating heterogeneous factors and the difficulty of predicting changes in the intensity of their action.

The scientific and methodological apparatus of analyzing the security environment, identifying and assessing the level of military and hybrid threats, determining the necessary resources, the required time and level of de-escalation of the threat and the formation of the necessary group of defence forces, as well as their necessary capabilities the potential for asymmetric counteraction to inflict unacceptable damage on the enemy, including in non-military spheres, all of them need the significant improvements. Of course, such activities of the subjects of the defence forces require the definition of the inherent process of counteraction to specific forms and methods of their application. As in the art of war, the forms and methods of application of certain agencies of the defence forces will depend on the enemy, the current situation, the available forces and means, their capabilities,

qualitative characteristics of personnel who will rely on the development of a general strategy of asymmetric actions. and setting and performing specific tasks.

A separate study will be devoted to a deeper consideration of ways to integrate military and non-military forces and means to counter military threats.

Regarding the forms of application of selected subjects for asymmetric counteraction, it is proposed to use the term “special operation” (SO) as “coordinated actions of disparate forces and means united by a single purpose”.

That is why, the form of realization of the goal of asymmetric counteraction to the chosen threat is expedient to choose a “special operation”, a component of which can be a “local special operation” (LSO) as a form of achieving one of the tactical goals of counteraction.

Thus, the proposed goals, forms and methods of organizing and conducting asymmetric actions aimed at reducing the impact of certain threats on the significant spheres of he vital activities of the state, can be considered a further development of the theory of ensuring the MS of the state.

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7.3. Structural and logical sequence and organization principles of counteraction to information and psychological influences of the unfriendly state

At the beginning of the 21st century. the dependence of the political authorities of the states on the possibilities to resist information and psychological impacts (IPI) in the foreign and domestic spheres has sharply increased. The transformation of the world order, the geopolitical competition of the leading states in the struggle for control over energy resources and ways of their transportation, the development of the globalization process indicate that together with traditional force methods and means of solving problems in these areas mostly use information.

The main means of information confrontation are national and transnational mass media, as well as any other information networks that can influence on the worldview, political views, legal consciousness, mentality, spiritual ideals and values of the individual and society as a whole. These circumstances bring to the fore the problem of increasing the capacity of the state and its political authority to carry out information confrontation in the realization of national interests in such conditions. One of the effective forms of modern information confrontation is special information operations (SIO), which are conducted against the actors who make strategic decisions. Effective counteraction of SIO in the process of imposed information confrontation is possible on the basis of construction of structural and logical sequence and development of new principles of organization of counteraction to information and psychological influences on the part of unfriendly states.

Special information operations which are conducted against strategic decision-makers and the image of the state are partially described in the publications [1, 9], but the description is only verbal and does not allow to investigate these operations using modern methodological apparatus and modeling.

Technological advances have improved the means of communication, making the modern world more interconnected. The processes of globalization are actively influencing on the formation of a model of world order, which the human psyche and consciousness must realize today. The versatility of the information sphere makes information and psychological means of action not only inconspicuous, humane, but in some cases extremely dangerous.

Information and psychological impacts, despite the apparent innocence and security, have proven to be highly effective in achieving the victory of one opposing party over another. Spiritual, intellectual and information potentials have become fundamental factors of national security [9, 10].

According to world experience, countries with a high level of information technologies development have a significant advantage over other countries. The purpose of any war and the policy of the government of any country is to force the enemy, competitor, partner to make a decision favorable to their country. Public opinion itself has become the most powerful tool for achieving this goal. By influencing the worldview, consciousness, and psyche of the people with the help of information provided by the means of communication, it is possible to achieve that the governments of countries that have undergone informational action make “imposed” decisions that are unfavorable for their people and their country [10].

Due to the saturation of the world with the latest means of reproduction, transmission and receipt of information, which is greatly simplified the processes of information and psychological action on people. The human brain, psyche, consciousness are subject to change and, in turn, are able to change the existing objective reality through human activity [9]. This is both a great benefit to man and a great insecurity of falling victim to someone's manipulation. Modern technologies of information action make it possible to disorient a person in the events that take place, to control his behavior and actions unnoticed by himself. And today such action is possible not only at the level of consciousness, but also at the subconscious level. Information and psychological action can govern not only individuals but also large social groups, state institutions and entire states. Managing large groups of people by forming the necessary manipulator of public opinion through the formation of a particular attitude to the event (comment) through the mass media and social networks has proved quite effective.

Decisions made on the basis of untimely, incomplete or distorted information are always accompanied by losses of economic, political, military and other means. [9, 11].

The analysis of modern information-psychological confrontation [9, 10] shows that its most vulnerable forms for the target state are: information attack; information aggression; information operation; special information operation.

Counteraction of IPI by unfriendly states is a set of measures of the SDSU agencies, which take care of providing information and psychological security to neutralize the detected destructive impact or its de-escalation to an acceptable level.

The greatest effect of organized counteraction is achieved in the case of creating a separate system of counteraction under a unified command.

The main tasks of the counteraction system should be determined:

- minimize at most the expected destructive level of IPI implementation in the defining areas of national security;
- preserve mostly the image of the state in the international arena as much as possible;
- maximally preserve the image of the political and military leaders of the state (within the state and abroad) in case of determined IPI;
- prevent violations of socio-political stability within the state;
- retain strategic partners and allies, prevent damage of their image;
- minimize the resources involved in neutralizing destructive IPI;
- discredit the source state (aggressor) of destructive IPI in the court of international community;
- preclude the recurrence of a similar scenario of destructive IPI on the state.

The logical sequence of the organization of counteraction to information and psychological influences from other states can be presented in the form of consistently executed computational, logical, comparative and other procedures, (Fig. 7.1).

1. *Monitoring of channels through which IPI is being affected*. Signs of informational and psychological influences known today are added to the monitoring program.

2. *Identification, registration and rating of channels of influence*. Practice shows that up to several hundred information channels can be used to implement IPI.

IPI is detected, as a rule, in automatic or manual modes. Decisions on the fact of IPI are made by trained experts in the field of information and psychology. Then this fact is registered in the prescribed manner (for example, recorded in a special journal or passport), if possible, the affiliation of the source and location of the source are defined. Using the identified channels through which the IPI was carried out, the experts set priorities for further consideration.

3. *Analysis of IPV content, signs of action, attack, operation or aggression*.

Experts - specialists in the field of information confrontation analyze the content of recorded IPI and establish who is targeting this impact. According to the

content of influence and its features, experts using the method of Ishikawa [12], predetermine the “power” of influence, whether it is an action, attack, or may be part of an operation or aggression, including hybrid. If the fact of information-psychological action or attack against a specific object is established, the object for the organization of self-defence (counteraction) is notified. If the experts have established the possibility of information aggression or signs of the operation and then proceed to the next stage.

4. *Reconstruction of the plan of operation, aggression and installation of the objects of influence.* Based on the results of studying the content, established objects of influence and signs of “power” of influence, experts use the method of generating ideas or brainstorming to determine the idea of hybrid aggression (HA) (operation), its probable purpose and objects of influence, predict the main direction (main object) of aggression (operations).

5. *Predicting negative consequences for objects of influence*. Based on the information received about the initiated aggression or operation, the expert survey is used to predict possible destructive consequences for each of the identified facilities and NS as a whole.

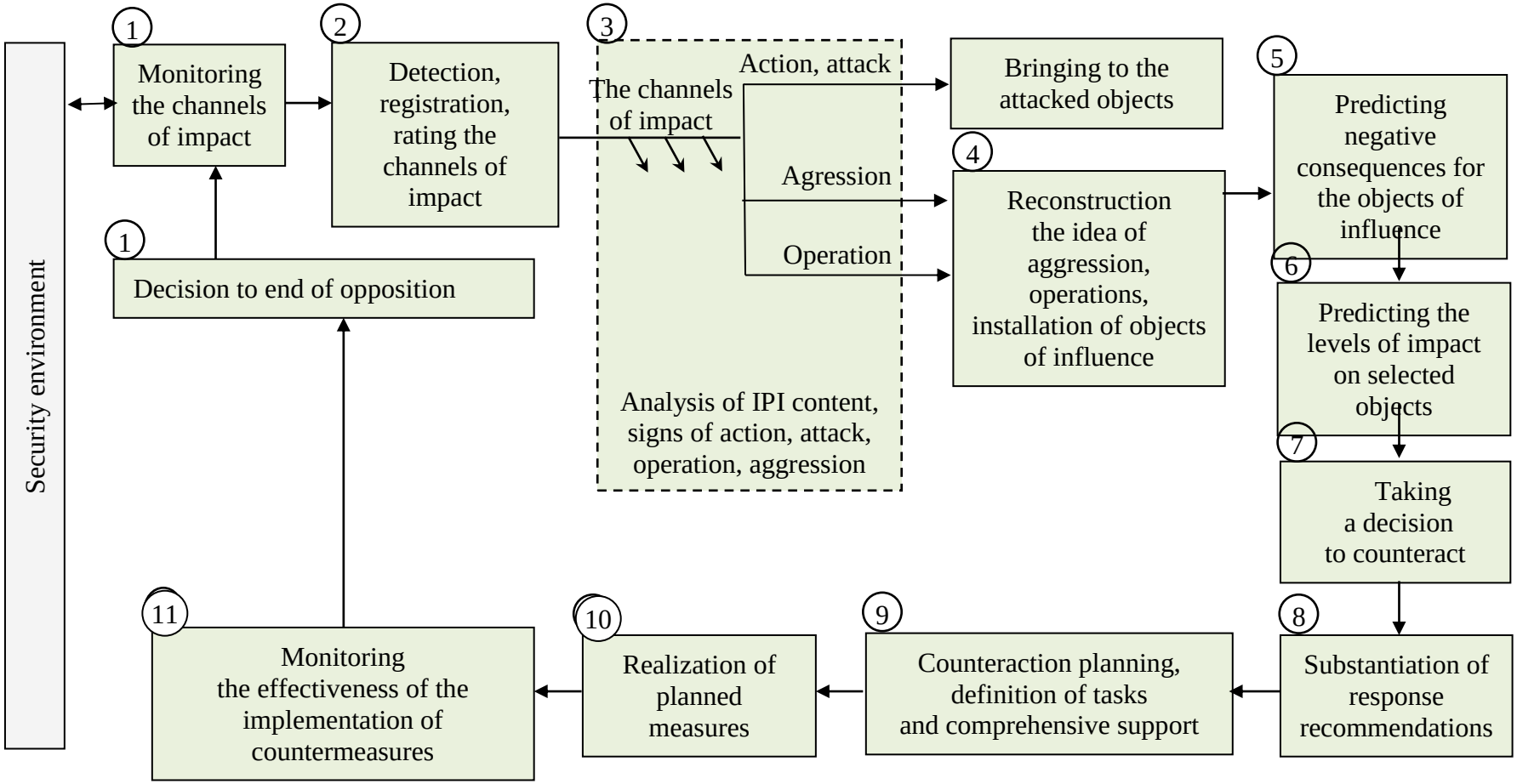

Fig. 7.1. System-logical sequence of organization of counteraction to information-psychological influences from unfriendly states

In particular, they predict a possible decline in the image of the state in the international arena and the image of the military-political leadership of the state inside the country and abroad. According to a separate method [4] it is predicted a decrease in the level of socio-political stability within the state. In a separate paragraph, experts predict the scale of the damage to the image of strategic partners and allies and anticipate the possible level of assistance from them.

6. *Forecasting the levels of impact on selected objects* Experts predict the expected levels of impact $K_{\text{IPI}j}$ on each j-th (j = 1, J, where J – number of influenced objects) selected object on the Saati scale [23] (tab. 7.1).

Table 7.1

Saati scale gradation levels

Level of impact	Very low	Low	Average	High	Very high
Countdown on a scale	1	3	5	7	9

For each j-th object the threshold of information and psychological security $k_{\text{пор}j}$ is determined by the method of expert interrogation. Those objects for which the projected expected level of impact exceeds the threshold of information and psychological security are allocated in a separate list. Their priorities are assessed depending on the method of expert survey from their influence on the decline of the image of the state in the international arena and the image of the military-political leadership of the state inside the country and abroad. For each of these objects, the required level of IPI de-escalation is estimated

$$\Delta d_j = K_{\text{IPI}j} - k_{\text{пор}j}.$$

7. *Decision-making on counteraction.* The decision-maker evaluates the necessary resources $R_{\text{потр}j}$ for de-escalation of IPI on that group of objects, the expected (forecast) impact on which exceeded their thresholds for information and psychological security. If there are enough resources, the DM decides to counteract, which can be either symmetrical or asymmetrical. If there are not enough resources, the DM decides to de-escalate the IPI for one or more objects with the highest rating. In this case, the opposition is organized as asymmetric.

8. *Substantiating response recommendations*. Symmetrical response, which is carried out in case of sufficient resources and high security of objects of influence, is described in the publication on information and psychological confrontation. The asymmetric response in the publication is covered only in the staging plan. That is why there is a need for its more detailed consideration. Of course, specific measures for asymmetric response are mostly closed. Let's focus only on the basic principles and general criteria for deciding on the asymmetric response to the most dangerous IPI.

The principles of substantiation of recommendations are:

- *sufficiency of the formed potential of asymmetric counteraction,* which means an integrated set of heterogeneous(military and non-military) forces andmeans, which are involved under a unified command for de-escalation of IPI to the selected object for protection;
- *complex vulnerability of the state-initiater of IPI* that means the development of such countermeasures that would simultaneously destructively affect the political sphere and political leadership of the unfriendly state, its economy. In the international community it is also formed its negative image, aggressive foreign policy, image of violator of international law, etc.;
- *increasing the "capacity" of counteraction through the use of coalition counteraction to an unfriendly state*. This means that in order to increase the "capacity" of counteraction as soon as possible, the target- state must turn to its allies and strategic partners for their support in counteracting the IPI of an unfriendly state;
- *fast-moving implementation of asymmetric measures*. Asymmetric measures should be taken in a short time so that the opposing side does not have time to recover, to redeploy forces and means, to adapt to the action of the target- state;
- *maximizing the damage* to the unfriendly state in various spheres of life to such level that it stops IPI;
- *hypertrophy of damage to an unfriendly state* (reproduction in the MM of morale disorder, alcoholism, drug addiction, atrocities against certain segments of its population, rising crime, etc.);
- *concealment and minimization of signs of state affilation* (legending) so that the target- state can call "fakes" the leaks of information about conducting SO or provocation of the state that implements IPI or its partners.

To decide on an asymmetric response, it is advisable to choose the following criteria:

- achieving the required level of IPI de-escalation to the *j*-th object;
- sufficiency of allocated resources;
- the time required for de-escalation of IPI.

If the condition of achieving certain criteria is met, a decision is made to neutralize the IPV by a symmetric method. If at least one of the conditions is not met, then a decision is made on asymmetric counteraction.

9. Counteraction planning, task definition and comprehensive support. Counteraction planning involves the development of a detailed plan (scenario) of asymmetric counteraction to the formed potential and systematic definition of specific tasks for each subject from the integrated set of heterogeneous (military and non-military) forces and means involved for de-escalation of IPI to the selected object for protection. Systematic definition of tasks means that the task is determined on the basis of the above principles and taking into account the achievement of the expected systemic effect. The planned tasks are implemented in the form of SO, the

organization and conduct of which is carried out according to separate guidelines with limited access.

10. *Implementation of planned activities.*

11. *Monitoring the effectiveness of countermeasures.* It is very important to monitor its progress and the problems that arise in order to ensure the responsiveness to changes in the situation. In addition, monitoring will help to identify in advance the actions of the enemy to adjust its strategy, attract reserves and backup options for IPI, and so on. According to the monitoring data, a decision is made to end the counteraction.

12. *Making a decision to end the counteraction.* The conditions for making a decision to end the counteraction may be:

- neutralization of IPI to an acceptable level;
- the unfriendly country refused to go on the implementation of IPI on the target-state.

Thus, the effective functioning of the target-state in the conditions of imposed information confrontation, in particular during the implementation SIO against it, is possible by improving the organization of counteraction to information and psychological influences by unfriendly states on the basis of new principles.

7.4. Generalized model of hybrid aggression (warfare)

Continued globalization significantly influences both the geopolitical interests of the states and the ways to promote them. It has regard to the providing the MS as the security aspect of the geopolitical interests. The main factor of the global system is considered to be the most developed countries of the world as they actually exploit the less developed countries, treating them as the semi-periphery or periphery. It is becoming important that in the global international system the potential of the dissemination of insecurities (threats, conflicts, crises, aggressions) is substantially higher.

Globalization enables the highly developed countries to enhance the effect of the traditional methods of influencing the world processes according to their geo-political interests and to apply the new methods, that are compliant with current conditions.

The armed forces of the states and their weapon along with the diplomacy and propaganda have been and remain the important instrument of the foreign policy.

As one of the most substantial peculiarities of the hybrid warfare there exists the fact that it is the willingness to destabilize the situation inside the country and to establish the external control rather than to seize recourses.

Due to the specific technologies the above-mentioned goals can be achieved without the lethal weapon. Another instrument to realize the geopolitical interests is

the coercion of the country to the armed conflict with the adversary that was chosen to be destroyed or weakened.

For the last decades the hybrid wars are waged mostly in *mental* space. It is possible to destroy the state without proclaiming the war and traditional military operations but using only the political, informational and psychological means. There exist many such means. For example, the revolution, re-programming of the conscience of the governing elite for the anti-state activity, the regime change and the establishment of the proxy-government, that will enact the will of the aggressor, act against the national benefit and destroy the statehood. Generally, all these means can be divided into the ones that influence the authorities by the methods that are based on the use of force (revolution) or not based on the use of force (fostering corruption or dealing with the corrupt officials or agents of influence) [14]. Either way the external power joins and implements the factor of the external influence [15].

The strategy of hybrid warfare is directed to the attrition of the target-country and is based on the application of the wide spectrum of means using both military and non-military formations. Besides the aggressive state attacks the governmental structures, economic, information and cultural spheres, people's mindset, law-enforcement bodies, armed forces of the target country in a hidden way, without the formal declaration of war. The externally funded local insurgents, mercenaries, irregular armed formations, nationalists and pseudo-religious organizations are involved into the confrontation with law-enforcement agencies. The representatives of the diplomatic corps and the intelligence service of the aggressive state contribute the toppling of the ruling regime.

One of the tasks of the hybrid aggression is considered to be the drawing of the target state into the local conflicts in frontier regions and the strategically important regions, first of all with the adversaries of the aggressor, for the competitors to be weakened by the proxies.

The ending of the hybrid warfare is the complicated problem that is resulted from the peculiarities of the informational warfare as the component of the hybrid war. The seeds of the mutual mistrust and hatred, that were lavishly sown, will germinate as the poisoned shoots for many decades and provoke the confrontation between nations and religions. The mercenaries from the whole world being supported by behind-the curtains actors will not lay down arms immediately as they treat war as their "birth mother".

During the hybrid warfare the consequences of using the indirect methods, associated with the imposition of sanctions, scaling-up of the coercive pressure, purposeful deteriorative information and psychological influence on the conscience of the ruling elites and the population as a whole, creation and support of the irregular armed formations, involvement of the special operations forces, participation of organized criminal and terrorist formations create the extremely dangerous situation, that is beyond of the initiator's control. It breaks the connection

between the cause and the effect. As a result, there emerge the large areas of uncertainty, related to the actions of different actors, that don't coordinate their plans. Besides, the actions of one actor can cause the landslide effect when the whole military, strategic and political situation gets changed. These and some others factors create significant barriers when the attempts to foresee the result and the course of hybrid war are made.

Emerging of new and sophisticated forms of aggression causes the necessity to create the mechanisms of neutralization of the external negative influence and internal extremists' actions due to the strengthening of the civil society, consolidation of allies and partners, defending national values and interests as the factors of internal mobilization to counteract color revolutions and hybrid wars.

Special attention should be given to the proactive research directed to the adaptation of some contemporary informational and humanitarian technologies for the military purposes.

As now the hybrid warfare has turned into the new form of interstate rivalry the study of this phenomenon is the topical scientific task. The issues of the counteraction to the hybrid aggression can be highlighted as one of the priority directions of the military science and the design of the hybrid aggression model can be considered as the first step [16]. The formal presentation of the hybrid aggression as the directed graph gives the opportunity to take into consideration the spacio-temporal character of the hybrid aggression, evaluate the specific parameters and characteristics of hybrid attacks, means and forces that can be used against the target state during the hybrid aggression. The final goal of the hybrid aggression is the establishment of the external control over the target state.

7.5. Conceptual model of iterative forming of the asymmetric potential for counteracting the threats to the military security of the state

In the reformation conditions of the security and defence sector of Ukraine, the topical issue is the efficient employment of the available means and forces. To counter threats, that requires the significant military-related efforts (for example, the correlation of military potential 1:10), resources that the state cannot find, minimum essential time to neutralize the detected (predicted) threat etc, the asymmetric actions can be used. Asymmetric actions are inherent to the conflict situation when the weaker adversary provides the asymmetric strategy (tactics) of the warfare through the economic, diplomatic, information and direct military measures in compliance with the available scarce resources in order to level the military and technological advantages of the stronger adversary.

The important requirement to conduct the asymmetric actions effectively is the precise identification of the most vulnerable and weak spots of the adversary. The influence on these spots will have the maximum impact with the minimum expenditure of the means and resources.

The above-mentioned necessitates the development of the conceptual model of the potential to counter the threats to the military security of the state (the military and hybrid-related threats) that would enable to create the necessary potential to asymmetrically counter the threats in order to provide the appropriate and legally determined level of the military security of the state and to satisfy the resource restrictions [1].

The Concept of the Development of the security and defence sector of Ukraine contains the priority tasks to reform the Sector. These tasks are rather general (for example, the consolidation of the operational capabilities of the SDSU agencies to provide in the timely manner the adequate reaction on the crisis situations that threaten the national security, etc). It leads to the low effectiveness of the measures taken in the security sphere.

It necessitates the research using the appropriate methods (models). Among them the important place is given to the conceptual model of forming the iterative potential for asymmetric counteracting (CMFIPAC) to the military security threats. [1]. This model can be used by the senior military and political leadership of the country in the situational centers of command and control during the planning and the implementation of deliberate policy to provide the necessary level of MS of the state, as well as in educational, scientific and research institutions during the study of crisis situations and the ways of their solution.

As the asymmetric actions there can be considered the following: the actions of SOF, foreign intelligence, different forms of informational influence, as well as political, economic and other non-military forms of influence.

The input data for CMIFACP are the results of the security environment analysis in order to find out if the dangerous phenomena, potential and real threats to the national interests when the state realizes its policy of national security exist or emerge [1].

The effectiveness of asymmetric actions depends on the completeness and timeliness of their realization and is achieved due to the provided by different state's agencies coordinated steps in terms of goals, place and time. The success of the asymmetric actions depends on the following factors:

- quality and completeness of the planning of local special operation (LSO);
- level of professional qualification of the personnel of the involved divisions;
- level of informational support of LSO;
- completeness and timeliness of the resource support and other kinds of the support of LSO in all stages of its realization.

The conceptual model of forming the potential of asymmetric counteracting the military security threats (Fig. 7.2) enables to solve both the direct task of the calculation of state's possibilities regarding the ensuring of MS, and the reverse task that provides the calculation of necessary capabilities of forces and means to ensure the legislatively established level of state's MS [17, 18].

The principal intended result of the asymmetric counteraction must become the adversary's refusal to conduct active military operations or the de-escalation of the military and hybrid threats to the acceptable (tolerable) level [19, 20].

If regarding the results of the monitoring the necessary level of military insecurity is not achieved (condition No) the inverse relationship technology, implemented in the model, enables to start the formation of another variant of integrated potential of asymmetric counteracting and the repetition of the computational, logical and comparative procedures that are described above.

The proposed conceptual model of forming the potential for asymmetric counteracting the military security threats enables to implement the new approaches to use the military and non-military means and forces for the serious undermining of the adversary including its non-military security spheres. In such a way it forces the adversary, even with the greater military capabilities, to refuse from the use of the military power against the state-the victim of the aggression. Besides, the conceptual model enables not only to substantiate the reasonable composition of forces and means for the de-escalation of detected (predicted) threats, assess the real possibilities to neutralize the specific military-related threats according to the strategies of providing the MS that are adopted in the state, but to assess the effectiveness of the certain agencies of the Security and Defence sector that are involved into the processes of the de-escalation of threats in the country.

7.6. Conceptual approach to the creating the design of special operation of asymmetric counteraction and defining partial objectives for the agencies involved in it

In the conditions when one of the rivalries is the state that has the greater military capabilities, another state in order to stand up for its independence and to defend its territorial integrity has to resort to the asymmetric actions.

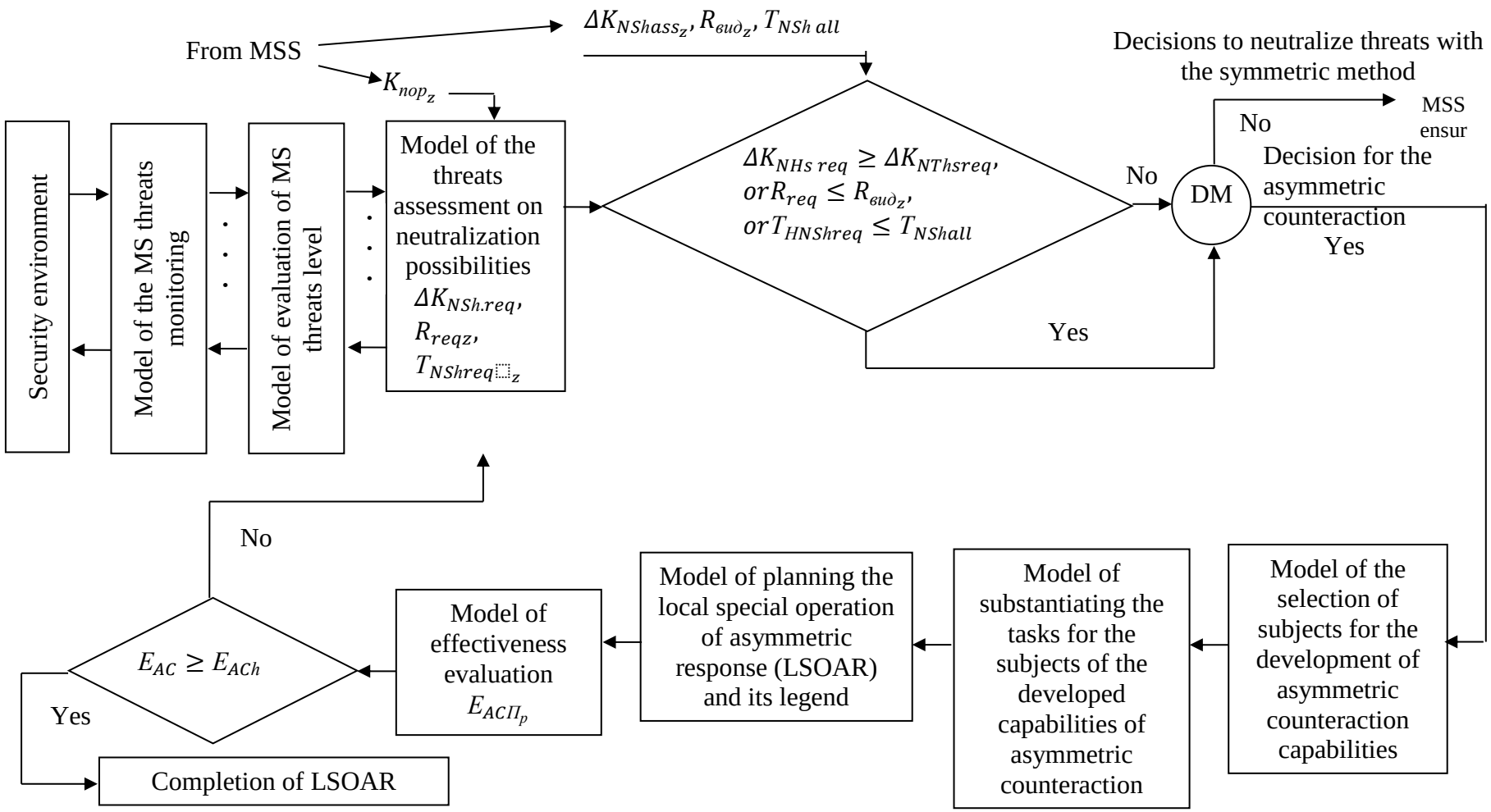

Fig. 7.2. Conceptual model of iterative formation of asymmetric counteraction capabilities to state's military security threats

Unfortunately, the theoretical fundamentals for conducting the asymmetric warfare have not been developed yet and the lessons of such wars have not been learned in-depth.

Given this, there exists the compelling need to develop the theoretical fundamentals and practical recommendations as to the implementating the technologies of preparation and conducting the asymmetric warfare into the MS practice. The fulfillment of this task is reasonable to begin with the development of the conceptual approach for the formation of concept of local special operation of asymmetric counteraction (LSOAC).

The Concept and the plan-schedule of the SO must be developed and approved by the authorized official. These documents are the basis for the preparation and conducting the LSOAC. The following strategies should be included in the Concept:

1. the goal of the local special operation.

2. the conclusions of the assessment of situation (adversary and its main parameters, inter alia the number of personnel involved into the aggression, the number of the reserve, the correlation of military capabilities, (acceptable) casualties of the adversary $M_{\text{pers.}}$invioled, when it refuses from the further combat actions, the (acceptable) loss of the adversary's AME, when it refuses form the aggression $M_{\text{ОВТ.доп}}$, assessed integral level of military threat, predicted risks of destructive influence on the significant spheres of national security, the most vulnerable points (spots) of damaging the adversary with the asymmetric actions).

3. combat missions to the subjects, that are involved into the LSO. The peculiarity of this provision is not only the substance of combat mission, but the determined extent of its influence on the achievement of LSO's goal, that is assessed on a 8-points scale by experts and using the M7 model [1]. Besides, the network graph-model of conducting the asymmetric actions is formed for every subject. The nodes of the graph are the tasks or their stages, and the arcs are the time norms for the fulfillment of the tasks. The combat missions have to correspond to the capabilities of the subjects involved into the operation, to their level of preparation, to the time for preparation for LSO and to the current situation. It is necessary to take into account the value and the limitedness of resources, possible loss of personnel and AME, risks and possible negative consequences in case the LSO's goal is not achieved, etc.

4. tasks to prepare the area where the LSO is conducted.

5. Procedure and ways of the infiltration of the subjects, that form the potential for asymmetric counteracting, into the area of LSO.

6. Command and control during the LSO. Main and reserve communication system and the procedure of cooperation with other components of the defence capabilities.

7. Legend of LSO.

8. Special informational, psychological and public relations' support of the LSO.

9. Procedure of withdrawal from the LSO.

The most important strategies of the Concept is the selection of the most vulnerable spots (“pressure” spots) of adversary and the substantiation of the partial tasks to the subjects of the integrated potential for asymmetric counteracting.

The principal most vulnerable places (“pressure” spots) of the adversary are the following:

- military, economic, moral and psychological capabilities of the state and of the Armed Forces;
- security of the critical infrastructure objects;
- survivability of the intelligence system, command and control system, fire damage effect;
- security of the MF life support system;
- international image of the state, Armed Forces, special tasks law enforcement agencies.

Partial tasks to the subjects of the developed integrated potential for asymmetric counteracting can be substantiated according to the procedures, cited in the publication [1].

As the development of *the integrated potential for asymmetric counteracting the military-related threats* we consider the iterative process of selection the effective set of SDSU forces and means and identifying the capabilities required for the creation of necessary level of de-escalation of the threat ΔK_{NShp} at the certain moment of the prognostication T_{pr}. The process of the hypothetically required level of the threats de-escalation by the subjects, that belong to the political, economic, informational and military spheres, using the Icikava method [12] is shown in fig. 7.3.

To shorten the scheme, the symbols in Fig. 7.3 are given based on the example of the informational sphere. For other spheres the schemes are similar, only the indexes of the names are changed.

For informational sphere:

- $P_{\mathrm{I1}}\ldots P_{\mathrm{I}n}$ – indicators of the threat and their “weight” in the informational sphere;
- $P^*_{\mathrm{I1}}\ldots P^*_{\mathrm{I}n}$ – indicators of the threat and their acceptable remaining “weight” after the realization of the necessary level of the threat de-escalation;
- $\mathrm{I}_1\ldots\Delta\mathrm{I}_n$ – minimum acceptable reduction of “weight” (priorities) of the threats indicators on the Saati scale [13] after the realization of the necessary level of the threat de-escalation;
- $\{P_{\mathrm{In}}\}$ – set of tasks for the informational sphere subjects for the de-escalation of the threat.

The identified multiplicity of tasks for the subjects, that created the integrated potential for counteracting, are the necessary minimum acceptable capabilities of these subjects and are considered as their partial operational tasks.

Traditionally, the tasks are considered to be completed if the enough number of executors with the capabilities, that provided the completion of the task, are identified. Besides the resources involved did not exceed the allocated ones, and losses did not exceed the acceptable ones..

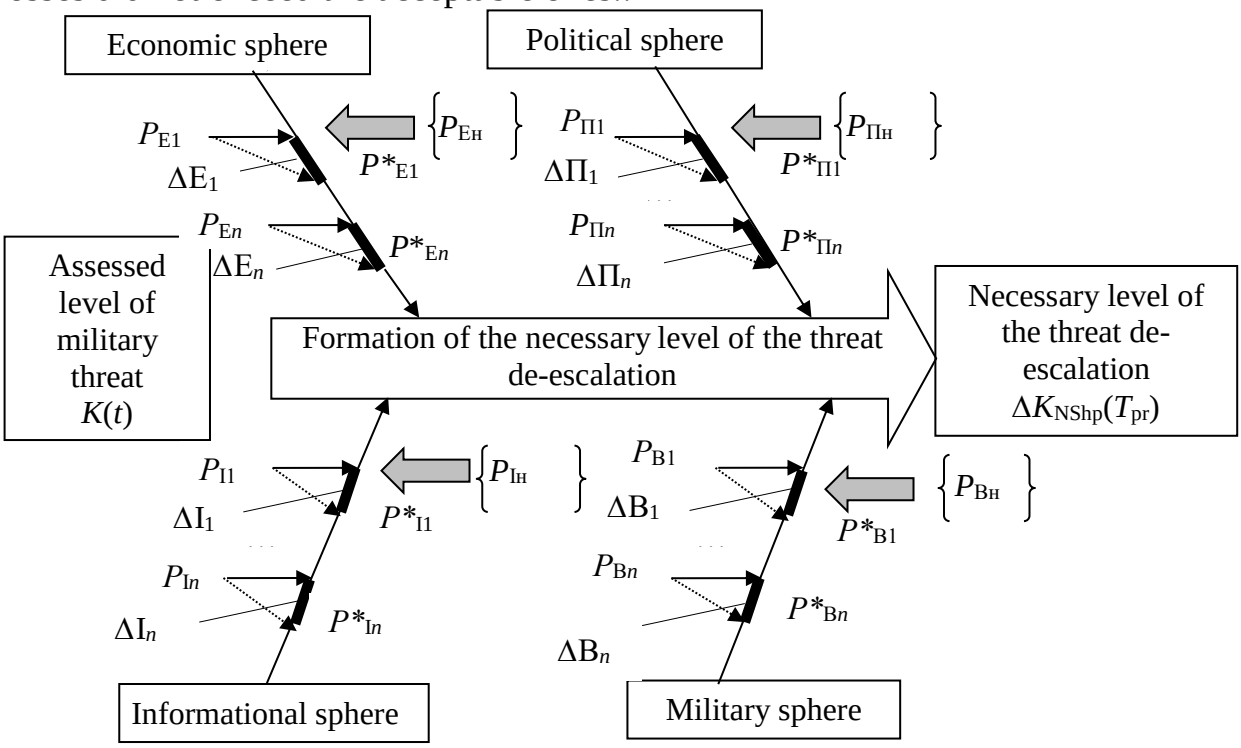

Fig. 7.3. Example of the formation of hypothetically necessary level of the threat de-escalation using the Icikava method

As the proposed method of formation of the Integrated Potential of Asymetric Counteraction (IPAC) is the highest level of the systemic use of the SDSU agencies for the threat neutralization in the system of MS providing, the goal function of the threat de-escalation has to be oriented on the achievement of the synergy as the result of using the complicated system [4].

The synergy of the asymmetric counteraction measures in the selected vulnerable ("pressure") spots of the adversary can be received due to their well-planned implementation into the political, economic, informational, communicative, cyber and military spheres.

For the practical realization of the above-mentioned requirement the cognitive approach to the process of preparation and fulfillment of the partial operational tasks by the subjects, that is different from the traditional one, is proposed. This approach is based on the theory and methods of expert system [23], expert valued provisional scenario (EVPS) [4], analysis of hierarchies [13], etc.

Necessary level of the threat de-escalation is assessed using the knowledge base of EU about threats (if there exists the one) [14] and computer technology M7 with

the iterative way through the reduction of the indicators of “weight” (priorities) of threats on the Saati scale till the following condition is achieved

$$\Delta K_{NShp}(T_{\text{pr}}) = \Delta K_{\text{d}}(t_1), \tag{7.1}$$

where K_{d} – coefficient of de-escalation (obtains the stand-still values: with emplementing “soft”power means $K_{\text{d}} = 1$, and “hard” power ones1; $K_{\text{d}} = 1{,}2$ [7]);

$\Delta K_{\text{d}}(t_1)$ – change of level of the military threat as the margin between the current level of military threat $K(t_1)$ for specific time t_1 and threshold K_{thrd} (determined in the state’s legal space).

Practical realization of expert-relevant scenarios requires the specific management in the security and defence sector as well as the appropriate informational, analytical and resource support, that will enable to implement the asymmetric measures to counteract in unexpected for aggressor-state places (“pressure” spots), significantly undermine it and, in such a way, force the adversary to refuse from the use of military power against the state – the victim of the aggression.

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7.7. Basic principles of evaluating the effectiveness of a local special operation of asymmetric counteraction in the interests of ensuring a sufficient level of military security of the state

As the analysis of the security environment has shown (see Chapter 1), for developed democracies, the civilizational factor is becoming increasingly important in the military sphere, which determines the level of allowable casualties in solving foreign policy problems by military means.

For a state victim of aggression, the losses of personnel, population, infrastructure, etc. In such a conflict is much greater. World experience shows that a much weaker country militarily, carrying out asymmetric measures by military and non-military agencies in the security and defence sector, is capable of inflicting unacceptable damage on the enemy and thus forcing him to abandon the continued use of military force.

Based on this, the target function of the asymmetric counteraction system should be determined: rationally using resources, inflict damage on the enemy in the most vulnerable and unexpected places (points), for which he is forced to abandon further aggressive actions. Asymmetric measures are carried out by specially trained agencies or forces assigned to them, usually in the form of a LSO. The number of LSOs depends on the enemy, resource capabilities of the victim state of aggression.

Given the above, the expected effectiveness of countering the aggression of the state, which significantly exceeds the target state in military “power”, can be

estimated by the total level of de-escalation of the threat at time due to symmetric (direct military) and asymmetric (complex) countering aggression (Fig. 7.4).

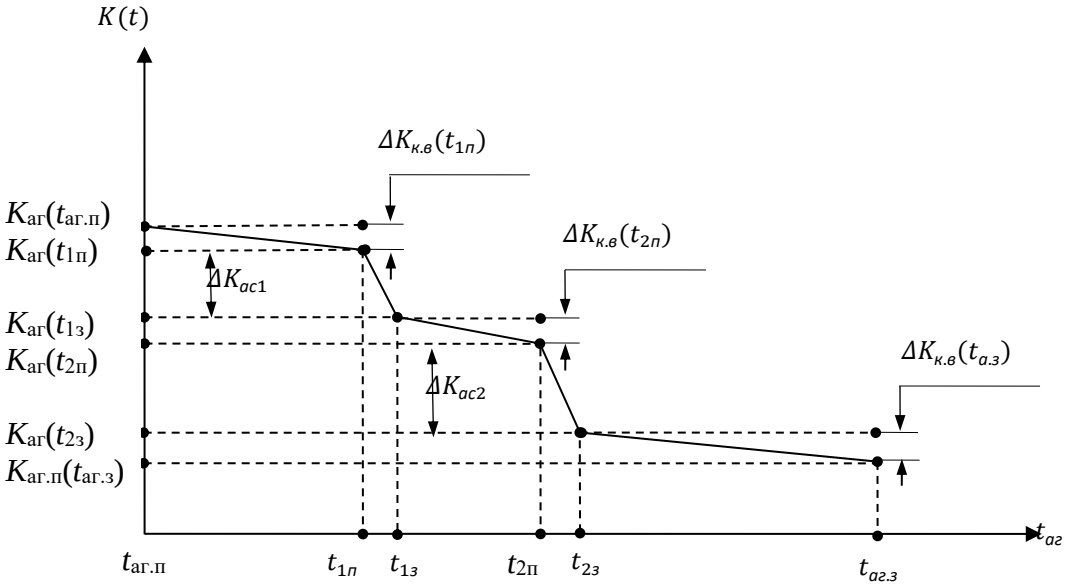

Fig. 7.4. Hypothetical example of assessing the effectiveness of repelling state aggression, which significantly exceeds the target state in military "power", using symmetric and asymmetric counteraction in two LSO (I = 2)

The effectiveness of repelling the aggression of the state E (t) is calculated by the formula at

$$E(t) = K_{ar}(t_{ar.п}) - \sum_{i=1}^{I} \Delta K_{ac_i}\left(t_{з_i},\ R_{рес_i},\ M_{pers}, M_{AME}\right) -$$

$$- \sum_{i=1}^{I} \Delta K_{к.в}\left(t_{n_i},\ R_{req_c},\ M_{o/c}, M_{AME}\right) - \Delta K_{к.в}\left(t_{ar} > t_{ЦК},\ R_{рес},\ M_{pers}, M_{AME}\right)$$

$$where R_{рес_i} \le R_{рес_{вi}}; M_{pers} \le M_{pers.доп_i}; M_{AME} \le M_{ОВТдоп_i},$$

where t – current time of counteracting (repelling) the aggression;

$t_{ar.п}(t_{ar.з})$ – start time (end) of the (aggression;

$t_{n_i}(t_{з_i})$ $t_{пi}(t_{зi})$ – start time (end) of the *i-th* (i = 1, I) LSO of assymetric counteraction;

I – number of conducted LSO;

$K_{ar}(t_{ar.п})$ – level of threat posed to the victim state by the aggression being unleashed;

ΔK_{ac_i} – reducing the level of threat due to the *i-th* LSO;

$\Delta K_{к.в}(t_{n_i})$ – reducing of the level of threat to the beginning of the *i*-th LSO due to the integrated use of military and non-military forces and means of the state-the victim of aggression (symmetrical counteraction);

$R_{рес_i}(R_{рес_{в}\,i})$ – resources (maximum possible resources) that are used during the *i-th* LSO;

$M_{pers\ i}(M_{pers.доп\ i})$ – losses (allowable losses) of personnel during the *i-th* LSO;
$M_{AME}(M_{AMEдоп_i})$ – losses (allowable losses) of the AME in the *i-th* LSO;
R_{res} – resources used during the repulse of aggression by symmetrical methods or integrated use of military and non-military tools [1];
M_{pers} – losses of personnel, including non-military subjects of the defence forces, who are involved in repelling of aggression;
M_{AME} – losses of AME duringnthe repelling of aggression.

Hence, the effectiveness of asymmetric counteraction to aggression, in general, can be assessed as a result of the total reduction in the level of threat in the LSO.

$$E_{ac}(t) = \sum_{i=1}^{I} \Delta K_{ac_i}\left(t_{з_i}, R_{рес_i}, M_{pers\ \ i}, M_{AME}\ \right).$$

The criterion for the decision of the aggressor state to refrain from further aggressive actions is the fulfillment of at least one of the conditions:

$$E_{в.аг}(t_{аг.з}) \leq K_{аг.п}(t_{аг.з});$$

$$M_{о/с.аг}(t_{аг.з}) \geq M_{о/с.аг.доп},$$

where $K_{аг.п}(t_{аг.з})$ – threshold level of the threat posed to the state - the victim of aggression, the aggression started against it;
$M_{pers.аг}(t_{аг.з})$ – loss of personnel of the aggressor state, which was involved in the aggression, including militants, mercenaries, etc .;
$M_{pers.аг.allow}$ – д allowable personnel losses for the aggressor state.

Thus, the developed basic principles of evaluating the effectiveness of the LSO of asymmetric counteraction allowed to synthesize a model for evaluating the effectiveness of asymmetric counteraction to threats to the military security of the state on the indicator of total threat reduction in the local special operation to refrain from further aggressive action. The proposed Concept of asymmetric counteraction to the enemy state is aimed at neutralizing its destructive influence on ensuring the national security of a militarily weaker country by introducing technologies for preparing and conducting asymmetric warfare.

The concept outlines the organizational and methodological basis for ensuring a sufficient level of state security using asymmetric actions to de-escalate individual military and hybrid threats, formulates the main objectives, identifies forms and methods of organizing and conducting asymmetric actions aimed at reducing the impact of individual threats on significant spheres of vital activities of the state.The structural-logical sequence and principles of organization of counteraction to information-psychological influences on the part of the unfriendly state are offered. On the basis of the developed generalized model of hybrid aggression (war) the conceptual model of iterative formation of potential of asymmetric counteraction to threats to military security of the state is constructed and the conceptual approach to

formation of the plan the local special operation of asymmetric counteraction evaluation of the effectiveness of a local special operation of asymmetric counteraction in the interests of ensuring a sufficient level of military security of the state.

The practical implementation of the concept in the practice of ensuring the military security of the state, which is much weaker militarily than the aggressor country, will allow asymmetric countermeasures against military and non-military defence forces to inflict unacceptable damage on the enemy and thus force him to abandon military force against her.

In the following sections, the proposed conceptual approaches will be detailed and presented in the form of specific methods and practical recommendations to the military-political leaders and some agencies of the state defence forces.

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Chapter 8

METHODOLOGICAL APPARATUS FOR SUBSTANTIATION OF THE NECESSARY POTENTIAL OF ASYMMETRIC RESPONSE, AGENCIES AND THEIR REQUIRED ABILITIES FOR ACHIEVING THE DESIGNATED LEVEL OF ASYMMETRIC COUNTERACTION EFFICIENCY

8.1. Formalization of the problem of de-escalation of threats to military security and synthesis of the system of indicators for assessing the effectiveness of implementation of the formed potential of asymmetric counteraction

The analysis of the main trends in the development of the security environment in the world shows that the vast majority of them esteem the emplementation of military force as an important element in relations between countries. The tendency to shift weight in military conflicts to the asymmetric use of military force is also gaining momentum.

The peculiarity of Ukraine is that almost all neighboring countries, except Moldova, significantly exceed its military capabilities to provide MS [1-3].

Modern reality proves that the threats of using military force against Ukraine by militarily stronger states not only exists, but some have already turned into real events. In conditions of limited defence resources, counteraction in such conditions requires a comprehensive and adequate response, which the target state may not always find the necessary resources for. In a broad sense, it is about integrating the efforts of military and non-military means of the defence forces (formation of integrated capabilities [4, 5]) to counter those threats to the military security of the state, which it cannot cope with using its capabilities and resources. The solution of this problem in asymmetric ways is entrusted to the Armed Forces of Ukraine and other agencies of the Security and defence sector of Ukraine. Unfortunately, in the guiding documents on state defence [1, 6–8] the organization of the integration process and the technology of forming the integrated potential of asymmetric counteraction is not defined, which indicates the emergence of both scientific and organizational problems. In our opinion, the formalization of the goal, the executive entities, and the procedure for forming the integrated potential of asymmetric counteraction to military threats can be considered one of the partial tasks of the study of the above-specified scientific problem.

The solution of this problem requires the application of a systematic approach, which, according to the authors, will ensure the development of conceptual, i.e. meaningful and formal means of reflecting the studied objects as a complex system, as well as developing generalized models of its components, forming requirements for their characteristics, purposeful behavior, development, hierarchical construction, management processes, etc. A systematic approach can be used to

formally describe a holistic model of hybrid aggression and a model of the asymmetric counteraction process [9, 10].

We are going to formalize the hybrid aggression and build its model [11]. The globalization processes significantly affect both the geopolitical interests of states and views on the ways to implement them. This fully concerns the ensuring of the MS as a security component of geopolitical interests. The main factor in the global system is considered to be the most developed countries in the world, which actually exploit the less developed ones, which they consider semi-periphery or periphery. It is important that in the global world system the potential for the spread of insecurities (threats, conflicts, crises, and aggression) is much higher. This increases the role of political, diplomatic, economic, information, ideological, psychological, humanitarian, intelligence and other means, which are often more effective and more destructive [4].

Thus, the globalization itself determines this specific character of international relations and enhances it with the development and implementation of modern technologies of complex, including asymmetric, use of the above-specified tools [2, 3, 12].

One of the tasks of hybrid aggression is to involve the target state in local conflicts in border areas and strategically important regions, primarily with rivals of the aggressor state, in order to weaken its competitors by means of a proxy war.

Hybrid warfare is illegitimate. All existing laws of war are usually designed for regulating conflicts between two warring parties, usually states that pursue interests that each party considers legitimate. For the traditional war, the UN adopted the concept of “aggression” in 1974. There are laws protecting the rights of combatants, prisoners of war and civilians, which prohibit the use of certain weapons. The legal and regulatory framework serves as a tool for political decision-makers and combat management. There is nothing like this for a hybrid war [15].

In the hybrid war, an extremely dangerous situation beyond the control of its initiators is developed due to the use of indirect methods associated with the imposition of sanctions, increasing power pressure, targeted destructive information and psychological impact on the minds of the ruling elites and the entire population, the creation and support of irregular armed groups, involvement of special operations forces, crime terrorist groups. The direct link between cause and effect is broken. As a result, large areas of uncertainty are created due to the actions of heterogeneous actors, who often do not coordinate their plans. These and some other factors seriously hinder attempts to predict the course and outcome of a hybrid war.

Completion of hybrid warfare is a complex problem caused by the peculiarities of information warfare as a part of a hybrid warfare.

The emergence of new subtle forms of aggression necessitates the early creation of mechanisms to neutralize the negative effects of external intervention and internal extremist actions by strengthening civil society, consolidating allies and partners, protecting national values and national interests as factors of internal mobilization to resist color revolutions and hybrid wars. [2, 3]. Particular attention

should be paid to advanced developments aimed at adapting some modern information and humanitarian technologies to the defence needs. Since at current time the hybrid war has become a new form of interstate confrontation, the study of this phenomenon is an urgent scientific task. Issues of counteracting hybrid aggression should be one of the priority areas of military research, and the first step in this direction should be development of a hybrid aggression model [9, 10].

The development of the HA model should be based on the following principles [16, 17]:

• *openness of the model* (allows to build the model with additional modules, if necessary, use a single database and guarantee reliable information protection from various information actions);

• *generation of multiple scenarios* (allows to model alternative scenarios of military-political and geopolitical situation in the region, the dynamics of interstate confrontation, the influence of strategic partners, temporary coalitions of states);

• *filtering of the proposed countermeasures* (allows to demonstrate the options of strategic decisions on the basis of certain criteria, the priority of using "soft"power methods for solving problems in the field of state MS, existing guarantees and restrictions in the Security and defence sector of Ukraine);

• *adaptation to the existing military-political situation* (provides an opportunity to justify measures to ensure the national security of the state, appropriate to the real level, direction, nature and scale of hybrid threats to the state);

• *modularity*, according to which it is allowed to replace certain partial models (modules) with more accurate and perfect ones, as well as to build on a general model.

Since the expected output of the process is not a linear dependence on the controlling input impact, but is formed by a synergistic effect, which is inherent in complex systems, which include modern society, it has many degrees of freedom. This can lead to the fact that even very small exposures can, under certain conditions, cause extremely large disturbances. Significant fluctuations can be observed near the bifurcation points in the systems. Such systems allegedly oscillate before choosing one of several paths of evolution. That is why even a small fluctuation can be the beginning of evolution in a fundamentally new direction, which will dramatically change the parameters and behavior of the studied macroscopic system.

In addition, hybrid aggression (process) is considered as spatiotemporal. Spatial nature means that the object (objects) of impact, target audience, information resources are in a certain (limited) area, i.e. scattered in space. Temporal nature means that these components of the process receive information not simultaneously, but with some delay, which is determined by the distance from the transmitter of information and the speed of its transmission. The amount of delay must be taken into account for the transmission of information by printed means (newspapers, magazines, books, postcards, etc.). For electronic media, like Internet, delays (fractions of a second) can be ignored. To model hybrid aggression, taking into

account these features, it is advisable to use the theory and methods of graph theory [18].

The developed generalized graph-model of hybrid aggression of the highly developed state against the chosen target state is shown in Figure 8.1 [10].

The vertices are marked in Figure 8.1:

G_{A1} - National Security Strategy;

G_{A2} - decision maker;

G_{A3} - strategic planning body;

G_{A4} - forces, means and resources involved in the implementation of hybrid measures;

G_{A5} - plan for implementation of a set of measures of impact;

G_{A6} - forces and means of information-psychological impact (IPI);

G_{A7} - forces and means of intelligence support;

G_{A8} - monitoring structures;

G_{A9} - section of evaluation and forecasting of efficiency of hybrid measures (HM) realization;

G_{A10} - the target state of hybrid aggression;

G_{A11} - establishment of external management of the target state.

Marked arcs:

g_1 - describes the geostrategic interests, goals, plans, intentions of the initiating state of the HA;

g_2 - describes the geostrategic imperatives for the selected target state;

g_3 - describes the decision of the DM to conduct HA;

g_4 - describes the tasks, procedures and resources for conducting HA;

g_5 - describes the tasks, instructions, resources allocated to “agents” of impact, non-governmental organizations, individual opposition figures on the territory of the target state (HA master plan);

g_6 - describes the tasks of each actor of the HA, the resources of the selected forces and means for the formation of many measures of impact (the potential of the HA);

g_7 - describes the general plan of implementation of measures of impact on the objects of the target state;

g_8 - describes the implementation of a set of measures of impact in accordance with the developed plan for the establishment of external governance of the target state;

g_9 - describes the required level of IPI measures of impact;

g_{10} - describes the actual level of IPI measures of impact;

g_{11} - describes the actual level of intelligence support for measures of impact;

g_{12} - describes the required level of intelligence support for measures of impact;

g_{13} - describes the program of monitoring the effectiveness of the implemented measures of impact;

g_{14} - describes the implemented measures of IPI;

g_{15} - describes the degree of impact of the implemented measures on significant spheres of the NS (the degree of achievement of certain goals by the implemented measures in the target state: agents of impact, opposition forces, intelligence);

g_{16} - describes the results of monitoring those activities that require an increase in the level of their intelligence support;

g_{17} - describes the need to adjust the monitoring program in relation to the selected measures of impact;

g_{18} - describes the final degree of achievement of the goal of HA;

g_{19} - describes the contribution of intelligence in achieving the goal of the HA;

g_{20} - describes the contribution of IPI in achieving the goal of HA;

g_{21} - describes the partial effectiveness of the implementation of measures of impact in accordance with the master plan of the HA;

g_{22} - describes the degree of achievement of the goal of HA;

g_{23} - describes the overall effectiveness of the measures of impact in accordance with the master plan of the HA for its adjustment or suspension (temporal suspension) of the HA DM;

U1 - describes the effectiveness of counterintelligence support in counteracting the target state of hybrid aggression;

U2 - describes the state of establishment of external control over the target state (inability to resist the HA).

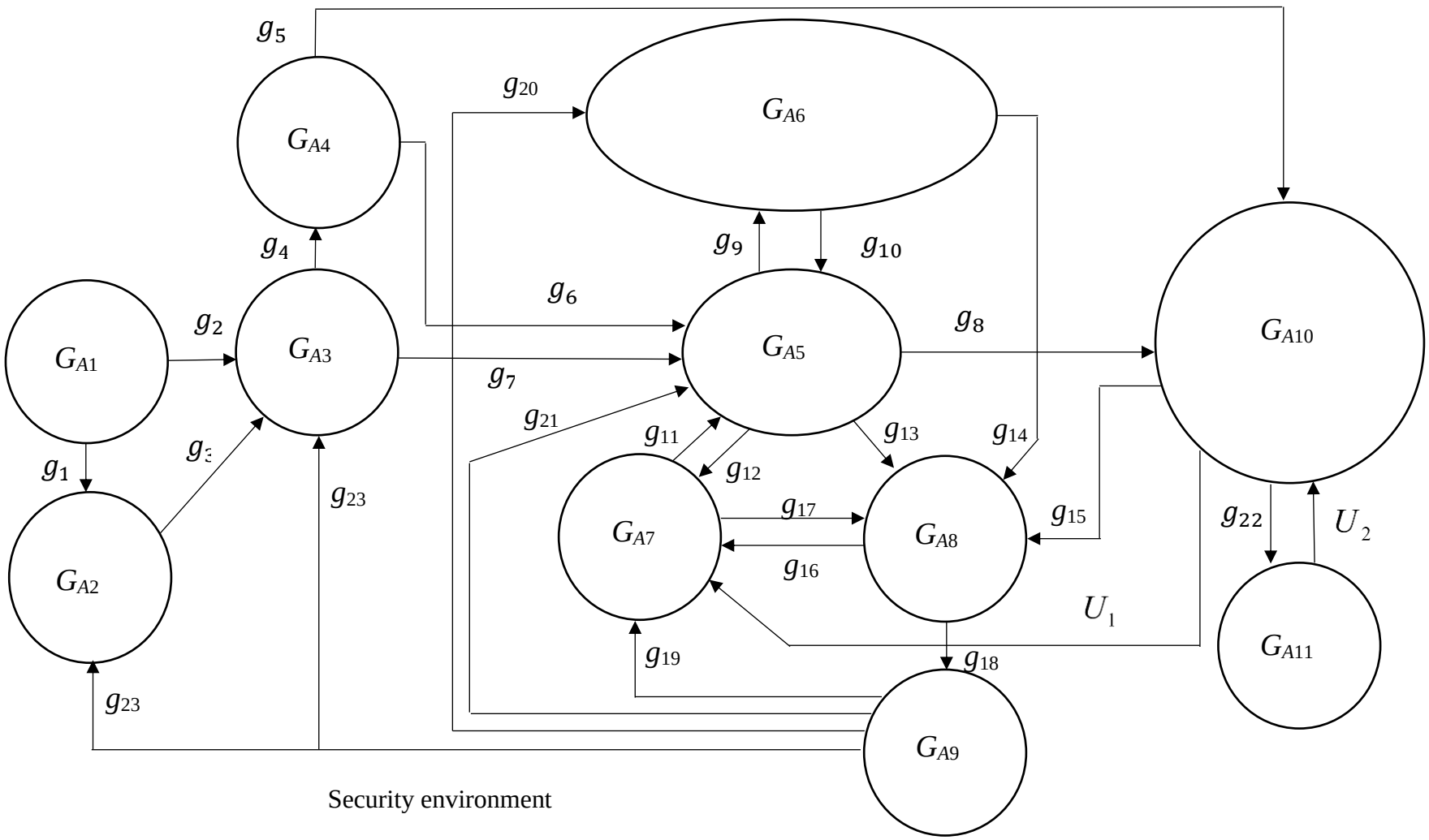

Fig. 8.1. Generelized graph-model of hybrid aggression against the chosen state-target

For the initiating state, the achievement of the HA goal is described by routes:

- ideal (desirable) - g_3, (g_4, g_6, g_7), g_8, g_{22};
- admissible - g_3, (g_4, g_6, g_7), (g_9, g_{10}), g_5, g_8, (g_{13}, g_{14}, g_{15}), g_{11}, g_{12}, g_{18}, (g_{16}, g_{17}), g_{19}, g_{20}, g_{21}, g_{22}, g_{23}.

An acceptable route requires more resources and time, and is accompanied by greater risks of failing to achieve the goal of hybrid aggression.

We are going to formalize the process and build a model of the system of asymmetric counteraction to the described above threats.

Decomposition and formalization of the goal (see paragraph 7.7) create opportunities for its correct description. In essence, it is an issue of developing the corresponding system of counteraction to military threats. It should be noted that each threat must have its own system of counteraction.

To substantiate the structure and strategy of managing the processes of asymmetric counteraction to military threats, as well as to build possible scenarios for the development of the situation, forecasting, use of resources and strategic planning, you can use a comprehensive model of hybrid aggression as a formalized theory. This theory can serve as a basis for developing the structure of the system of counteraction to hybrid aggression, its tasks, types of behavior and decision-making in the conditions of volatility and uncertainty of the external security environment [19, 20–22].

The model provides the formation of several scenarios of armed aggression and modeling of each of them in full scale. The model makes it possible to respond to the action of several indicators of aggressive actions of the aggressor state at the same time, and to demonstrate the result of the impact of one indicator selected by the analyst.

Of course, the constructed model of detected aggression will be somewhat conditional, as it cannot cover all aspects of the situation and serves only as a tool to focus the analyst's efforts on the identified main essential characteristics, which will justify the most rational management project. A variant of the model structure of the process of counteracting aggression by a militarily stronger state is shown in Figure 8.2 [9].

To identify signs of aggression in terms of resource constraints, it is advisable to connect the relevant structural unit of the countermeasures to the state monitoring system in the political, economic, military, information, cultural and ideological spheres (mandatory areas).

In the political sphere, special attention is paid to attempts to ruin the prestige of the military-political leaders of the state, weaken the defence capabilities of the state by taking targeted measures against the state military, military-industrial complex, accusing the government of excessive military expenditures, reducing the prestige of military service, damage to the image of the Armed Forces of Ukraine at the international level, etc.

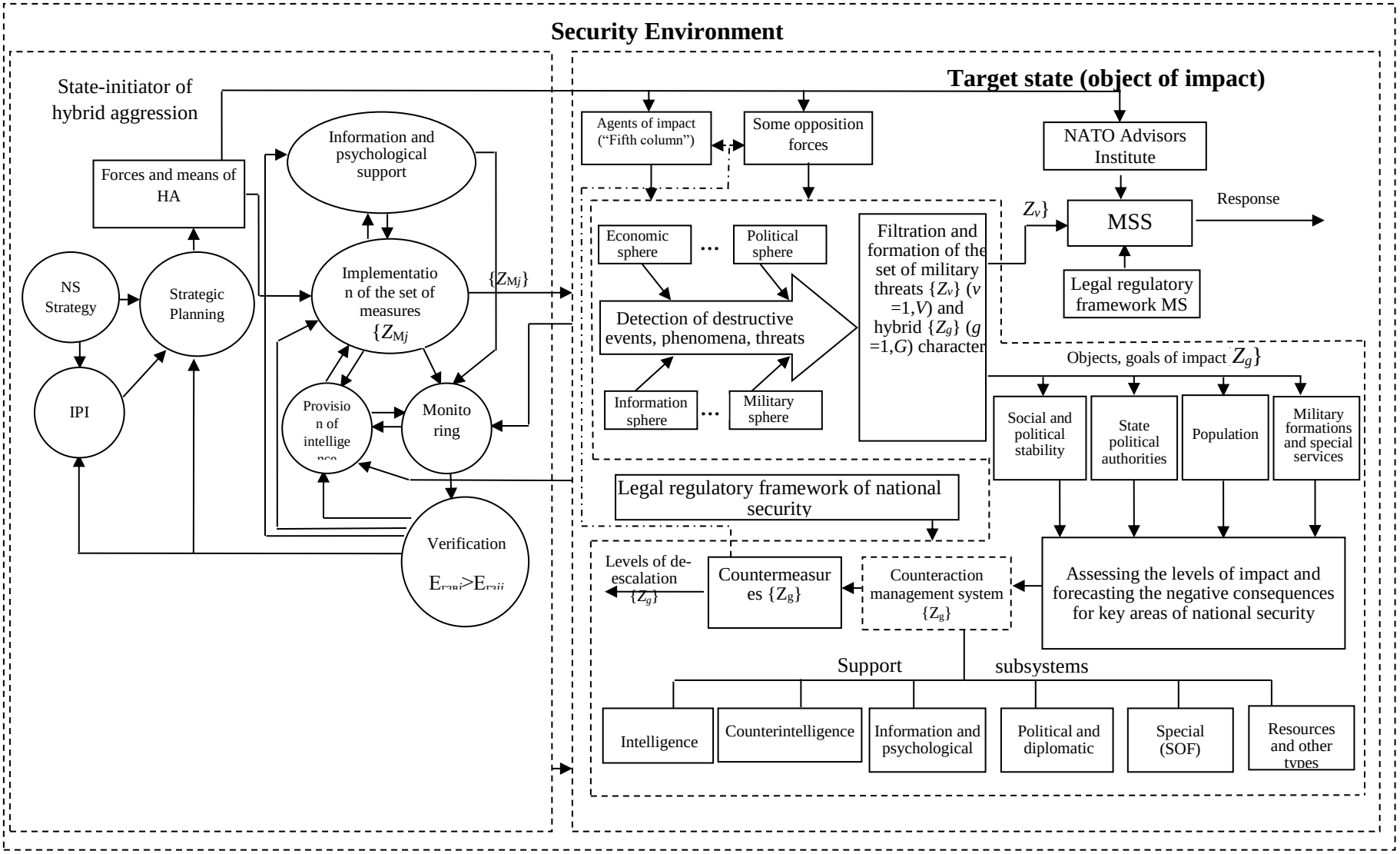

Figure 8.2. Variant of the structure of a complex model of the counteracting hybrid aggression process

In the economic sphere, attempts to impose economic sanctions on the state, undermine the competitiveness of the country's products in foreign markets, disorganize the banking system by conducting cyber attacks, etc. are analyzed in detail.

In the military sphere, the opposing party's measures are aimed at achieving unilateral advantages by misleading the target state, especially during the collection, processing and use of intelligence data, disrupting the stability of critical infrastructure and government and armed forces, using cyber impact on vulnerabilities.

In the information sphere, information and psychological impacts are carried out through the information sphere of the MS, often causing significant losses in other spheres (military and military-technical cooperation, foreign economic activity of the Ministry of Defence of Ukraine during the import of AME, etc.). Information threats, affecting the military sphere, quite often are transformed into military threats and lead to military losses. Information threats to the state in the military sphere are a “complex” type of threats, have a specific character and need to be considered as a priority when assessing the integrated level of threat posed by aggression [14, 16].

In the cultural and ideological sphere, a key place is given to hybrid threats related to information warfare in order to achieve various political goals, including the establishment of strategic, comprehensive control over the consciousness of the target population and gaining full power over the future of the conquered state.

In this context, the use of the media to spread false, unreliable information, Internet trolling against key personalities in the defence system should be mentioned. In general, the implementation of threats within the strategy of information confrontation becomes a key component of the technology of “managed chaos” in the cultural and ideological sphere [23]. This type of threats implementation allows, by developing chaotic situation and disorganization of public and military administration, to seize strategic initiative in various attacks, bring under external control the armed forces of the target country, and thus deprive the target state of de facto sovereignty, even without seizing its territory by military force.

The next step of the model is the filtering and formation of sets of threats of military $\{Z_M\}$ and hybrid $\{Z_H\}$ character. Countering military threats is carried out by familiar methods of symmetric and asymmetric response [24]. Filtering of hybrid threats is carried out by the method of expert survey in two stages.

At the <u>first</u> stage, a general set of threats of a non-military nature is developed.

At the <u>second</u> stage, this set is transformed into four groups:

• threats aimed at undermining socio-political stability $\{Z_{s.p.s}\}$;

• threats aimed at discrediting the military-political leaders of the state $\{Z_{m.p.l}\}$;

• threats against the population of the country $\{Z_{pop}\}$;

• threats aimed at MF personnel and special services $\{Z_{mp}\}$.

At the third stage, using the M7 model [2, 24], experts assess the levels of impact and predict the expected negative consequences for key areas of national security.

At the fourth stage, the received information enters the counteraction management system, on the basis of which, in accordance with the current legal ND regulatory framework of the MS, the relevant management decisions on counteraction are substantiated, individual tasks for the entities involved in counteraction are organized. When making management decisions on the implementation of specific countermeasures, it is necessary to ensure the necessary levels of de-escalation of the identified effects on certain objects of aggression.

Specially trained entities or their assigned forces, usually in the form of LSO, carry out asymmetric measures. The number of LSO depends on the enemy, resources and capabilities of the state - the victim of aggression.

Analysis of trends in the geopolitical and military-strategic situation in the world shows that during the first half of the 21st century humanity will not be able to get rid of military clashes of various magnitudes. This is due to the preservation of existing and the emergence of new centers of power and the desire of the political elite of individual states to resolve emerging economic, political, territorial, religious, ethnic, and other antagonistic contradictions through various forms of violence [20].

Asymmetric actions can be used to counter threats that require significant military efforts (for example, a military potential ratio of 1:10 or more), resources that the state cannot find, the minimum time needed to neutralize an identified (predicted) threat, and so on. Asymmetric actions are inherent in a conflict situation, in which the weaker enemy pursues an asymmetric strategy (tactics) of armed struggle in accordance with its limited resources to level the military-technological advantages of the strong side by using economic, diplomatic, informational and direct military measures [23]. The study will focus on the asymmetric military actions of individual SDSU agencies. An important condition for the effectiveness of asymmetric actions is the precise identification of the most vulnerable and weak points of the enemy, the impact of which will give the maximum effect at the minimum cost of their own forces and resources [25-26].

However, it is problematic to develop a universal set of asymmetric actions for all possible conflicts due to the characteristics of each of them. In addition, asymmetric actions are mostly shortened in time, because a stronger enemy is able to quickly adapt to the situation and provide effective counteraction.

The success of asymmetric actions will depend on the following factors:

• quality and completeness of LSO planning;

• the level of professional training of the personnel of the involved units;

• the level of information support for LSO at the national and international level;

• completeness and timely resource and other types of provision of LSO at all stages of its implementation;

• degree of preparation of space for conducting LSO;

• the degree of misleading the enemy regarding the time, place, objects and scale of LSO, etc.

The main desirable result of asymmetric counteraction should be the refusal of the enemy from active hostilities, i.e. de-escalation of the threat of military or hybrid nature to an acceptable (permissible) level.

Thus, as a result of the formalization of the process of organizing the asymmetric response of the Security and defence sector of Ukraine (SDSU) to threats in the military sphere, a logical sequence of computational, comparative, logical and other procedures for forming and using the potential of asymmetric response to MT provided by states, whose capabilities exceed the resources of the Armed Forces of Ukraine and make it difficult to counteract to, has been developed. It is important to protect vital national interests and force the enemy to refrain from using military force against Ukraine. Asymmetric measures are implemented, as a rule, in the form of LSO. To achieve this goal, a system of indicators and criteria for making managerial decisions on the transition to an asymmetric response to the state MS threats, taking into account the limited available in the state both financial and human resources, has been chosen.

Successful solution of this problem requires the introduction of a new methodology for assessing the security environment and adapting to its changes in current conditions.

8.2. Methodology of assessing the security environment

Current legal documents in the field of national security [1, 6–8] define the tasks of ensuring national security in its key areas on the basis of assessing the security environment and financial and economic capabilities of the state, carried out during a comprehensive review of the SDSU. However, at present in Ukraine the necessary methodological tools for assessing the security environment have not been developed, and the concept of “security environment” has not been defined, which complicates the process of determining the initial data for research in the security and defence sector.

In order to implement effectively the national interests of the state in the modern security environment, it is necessary to be able to detect the threats and insecuruties in time, assess their nature, level, scale and predict the possible damage from them in case of implementation. In addition, it is also important to monitor global and local processes, strategies of leading countries, tendencies and trends of situation development in individual regions and in the world as a whole [20-22, 27].

To solve these challenges, the national security system organizes and conducts comprehensive monitoring of hazards and threats. Under the *monitoring of insecurities and threats* we understand constant, specially organized, systematic

observation to identify reasons and factors that hinder or disable the realization of national interests in certain areas of national security [13].

Threat monitoring is carried out in a *security environment*, which means geopolitical, political and diplomatic, military, economic, information and other areas where arise, exist, accumulate or reveal favorable conditions or dangerous events, potential and real threats to the national interests in which the state implements its national security policy, interacts with international security structures, strategic partners, allies, military and political and other institutions and organizations for ensuring its sustainable development in a certain time interval [20, 27].

Monitoring data is not enough to provide information on the effective implementation of national interests. More qualified analytical processing of information circulating in the security environment, but not recorded during monitoring is required. To process this information a higher level of professional training of analysts and appropriate methodological tools are required. The main component of the methodological tools can be a comprehensive method of assessing the security environment, which is divided into external and internal. At the first stage of the research, the attention was paid to the external environment, the assessment method of which is proposed for consideration and is shown in Fig. 8.3 [20].

The methodology consists of 14 main blocks, where analytical, logical, expert, comparative and other procedures are performed with information obtained from the security environment about conditions on the bases of which national interests, destructive processes, events, insecuruties, threats and others are being implemented.

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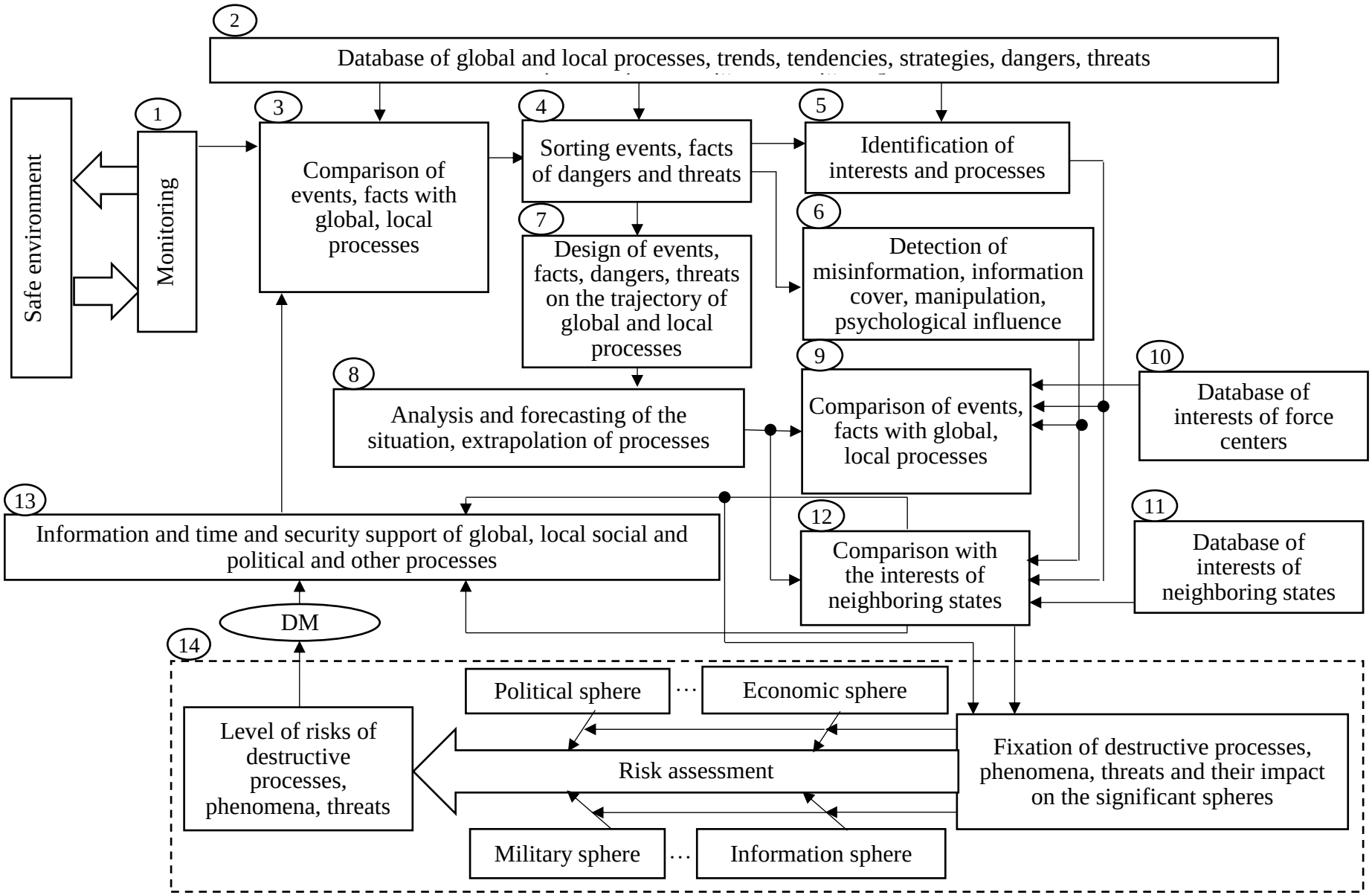


Fig. 8.3. Generalized scheme of the security environment assessment methodology

In block No. 1 monitoring is performed according to the method described in [13, 28]. Destructive phenomena, factors, insecurities as ell as military and hybrid threats are revealed, their scale, ways of influence on the MS of the state and significant spheres of NSS are preliminary estimated.

In block No. 2 information about global and local processes in international relations, about the states that generate these processes, current trends, tendencies, insecuruties and potential and real threats to military security, strategies of centers of power and neighboring states, and other information is accumulated.

In block No. 3 the obtained during the monitoring data are compared with the data in the database (*block No. 2*) in order to at least roughly relate them to certain global and local processes, or to identify new phenomena that affect the implementation of national interests.

In block No. 4 a more detailed sorting of events, facts, insecuritys and threats obtained during the monitoring is carried out, proposals are prepared for their distribution by response time (urgent, medium-term, long-term response).

In block No. 5 there is an identification of individual facts, events and phenomena with global and local processes, insecuritys and threats, actions of other states [13].

In block No. 6 they complete the sorting of information from *block No.* 4, revealing the facts of misinformation, manipulation, psychological influences, information coverage of the promotion of certain interests through the information space, orientation of agents of influence on the formation of certain public opinion, opposition, etc.

In block No. 7 the information from *block No. 4* is projected on the trajectory of global and local processes, in particular, it is established which processes are intensifying, in which processes the interested states want support from Ukraine, etc.

In block No. 8 according to information from *block No. 7*, the identified threats are analyzed, their dynamics are assessed, the military and political and international situation is forecasted, global and local processes are extrapolated for the short and medium term, the most “difficult” scenarios for the state are formed and evaluated , primarily in the short term. Proposals are being prepared for the priority of both direct and asymmetric response to MT, etc.

In block No. 9 they do a logical comparison of the information obtained in block No. 8 with the interests of the centers of power, which for convenience are placed in the database (*block No. 10*). In parallel, information from block No. 8 is submitted to *block No. 12* for comparison with the interests of neighboring states (*block No. 11*). This “binding” of the identified destructive factors (threats) allows them to be structured by scale and priority and, accordingly, to organize in *block No. 13* information-time [22] and security support [2, 23, 24] of global, local and other processes, initiated by centers of power, neighboring states or their coalitions.

In block No.14 revealed destructive processes, factors, individual facts, which were grouped in *blocks No. 9* and *No. 12* by belonging (proximity) to the interests of centers of power and the interests of neighboring states or coalitions of states are analyzed for the power of influence on significant spheres of national security , the corresponding risks of realization of threats and disturbance of social and political stability in the state, decrease in level of MS of the state and other destructive consequences for national security are estimated. The information received in *block No. 14* can be used by the person (agency) who makes decisions in the field of national security to adjust the parameters of information-time and security support of global, local and other processes in *block No. 3*.

Of course, a qualitative assessment of the security environment requires the involvement of analysts with a higher level of training. Unfortunately, this task is not a priority in the state. In addition, experts who may be involved in certain stages of the methodology should be trained in such disciplines as the basics of geopolitics and the basics of national security, which were thought at different time period at national security departments before their reformation at the National Academy of Public Administration under the President of Ukraine and at the National Academy of Security Service of Ukraine.

The second determining factor in the successful implementation of this technique should be the development of applied information technology to support management decisions as part of the IAS GSCU [7].

Thus, the proposed methodology of assessing the security environment allows to identify in advance the interests of centers of power and the interests of neighboring states or coalitions of states projected on the territory of Ukraine, destructive processes which they generate to disrupt sustainable development of Ukraine, and assess the impact on significant spheres of national security, assess the relevant risks of threats and violations of social and political stability in the state, predict a decrease in the level of MS and other destructive consequences for national security, which creates favorable conditions for developing preventive measures to ensure social and political stability as a necessary condition for sustainable development of the state.

8.3. Method and methodology for substantiation of management decision on asymmetric response to the threats to military security of the state

In recent decades, the geopolitical transformation of the world has been accompanied by an escalation of interstate contradictions in the political, economic, military, ideological and other spheres. According to many political scientists and military experts, the struggle for spheres of influence and possession of vital natural resources has long been the main cause of armed conflicts and local wars in various parts of the world.

Analysis of trends in geopolitical and military and strategic situation in the world shows that in the first half of the 21st century humanity will not be able to get rid of military clashes of various magnitudes. This is due to the preservation of existing and the emergence of new centers of power and the desire of the political elite of individual states to resolve emerging economic, political, territorial, religious, ethnic and other antagonistic contradictions through various forms of violence [29].

The analysis of the danger of catastrophic consequences of military actions of various scales with the use of highly effective modern and promising weapons confirmed the tendency to actively implement non-military measures of interstate confrontation during armed conflicts and local wars. The range of military and non-military threats, which are projected on the territory of Ukraine, is quite wide and has economic, political, environmental, demographic, information and technological orientation [30]. The analysis of their content gives grounds to assert that in modern conditions the importance of military force in the system of international relations tends to increase. Many political scientists, sociologists, philosophers and military scientists believe [29-32] that the main process that affects world stability and provokes uncertainty in interstate relations is globalization.

The inability of most countries in modern conditions to fight on equal terms with the most powerful military machine of globalization (especially the United States) led in the 21st century to an increase in the number of terrorist acts, armed conflicts and local wars. Combining them into a single antagonistic system gives rise to a phenomenon called by military-political theorists asymmetric actions (asymmetric conflicts and even asymmetric wars) [25, 29]. In these conditions, none of the countries of the world, including Ukraine, is able to withstand modern threats, relying only on their own capabilities. The vast majority of states to ensure national security seeks to create a peaceful, secure security environment, which is currently in a state of deep crisis [33].

Asymmetric actions can be used to counter threats that require significant military efforts (for example, a military potential ratio of 1:10), resources that the state cannot find, the minimum time needed to neutralize the identified (predicted) threat, and so on. Asymmetric actions are inherent in a conflict situation, in which measures of economic, diplomatic, information and direct military nature, the weaker enemy pursues an asymmetric strategy (tactics) of armed struggle in accordance with its limited resources to level the military-technological advantages of the strong side [34].

An important condition for the effectiveness of asymmetric actions is the precise identification of the most vulnerable and weak points of the enemy, the impact of which will give the maximum effect at the minimum cost of their own forces and resources.

Asymmetric actions can be the actions of the SOF, foreign intelligence, various forms of information influence, as well as political, economic and other non-military influences.

One of the steps to solve this problem, in our opinion, can be a proposed method of asymmetric response to threats to military security of the state and methodology developed on its base [25].

The essence of the method is to consistently perform certain procedures for analyzing the security environment, monitoring, assessing the level and nature of military or hybrid threats, determining the necessary resources, time and level of de-escalation ("neutralization shift" ΔK_{NShreq}) threat and forming the necessary group $\{Sj\}$ agencies of the defence forces and their necessary capabilities to form the potential of asymmetric counteraction.

The method involves computational procedures for determining the tasks of the subjects of the formed group and the main parameters of the planned LSOAR, including comprehensive support and information support.

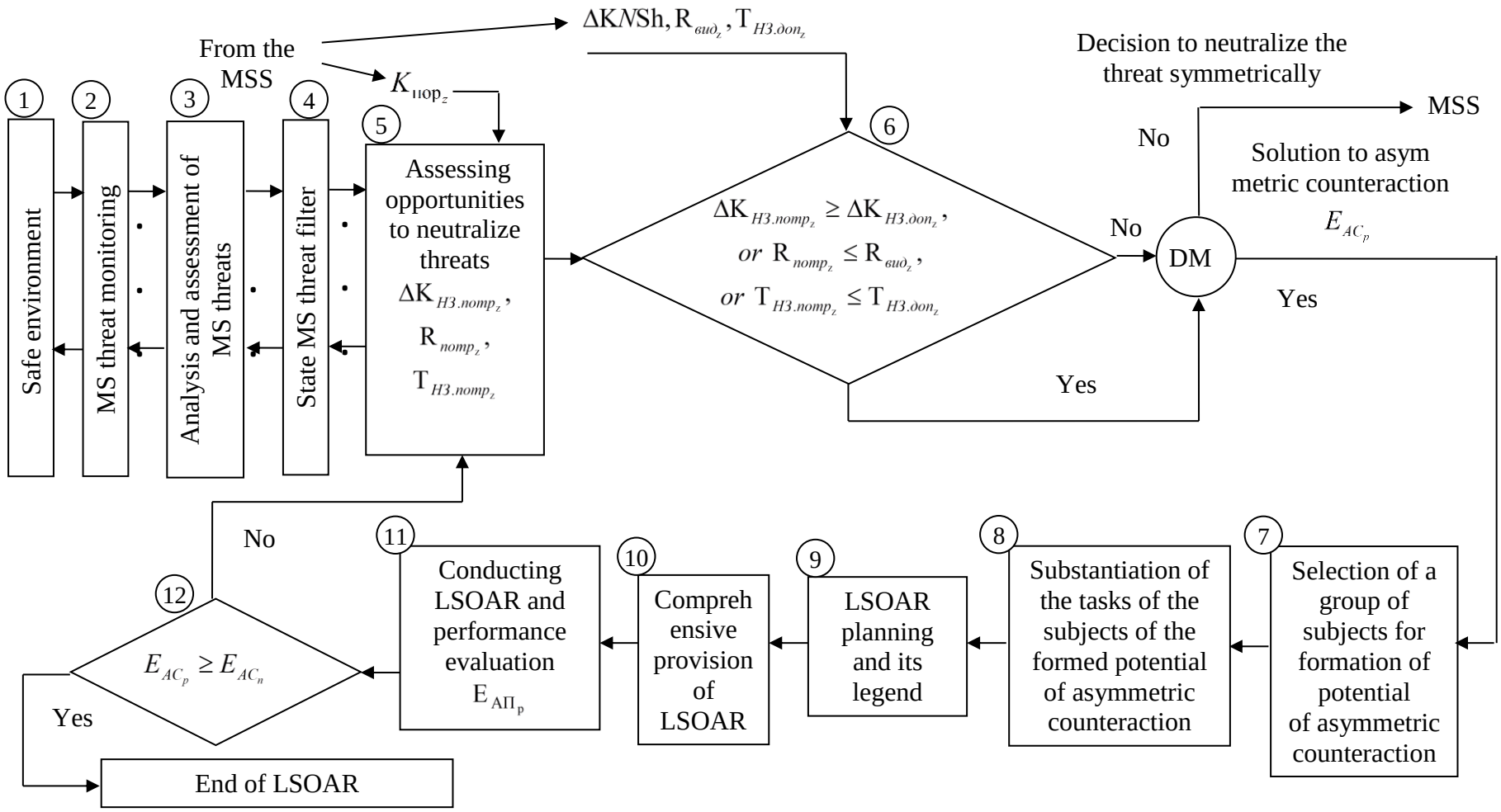
The block diagram of the method is shown in Fig. 8.4.

The first and second stages of the method were discussed in detail in the previous paragraphs.

The novelty of the third stage is to conduct expert-analytical analysis and assessment of threats to military security by assessing the current $\Delta K_{\text{req } z}(T_{\text{pr}})$ and clarifying the forecast $\Delta K_{\text{forc } z}(T_{\text{pr}})$ levels of the identified z threat and identifying the factors that shape this threat. This stage is key for further organization of countering the z threat, because the accuracy of forecasting the level of military insecurity and the completeness of the factors that form it will depend on the effectiveness of all further actions to neutralize the threat (detection of factors that form a threat is carried out by the method of Ishikawa [35] and expert method, and assessment of levels - using the advanced method of analysis of hierarchies (MAI) and the model M7) [13, 28].

At the fourth stage, the filtering of threats quantity$\{z\}$ to the military security of the state is carried out for their conditional distribution by spheres of manifestation (foreign policy, domestic policy, military, economic, scientific and technological, social and humanitarian, environmental, information, etc.).

By filtering, we identify threats, the neutralization (elimination) of which requires the involvement of law enforcement agencies$\{z_{3.c}\} = \overline{1,\ z_{3.c}}$ using direct (symmetrical) or asymmetric methods (actions)


1
Safe environment
2
MS threat monitoring
3
Analysis and assessment of MS threats
4
State MS threat filter
5
Assessing opportunities to neutralize threats
$\Delta K_{H3.потр_z}$,
$R_{потр_z}$,
$T_{H3.потр_z}$
From the MSS
$K_{пор_z}$
$\Delta KNSh, R_{вид_z}, T_{H3.доп_z}$
6
$\Delta K_{H3.потр_z} \geq \Delta K_{H3.доп_z}$,
or $R_{потр_z} \leq R_{вид_z}$,
or $T_{H3.потр_z} \leq T_{H3.доп_z}$
No
Yes
DM
Decision to neutralize the threat symmetrically
No
MSS
Solution to asym metric counteraction
E_{AC_p}
Yes
7
Selection of a group of subjects for formation of potential of asymmetric counteraction
8
Substantiation of the tasks of the subjects of the formed potential of asymmetric counteraction
9
LSOAR planning and its legend
10
Compreh ensive provision of LSOAR
11
Conducting LSOAR and performance evaluation
$E_{АП_р}$
12
$E_{AC_p} \geq E_{AC_n}$
No
Yes
End of LSOAR

At the fifth stage, the ability of law enforcement agencies to neutralize the threat is assessed according to certain indicators, namely:

- the ability to achieve the desired "neutralization shift" $\Delta K_{\text{NSh req } z}$ level of military threat as the difference between the current $K_{\text{req.}z}(T_{\text{pr}})$ and threshold $\Delta K_{\text{thredr } z}(T_{\text{pr}})$ levels of military threat $\Delta K_{\text{Nshreq } z}(T_{\text{pr}}) = K_{\text{req } z}(T_{\text{pr}}) - K_{\text{thredr } z}(T_{\text{pr}})$ (Fig. 8.5) [5];
- assessment of required resources R_{reqz} to achieve the required "neutralization shift" taking into account the capabilities of the NSS that exist;
- the right time $T_{\text{NShreq } z}$ to achieve the required "neutralization shift" of the threat under consideration.

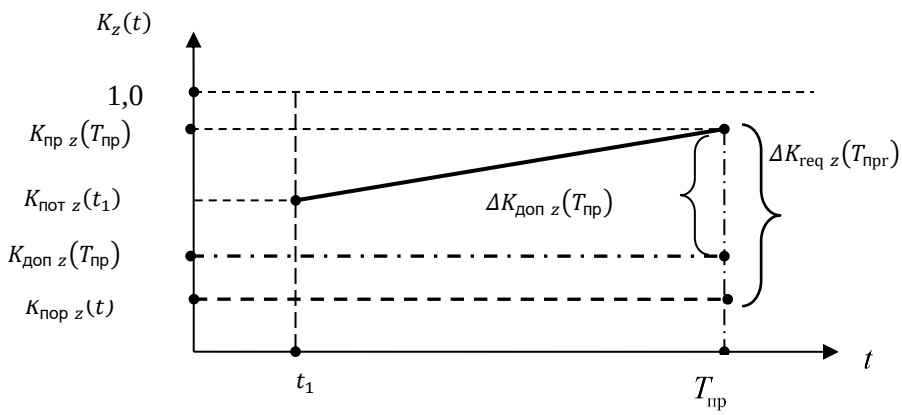


Fig. 8.5. A hypothetical example of the formation of the desired "neutralization shift" $\Delta K_{\text{req } z}(T_{\text{pr}})$ the level of military threat at the time of forecasting T_{pr}: $K_{\text{thred } z}(t)$ – threshold level of military z threat; $K_{\text{perm } z}(T_{\text{pr}})$ – permissible level of military z threat; $K_{\text{reqr } z}(t_1)$ – current level of military z threat at the time of assessment t_1; $K_{\text{pr } z}(T_{\text{pr}})$ – projected level of military z threat at the time of forecasting T_{pr}; $\Delta K_{\text{perm } z}(T_{\text{pr}})$ – permissible "neutralization shift" of the level of military threat at the time of forecasting T_{pr}

At the sixth stage, a procedure is used to determine the most rational form of response to the identified threat according to the criteria defined at the fifth stage, namely to achieve the required "neutralization shift" $\Delta K_{\text{NShreq } .z} \geq \Delta K_{\text{Nshperm } z}$, allocated resources time $R_{\text{req } z} \leq R_{\text{def } z}$ and the right time $T_{\text{Nsh } z} \leq T_{\text{Nshperm } z}$ for further decision-making on neutralization of threat by a symmetric or asymmetric method.

If the condition of achieving certain criteria is met, then a decision is made to neutralize the threat by a symmetric method, if at least one of the conditions is not met, then a decision is made on the asymmetric action.

At the seventh stage, after the decision to neutralize the threat by the asymmetric method, a set of variants of groups of subjects from the armed forces $\{j\}$, $j = 1, J$ is formed, where J is the number of groups of subjects from which it is expedient to form the potential of asymmetric counteraction and the most rational

form of their application, for example, LSO with information support (this procedure is performed using advanced MAI technologies and expert assessment) [36].

At the same time, for each proposed variant of asymmetric counteraction potential formation, the necessary resources and the necessary time to achieve the required “neutralization shift” are substantiated.

The existence of many options for the use of forces and means of the armed forces to neutralize the threat is explained by the different capabilities of the armed forces, the availability of the necessary different resources, possible (necessary) to perform time intervals, and so on.

At the eighth stage, according to the plan, a set of partial tasks is determined for each subject of the formed potential of asymmetric counteraction for neutralization (counteraction) of the threat. The tasks are based on certain degrees of reduction of the impact of the threat indicator Δ on the Saati scale and the required capabilities for this, which are determined using advanced MAI and expert review procedures.

At the ninth stage, it is planned to conduct LSOAR and its legend [33].

At the tenth stage, to ensure the implementation of LSOAR substantiated the necessary resources to achieve the required “neutralization shift” and evaluates the possibility of their allocation from national resources available in MSS, namely: acquisition of a certain composition of the formed potential of asymmetric counteraction with the AMQ, means of communication, specialized non-military means and other resources, coordination and other necessary measures to prepare for the tasks assigned to them.

At the eleventh stage, the LSOAR is carried out with further ev [33].

At the twelfth stage, all monitoring measures are carried out to determine the current value of the level of military insecurity $K_{\text{req.}z}(T_{\text{pr}})$. If the required level of military insecurity is not achieved as a result of the monitoring, they return to the third stage to pass all other stages.

If this level is reached, it is considered that the threat is neutralized, the military security of the state is ensured and a possible transition to the next stage is possible. At this stage, if necessary, decisions are made on further actions to ensure the state's MS.

The main desirable result of asymmetric counteraction should be the refusal of the enemy from active hostilities, that is de-escalation of the threat of military or hybrid nature to an acceptable (permissible) level.

Thus, the proposed method of asymmetric response to threats in the military sphere with resource constraints allows to implement new approaches to the use of defence forces, taking into account the specifics of existing and projected threats and dangers, counteraction againt which combines both direct (symmetrical) actions, involving the preparation and conduct of operations with the decisive goal of defeating groups of troops (forces) of the enemy, and the implementation of

asymmetric actions to military stronger enemy for inflicting unacceptable damage, including non-military security spheres.

8.4. Method and methodology for creating a group of defence forces agencies for realization of the operation design of asymmetric counteraction to the detected (predicted) threat

Many international political scientists and military specialists have been studying and theorising the phenomenon of asymmetric tactics, their forms and conduct [15, 37-41]. In these publications it has especially been noted that the success of a military campaign in such armed conflicts and local wars is not so much related to the military capabilities of the warring parties but more to the interaction between military and non-military factors, i.e. political, psychological, ideological and information components of these campaigns. The support of the goals of war by the society of the country at war is required to attain victory. This factor is crucial for both the militarily powerful and the weaker warring parties.

As indicated in the paper [38], an important characteristic of modern wars is multidimensionality, which is formed by a combination of information, military, financial, economic and diplomatic influences on the enemy in real time. Multidimensionality is fully implicit to hybrid conflicts of a non-classical nature with the participation in hostilities of such armed groups of non-state actors as international terrorism, private military companies with their characteristic blurring of national and ideological identity. In addition, the ratio of military and non-military methods of action used by the parties to the conflict is changing.

Non-military means in a hybrid war include traditional and public diplomacy, legal, economic, ideological and psychological, information, humanitarian, intelligence, technological and some other instruments of action. It is emphasized that the correctly chosen application strategy of such means will lead to cumulative, systemic (synergistic) effect. However, the methodology that can be used to form the potential of asymmetric warfare is not given.

Thus, the above sources do not contain approaches to the selection of a group of military and non-military subjects to engage in asymmetric counteraction to threats of military and so-called hybrid nature, which have recently become widely used for pursuing the national interests with or without military force.

Therefore it is necessary to establish a method of forming a group of agencies of the defence forces for asymmetric counteraction to the detected (predicted) threat

8.4.1. Method of creating a group of defence forces agencies for realization of the operation design of asymmetric counteraction to the detected (predicted) threat

The inability of most countries in modern conditions to fairly compete with the most powerful war machine of globalization (especially the United States) in the current context has recently resulted in an increased number of terrorist acts, armed conflicts and local wars. Combining them into a single antagonistic system produces a phenomenon called asymmetric actions (asymmetric conflicts and asymmetric wars). Asymmetry in inter-state relations reflects their paradoxical nature, when the weaker adversary can seriously affect and even impose its will on the stronger one, and the latter, despite its seemingly obvious advantage, can not always defend their interests and subdue the weaker party. The strategy of the weaker adversary against the stronger one is the essence of asymmetric actions (asymmetric conflicts and local wars).

The specific characteristics of asymmetric actions are [15]:

- unpredictable outcomes of comcat actions with a clear disproportion of forces, means and capabilities of the parties;
- implementing vthe strategy to identify vulnerabilities and use of prohibited means of combat and indirect military actions by the weaker party;
- failure of the stronger party to defend its position or reliably suppress the troops (forces) of the weaker adversary.

To organize asymmetric counteraction it is necessary to solve a number of methodological problems, the main ones being [42-45]:

- identifying *K* vulnerabilities of the enemy;
- dentifying a sufficient level of damage to the enemy Δ_{dlk} in each *k -th*(k = 1, *K)* vulnerable point of asymmetric effect;
- identifying the required (sufficient) potential of asymmetric counteraction A_{tadk} to cause sufficient damage to the enemy at the chosen vulnerable point;

To organize asymmetric counteraction, it is necessary to solve a number of methodological problems, the main ones being [42-45]:

- identifying *K* vulnerabilities of the enemy;
- identifying a sufficient level of damage to the enemy Δdlk in each *k* (k = 1, K) vulnerable point of asymmetric effect;
- identifying the required (sufficient) potential of asymmetric counteraction Atadk to cause sufficient damage to the enemy at the chosen vulnerable point;
- developing the *j-th* (*j* = 1, *J*, where *J* is the number of possible groups of agencies that can ensure the required potential of asymmetric counteraction) group of agencies of defence forces S_{jdk} to build the desired potential for asymmetric counteraction A_{tadk} [46];
- planning and conducting the *l-th* operation (*l* = 1, *L*, where *L* is the number of LSOAC that can be conducted by the weaker party);
- comprehensive resource support of LSOAC;
- information support;

- assessing the effectiveness of LSOAC.

We will focus our attention on forming a group of agencies of defence forces to build a necessary potential for asymmetric counteraction. We will make some assumptions:

- *k-th* vulnerable point of the enemy is chosen;
- a sufficient level of damage to the enemy Δ_{dk} is determined for the chosen *k-th* vulnerable point of the enemy;
- the required (sufficient) potential of asymmetric counteraction A_{tadk} is determined for the chosen *k- th* vulnerable point of the enemy;
- one LSOAC is conducted at the *k-th* vulnerable point of the enemy.

The experience of the armed conflicts of the last decade shows that in order to organize asymmetric counteraction to military threats, the state-victim of the aggression involves SOF, intelligence structures, assault units, etc. In addition, it uses "soft" power (hybrid) tools of information-psychological and military-political influence, military-economic pressure, as well as special actions and measures aimed at forming the "right" public opinion and ensuring support from the local population, etc. The effectiveness of such an asymmetric response of the defence forces to limit the aggressive actions of the aggressor state depends on the capabilities of the agencies involved in asymmetric actions, efficiency in accomplishing the stated tasks by the subjects, their resources and the effectiveness of LSOAC management, etc.

It is natural that the agency for asymmetric actions should be chosen based on the assessment of the party from which the threat is detected or predicted, the scale and nature of this threat, as well as other factors that shape, enhance and destructively affect the significant spheres of the vital activities of the state-victim. Unfortunately, at the moment the DM (manager) chooses the subjects for the asymmetric actions without proper justification, with a high degree of subjectivity. Improving the process of appointing the agencies for asymmetric actions and defining their tasks is difficult due to inadequate methodological apparatus and specialized information technologies for the implementation of this process.

One of the practical steps to solve this problem can be the suggested *method of forming a group of subjects (MFGS) of the defence forces to implement the Concept of asymmetric counteraction to the identified threat (*hereinafter - the method) [46]. The method is to consistently implement certain computational, predictive, comparative, logical and other procedures aimed at obtaining the necessary information about the military threats (MThs) and their characteristics, determining the rational (necessary) level of threat de-escalation ("neutralization shift") in terms of available resources and forming the necessary S_j group of agencies of the defence forces, i.e. a reasonable option of the S_{jdk} group of agencies of the defence forces ,

which provides maximum damage to the enemy in the *k-th* vulnerable point provided there is sufficient resource support.

The block diagram of the method is shown in Fig. 8.6.

The procedures mentioned above can be combined in several stages.

At the first stage monitoring is carried out, during which military and hybrid threats (insecurities and other destructive factors) are identified from those states that are considered to be potentially dangerous. For the identified *z-th* threat, its level $K_z(t)$ is assessed, which is compared with the predicted K_{thred} (t) "probable" (threshold) level, the nature and extent of its impact on other areas of national security [39, 47].

Based on the information received, the decision maker (DM) decides on response to the identified threat.

At the second stage the most likely scenario of the threat realization is developed.

At the third stage vulnerable points $\{k\}$ of asymmetric effect are determined by expert methods.

At the fourth stage a sufficient level of damage to the enemy Δ_{dk} is estimated at each *k- th* (k = 1, K) vulnerable point of asymmetric effect involving an improved hierarchy and model analysis method M7 [28].

At the fifth stage expert methods are used to determine the required (sufficient) potential of asymmetric counteraction A_{tadk} for each chosen *k-th* vulnerable point [45].

At the sixth stage expert methods are used to form J options of groups of agencies of defence forces S_{jdk} for each chosen *k-th* vulnerable point, each option being able to realize the required (sufficient) potential of asymmetric counteraction A_{tadk}.

At the seventh stage the expert methods are used to assess the R_{kj} required resources for each chosen *k-th* vulnerable point and chosen *j-* (j = 1, J) option of the group of agencies of defence forces S_{jdk}.

At the eighth and ninth stages, the assessed resources are compared with those allocated for the conducting the LSOAC in the *k-th* vulnerable point.

At the tenth stage the numerous measures of information support and legending of LSOAC are formed for each chosen *k-th* vulnerable point.

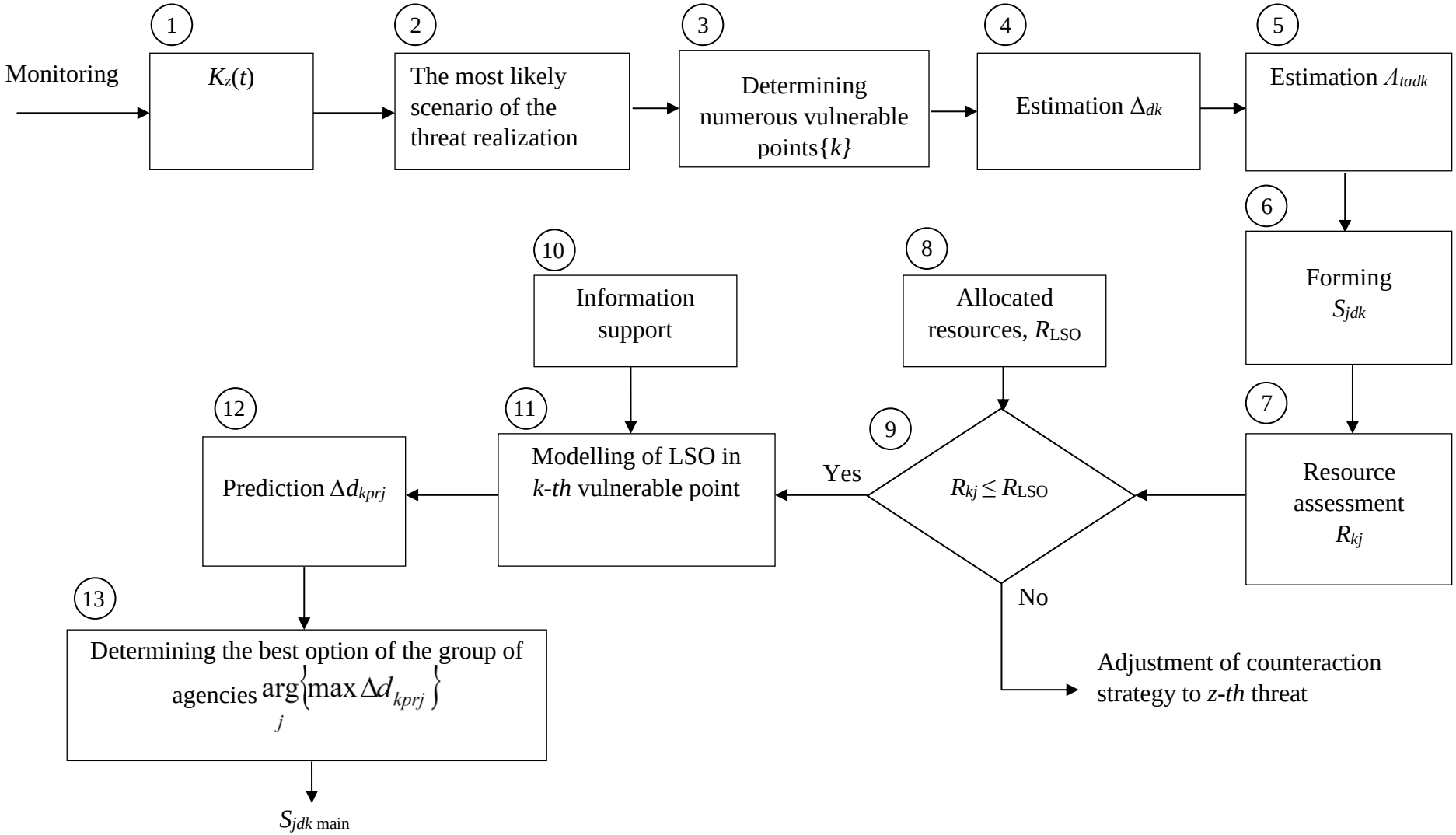


Fig.8.6. Diagram of forming a group of agencies of defence forces to implement the Concept of asymmetric counteraction to the detected threat

At the eleventh and twelfth stages LSO scenario modelling at each chosen *k-th* vulnerable point and prediction of damage done to the enemy by each j (j = 1, J) group of agencies of defence forces (S_{jdk}) are under way using the methods of scenario analysis and model M7 [48].

At the thirteenth stage the search method is used to find that *j-th* option of the group of agencies of defence forces (S_{jdk}), which provides the maximum value of the predicted damage to the enemy Δ_{dkrj} within the allocated resources and which is recommended by the DM as the main option.

Thus, the above method determines the sequence of procedures aimed at choosing the most vulnerable point in order to cause the damage unacceptable militarily for the stronger party by the group of agencies of defence forces, which may be one of the arguments to force the adversary to renounce the use of military force against the victim of aggression.

The method allows damage to the enemy at several vulnerable points. For each vulnerable point an improved hierarchy and model analysis method M7 is used to assess a sufficient level of damage to the enemy, which allows each subject from the formed group to determine its vector of tasks and the required level of their performance so that the predicted level of threat de-escalation would reach the required (sufficient) level.

8.4.2. Methodology of creating a group of defence forces agencies for conducting the operation of asymmetric counteraction to the desired (predicted) threat

The desire to take into account the specifics of asymmetric conflicts was evident in international politics throughout the second half of the twentieth century. First of all, the states tried to modify the strategy of military action taking into account the peculiarities of the struggle against relatively weak opponents.

Such a modified strategy included the development of scenarios of direct military clashes of limited scale, the preparation of the armed forces for combat actions by small contingents of specially trained troops, preventive measures against irregular enemy formations and the use of intelligence and intelligence networks, as well as providing military and material support to groups of their supporters among the local population.

Modern methods of asymmetric wars differ from the conventional classical forms of previous generations of full-scale wars and local armed conflicts by the presence of hidden political goals, the task of sudden, point strikes using new, often unexpected means and forms of violence. The result is a stunning result with unacceptable human casualties and material losses, often accompanied by massive psychological shock. At the same time, there are no usual, clearly defined front lines and visual contacts with the enemy-the “ghost”. Actually, asymmetric wars are

generated by the geopolitical technology of modern international terrorism in the absence of territorial limitations of this strategy, as terrorist acts can be carried out anywhere and at any time.

The method proposed in the previous paragraph to form a group of agencies of the defence forces to implement the idea of the operation of asymmetric counteraction to the identified threat in practice can be implemented using applied techniques.

The method is based on the following assumptions determined by the method [49] strategies of the process [50]:

firstly, selected *k-th* vulnerable point of the enemy;

secondly, for the selected *k-th* vulnerable point, a sufficient level of damage to the enemy Δ_{dk} is determined;

thirdly, the required (sufficient) potential of asymmetric counteraction is determined for the selected *k-th* vulnerable point A_{tadk};

fourthly, in the *k*-th vulnerable point one LSOAC is made.

The essence of the methodology is the consistent implementation of certain computational, forecasting, comparative, logical and other procedures aimed at obtaining the necessary information about the MT and their characteristics, determining the rational (necessary), in terms of attracting available resources, the level of threat de-escalation and for this, the S_j of agencies of the defence forces arg {max (Δ_{dkprj})}, ie the choice of the most rational *j*-th variant of the group of parties (actors) of the defence forces S_{jdk}, which provides maximum damage to the enemy at the *k*-th vulnerable point provided sufficient resources.

Block diagram of the methodologies shown in Fig.8.7 [50].

The following procedures can be combined into several blocks.

In Block No. 1, monitoring is carried out, during which military and hybrid threats (insecurities and other destructive factors) are identified by those states that are considered to be potentially dangerous.

For the identified *z-th* threat, its level $K_z(t)$ is assessed, which is compared with the predicted allowable (threshold) level $K_{\text{thred}}(t)$, nature, degree of impact on other areas of national security [33, 47].

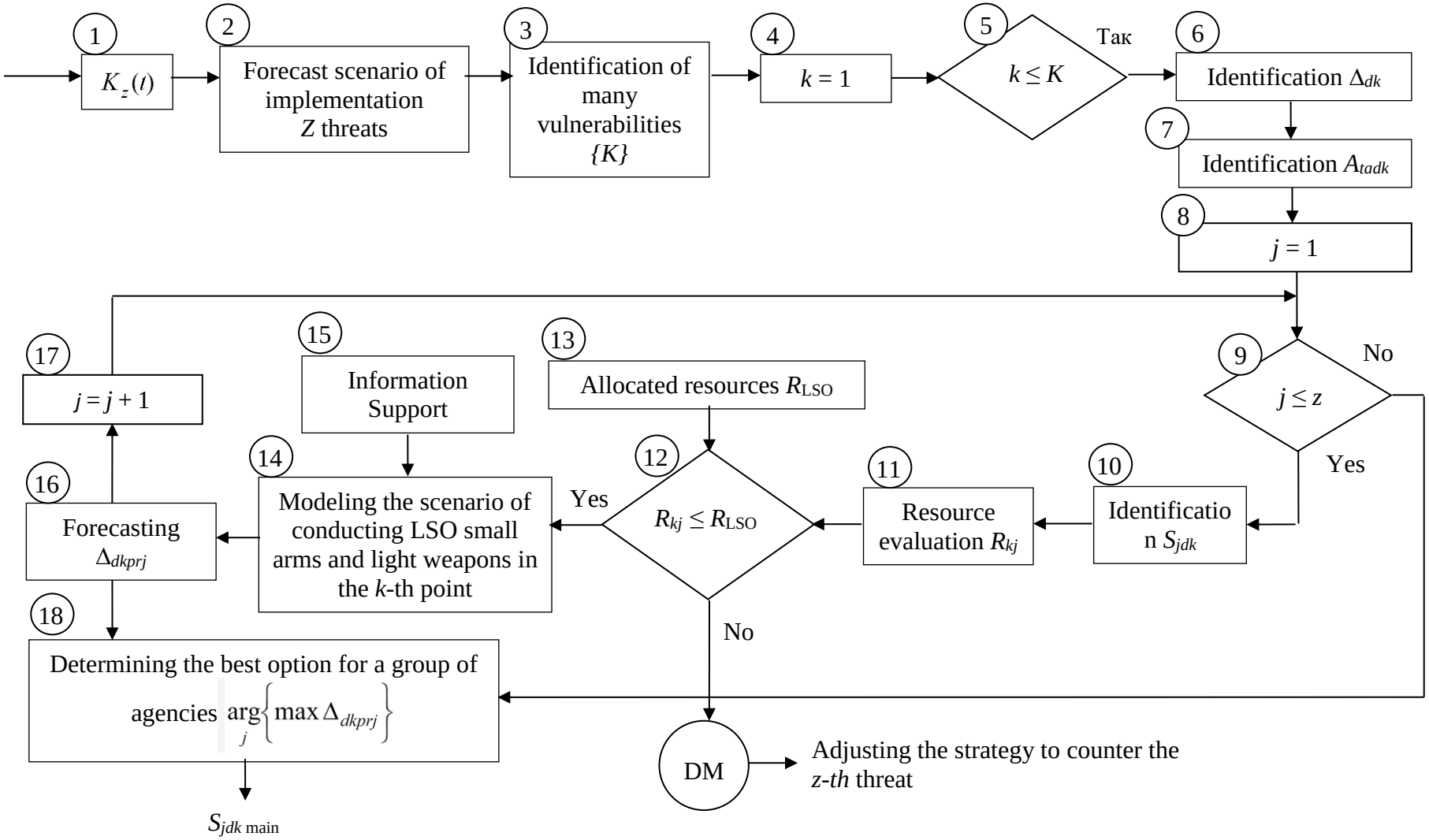


Fig. 8.7. Block diagram of the method of forming a group of agencies of the defence forces for the operation of asymmetric counteraction in the *k-th* vulnerable point of the enemy

Based on the information received, the DM decides to respond to the identified threat.

In Block No. 2 with the involvement of analysts, forecasters develop the most likely scenario of the threat.

In Block No. 3 the set of possible vulnerable points *{k}* of asymmetric influence is determined by expert methods.

In Block No. 4 choose to consider $k = 1$ vulnerability.

In Block No. 5 the program logical procedure of viewing of all set of the selected vulnerable points is carried out.

In Block No. 6 for each *k-th* ($k = 1, K$) vulnerable point of asymmetric impact experts using the model M7 [48] determine a sufficient level of damage to the enemy Δ_{dk} in various spheres of his life, which is the input value to determine in Block No. 7 required (sufficient) potential of asymmetric counteraction A_{tadk}. A_{tadk} is determined by the method of brainstorming by forming J possible groups of agencies of the defence forces (both military and non-military), which, according to experts, can cause the enemy a sufficient level of damage Δ_{dk} in various spheres of life of the state, initiating the use of military force.

The Blocks No. 8, 9 and No. 17 implement logical and comparative program procedures for reviewing the variants of groups of agencies formed in Block No. 7.

In Block No. 10 the *j*-th variant of the group of parties (actors) S_{jdk} using the method of Ishikawa is presented in more detail in the directions of possible asymmetric influence in those spheres of life of the state, which choose to inflict unacceptable damage to the enemy [51].

In Block No. 11 for the selected *k-th* vulnerability and the selected *j-th* ($j = 1, J$) variant of the S_{jdk} group of agencies of the defence forces expert methods estimate the required resources R_{kj}.

In Blocks No. 12 and No.13 the assessed resources are compared with those allocated for carrying out in the *k-th* vulnerable point of LSOAC. If resources are insufficient, proposals are prepared to adjust the strategy to counter the *z-th* threat.

In Block No. 15 for each selected *k-th* vulnerability is formed a set of measures of information support and legending the LSO.

In Blocks No.14 and No. 16 using the methods of scenario analysis [52] and model M7 [48] the simulation of the scenario of LSO at each selected *k-th* vulnerability and prediction of each *j-th* ($j = 1, J$) S_{jdk} group of agencies of the defence forces damage the enemy $\Delta_{dkprj.}$.

In Block No.17 the transition to the ($j + 1$)-th group of agencies for computational and logical procedures is performed programmatically.

The Block No.18 solves the optimization problem of finding the best option for a $S_{\mathrm{jdkm}ain}$ group of agencies, which provides the maximum value of the expected level of damage to the enemy Δ_{dk} in various spheres of his life.

Thus, the above methodology determines the sequence of performing procedures aimed at choosing a damage that is rational from the point of view of the task of a group of agencies of the defence forces, unacceptable for a militarily strong enemy, can be one of the arguments for forcing the enemy to refuse to employ the military force against the victim of aggression. The technique ensures the formation of group of agencies to inflict maximum damage on the enemy in several vulnerable points. For each vulnerable point, using the improved method of hierarchy analysis and the M7 model, for each of the subjects of the formed group, further, according to technology [32], its own vector of tasks and the required level of their implementation are determined so that the predicted level of threat de-escalation reaches a certain level.

8.5. Method and methodology for assessing the effectiveness of asymmetric counteraction in the interests of ensuring a sufficient level of military security of the state

In the domestic and foreign literature analyzed by the authors, there is no scientific and methodological apparatus for assessing and forecasting the anticipated effectiveness of asymmetric counteraction. The authors propose to assess the effectiveness of countering the aggression of a state, which significantly exceeds the target state in terms of military "strength", by the total level of de-escalation of threat achieved at a certain point in time due to symmetric (direct military) and asymmetric (complex) counteraction to aggression carried out in the form of LSO [5, 50].

8.5.1. Method for assessing the effectiveness of asymmetric counteraction in the interests of ensuring the sufficient level of military security of the state

Given the changes in the modern security environment [6], Ukraine is carrying out a strategic revision of the concept of defence, considering the experience of overcoming the current crisis, the introduction of new methods of defence management, based on Euro-Atlantic experience of achievign "high efficiency at reasonable cost". At the same time, it is envisaged to create an effective mechanism for the formation and realization of the state policy on ensuring MS, carrying out military-political, administrative and direct military management of the defence forces. The priority is to create an effective system of management of the security and defence sector of the state.

The updated concept of defence envisages the introduction of new methods of defence management [6], which are based on the Euro-Atlantic experience.

Acceptable costs are considered mainly by developed democracies, in which civil society is the main socio-political force that determines the domestic and foreign policy of these countries, including in the military sphere, and exercises civilian control over the power. Military way of addressing foreign policy problems is unacceptable for civil society, if the fighting involves significant losses of its citizens. Using military force in situations that do not threaten the existence of the state becomes more difficult as civil society strengthens. Developed democracies pay great attention to the level of allowable personnel losses when solving foreign policy problems by military means.

The experience of military conflicts of various scales over the last decade shows that the level of acceptable losses is dozens of lives, and is becoming one of the key factors in the denial of use of military force [53]. For example, the United States, when planning the use of military force, determines the level of acceptabke loss of personnel for its armed forces in the range of 0.5 - 1 percent. For the state – terget of aggression, the loss of personnel, population, infrastructure, etc. is much bigger in such a conflict. The experience of some unequal wars shows that a country which is much weaker militarily, by carrying out asymmetric countermeasures, can inflict unacceptable damage on the enemy, including in non-military security spheres, and compel the stronger enemy to refuse from using military force against it.

Block diagram of the Method is shown in Fig. 8.8 [5].

The asymmetric measures are carried out by specially trained agencies, or their assigned forces, usually in the form of LSO. The number of LSOs depends on the resources and capabilities of the state-target of the aggression and the enemy.

The accompanying tasks can be:

- maximum reduction of the anticipated destructive effects of threats on the significant spheres of national security of the state which is the target of aggression;
- prevention of violation of socio-political stability within the state;
- discrediting the state which is the source of HA in the eyes of international community, etc.

The conceptual bases for forecasting the anticipated effectiveness of countering the aggression of a state with stronger military power are specified in Chapter 7 (see Section 7.5, Fig. 7.7).

The effectiveness of asymmetric counteraction to aggression in general can be assessed as the result of total reduction in the level of threat in LSOs conducted.

$$E_{ac}(t) = \sum_{i=1}^{I} \Delta K_{ac_i} \left(t_{з_i}, R_{rec\ \ i}, M_{persc_i}, M_{AME}\ \right).$$

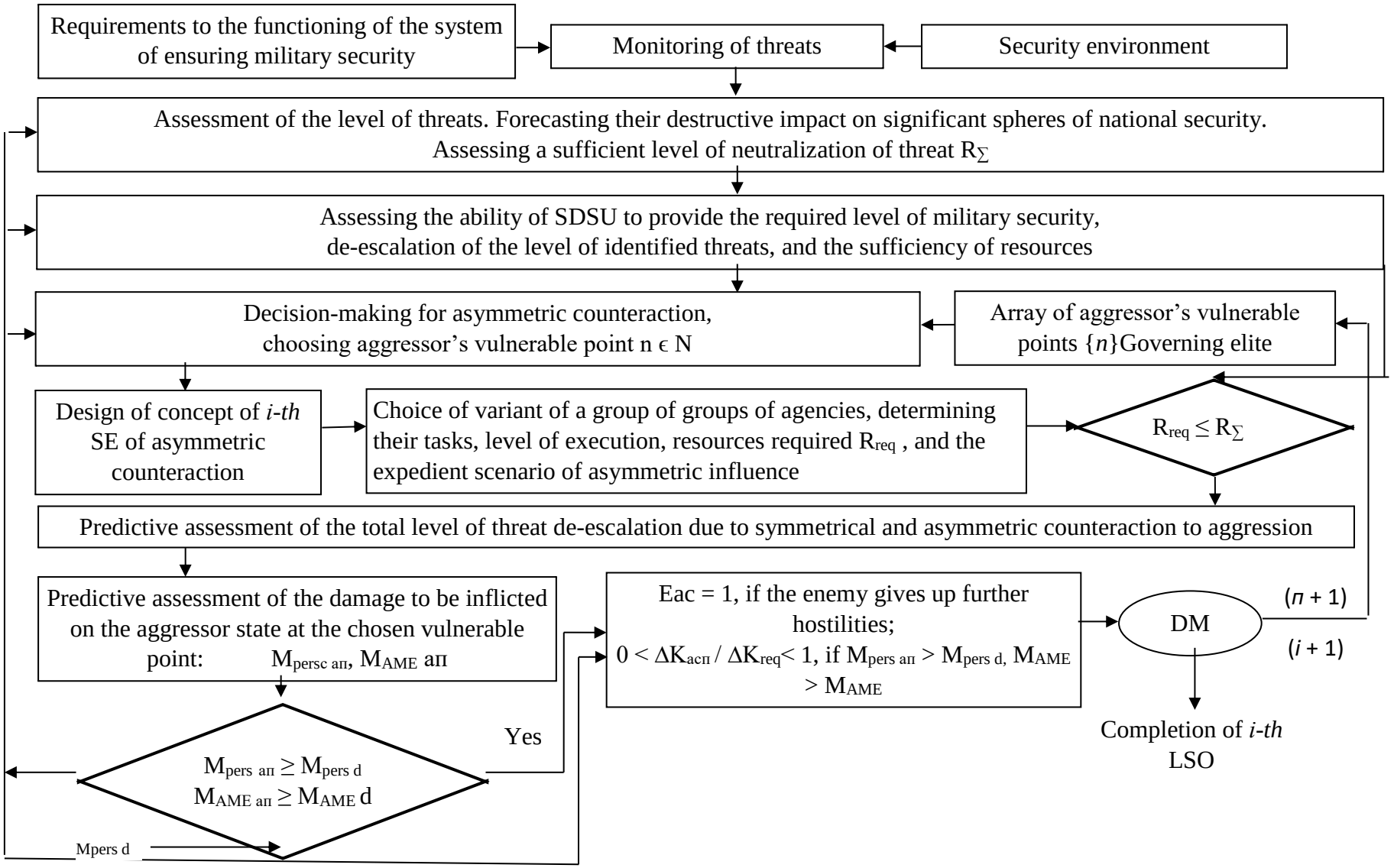


Fig. 8.8. Block-chart of the method of assessing the effectiveness of asymmetric counteraction conducted by defence forces

The criterion for the decision of the aggressor state to refrain from further aggressive actions is the fulfillment of at least one of the conditions:

$$E_{в.аг}(t_{аг.з}) \leq K_{аг.п}(t_{аг.з});$$

$$M_{pers.аг}(t_{аг.з}) \geq M_{pers.аг.доп},$$

where
$K_{аг.п}(t_{аг.з})$ – threshold level of threat posed to aggression target state by the aggression which was started against it;
$M_{pers.аг}(t_{аг.з})$ – losses among aggressor state's personnel involved in the aggression, including militants, mercenaries, etc;
$M_{persаг.доп}$ – losses of personnel, acceptable to aggressor state.

Thus, the developed method of assessing the effectiveness of asymmetric counteraction LSO made it possible to synthesize a model for evaluating the effectiveness of asymmetric counteraction to threats to military security of the state in terms of total threat reduction in the course of LSO, as well as to form a system of restrictions and criteria for the aggressor state's aggressive actions. An appropriate technique is proposed for the practical implementation of the method.

8.5.2. Methodology for assessing the effectiveness of asymmetric counteractionin the interests of ensuring a sufficient level of military security of the state

Successful counteraction to forceful pressure and the use of military force against a state that opposes a militarily stronger adversary requires a quantitative assessment and prediction of the effectiveness of the asymmetric use of military and non-military forces and means. The particular urgency of this problem is determined by the events in the Middle East in early 2020. To solve these problems, a method of assessing the effectiveness of asymmetric counteraction to modern threats to military security of the state is proposed. Its block diagram of is shown in Fig. 8.9 [50].

The essence of the methodology is to consistently perform certain procedures for analyzing the security environment, monitoring, assessing the level and nature of military or hybrid threats, determining the necessary resources, time and level of de-escalation (reduction) of the threat, and select the required array of defence forces and their required capabilities to form the potential of asymmetric counteraction.

At the *first* stage, the analysis of the security environment is carried out for the origin or existence of dangerous phenomena, potential and real threats to national interests, in which the state implements its national security policy [27].

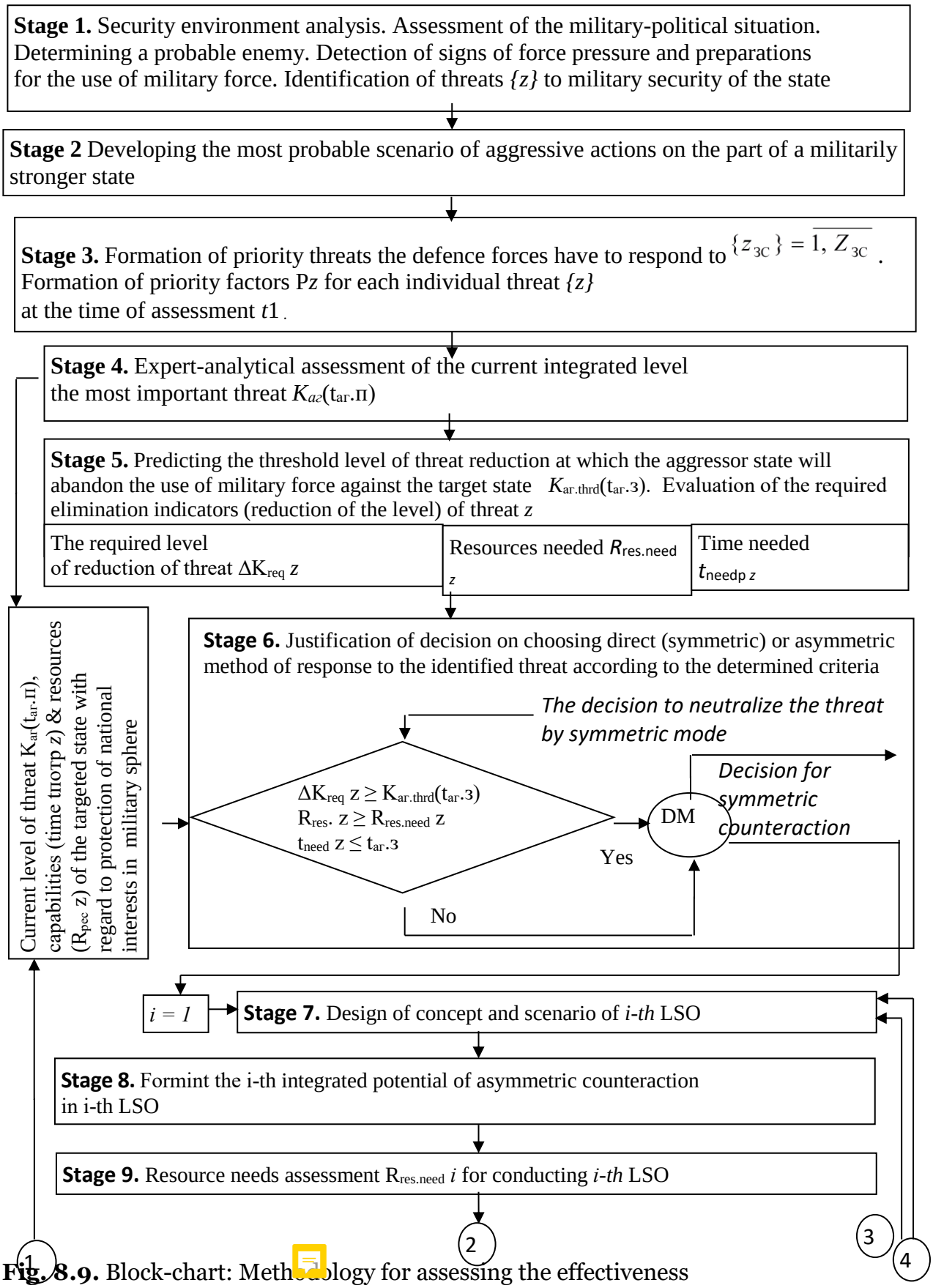
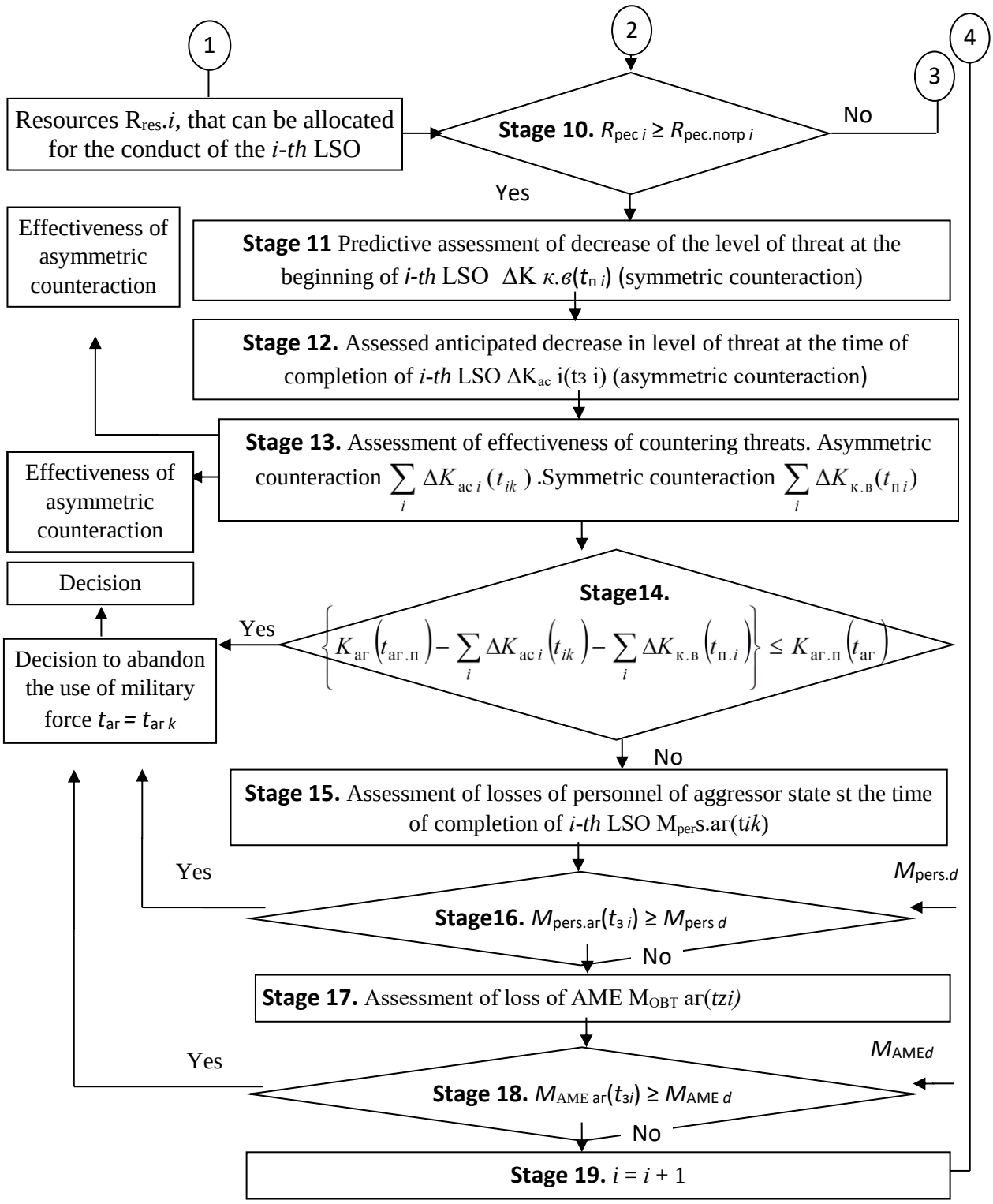


Fig. 8.9. Block-chart: Methodology for assessing the effectiveness of asymmetric counteraction to threats to military security of the state


1
2
3
4
Resources Rres.i, that can be allocated for the conduct of the i-th LSO
Stage 10. Рес i ≥ Рес.потр i
No
Yes
Effectiveness of asymmetric counteraction
Stage 11 Predictive assessment of decrease of the level of threat at the beginning of i-th LSO ΔK к.в(tп i) (symmetric counteraction)
Stage 12. Assessed anticipated decrease in level of threat at the time of completion of i-th LSO ΔKac i(tз i) (asymmetric counteraction)
Stage 13. Assessment of effectiveness of countering threats. Asymmetric counteraction ∑ ΔKac i (tik) .Symmetric counteraction ∑ ΔKк.в(tп i)
Effectiveness of asymmetric counteraction
Decision
Stage14.
Yes
Decision to abandon the use of military force tar = tar k
No
Stage 15. Assessment of losses of personnel of aggressor state st the time of completion of i-th LSO Mpers.ar(tik)
Yes
Mpers.d
Stage16. Mpers.ar(tз i) ≥ Mpers d
No
Stage 17. Assessment of loss of AME MОВТ ar(tzi)
Yes
MAMEd
Stage 18. MAME ar(tзi) ≥ MAME d
No
Stage 19. i = i + 1

MPS at the time t_1 is assessed. Monitoring of threats is carried out, which includes the detection of threats (dangers and other destructive factors) of military of hybrid origin on the part of states that are considered as potentially dangerous from military standpoint (Fig. 8.10).

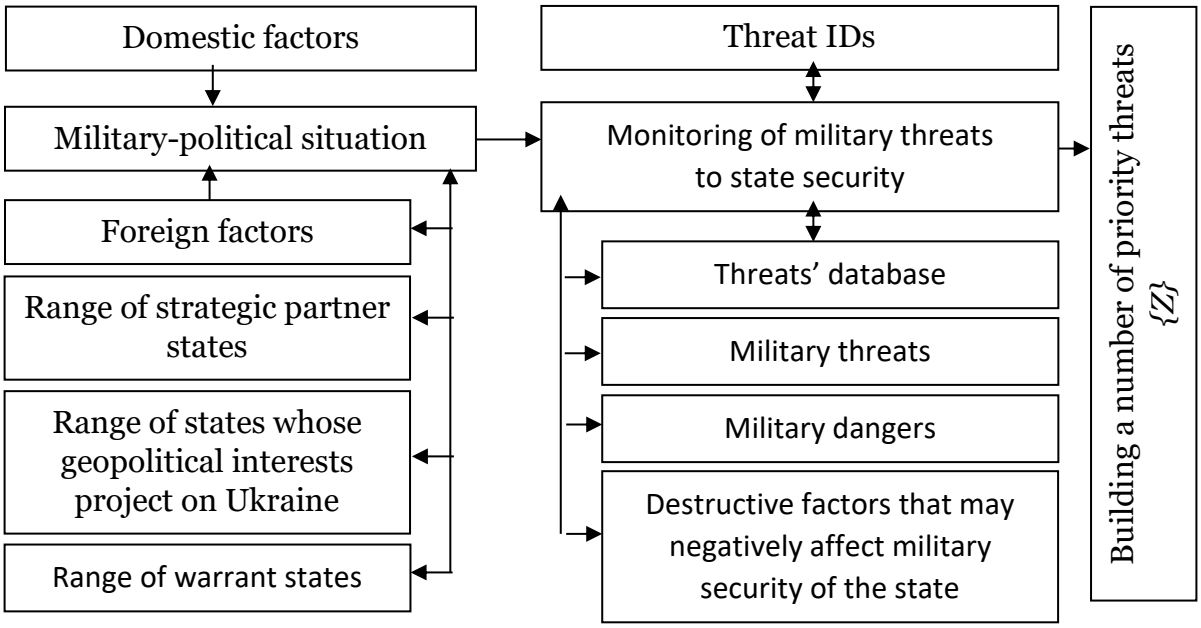


Fig. 8.10. Generalized scheme for monitoring threats to military security of the state

The result of monitoring is a range $\{z\} = \overline{1, Z}$ of threats of military or hybrid nature, which can significantly affect the military security of the state (the main methods of identifying threats are methods of comparison and expert assessment).

At the second stage, experts build the most probable scenario of aggressive actions by a militarily stronger state. Aggressive actions should be expected simultaneously in the military, information, diplomatic, political, humanitarian and other spheres. The description of the scenario should be detailed to a degree that enables forming a systemic model of the threat to the state in the military sphere and to assess its level using the M7 model [28].

At the third stage, the method of expert assessment is applied to determine a number of priority threats to the military security of the state, neutralizing (elimination) of which requires the involvement of the armed forces $\{z_{3C}\} = \overline{1, Z_{3C}}$ .First, the most important threat is considered. Using the Ishikawa's method [35], experts decompose the threat to military security of the state and determine the priority factors Pz (Fig. 8.11), which form this threat at the time of assessment. This stage is a key one for further arrangement of counteracting the Z threat, as the accuracy of forecasting the level of military threat and the completeness of the factors that shape

it will determine the effectiveness of all subsequent actions aimed at neutralizing this threat [45] (identification of factors that shape the threat is carried out by the Isikawa's method and the expert method, and the level assessment - by using the improved method of analysis of hierarchies and the M7 model [28]).

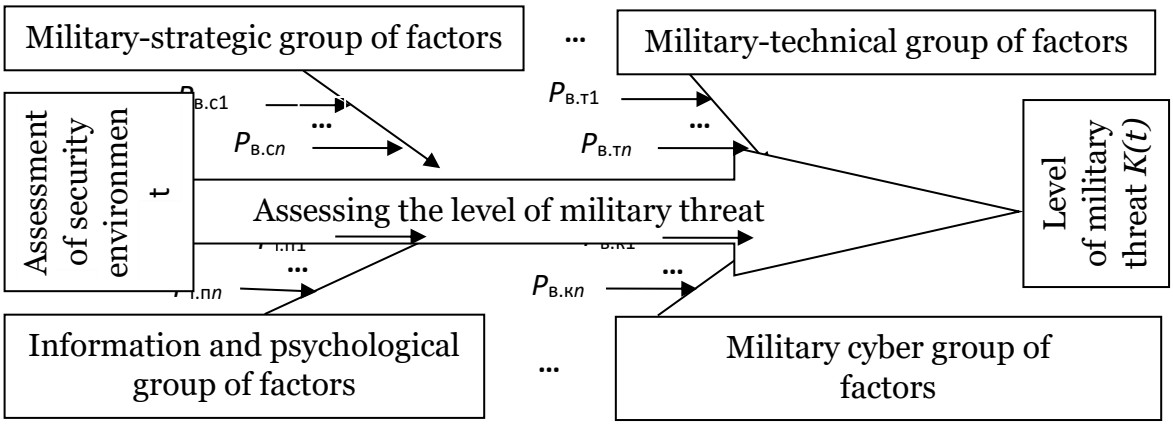


Fig. 8.11. Example of decomposition of threats to military security of the state using the Ishikawa's method

At *the fourth stage*, with the help of an improved MAI and using a computer model M7, an expert-analytical assessment of the current level $K_{req.z}(t_1)$ of the identified *z* threat (Fig. 8.12) is carried out.

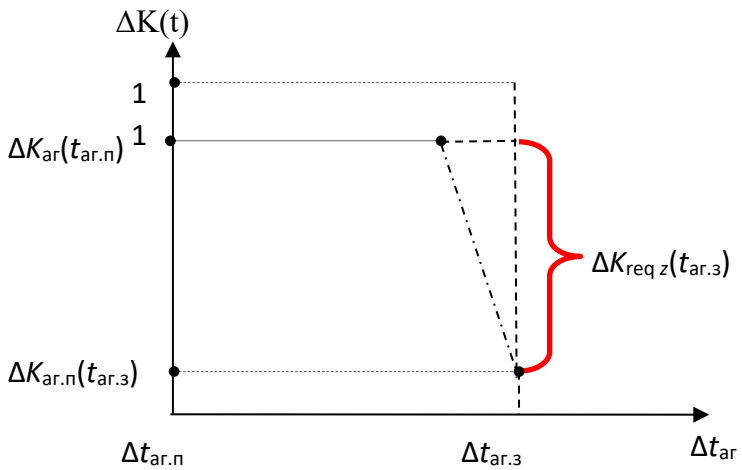


Fig. 8.12. Hypothetical example of the formation of the desired level of threat reduction *z* $\Delta K_{req\,z}(t_{ar.з})$ at the forecast time $t_{ar.з}$: $\Delta K_{ar.п}(t_{ar.з})$ – *z* (determined in the system of military security for each threat by a separate method); $\Delta K_{ar}(t_{ar.п})$ – currentllevel of military threat *z* at the time of assessment $t_{ar.п}$

A feature of the M7 model is that it can operate on qualitative and quantitative indicators simultaneously, as well as operate on the nine factors that form threats, for each of which to analyze 9 - 13 indicators. The level of threat $K_{z(t)}$ is estimated by the formula

$$K_z(t) = \frac{\sum_{i=1}^{I}\sum_{j=1}^{J} L_i\, P_{\text{ij}}}{\sum_{i=1}^{I}\sum_{j=1}^{J} max\left(L_i P_{\text{ij}}\right)},$$

where *Li* – is the priority value of the *i-th* (*i* = 1, *I*) factor that affects the level of threat;

P_{ij} – the value of the priority of the *j-th* (*j* = 1, *J*) indicator of the *i-th* influencing factor ,which affects the level of threat.

At *the fifth stage*, with the use of an improved MAI and the M7 model, expert-analytical forecasting of the threshold level of threat reduction is carried out, at which the aggressor state will refuse to use military force against the target state.

The method of expert assessments is used to assess the necessary indicators for the elimination (reduction) of the *z-th* threat, namely:

- the required level of threat reduction $\Delta K_{\text{req.}z}$ as the difference between the current $K_{\text{ar}}(t_{\text{ar.п}})$ and the threshold $K_{\text{ar.п}}(t_{\text{ar.з}})$ threat levels, ie $\Delta K_{\text{ar}}(t_{\text{ar.з}}) = K_{\text{ar}}(t_{\text{ar.п}}) - K_{\text{ar.п}}(t_{\text{ar.з}})$, $\Delta K_{\text{req.}z}(t_1) = \Delta K_{\text{thr.}z}(T_{\text{пр}})$. An example of forming the desired level of decrease $\Delta K_{\text{ar.п}}(t_{\text{ar.з}})$ of threat at the time of forecasting я $t_{\text{ar.п}}$ is shown in Fig. 8.11;
- assessment of the required resources $R_{\text{res } reqz}$ to achieve the required level of threat reduction;
- required time $t_{\text{req } z}$ to achieve the desired level of threat reduction.

At the *sixth* stage the decision on a choice of direct (symmetrical) or asymmetric way of reaction to the revealed threat by criteria is substantiated:

- achieving the required level of threat reduction $\Delta K_{\text{req } z} \geq K_{\text{ar.п } z}(t_{\text{ar.п}})$;
- achieving the required level of threat reduction ΔKreqp z ≥ Kar.п z(tar.п);
- allocated (available) resources $R_{\text{res.}z} \geq R_{\text{res req.}z}$;
- time limit $t_{\text{req.}z} \leq t_{\text{ar.з}}$.

If these conditions are met, then a decision can be made to neutralize the threat by a direct (symmetrical) method; if at least one of the conditions is not met, it is advisable to decide on additional asymmetric counteraction.

At the *seventh* stage, after the decision to neutralize the threat by the asymmetric method is taken, experts develop a draft concept (proposal) and a scenario of conducting the *i-th* LSO with the involvement of entities of the Armed Forces of Ukraine to isolate the identified threat, with the determination of the share of each entity in the formation of the *i*-th integrated potential of asymmetric counteraction.

The main strategies reflected in the concept of LSO are discussed in detail in Chapter 7 (see paragraph 7.7).

At the *eighth* stage, experts form an integrated potential of asymmetric counteraction from the composition of the defence forces in the *i-th* LSO. The formed integrated potential of asymmetric counteraction consists of the selected $\{V_{kz}\}$ (k = 1, K) variant of groups of agencies J (Fig. 8.13), where K is the number of variants of groups of entities. For each proposed variant Vk, the resource requirements $R_{\text{res}.vkz}$ and the required time t_{vkz} for obtaining the required level of threat de-escalation $\Delta K_{\text{req } z}$ are substantiated.

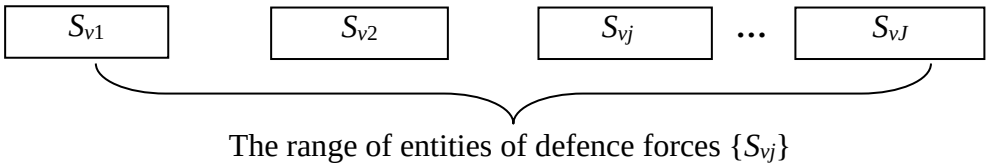


Fig. 8.13. Defence agencies that may be involved in the formation of integrated potential of asymmetric counteraction

The variety of options in forming the group of entities of defence forces for neutralization of threat is available due to different capabilities of the components of the defence forces, the complexity of tasks, the availability of various resources, possible (required) time intervals to perform the tasks, etc.

At the *ninth* stage, the possibility of accomplishing the tasks of neutralizing the threat by the formed potential of asymmetric response is carried out by means of expert assessment, considering the resources required for neutralization of the threat $R_{\text{res req } I}$ and the resources available to neutralize the threat $R_{\text{resc } i}$.

At the *tenth* stage, if the condition $R_{\text{res } i} \geq R_{\text{res req } i}$ is not met, a new iteration is performed at the seventh stage.

Carried out at the *eleventh* stage by the improved method of analysis of hierarchies and the M7 model, is a predictive assessment of threat level reduction at the beginning of the i-th LSO $\Delta K_{\text{к.в}}(t_{\text{п } i})$ due to military and non-military forces and means of the state-target of aggression (symmetric counteraction).

At the *twelfth* stage, by using the advanced method of analysis of hierarchies and the M7 model, a predictive assessment of the threat reduction at the time of completion of the *i-th* LSO $\Delta K_{\text{ac } i}(t_{\text{з } i})$ is carried out due to asymmetric counteraction by the defence forces of the target state.

Given the above, the forecasted effectiveness (efficiency) of counteracting the aggression of the state, which significantly exceeds the target state in the military "power" $E_{\text{в.а}}(t)$,), can be estimated by the total level of de-escalation of the threat at t time due to symmetric (direct military) and asymmetric (comprehensive) counteraction to aggression (see Fig. 8.8).

At the *thirteenth* stage, using the improved method of analysis of hierarchies and the M7 model, evaluate the effectiveness of countering threats:

- asymmetric counteraction; $\sum_i \Delta K_{\text{ac } i}(t_{ik})$;
- symmetric counteraction. $\sum_i \Delta K_{\text{кв}}(t_{\text{п } i})$.

At the *fourteenth* stage, the possibilities that the aggressor state will abandon further aggressive actions are assessed by the criterion

$$\sum_i \Delta K_{ac\ i}(t_{\text{ik}})\left\{K_{аг}(t_{аг.n}) - \sum_i \Delta K_{ac\ i}(t_{\text{ik}}) - \sum_i \Delta K_{кв}(t_{ni})\right\} \leq K_{аг.n}(t_{аг.з}).$$

At the *fifteenth* stage, experts estimate the losses of the aggressor state's personnel at the time of completion of the *i*-th LSO $M_{\text{pers.ar}}(t_{зi})$ (for example, using data from the Main Intelligence Directorate of the Ministry of Defence of Ukraine).

At the *sixteenth* stage, assess the possibility of refusal of the aggressor state from further aggressive action by the criterion

$$M_{\text{pers.ar}}(t_{зi}) \geq M_{\text{pers.}d}.$$

At the *seventeenth* stage, experts estimate the losses of weapons of the aggressor state at the time of completion of the *i*-th LSO $M_{\text{AMQ.ar}}(t_{зi})$ (for example, using data from the Central Intelligence Agency of the Armed Forces of Ukraine).

At the *eighteenth* stage, the possibility of refusal of the aggressor state from further aggressive action is evaluated by the criterion

$$M_{\text{AME.ar}}(t_{зi}) \geq M_{\text{AME}d}.$$

At the *nineteenth* stage, if one of the conditions in the *thirteenth*, *fifteenth* and *seventeenth* stages is not met, a new LSO is prepared and conducted.

The methodology is proposed for use by top military and political leadership of the state with the involvement of forecasters, analysts and experts.

Aggression against the target state can be stopped under other conditions, for example, by a decision of the UN Security Council, in response to the ultimatum of the coalition of states, and so on.

Thus, the developed method of predictive assessment of the effectiveness of asymmetric response of the Armed Forces of Ukraine to threats in the military sphere allows to form the integrated potential of the defence forces, the practical implementation of which in the form of LSO in certain “pain points” of the aggressor state including in non-military security.

The methodology provides a predictive assessment of the effectiveness of countering the aggression of the state, which significantly exceeds the target state in terms of military “power”, the integrated indicator “total level of de-escalation of the threat” at a given time due to symmetric (direct military) and asymmetric (complex) counteraction to aggression. The number of local special operations is

determined by the capabilities of the target state of aggression. The system of restrictions is formed and criteria of decision-making by the aggressor state on the denial of further aggressive actions are defined. The main limitations of the state, which carries out offensive actions, are the loss of personnel, AME of its armed formations.

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RECOMMENDATIONS FOR INCREASING THE EFFECTIVENESS OF DE-ESCALATION OF THREATS TO THE MILITARY SECURITY OF UKRAINE BY ASYMMETRIC ACTIONS OF THE SECURITY AND DEFENCE SECTOR OF UKRAINE

9.1. Recommendations for the selection of vulnerabilities of the aggressor state to inflict unacceptable damage

The main task of MS of Ukraine is to develop a deterrence potential. The main priority is to increase capabilities of the Armed Forces of Ukraine, which, combined with the capabilities of other agencies of the security and defence sector of Ukraine, can inflict unacceptable damage for the enemy on land, in the air, at sea and in cyberspace [1]. One of the ways to increase capabilities of the Armed Forces of Ukraine, as defined in the National Security Strategy, is to strengthen the interaction among all entities of security and defence sector to carry out common tasks. Similarly, the joint implementation of tasks in confronting hybrid threats makes it necessary to determine the most vulnerable points of an aggressor state, the joint impact on which will make it impossible to implement aggressive intentions.

These factors characterize the necessity to develop recommendations for determining aggressor's vulnerabilities. This will help to define tasks for SDSU agencies in case of joint application and creation of an integrated potential of asymmetric counteraction to the aggressor country, introduction of which will contribute to ensuring timely and adequate response to challenges and threats to national security in the various areas.

According to the publication [2] the term "hybrid aggression" absorbed the complex nature of 21st century war, involved many actors, blurred differences between conventional types of armed conflicts and even between the terms of war and peace. Hybrid aggression inwardly combines the aggressor's use of conventional and irregular means at the same time, but according to a single thought; is asymmetrical in nature. At first glance, the individual agencies, that make up the military, economic and information potential of the aggressor state, act independently and achieve the objectives in accordance with the declared general political goals. This deprives the state, the victim of aggression, of having clear defence strategy, since in the process of application by the aggressor state of destructive influence means constantly changes the areas in which threats are formed. As a result of such a strategy, the state, the victim of hybrid aggression, is not able to determine where the "front line" should be installed and what tools should be used primarily to organize adequate counteraction. The absence of the possibility

to detect promptly connection between hybrid means and their organizational hierarchical structure characterizes the hybridity of threats of the aggressor state [2, 3]. Thus, if the aggressor acts covertly according to the previously developed plan and step-by-step algorithm for the employing forces and means belonging to different spheres of national security, the state against which such hybrid actions are unleashed can answer only with spontaneous, reflexive actions of the SDSU agencies, without realizing a full scope of aggressor state's strategy and tactics. [4–6].

In accordance with the Concept of asymmetric counteraction to an aggressor state to neutralize its influence on the significant spheres of national security of Ukraine [7], identifying enemy's vulnerabilities for inflicting damages by asymmetric actions is an element of assessing the situation (with respect to the enemy) during the determination of a plan of SO of asymmetric counteraction to the aggressor country.

Critical points of the enemy are objects, systems and resources (or their totality in certain areas), which, under destructive influence, are significantly limited to continue aggressive actions and create favorable conditions for neutralizing the threat in the areas to which they are posed. These vulnerabilities may include:

- entities of military, economic, informational and moral and psychological potential of the aggressor state and its armed forces;
- security of critical infrastructure facilities;
- survivability of reconnaissance, control, fire damage systems;
- security of life support systems of the enemy's MFs, its law enforcement agencies, especially for special purposes;
- security of its critical information infrastructure;
- international image of the state and political leaders, etc.

During the SO, which is a form of achieving a strategic goal to counter the detected military or other threats, together with classical parameters (indicators) of the enemy's assessment (combat capabilities of troops, readiness of the army command and control system, combat experience, moral and psychological state, etc.), at the stage of concept development, specific indicators (parameters) that characterize the corresponding potential of the aggressor state are determined. These indicators include [7]:

- number of personnel involved in the aggression;
- number of reserves;
- ratio of military potentials;
- acceptable damage of enemy's AME, because of which he refuses aggression;
- acceptable damage of enemy's personnel, because of which he refuses further hostilities;
- estimated integral level of threat;

- predictive risks of destructive influence on significant spheres of national security, as well as the most vulnerable points of the enemy, the impact of which achieves the desired level of de-escalation of the detected threat.

Critical infrastructure in the publication [8] is defined as objects, systems and resources (physical or virtual, which provide functions and services), dysfunction of which will lead to the most serious and negative consequences for the life of society, socio-economic development of the country and national security ensuring. Vulnerable points are a category to which objects and systems or resources of the aggressor state, that do not belong to critical infrastructure, can be also counted. Objects, systems and resources can be considered as enemy's vulnerable points are due to the purpose and objectives of a certain special operation (local special operation) of asymmetric counteraction to the aggressor state, determined taking into account the results of the analysis of the factors that form the threat and their focus on. At the same time, the spheres (political, economic, social, military, etc.), in which these destructive factors are manifested the most, are determined. Particular attention is paid to own objects, resources and systems, which the enemy influences with information of a destructive nature. It is the content and scale of the enemy's information influence that indicates the sphere of national security to which it directs the main efforts in hybrid actions.

Influence on the enemy's vulnerable points means all possible arsenal of measures (demoralization, isolation, demage, destruction, suppression, violation, capture, defeat, blocking, initiation of negotiations, etc.), which is available to inflict maximum damage to objects, the operation of which provides achieving the goal of aggressive actions or their neutralization (initiating and conducting negotiations, appealing to international courts and organizations, etc.). For example, violation of the security of enemy's critical information infrastructure through the targeted use of information and communication technologies against certain objects of its critical infrastructure.

To decide on adequate counteraction to the aggressive actions of a militarily and economically stronger state and to develop an SO (LSO) plan, it is required sufficient, timely and reliable information about the real state, number and importance of enemy agencies that need to be neutralized (influenced) by forces and means of integrated potential of asymmetric counteraction (IPAC) [9].

Measures to influence enemy's vulnerabilities in accordance with SO plan, can be carried out openly, covertly or in a combined way. Regardless of the results, any measures are actions to counter the state, which posed a threat (military, hybrid, information, economic or other) in the interests of its own national security. For example, the use of asymmetric measures in the economic sphere (in 2014-2015, the National Bank of Ukraine neutralized panic and speculative attacks in the foreign exchange market and Russia's use of bank subsidiaries in Ukraine as instruments of hybrid warfare) allowed to stabilize the national financial system, radically weaken

the role of the Russian banks in the state and prevent Russia from achieving its goals in this area.

Each threat needs its own system of counteraction with the corresponding defined critical points of the enemy, to which it is expedient to direct the measures of influence of the respective agencies of integrated potential of symmetrical or asymmetrical counteraction. Measures of asymmetric influence are usually planned for a militarily and economically stronger enemy.

In general, it can be noted that the need to select vulnerabilities of an aggressor state to inflict unacceptable damage to it is due to the following:

- counteraction to the military threats and especially hybrid ones is a complex process due to the large number of heterogeneous factors that form threats, and the difficulty of forecasting changes in the intensity of their action;
- information on enemy vulnerabilities is a separate element of situation assessment – the most enemy's vulnerable points to implicit damage by asymmetric actions and their characteristics, as well as the initial data for IPAC formation based on the model of iterative formation of asymmetric countermeasures [7];
- there is a need for a rational distribution of IPAC agencies by enemy objects belonging to different areas, and the preparation of options for their distribution taking into account resource constraints;
- data on the enemy's vulnerabilities are factors and parameters that need to be taken into account when designing an operation, and need to be constantly updated both during and after its implementation.

The vulnerability of the aggressor country will usually be identified in the face of uncertainties of various kinds, mostly subjective chance. Subjective chance is characteristic of the process of preparation and design of the operation, when there is a system of advantages of DM and as an expert in a particular field of knowledge determines the probability of some unique events on his subjective principles, because only one can take a decision [10].

Enemy's vulnerable points, functioning of which ensures or contributes to the achievement of the goal of enemy's aggressive actions, require timely determination of importance (priority). The need to determine their importance (priority) is attributable to the following [9]:

- diversity of objects, systems and resources that are included in the list of enemy's vulnerabilities in a particular SO (LSO) and their potential capabilities to generate a threat in a particular area (the functioning of which most affects the outcome of aggressive actions);
- need to form an appropriate composition of the integrated potential of asymmetric counteraction in SO (LSO) depending on the sphere (spheres) in which the enemy focuses its main efforts to achieve the goal of aggressive action;

- ensuring the rational (appropriate) distribution of IPAC forces and means by enemy objects, systems and resources, i.e. determining the priority of impact on the enemy's vulnerabilities during the implementation of SO (LSO) plan;
- taking into account resource constraints when planning measures of influence (counteraction) to the aggressor state;
- achieving the goal of SO (LSO) – rationally using available resources, to inflict such damage to the enemy that he will be forced to abandon further aggressive actions.

The need to determine the importance of the enemy's vulnerabilities is also due to the fact that the expected effectiveness of countering the aggressor state, which significantly exceeds the target state in military "power", according to the scientific work [7], is assessed by the total level of threat de-escalation at the time due to the implementation of a system of asymmetric measures of IPAP subjects influence on enemy's vulnerabilities.

First of all, it is necessary to determine the importance of military infrastructure, especially special, infrastructure of other MFs, which are used to achieve the goal of aggressive actions, infrastructure of defence industry complex, which provides maintenance of defence industry of the aggressor state, and objects of state (civil) infrastructure of common use (dual purpose), which make up its military, economic, moral, psychological and other potential, objects of critical infrastructure of the aggressor state, etc.

Given that when assessing the importance of enemy resource objects, it is necessary to take into account many indicators (characteristics), such issue cannot be solved using purely formal methods. According to the scientific work [9], the following methods can be used: methods of direct expert review or hierarchy analysis, which is used to support decision-making by composing a system and determining the advantage (rating) of alternatives (in our case, vulnerable objects, systems and resources that are subject to IPAC influence). It should be noted that the importance of enemy objects or resources belonging to vulnerabilities may vary depending on their role (contribution) in achieving the goal of their use by the aggressor country (main or auxiliary). This requires constant analysis of large data sets of both statistical nature and non-statistical (qualitative) information in combination with content analysis of a significant volume of various messages. Thus, to identify the enemy's vulnerabilities in advance and their importance, it is advisable to assess them within the typical scenarios of aggressive actions, which determine: a probable purpose of aggressive actions of the enemy; possible composition of enemy's forces and means involved, and to which sphere (spheres) of national security they belong, as well as the expected result. It is advisable to form databases of objects, their indicators and properties in each enemy's area (facilities of economy, public administration, military facilities, facilities of information sphere, etc.). The results of assessing the importance of objects in predetermined scenarios are used to identify the need of forces and means of IPAC subjects to

neutralize objects or achieve other effects (demoralization, isolation, damage, destruction, suppression, disruption, capture, destruction, blocking). If there are certain resource constraints, the most important enemy's vulnerabilities are chosen to influence and the targeted action on which will be taken to ensure maximum results.

From experience, different forces and means of IPAC agencies belonging to different spheres can be used to influence enemy's vulnerabilities. Thus, there is a need to determine in advance the capabilities of individual components (options of sets of forces and means) that make up the IPAC, their impact on the vulnerabilities of the aggressor country and their comparison by resource indicators, time to achieve results and expected losses of their forces and enemy forces. It is necessary to take into account both the time for the preparation measures (deployment of forces in the area if necessary) and the time for their implementation (required duration of impact) directly on various objects, systems and resources of the enemy. In the event of an immediate response to the enemy's aggressive actions, priority is given to forces and means that are ready for rapid deployment, despite their ability to counter, with further efforts by an appropriate set of IPAC forces and means.

The next step is to establish an appropriate combination of different forces and means of IPAC for the joint implementation of the activities planned in the SO (usually in the form of LSO). The input data for the calculations can be threat passports.

Typical measures to influence enemy's vulnerabilities, their list and characteristics for asymmetric response to aggressive actions are mostly covert. Demonstration measures can also be taken at the same time (mainly to mislead the enemy). The implementation of covert and demonstration measures requires compliance with certain principles:

- *sufficiency of the formed potential of asymmetric counteraction,* which means an integrated set of heterogeneous (military and non-military) forces and means, which are involved under a single control to achieve the desired impact on vulnerable points;
- *comprehensiveness of influence measures* that ensures the impact on objects in areas where operation is aimed at creating a threat (for example, the development of such influence measures that would simultaneously and destructively affect the political sphere and political leadership of an unfriendly state, its economy, would create its negative image in the international community, the aggressiveness of its foreign policy, the image of an international law violator, etc.)*;*
- *continuous increase in the "capacity" of IPAC efforts* by influencing new enemy's vulnerabilities, taking into account resource constraints;
- *ephemerality of the impact* on enemy's objects, systems and resources (measures should be taken in a short time so that an opposing party does not have time to react; timely redeploy forces and means and adapt);

- *maximizing damage* to an unfriendly state;
- *concealment and minimization* of state affiliation signs (legending);
- *supplemental reconnaissance and continuous monitoring* of the effectiveness of measures to influence vulnerabilities, etc.

At the same time, it is proposed to actively use the intelligence and analytical capabilities of strategic partners to detect, identify and evaluate agencies whose operation has a destructive impact on the national security. The necessary preconditions for the organization of such cooperation are, including the need for closed data exchange, institutional readiness of the security and defence sector of Ukraine to organize and implement measures for the exchange of restricted information with their strategic partners, especially with the Ministry of Defense and the General Staff of the Armed Forces of Ukraine, the National Guard of Ukraine, the Ministry of Internal Affairs, the State Border Guard Service, the State Service of Special Communications, etc.

The effectiveness of the impact on the vulnerable points of the aggressor state also depends on the completeness and timely implementation of countermeasures, which is achieved by the actions of various forces of the entire state organization.

Since the method for the formation of the integrated potential of asymmetric counteraction proposed in the publication [7] is the highest level of systemic use of SDSU agencies to neutralize the threat in MSS, then the target de-escalation function of the threat should be focused on achieving a synergistic effect as a result of using a complex system [11]. The synergy of asymmetric countermeasures in selected enemy's vulnerabilities can be obtained through their clearly planned implementation in the political, economic, informational (information-communication, cybernetic) and actually military spheres.

The effectiveness of asymmetric counteraction to aggression can be assessed as a result of the total reduction of threat level in the conducted LSO, primarily by influencing enemy's vulnerable points. According to calculations, the impact on enemy's vulnerable points during LSO increases the effectiveness of LSO by 25 - 40% if the vulnerabilities are timely determined and influence subjects are provided with the resources.

In the case of successive 2… 3 LSO within SO, the threat level is reduced by 25 - 30%. At the same time, the calculations show that in the case of simultaneous 2 - 3 LSO, total reduction of the threat level (achieving the required "neutralization shift") only due to the impact on predetermined vulnerabilities (points) of the enemy can reach 35… 40% [9]. This is due to the factor of suddenness, and hence the unwillingness of the enemy to organize effective counteraction to the impact on vulnerable points simultaneously in several areas.

World experience also proves that a much militarily weaker country, by carrying out asymmetric countermeasures involving military and non-military forces and means of the security and defence sector, is capable of inflicting unacceptable

damage on a militarily stronger enemy and forcing it to abandon the employment of military force against it. Thus, SO of asymmetric counteraction in its organization and content differs from the classical forms of military (combat) operations and is characterized by: distributing the agencvies of the security and defence sector, forming in the operation integrated potential of asymmetric counteraction by objects of influence, first of all vulnerabilities (points) of the enemy, which belong to different areas (military, information, political, economic, etc.); formation of a single combat space with new characteristics (nonlinearity, absence in the traditional sense of the front, flanks, rear, etc.).

There is a need to create in advance a catalog of objects, systems and resources of the probable aggressor state, which belong primarily to the defence infrastructure (military infrastructure, especially special, infrastructure of other MFs), defence industry infrastructure that provides defence production and state (civil) infrastructure of common use (dual purpose) and make up its military, economic, moral, psychological and other potential, critical infrastructure, etc.

It is required to assess the capabilities of individual agencies of the security and defense sector, which may be involved in a special (local special) asymmetric counteraction, their impact on enemy's vulnerabilities (points), the purposeful operation of which poses a threat to its timely neutralization.

Early creation of a catalog of objects, systems and resources of the aggressor state, which can be counted as its vulnerabilities (points), and the availability of the results of assessing the impact on their functioning by measures of different sets of forces and means that constitute integrated countermeasures will allow during SO planning to include in its composition those SDSU agencies that take care of the areas in which the most significant signs of military or hybrid threats are identified. It is proposed to use the "threat passports".

According to preliminary calculations, carried out by the method of assessing the effectiveness of asymmetric counteraction in the interests of ensuring a sufficient level of state MS, provided simultaneous SO 2 - 3 LSO, total reduction of threat level (due to the impact on pre-identified vulnerabilities) can reach 35 - 40%.

The effectiveness of SO depends on the number of simultaneously or sequentially conducted LSO and their resources to influence the significant spheres of the enemy, which pose a threat. Increasing the spheres in the SO, in which the pre-planned impact on the enemy's vulnerabilities (points) will reduce the time for de-escalation of the threat and achieve a synergistic effect from targeted asymmetric measures and achieve a synergistic effect from targeted asymmetric measures.

In order to systematically protect the state from modern threats to national security and strengthen the interaction of all SDSU entities in the performance of common tasks, it is necessary to improve the management and coordination of its agencies and revise its architecture, as well as implementation of the Law of Ukraine "On National Security of Ukraine". The joint employment of forces and means of

different SDSU agencies to achieve the objectives (early creation of sets of forces and means and their resource provision) in the interests of achieving the goal of SO, their coordination and interaction also requires mandatory regulation of legal base for such joint activities.

9.2. Recommendations for determining the objectives to the integrated potential components in the local special operation of asymmetric counteraction

The realization of the state national interests at a certain stage may face resistance from other states, which leads to contradictions.To overcome them, a set of tools (economic, political, information, psychological, diplomatic and military) available in the state can be used. Experience in resolving modern military conflicts shows that insufficient ways to resolve conflicts by non-military means and to give priority to resolving disputes by military means, especially by more militarily powerful states, lead to the use of military force. This requires an adequate 'force' response, but not always the state, against which military force is purposefully used, especially in combination with information and psychological influence, measures of economic and political pressure, can find resources for effective counteraction.

To overcome this problem, the Concept of asymmetric counteraction to the enemy state was developed to neutralize its influence on the significant spheres of national security of Ukraine [7]. The concept envisages the formation of an integrated potential for asymmetric counteraction to aggressive actions of a stronger enemy, to which there are not enough resources to respond in symmetrical ways. Existing approaches to the definition of tasks for the subjects of integrated capacity are based on the strategies of national legislation in the field of national security and defence [1, 13–15] and the results of recent research [2, 3, 16–20]. The SDSU is responsible for defining the objectives and management of the security and defence sector entities that form the integrated potential of asymmetric counteraction to the aggressive actions of a militarily stronger enemy. Given the incompleteness of the national resilience system, which should ensure effective coordination and clear interaction between security and defence and local government in preventing and responding to threats and developing universal protocols for crisis response [1], the most difficult task to address the potential of asymmetric substantiation of partial tasks for the agencies of the integrated potential of asymmetric counteraction.

Asymmetric actions are inherent in a conflict situation in which measures of economic, diplomatic, information and direct military nature, the weaker enemy pursues an asymmetric strategy (tactics) of armed struggle, in accordance with its limited resources to level the military-technological advantages of the strong side [7].

The main form of achieving the strategic goal of asymmetric counteraction to aggressive actions of a stronger enemy in the Concept [7] is defined as a "special operation". A special operation is meaningfully "coordinated actions of disparate forces and means united by a single goal" with the corresponding "local special operations" as a form of achieving tactical objectives of counteraction. Local special operations are specific in purpose (objectives), and therefore limited in time and composition of forces in the form of asymmetric counteraction to the selected threat of both military and hybrid nature. As a rule, the content of LSO is the simultaneous or sequential impact on the vulnerabilities of the enemy.

Vulnerabilities(vulnerable points) are objects (group of objects), systems and resources of the enemy, located both in the area of a SO (LSO), and outside it, the impact of which significantly reduces the ability of the enemy to continue aggressive influence or forces him to abandon it altogether. Given that the LSO may involve forces and means of various agencies of the SDSU, and the purpose of LSO, depending on the chosen method of its conduct (giving preference to military or non-military methods) may be simultaneous or sequential impact on individual vulnerabilities of the enemy different areas (for example, armed forces and critical infrastructure, economic potential and international image of the state), it is advisable to create a single temporary (for the period of the operational task) governing body (center) and take into account resource constraints.

Joint implementation of tasks with integrated capabilities requires interaction and coordination of public authorities, local governments and components of the security and defence sector of Ukraine, taking into account the peculiarities of modern armed struggle, which uses not only military forces and means, but also various non-military. This necessitates the consideration of the basic principles of management when defining the tasks of the components of IPAC. The main of these principles, which are proposed to be taken into account when defining the tasks as a component of the integrated potential in the operation, are [19]: the presence of one control center (body); balance of rights and responsibilities of decision-makers in the structure of SDSU subjects, ie responsibility should be consistent with their powers; the reality of the tasks and deadlines; specificity and targeting, which provide for the definition of the executor of the event, time and deadlines; consistency, ie consistency with other decisions to ensure the MS. Adherence to these principles should ultimately ensure that the goal of the SO (LSO) is achieved.

The main factors (initial data) that need to be taken into account when determining the objectives of the SDSU agencies in LSO are shown in Fig. 9.1.

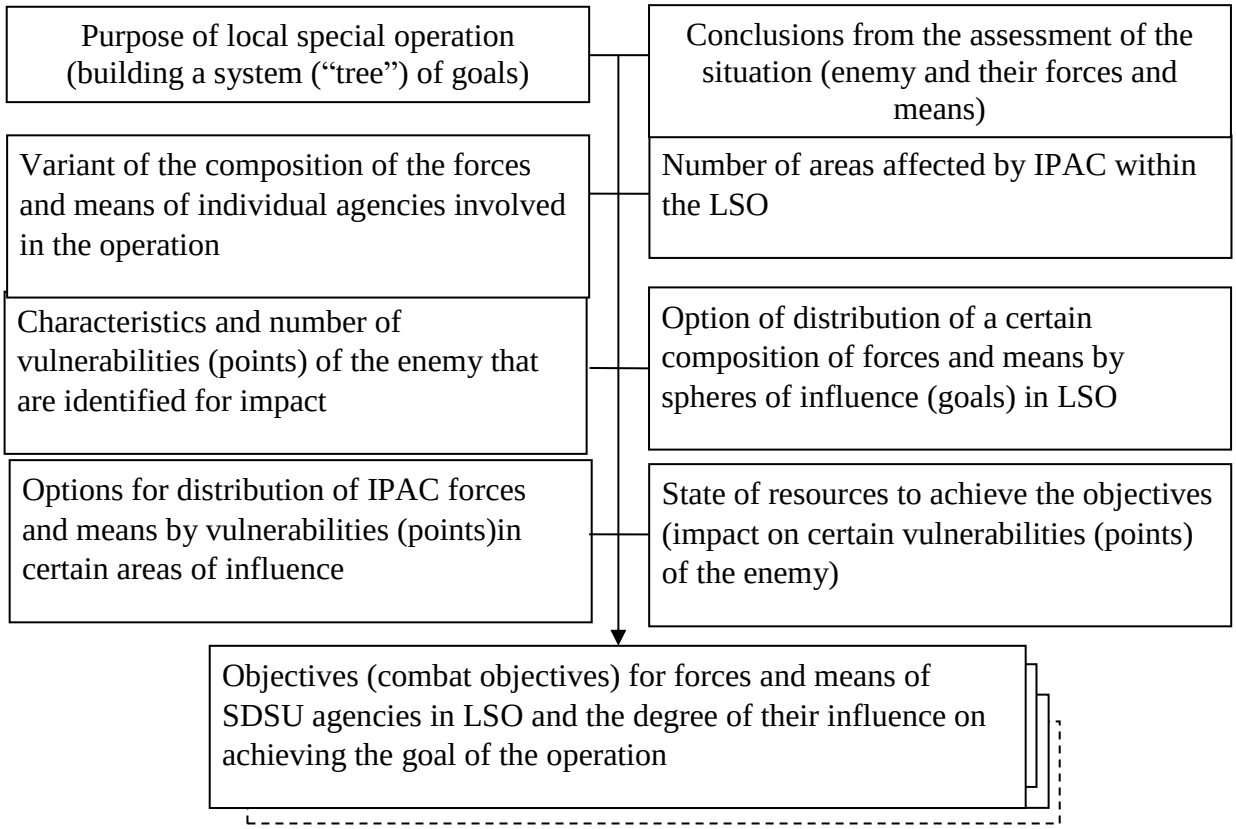

Fig. 9.1 Factors influencing the definition of tasks for the agencies of asymmetric counteraction

As shown in Fig. 9.1, the most important in determining the design of the SO (LSO) is the preliminary determination of the composition of the agencies for asymmetric actions and justification of their partial tasks, which is based on the assessment of the situation and vulnerabilities (points) of the enemy. The defined sets of objectives for the agencies (forces and means) that have formed the integrated potential of counteraction are the necessary minimum allowable capabilities of these agencies and are considered as their partial operational objectives.

The situation that develops in the process of fulfilling the tasks of IPAC in SO (LSO) will be defined as the relative achievement of general and specific goals, objectives of its implementation. The main system requirements for the list of LSO objectives are their completeness, expediency (not redundancy) and measurability. The measurability of the goals allows to determine the rational (appropriate) version of the integrated potential of both military and non-military agencies of the SBU to achieve the goal of LSO [16].

The priority task of the SO in accordance with the Concept [7] is the following: rational use of resources, to inflict on the enemy in the most vulnerable and unexpected places (points) such damage, for which he is forced to refrain from further aggressive actions. The task by level is strategic and is achieved by

simultaneous or sequential implementation of several LSO. LSO may be involved in various functions and subordination in the general system of state bodies, non-governmental organizations, forces and means, which requires the organization of appropriate interaction between them in the process of performing tasks.

The synergetic effect of asymmetric countermeasures in selected vulnerabilities of the enemy is ensured by their clearly planned implementation (simultaneously or sequentially) in the political, economic, information and communication, cyber and military spheres. Traditionally, a task is considered fulfilled if a sufficient number of executors with the capabilities that ensured its implementation is identified, the resources involved do not exceed the allocated ones, and the losses do not exceed the allowable ones [19].

Regardless of the ways of forming the integrated potential of asymmetric counteraction (with priority of force or non-force means) each of them can have many variants of a specific list of applied forces and means of SDSU agencies and the degree of their participation in asymmetric counteraction over time [18]. In general, the effectiveness of asymmetric counteraction depends on a clear goal and capabilities of the agencies involved in its conduct, the effectiveness of the agencies of their tasks, resource provision and effectiveness of management of SO as the main form of counteraction to aggressive actions of the aggressor country [19]

Local special operation in organization and content differs from the classical forms of military (combat) operations and is characterized, as shown in paragraph 9.1, the formation of a single combat space with new characteristics: nonlinearity, lack of traditional front, flank, rear, distribution simultaneously with integration and multidimensionality. In Fig. 9.2 shows a schematic diagram of the formation of the IPAC from different agencies of the SDSU to conduct SO and determine the tasks in the operation.

Demonstration measures of military warning and deterrence play a significant role in the SO [6]. Forceful methods are used sparingly and covertly, usually by special operations, intelligence, electronic warfare to destabilize the situation using cognitive technologies and create conditions for the depletion of the enemy, violations of state and military administration, and so on. The set of non-violent measures is performed by various entities of the SDSU in the information, political, economic, ideological, and energy spheres. To achieve operational and tactical goals, groups (groups, centers) are created with the specified capabilities to influence the enemy and functionality [6, 16].

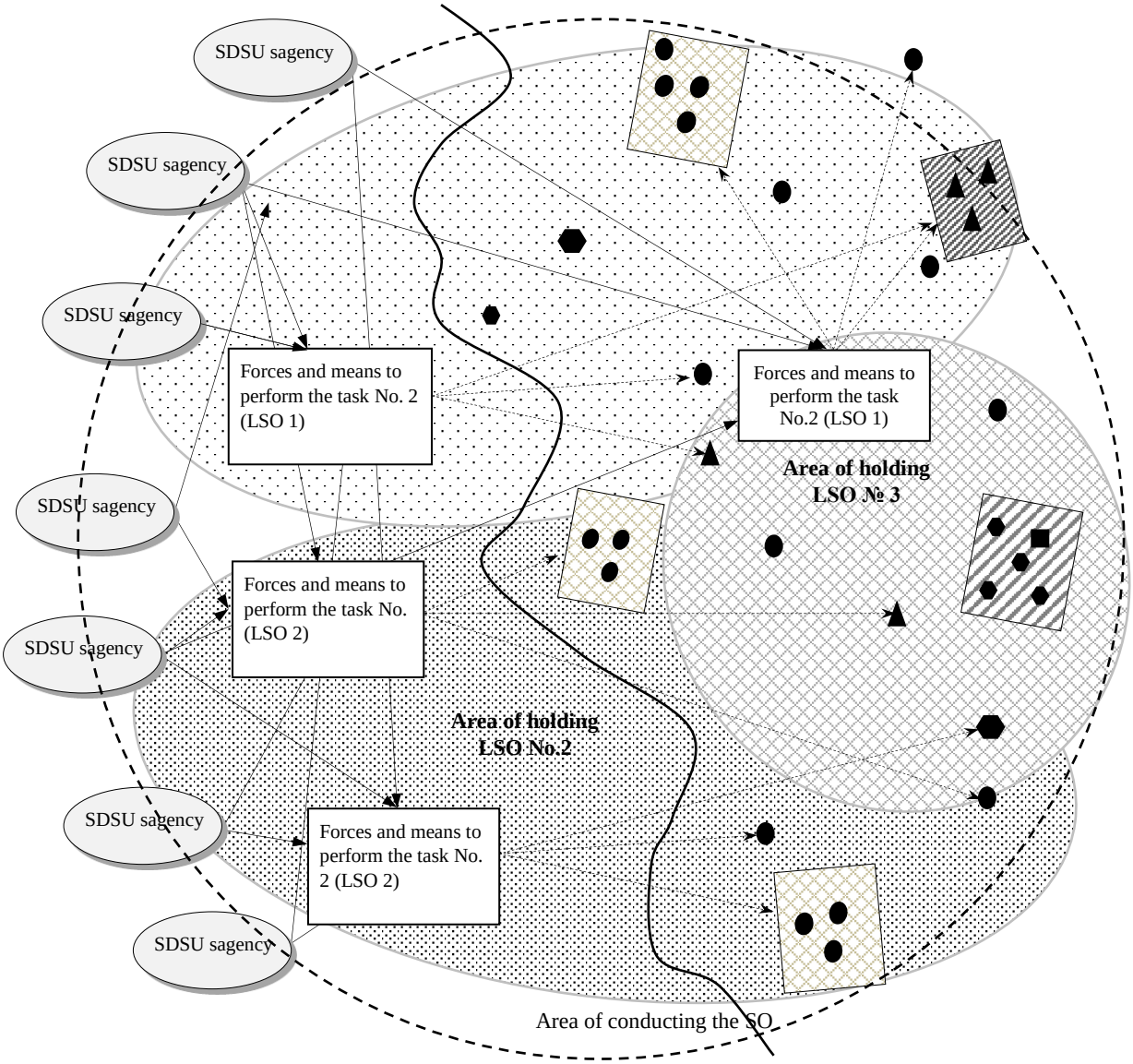

Fig. 9.2. Schematic diagram of the formation of the IPAP and the tasks for the agencies of the SDSU (agencies for the asymmetric counteraction) in a special operation:

– a group of objects ("vulnerable" places of the enemy) that belong to the spheres of influence of IPAC in LSO;

– objects ("vulnerable" points of the enemy), which belong to the spheres of influence of IPAC in LSO;

– conditional line of contact (demarcation) of the opposing parties

As can be seen from Fig. 9.2, vulnerabilities of the enemy, which are directed to the components of IPAC, are individual objects of the enemy or their combination, as well as resources, systems that belong to different areas of threat. Given the limited objectives of the LSO (formed to solve operational tasks in the SO), the number of areas of the enemy with their corresponding vulnerabilities (points),

which are aimed at a certain composition of forces and means of asymmetric counteraction, is not more than two.

The number of enemy objects, systems and resources that are classified as vulnerable and in need of impact in the SO (LSO) may be different in each area and depends on the required degree of reduction of the indicators that characterize the threat. At the same time, the action of the SDSU agencies that form the IPAC in the LSO can be simultaneously or sequentially directed at the vulnerable places (points) of the enemy, which belong to different areas. This necessitates a preliminary determination of the composition of the forces and means of the various agencies of the SDSU, depending on their ability to influence the vulnerabilities (points) of the enemy. In this case, as shown in Fig. 9.2, the same forces and means may be used to influence vulnerabilities (points) of the enemy, which belong to different spheres of influence (for example, SOF forces may be simultaneously applied to objects belonging to economic, political, military spheres, etc.).

The condition is compliance with such basic requirements during the formation of the "tree" of goals (sub-goals) – the exclusion of unimportant and ineffective measures and measures that cannot be provided with resources. The main system requirements for the list of goals of the lowest level are classical, ie their completeness, redundancy and measurability [18]. It is the measurability of the goals that makes it possible to find the optimal (rational) distribution of efforts between the agencies of the SDSU and to organize control over the results of their actions at all stages of countering threats. As a rule, the number of targets in the LSO corresponds to the number of enemy areas to which the IPAC action is directed. The goals of the local operation meaningfully reflect the stages of its implementation. Unlike the stages of classical operations, the stages of LSO can be carried out both sequentially and simultaneously (for example, simultaneous impact on vulnerabilities of the enemy in the political and information spheres, sequential impact on vulnerabilities (points) in economic and military spheres). The number of objectives to neutralize the threat (achieve the goal of the operation) and their hierarchical levels will depend on the chosen strategy to counter the threat, the role and place of LSO in the SE and the capabilities of the SDSU, their structural units subordinated. The defined goals are achieved by performing tasks that are meaningfully a set of measures, usually mutually agreed in place and time.

Thus, in itself, the asymmetry of counteraction to the militarily stronger enemy presupposes the existence of certain restrictions on the formation of the goals of LSO. Thus, the possible scenarios of counteracting the asymmetric impact of the enemy and the number of vulnerabilities (points) to which the action of IPAC (LSO) should be directed, determine the different options for forming the composition of the integrated potential (agencies) of the SDSU. The formation of the purpose of the operation is also significantly affected by restrictions on the ensuring measures to influence resources. At the same time, at the stage of goal formation, there is no

complete information about their presence and the composition of the SDSU agencies that will form the integrated potential has not been determined yet. This requires an early expert assessment of possible scenarios of enemy action and basic options for asymmetric counteraction to create an appropriate adequate list of goals that can be achieved.

To substantiate partial objetives for IPAC agencies, a cognitive approach to the process of preparation and execution of partial operational tasks by agencies is used. It is based on the theory and methods of expert systems, EVPS, analysis of hierarchies, etc. The essence of the cognitive approach is the formation of eight EVPS, which means selected by experts relatively independent stages of task definition, without which it is impossible to determine operational tasks for IPAC entities [7, 20].

Recommendations for the initial data, procedures and their sequence when defining the tasks of the components of the integrated potential in LSOAC (Fig. 9.3) are developed on the basis of the approach proposed in [20].

As can be seen from Fig. 9.3, the identified target options should form a base of targets, a variant of which may be proposed by the DM at the stage of deciding on the response to the threat identified during the threat monitoring.

Adjustment of the purpose of asymmetric counteraction is carried out during the management process (after assessing the enemy and the possibilities for the formation of IPAC and providing it with resources) at the stage of determining the design of the SE (LSO). This will reduce the influence of the subjectivity of DM assessments (judgments) on the purpose of asymmetric counteraction in the conditions of uncertainty of information about the threat (enemy) and narrow the range of possible options for its formulation for further processing [21].

Therefore, when defining the tasks for the agencies, involved in LSO, it is necessary to indicate not only the content of the task, but also to determine the degree of its impact on achieving the goal of LSO, which is assessed on an 8-point scale by experts using the M7 model [3].

In addition, a network graph model of asymmetric measures is formed for each agency, in which the vertices are tasks or their stages, and the arcs determine the time norms of their implementation. Combat missions must correspond to the capabilities of the agencies involved in the operation, the level of their training, the time to prepare for the LSO, the current situation.

It is also necessary to take into account the value and limited resources, possible losses of personnel, AME, risks and possible negative consequences in case of failure to achieve the goal of LSO, etc.

It is recommended to choose those agencies who take care of the areas in which the most significant signs of the detected MT. Threat passports can be used.

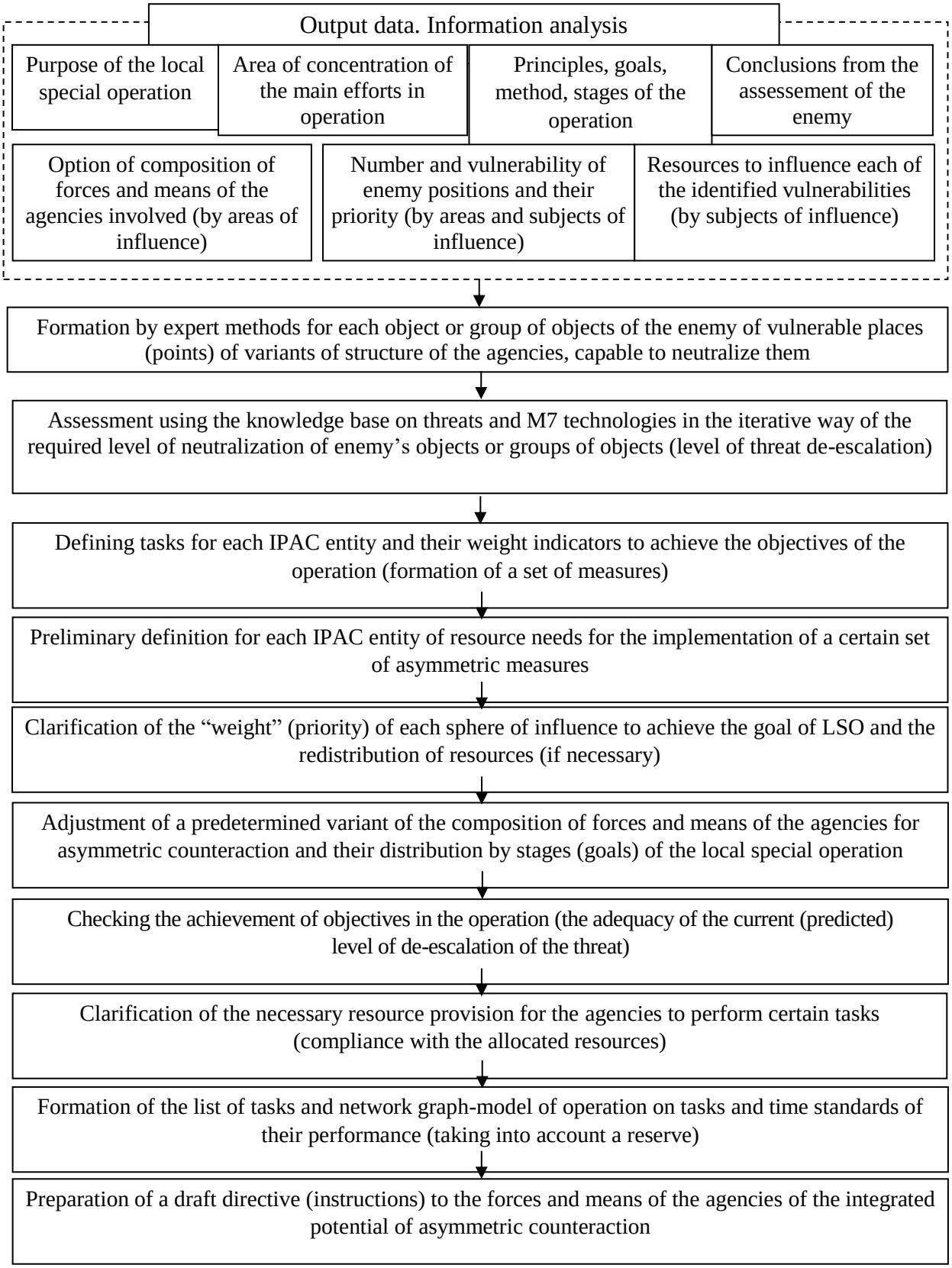

Fig.9.3. General sequence of determining the objectives for the agencies of asymmetric counteraction in the local special operation

List of tasks (option), that can be provided by DM in the form of a formalized document (Table 9.1), which is used by the group (center) of LSO planning to develop a graph-model of asymmetric measures in the operation.

Table 9.1

Objectives, activities and resources to achieve goals in LSO (*options*)

Objectives of the operation (stage of the operation)	Sphere to which the objects (groups of objects) of the enemy belong	Priority of the sphere of influence in LSO	Objectives to reach the purpose of the operation	Measures to complete the task	Assessment of the task impact on achieving the goal of LSO	Required resources
A_1	Economic	E_i	Z_{E1}	1		
				2		
				3		
			Z_{E2}	1		
				2		
	Military	B_i	Z_{B1}	1		
				2		
				3		
A_2	Information	I_i	Z_{I1}	1		
			Z_{I2}	2		

Table of contents. 9.1 may take a different form or be supplemented by other necessary data.

The tasks approved by the DM as part of the IPAC are specified in the directive, which contains general guidelines for the preparation of the operation, tasks for the forces and means of the security and defence sector of Ukraine involved in the operation, the required reserve of forces and resources (if necessary). readiness to perform tasks, and are mandatory [21].

According to preliminary calculations, early determination of the objectives of LSO and the appointment of sets of forces and means to achieve them (using the model of selection of subjects to form the potential of asymmetric counteraction), justification of tasks of IPAC components in the operation (using the model of substantiation of tasks) reduces the planning time of LSO by 15 - 20% [21].

Practical implementation of the method of substantiation of tasks for IPAC entities in LSO requires specific management in the security and defence sector, and therefore, overcoming the problem of inertia of this process, which is associated with the need to unite under a single leadership performers and those who play a supporting role.

At present, the mechanism of interaction of various elements in the forces of asymmetric counteraction needs to be improved, because each of the departments has experience and formed certain approaches to the management of subordinate

forces and means. In addition, the preparation of initial data (see Fig. 9.1) to determine the tasks of the IPAC component in LSO, monitoring the status of integrated potential entities during the operation (status of tasks and activities) and monitoring the status of vulnerabilities, points and groups of objects) of the enemy requires the processing of large arrays of information. This requires the creation of a new generation information and analytical system, built on the use of new generation business intelligence and associative "*In-memory"* technology

The new generation of business analytics does not require the installation of a set of heterogeneous expensive software products (has a single full-featured platform), has a short cycle of implementation, customization and training.

Associative "In-memory" technology has advantages over the traditional OLAP model [22]:

• ability to perform arbitrary unregulated queries when analyzing data of any complexity;

• providing an instant response to any user requests, even in the case of significant amounts of data;

• any value of the required calculations can be a starting point for further analysis.

According to [22, 23], these requirements are met by a modern analytical system *QlikView*, which is not limited to the scope, has a fairly flexible hierarchy, connectors from lea+ding companies (there is a connector from SAP and GIS). This system in the minimum configuration, sufficient for testing and development, is already in the Armed Forces of Ukraine (in the future, other modules can be purchased to expand the capabilities of the system). Easy integration into the existing information infrastructure allows you to quickly start using comprehensive full-featured analytical applications and easily report on them. This will help to create information-analytical automated workplaces (IAAW) of the SDSU management staff in the direction of managing the integrated counter-potential in the SO (LSO).

The advantages of creating an IAAW using the analytical BI system *QlikView* are that it has the usual intuitive interface and a high level of visualization, and the information in the system can be updated at the request of the operations manager instantly [24].

The joint use of forces and means of different agencies of the SDSU to solve problems in the interests of achieving the goal of LSO, their coordination and interaction also requires mandatory regulation of the legal basis for the organization of such joint activities [25]. This issue is currently unresolved [26, 27].

To solve this problem, it is recommended to introduce appropriate methods of state management/, legal (legal regulation, subordination and coordination), administrative (administrative, regulatory and normative) in the interests of organizing and conducting asymmetric counteraction to a stronger military state.

The use of “hard” power is limited and covert, as a rule, the special operation forces, intelligence, electronic warfare in order to destabilize the situation with the use of cognitive technologies and create conditions for the depletion of the enemy, violations of state and military administration and more.

The complex of “soft” power measures is performed by various components of the SDSU in the information, political, economic, ideological, and energy spheres.

The definition of reasonable tasks as a component of integrated potential and their resource provision creates conditions for the organization of effective interaction of various forces and means in the interests of achieving the goals and objectives of LSOAC.

In the interests of systemic protection of the state from modern threats to national security and strengthening the interaction of all agencies of the security and defence sector during the implementation of common tasks, it is necessary to improve the management and coordination of its entities, revise its architecture and clarify and implement the law of Ukraine “On the National Security of Ukraine”.

9.3. Recommendations for automation and information-analytical support of management of the integrated potential of asymmetric counteraction to aggressive actions of the militarily stronger adversary

Modern military means employment in the active armed conflicts by the powerful military states makes countries at the lowest level of economic, technological and military development look for ways of asymmetric counteraction [28].

The principles of forming IPAC to aggressive actions of the militarily stronger enemy are based on the ensuring the national legislation in the field of national security and defence [1, 13–15]. Thus, in the Military Doctrine of Ukraine [14] one of the main trends in the formation and development of the security environment in the world is the transfer of weight in military conflicts to the asymmetric use of military force by illegal armed groups, shifting the emphasis in military conflicts to integrated economic, political, information and psychological tools, etc.

The Concept of development of the NSDC [13] defines the need to increase the efficiency of the national security system (NSS) in the interests of joint use of military and non-military forces and means of the NSDC in crisis, emergency and special period.

In accordance with the Strategy of the national security [1], the NSS inefficiency is the actual threat to national security of Ukraine, primarily due to the lack of management of the SDSU, as an integral functional association, from a single center.

Overcoming the above mentioned problem requires:

• centralized management of the SDSU in peacetime, in crisis situations and in special periods;

• interdepartmental coordination and interaction;

• creation of a unified system of monitoring, analysis, forecasting and decision-making in the field of national security and defence;

• ensuring effective coordination and functioning of a unified system of situational centers of the relevant bodies of state power of the SDSU [1, 15].

The implementation of those requirements in modern conditions could be impossible without the appropriate IAS and automation of centralized management processes, and therefore, there is a need to develop appropriate recommendations.

Recent research findings indicate that the automation issues and IAS control of the integrated potential of asymmetric counteraction to aggressive actions of a more powerful enemy are given insufficient attention. The task of IAS of any management activity is that decision-makers would have a sufficient amount of information necessary for decision-making and the ability to bring it to the appropriate agencies involved in its implementation. Therefore, the development and decision-making of asymmetric counteraction to the aggressive actions of a more powerful enemy requires sufficient, timely and reliable information about the real situation and capabilities of the SDSU, as well as threats that need to be neutralized.

Most conflicts in human history have been determined by the use of asymmetry aimed at using the weaknesses of the enemy, resulting in complex situations with the use of standard (non-standard) and conventional (unusual) tactics [29]. It is clear that modern military (hybrid) threats, which are formed not only by purely military factors but also by non-military ones, are characterized by different “power” and require the same comprehensive and adequate response, but the target state cannot always find the necessary resources.

Hence, the issue under consideration is forming an integrated potential for asymmetric counteraction to aggressive actions of a stronger enemy, with restricted resources to react in symmetrical ways. The solution of this problem in asymmetric ways is entrusted to the SDSU [3, 12]. Regardless of the methods of formation of IPAC (with the priority of “hard” power ao “soft” power means), each of them can have many variants of a specific list of applied forces and means of SDSU agencies and the degree of their participation in asymmetric counteraction over time [19]. Because of this, IPAC management is a complex multifaceted feedback process. In this case, all the functions of the IPAC management process, management components (components of SDSU) and situational variables are so interrelted that they cannot be considered independently [3].

Experts suggest [3, 25, 30] that in the public authorities there is no integrated system of IAS decision support to ensure a certain level of national (military) security. The existing information and analytical structures of the state are not integrated into a single data network, use different methods for calculations and have

an insufficient level of automation of the process of the security and defence sector command and control in the crisis situations.

Depending on the threat to military security, the nature of the information needed by public authorities to make decisions in order to maintain the required level of national (military) security of the state changes rapidly, and the array of information that needs processing and analysis may be unlimited. At the same time, there is evidence proving that the quality of management activities in modern conditions is determined primarily by the quality of IAS. All this requires the creation of a national IAS system and automation of the process of ensuring the state's MS management, which will allow to expand the capabilities of the MSS of Ukraine exposed to a wide range of threats.

Relying on the fundamental nature of IAS as one of the types of information support, IAS system should be the only contour of interacting structures that will provide information-analytical and information-technological support for decision-making on asymmetric counteraction and its practical implementation (evaluation of effectiveness) [3 , 30].

According to relevant research [35], 73 percents of American, 63 percents of British and 85 percents of Japanese strategic managers consider the exchange of information to be the most complex part of the management process in the institution with a hierarchical structure. The exchange of information is subject to the mission (task) of any agency (entity). The more specific the mission (objective) of each agency (entity), the easier it is to organize the exchange of information and its analysis. Therefore, the process of integrated potential management also requires an integrated approach to IAS, which is designed to strengthen the links between the individual elements of IPAC, between the levels of vertical management, between the entities of horizontal management and determining the state of the object (enemy), on whom the integrated counteraction potential is aimed at.

The availability and essence of feedback in the process of IPAC management and control over the decisions on its application implementation requires timely changes (adjustments) of tasks to the elements of integrated capacity, depending on the results over time. This requires an appropriate IAS of the SDSU's integrated capacity management process. Thus, the process of managing IPAC aggressive actions of a stronger enemy requires constant monitoring and data evaluation from the constituents involved.

Nowadays, the organization of the integration process (integration technology) is generally defined, a method of forming and managing the integrated counteraction potential has been developed, but they should be put into practice in the form of recommendations to SDSU subjects and military authorities taking into account their perspective model.

Recent research findings [3, 16, 18, 19, 25, 30, 32] indicate that the fundamentals for managing the integrated potential of asymmetric counteraction to aggressive actions of a stronger enemy, requiring a corresponding IAS, are:

• organizational and methodological concepts to ensure a sufficient level of the state MS with the use of asymmetric actions to de-escalate certain military and hybrid threats;

• goals, forms and methods of organizing and conducting asymmetric actions;

• conceptual model of iterative formation of integrated potential;

• the MS threat monitoring model, which includes a model for assessing the level of threats to military security and an opportunities assessment model for neutralizing threats;

• a decision (plan) on asymmetric counteraction content whose definition and substantiation are carried out by using the model of selection of actors for formation of potential of asymmetric counteraction, model of substantiation of tasks to actors of the formed potential of asymmetric counteraction, evaluation of the effectiveness of SO (LSO), etc.

The importance of IAS management IPAC is stipulated by the fact that changes in the situation can occur at any time, which may not coincide with the moments of obtaining the necessary information for decision-making, while decisions made on out of line, incomplete or distorted information are always accompanied by economic, political, military losses, etc.

Thus, the effectiveness of asymmetric counteraction depends on a clear goal of asymmetric counteraction and the capabilities of the actors involved, the effectiveness of the agencies achieving their objectives, resource provision and management of SO (LSO), which is the basis for counteracting aggressive actions of the aggressor country and requires a corresponding specific IAS [12, 18].

Following the research outcoomes [33], in the IAS control IPAC aggressive actions of a stronger enemy by conducting SO there have to be two structural components:

- *the first* – is designed to substantiate the idea of "special operation"using the method of forming a group of defence forces to implement the idea of asymmetric counteraction to the identified (predicted) threat [18] and a conceptual approach to forming the plan of LSOAR involved in it [20];
- *the second* – is functionally designed to recognize changes in the situation adopted during the planning a "special operation"relying on the method of evaluating the effectiveness (efficiency) of asymmetric counteraction in the interests of ensuring a sufficient level of the state MS [12].

At *the preliminary stage*, when the plan on carrying out SO (LSO) of asymmetric counteraction to aggressive actions of the stronger enemy is being developed, the initial data corresponding to its plan must be put into the base of IAS.

Factors that determine the content of the necessary information for the development of the design of the SO (LSO) and the use of the necessary analytical tools are the following [7]:

- the goal of the SO (LSO) (rational use of resources, to cause damage to the enemy unexpectedly, to force enemy to abandon further aggressive actions);

- conclusions on the situation monitoring (the enemy and its main parameters, in particular, the expected number of personnel involved in aggression, the number of reserves, the ratio of military capabilities, estimated losses of enemy personnel, for which he may refuse further hostilities, estimated (regulatory) losses of the enemy's AME, at which he loses combat capability, the expected integrated level of the military threat, the expected risks of destructive influence on the significant spheres of the enemy's national security);
- the most vulnerable places (points) of damage to the enemy by asymmetric actions (military, economic and moral-psychological potentials of the state and armed forces; security of critical infrastructure; objects of reconnaissance, management, fire damage; security of MF life support systems; international image of the state and its armed forces, law enforcement agencies of special purpose, etc.);
- determining the actor for asymmetric actions;
- combat missions of SDSU agency involved in the SO (LSO), and certain degrees of their influence on achieving the objectives of the operation;
- objectives, related to the preparation of the SO (LSO) area (single districts);
- procedures and methods to withdraw forces and means of the agencies, where the potential of asymmetric counteraction is been formed, to the area of the SO (LSO);
- forces and means management during the SO (LSO), the main and backup communication systems and the order of interaction;
- legending of SO;
- order of separation from SO (LSO), etc.

It is utterly important at the preliminary stage (the planning) of the SO is the IAS of the process of reasonable formation of agencies for asymmetric actions and substantiation of partial objectives to their forces and means of the formed integrated potential of asymmetric counteraction on the basis of assessment of the situation and choice of the hostile critical areas. The designated sets of tasks for the agencies (forces and means) that have formed the integrated potential of counteraction are the necessary minimum allowable capabilities of those entities to be considered as their partial operational tasks. The synergetic effect of asymmetric countermeasures in the selected hostile critical areas is provided by their clearly planned implementation (simultaneously or sequentially) in the political, economic, information and communication, cyber and military realms. Traditionally, the objective is considered to be reached if a sufficient number of performers with the equal capacity to ensure its implementation have been identified, the resources involved do not exceed the allocated ones, and the losses do not exceed the expectancy [18, 21].

A version of the structural scheme of IAS implementation for the general determination of the agencies for asymmetric counteraction is shown in Fig. 9.4.

Thus, in Fig. 9.4, IAS process of preparation of constituent entities for asymmetric cases is created in the subsequent implementation of certain services of

accounting, forecasting, contrasting and other procedures aimed at obtaining the necessary information about MT and their characteristics that determine the required level of threat de-escalation. The rational variant of groups of entities of the defence forces provides the maximum damage to the enemy in critical areas with sufficient resource maintenance implied.

For the practical implementation of IAS the *substantiation of partial tasks*, a cognitive approach to the process of preparation and execution of partial operational tasks by agencies has been adopted to IPAC entities, which is relies on the theory and methods of expert systems, EVPS, hierarchy analysis, etc. [20, 21].

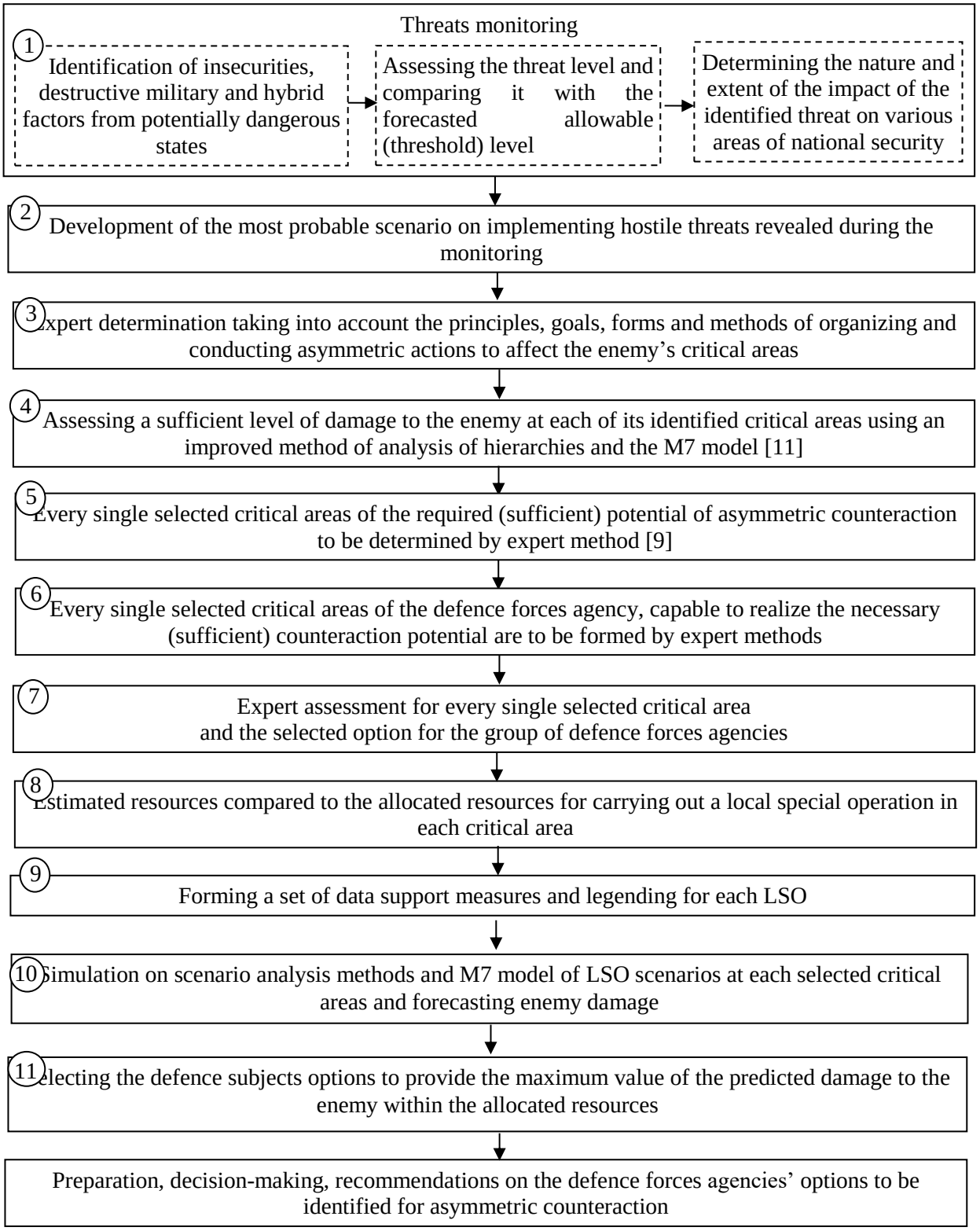

Fig. 9.4. Analytical data structural scheme of implementation of providing a reasonable list of actors for asymmetric actions

IAS implementation of this process has been put in line with the content of the cognitive approach, which consists in the formation of eight EPS, referring to the

relatively independent selected stages of task definition, which make it impossible to define operational tasks for the IPAC entities [7, 21] (Fig. 9.5).

At *the stage of conducting* SO (LSO) (plan implementation) there must be an evaluation of the outcomes. The content of the necessary information for analytical support of SO (LSO) is determined by the strategies of the basic principles of evaluating its effectiveness [7, 11]. It allows to synthesize a model for assessing the effectiveness of asymmetric counteraction in terms of total threat reduction in LSO.

The effectiveness of asymmetric counteraction to aggressive actions of $E_{ac}(t_{аг})$ can be assessed as a result of the total reduction of the threat level within the SO (LSO):

$$E_{ac}(t_{аг}) = \sum_{i=1}^{I} \Delta K_{ac_i}\left(t_{зi}, R_{res}, M_{pers_i}, M_{AMEi}\right).$$

The structural scheme of IAS implementation of the process of the effectiveness of CO (LSO) evaluation can be constructed similarly to IAS of the process of preparation and execution of partial operational objectives by the agencies of asymmetric counteraction, as shown in Fig. 9.5.

The existence of a separate, external to the design making procedures on the SO (LSO) and assessing its results in the form of an expert system in the IAP IPAC is stipulated by the need to prevent the impact of the DM subjectivity. For instance, if the opponent is underestimated, the consequences of this are manifested in the obviating certain hypotheses about his possible actions. Thus, according to [34], the United States underestimated Vietnam's desire for independence, and Israel underestimated Palestinian’s readiness to revolt and launch the Resistance movement on the occupied territories.

Thus, to prevent mistakes in making complex management decisions, it is proposed to apply the principle of *the principle of independent expert evaluation.* To do this, the IAP of IPAC management must have an expert subsystem (group of independent experts), Its functioning is not to be subjected to the general process of IPAC management, relying on the use of knowledge of specialists (experts) in a particular subject area [21] is carried out at the request of DM.

This will allow you to identify new hypotheses, estimate and predict, compare results and request additional information about the object of analysis (threat). Ideally, the number of experts should ensure the effectiveness of the majority assessment principle, unless another method of justifying the choice can be used. Such experts should be independent, i.e. irrespective of DM funding, service activities, etc. [35].

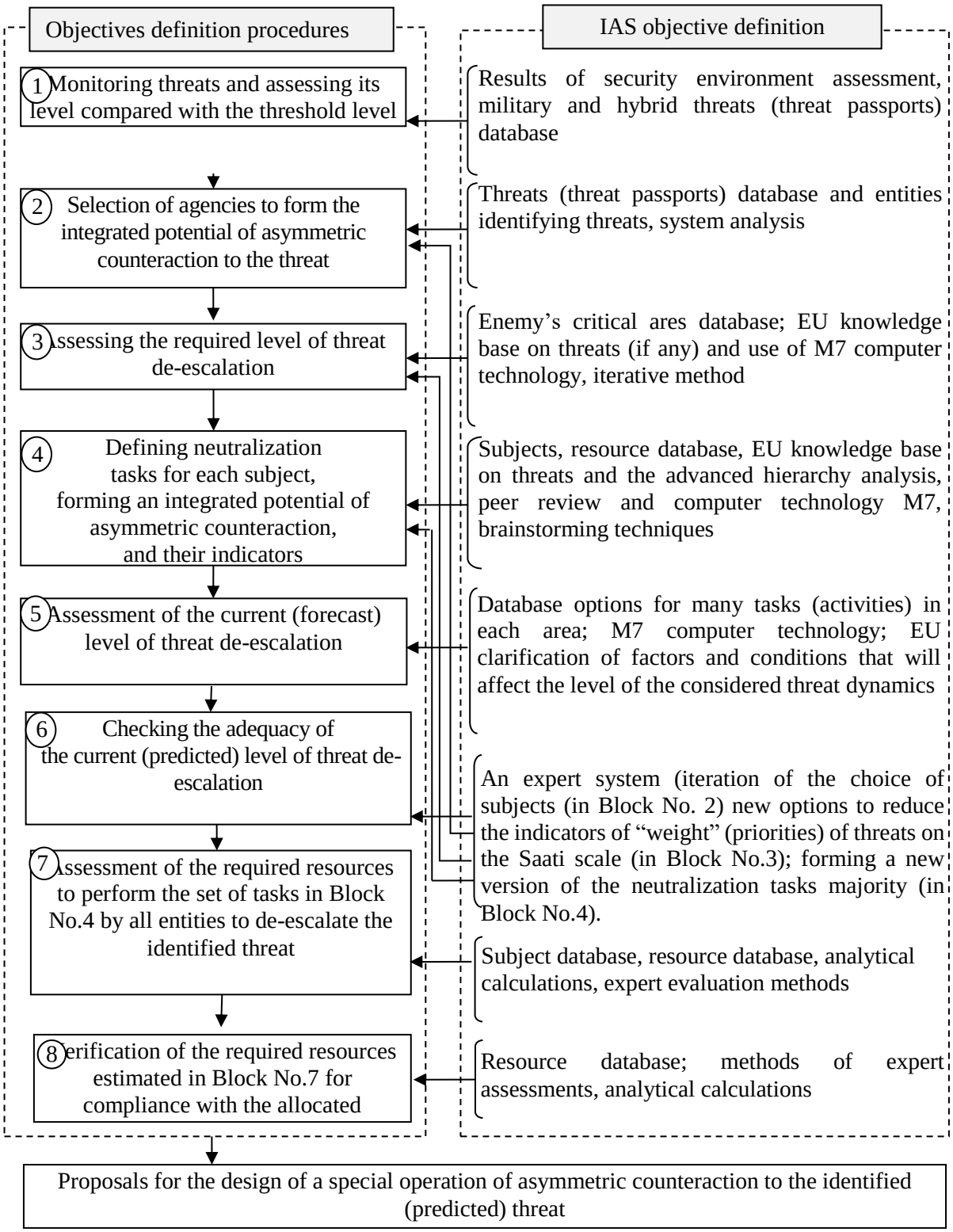

Fig. 9.5 Structural scheme for data-analytical support of partial operational tasks reasoning by actors/agencies of asymmetric counteraction

The need for independent expert evaluation also arises at the stage when a DM states the purpose for *the asymmetric actions conduct*, as a purpose statement is an important phase in the process of IPAC creation and management, which is usually carried out in conditions of uncertainty. It is well known that the category of purpose of any system is an important component of system methodology [34]. The asymmetry of countering a militarily stronger enemy on its own presupposes the existence of certain restrictions on the purpose statement of its conduct. Thus, the possible scenarios of the enemy actions and the number of "vulnerable" points to which the asymmetric impact can be directed (conduct of LSO), determine different options for conducting asymmetric actions with their respective purposes. The purpose statement of asymmetric counteraction is also significantly influenced by resource constraints. At the same time, at the stage of purpose statement, there is no complete information about their availability, and the composition of the SDSU agencies/entities that will form the integrated potential has not been determined yet as well. This requires an early expert's assessment of possible scenarios of enemy actions and basic options for asymmetric counteraction in order to create an adequate list of purposes that can be achieved [9].

The defined variants of the purposes make a base of the purposes. At the decision-making stage the DM can propose the variant of the purpose concerning the response to the threat identified during the monitoring. Adjustment of the purpose of asymmetric counteraction is carried out during the management process (after assessing the enemy, the possibilities for the formation of IPAC and providing it with resources) at the stage of determining the concept of SO (LSO). It will reduce the impact of the subjectivity of the DM's assessments (judgments) on the purpose of asymmetric counteraction in conditions of uncertainty about the threat (enemy) and narrow the range of possible variants for its statement for further processing [10, 21].

Separately, it is advisable to consider the special features of the IAS to combat information and psychological impacts (IPI) of unfriendly states as part of the process of management of IPAC to aggressive actions of a stronger enemy. Information and psychological actions allow to manage not only individuals, but also large social groups, state institutions and entire states [34]. Counteraction to IPI of hostile states is a set of measures taken by the SDSU entities, which ensure information and psychological security in order to neutralize the identified destructive impact or its de-escalation to an acceptable level.

The greatest effect of the organized counteraction is achieved in the case of creation of a separate subsystem of counteraction under a single leadership. The objectives of this subsystem are described in the research [7]. To counter destructive IPI, the use of the information and analytical technologies (IAT) developed by trained experts in the information and psychological sphere is a priority. The use of IAT requires continuous monitoring, whose tasks are assigned to the IAP system of

the IPAC management process. The monitoring program includes currently known features of informational and psychological impacts.

Two components are usually distinguished in the structure of the IAT - *automation in command and control* (instrumental direction) and *algorithmization of analytical work* (methodological and organizational direction) [34, 36, 37]. The use of the IAT is an additional tool for a DM under the conditions of shortage of time, incomplete data on the situation, as well as vague and inaccurate information about the intentions and actions of the enemy.

Current experience shows that the use of the IAT in order to counteract destructive IPI can:

• significantly reduce the burden on a DM regarding measures and methods of the counteraction;

• simplify the systematization and summarization of data required for IPI content analysis, detection of signs of action, attack, operation or aggression;

• provide data reformatting for easier perception;

• provide automation of indication of data that have contradictions (in the presence of appropriate procedures for their formalization);

• provide automatic indication of expected situations by setting tasks for automated systems, as well as increase the efficiency of IAS by algorithmization and standardization of analytical procedures, etc.

As it can be seen from these functions, the IAT are not a simple set of software and hardware data processing, but mostly special techniques suitable for their implementation with or without the use of automation tools. Unlike information technologies, which are designed to organize data sets for processing in the interests of the management process of IPAC to aggressive actions of the enemy, the essence of the IAT is the intellectual, creative content of analytical procedures carried out by a DM.

Thus, based on generally accepted approaches, the IAS of the management process of IPAC can be presented in the form of three components: methodological, technological (instrumental) and organizational support. The recommendations given in the research [9] on the methodological aspects of the IAS process of preparation and implementation of partial operational tasks by entities of asymmetric counteraction, reasonable determination of entities for asymmetric actions and evaluation of SO (LSO) effectiveness are the basis of IAS for the IPAC management process and need their integration in the existing methodological base of the IAS of the NSDC as a coordinating body on national security and defense under the President of Ukraine.

The process of integration should take into account the real state of implementation of IAT in the management activities of the SDSU entities, which can be included in the structure of IPAC and the needs of the NSDC. For example, the process of integration of the IAS system in the United States began in 1996. The

IAS entities in the US administrative bodies have begun to improve the tools that ensure effective information interaction of analytical services. In 2000, a joint center for the conceptual development of information extracted by intelligence agencies was established, and in 2001 the work to explore options for integrating and rearranging the means of extracting and analyzing information within the US Intelligence Community was resumed [31, 34].

As the experience of militarily developed countries shows, IAS of the management process allows to increase the efficiency of decision-making and its validity by 30 - 40%, which is quite fair for the management process of the integrated potential of asymmetric counteraction [21].

In this respect, Ukraine lags far behind the world's leading countries, although in 2000 the Decree of the President of Ukraine "On improving the information and analytical support of the President of Ukraine and public authorities" of 14.07.2000 № 887/2000 was issued. The main reasons for this situation have been and remain [37]:

- imperfection of the methodological base of the IAS;
- inconsistency of the pace of analytical data processing with the pace of its receipt;
- conceptual, methodological, technological inconsistency of procedures of information-analytical data processing and disunity of information resources in the system of IAS SDSU;
- inconsistency of the level of development of means of automation of processes of the analysis of situations and administrative decision making to a level of complexity of the solved tasks;
- low clarity of presentation of analytical materials and lack of trained staff (analysts), etc.

The events of 2014 gave some impetus in this direction. An information and analytical center within the NSDC were established. Its task was to prepare proposals for information support of the activities of the executive authorities, the Armed Forces of Ukraine and other MF, law enforcement agencies of Ukraine in order to stabilize the social and political situation in Ukraine and counteract the negative information impact on the population of Ukraine and its international image; to prepare analytical and forecast support for the activities of the NSDC in order to coordinate the activities of the executive bodies regarding national security in the information sphere, etc. [38]. Scientific support of the center's activities was provided by the National Institute for Strategic Studies, and organizational, technical and other support of the center's activities, work of expert and working groups were provided by the Office of the NSDC of Ukraine.

In modern conditions, organizational and technological issues of this process are in the plane of the requirements of regulatory documents [1, 13, 15] and the real state of funding of information and analytical structures of the SDSU. To provide

information and analytical support to the activities of the NSDC on coordination and control over the activities of executive bodies, law enforcement agencies and MF in the field of national security and defense in peacetime, during special periods, including martial law, emergency and in case of crisis situations that threaten the national security of Ukraine, the Decree of the President of Ukraine established the Main Situation Awareness Center (MSAC) [39].

Despite the fact that the MSAC is defined as a software and hardware complex for collecting, accumulating and processing information necessary for training and decision-making in the field of national security and defence, in the MSAC the task of accumulating and summarizing only reliable verified data under which strategic decisions in the sphere of national security will be made remains relevant. To this end, a model of the MSAC, in particular in terms of requirements for the data transmitted to it, as well as routes for their transmission was developed.

To improve the work of the MSAC in the management of IPAC, it is advisable to develop regulations for the interaction of the SDSU components and improve their coordination by the NSDC of Ukraine in the interests of training and decision-making in the field of asymmetric counteraction. It is clear that the IAS of IPAC management requires the use of appropriate technologies for managing information resources: formation, processing, protection, storage, use, etc. And all operations on information resources of the IAS of IPAP must be planned, organized, controlled, accounted, regulated and coordinated in advance on the basis of the MSAC [21].

Thus, the proposed IAS of the process of managing the integrated potential of asymmetric counteraction is based on the theory and methods of expert systems, EVPS, analysis of hierarchies, etc., which will help to determine the purpose and objectives of asymmetric actions, concept of SO (LSO), substantiate the tasks to the SDSU entities on asymmetric counteraction, evaluate its effectiveness, etc. under the conditions of uncertainty of information.

The complexity of managing IPAC to aggressive actions of a militarily stronger enemy requires not the usual accumulation and consumption of raw data within the IAS, but the use of new IAT and the creation of centers for their implementation and use. This is possible for account of the development of telecommunications support of situational centers and centralized coordination of processes of improvement of their methodological and technological base of information and analytical activities support.

The implementation of the proposed recommendations for improving the methodological and organizational components of the IAS in practice will significantly increase the efficiency and validity of decision-making (30… 40%) in the context of asymmetric actions and reduce conceptual, methodological, technological inconsistencies in the IAS system of the SDSU.

Recommendations for improving the IAS of IPAC management processes can be used in the development of special mathematical and software situation centers of the SDSU entities and the integrated IAS of the MSAC of the NSDC of Ukraine.

9.4. Recommendations for improving the legal support of asymmetric use of defence forces in counteracting a militarily stronger adversary

Improving and implementing the regulatory framework in the sphere of MS is one of the priority areas for improving the efficiency of formation and implementation of military policy. During the years of independence, Ukraine as a whole has developed a set of documents that define its principles, priorities, main entities and objects of military policy, lists of national values, national interests, national goals, threats to national interests and ways to develop national security, etc [11, 40]. At the same time, the armed conflict in eastern Ukraine in 2014 became a long-term factor influencing the political, economic, military and social spheres of national security of our state. Almost all international guarantees for Ukraine proved to be ineffective when one of the guarantors of its security acted as an aggressor [2]. Under these conditions, the threats of a hybrid nature and their level are not fully understood not only by civil society, but also by governmental agencies responsible for the comprehensive confrontation with an external aggressor and the prevention of internal challenges aimed at violating the territorial integrity of the state. There is also a lack of legitimate tools for organizing an adequate confrontation, and peacetime instruments are ineffective in the new conditions for the functioning of the state [3].

The urgency of developing recommendations for improving the legal framework for the asymmetric use of defence forces in counteracting a militarily stronger enemy is determined by the fact that the problem of ensuring national sovereignty and territorial integrity remains important for society and the state.

In the conditions of the armed conflict, ensuring national sovereignty and territorial integrity are vital national interests, the reliable protection of which from risks and threats is provided by all available political, economic, information, legal, diplomatic and military means. At the time when the state performs the function of defence, the restoration of national sovereignty is impossible without the appropriate legal support [41].

The current period of the development of military law science in Ukraine is characterized by a significant increase in the interest in this area caused by many circumstances. In the context of the conflict, the importance of the military sphere as a whole and the need to increase Ukraines defence capabilities are growing. There is a clear understanding among experts that the development of research in the field of military law should be aimed primarily at the needs of practice, closing gaps in

the legal regulation of the military sphere, and military legal research on military security should be comprehensive.

In general, it can be noted that modern publications [42-46] and studies [47-49] cover topical issues of systematization of military legislation, regulatory and legal support of Ukraine`s defence. However, very little attention has been paid to asymmetric measures to counter military and hybrid threats. That is why the introduction of technologies for the preparation and conduct of asymmetric warfare into the practice of providing MS requires appropriate regulatory and legal support.

Ukraine`s national security policy is based on the respect for the norms and principles of international law. Peacemaking and restoring the sovereignty and territorial integrity of Ukraine within its internationally recognized state border is the highest priority of the state [1].

Priority areas are strengthening defence and security capabilities, strengthening Ukraine`s international support and effective use of international assistance, as well as maintaining consolidated international political, economic and legal pressure on the aggressor. At the same time, the National Security Strategy states that the current pace of rearmament of the Armed Forces of Ukraine and other components of the defence forces with the latest (modernized) models of AME does not meet the need to replace the main Soviet-made armament and military equipment, which will run out of resources in the near future, and the lack of financial resources makes it impossible to ensure the production and purchase of modern samples of AME in the required amounts. Together with the imbalance of military potentials of Ukraine and the Russian Federation, these factors necessitate the introduction of new approaches to ensuring the MS, based on asymmetric counteraction to military and hybrid threats (military and non-military forces and means of defence forces) in places unexpected for the aggressor state. This will allow further development of deterrence capabilities, which is the main task in the sphere of MS. At the same time, the priority is the combat-ready Armed Forces of Ukraine, prepared and motivated military reserve and effective territorial defence, which together with the capabilities of other agencies of the security and defence sector can cause such unacceptable for the adversary losses on land, in the air, at sea and in cyberspace that will prevent the realization of its aggressive intentions. The fulfillment of this task, as the experience of the joint use of security and defence forces in the East of Ukraine has shown, becomes impossible without the appropriate legal support.

The basis of legal support are normative-legal acts – official acts of decisions of authorized subjects of law, which establish (change, cancel) legal norms for regulation of public relations. A normative-legal act is a decision of a law-making body aimed at establishing, changing or repealing the rules of law which performs two equivalent functions: the legal source of law and the rule of law, ie acts as a way of existence and expression of law. The main difference between a normative act and other legal acts is that, firstly, a normative legal act establishes new rights and

obligations that did not exist before, or changes (cancels) them, and secondly, it contains rules of law of a general nature, while the individual act (the act of application of the law) has an individual orientation [50].

By regulatory and legal support we mean a set of measures to implement the requirements of Ukrainian legislation for the successful solution of national defence problems. The content of normative-legal support of state defence tasks is determined in state laws, other normative-legal acts, normative-legal agreements, by-laws, etc., which are established by the state power (competent state body). In turn, the normative and legal provision of the asymmetric use of defence forces in counteracting a militarily stronger enemy must be an important component of it. The legal framework for national security determines that the MThs should be eliminated or neutralized primarily by non-military (political, economic, informational, psychological, diplomatic, etc.) methods and means, and in case of their low effectiveness – using military-political, military-technical, special and other methods and means to ensure a sufficient level of military security of the state [50].

The main non-military tools for the achieving those goals in accordance with the developed Concept [7] should be:

- balanced policy of ensuring sufficient defence capabilities;
- renewal of security guarantees provided to Ukraine for voluntary renunciation of nuclear weapons;
- mutually beneficial strategic partnership;
- active measures in the information space;
- effective cooperation with international organizations and unions on the basis of balance of interests, etc.

Those non-military tools can be fully used in planning the asymmetric use of defence forces in countering a militarily stronger enemy, which has some differences from the defence forces employing in the organization and implementation of symmetric countermeasures. Despite the measures taken to improve the legal framework for the use of defence forces after the beginning of the aggression against Ukraine, at present the legal acts in the sphere of defence only fragmentarily determine the possibility of using asymmetric counteraction to the aggressor. This is primarily due to the fact that the theoretical foundations of asymmetric counteraction to a militarily stronger enemy are still being developed, the mechanisms and tools for creating the integrated potential of such counteraction have not been fully defined. Moreover, modern experience has shown that in the face of military threats, especially of a hybrid nature, the neutralization of which required the involvement of various components, both security and defence forces, there were difficulties primarily in the legal support of formations and military units of the Armed Forces of Ukraine (an example is the anti-terrorist operation in the east of Ukraine).

Thus, according to [42, 44], the legal framework for the functioning of the security and defence sector of Ukraine, as well as the employment of the Armed Forces of Ukraine in conflict situations at the beginning of the armed aggression of the Russian Federation had certain contradictions and did not meet the urgent needs due to the lack of delimitation of government agencies in the sphere of national security and defence. The system of command, control and coordination of security and defence operations has not been clearly defined.

The importance of these strategies lies in the fact that in order to manage any system, it is necessary to clarify its components and distribute the powers of the relevant government agencies. The lack of a clear understanding of this issue, as experience has shown, for example in Bulgaria, hides the insecurity of weakening and chaotic changes in the distribution of responsibilities between agencies in the implementation of their main activities [51]. Thus, in the Bulgarian Constitution, the concept of the "Armed Forces" covered almost all elements of the security sector, which also influenced the development of the Act on Defence and Armed Forces, which came into force in 1995. In accordance with the strategies of this act, all special services (in particular, the national intelligence service, the national security service) have been included in the Armed Forces. In addition, there was a discrepancy between the status of the president as the supreme commander of the Armed Forces (which included all special services) in peacetime and during the war and his symbolic role as head of state deprived of any constitutionally recognized presidential power in peacetime and during the war. According to [51], this uncertainty and inconsistency led to violations of the Constitution, namely in the articles of the Defence and Armed Forces Act, which gave the president an additional power. It is the president who must approve all strategic plans for the use of force, orders to mobilize and prepare the country for the war, to declare a higher level of readiness of the Armed Forces, to conduct operations (combat operations), and so on. For the thirteenth year after the adoption of the 1991 constitution, Bulgaria did not have a central body to coordinate and manage the activities of the security sector.

In Ukraine, the system of national security was formed with the adoption of the Law of Ukraine "On Fundamentals of National Security of Ukraine" dated of June 19th, 2003. Subsequently, Ukraine`s foreign policy orientations changed quite frequently in the context of integration into European and Euro-Atlantic structures. In general, this negatively affected the organization of Ukraine`s national security system and its ability to effectively counter threats. The aggression against our state and the manifestations of separatism in some of its regions led to the testing of the national security system for strength. This situation necessitated, on the one hand, the need to take decisive measures to repel aggression, and on the other – demonstrated the unwillingness of the domestic security and legal system to act in special conditions. Numerous shortcomings in the legislation led to the extraordinary

nature of the response, which led to complicated legislative constructions, some of which, for a number of reasons, immediately proved their own unviability, while others significantly complicated the legal regulation of public relations in defence [52].

In 2018, after the adoption of the Law of Ukraine "On National Security of Ukraine", the process of building a new model of the security and defence sector was launched, which includes: security forces; defence forces; defence-industrial complex; citizens and public associations that voluntarily participate in ensuring national security. This law, adopted during the armed aggression of the Russian Federation, differed significantly in content from the Law of Ukraine "On the Fundamentals of National Security of Ukraine" of 2003. The strategies of the law define and differentiate the powers of government agencies in the spheres of national security and defence, create a basis for the integration of procedures of state authorities, other state agencies whose functions are related to the NS of Ukraine, as well as security and defence forces. The system of command, control and coordination of operations of security and defence forces has been defined. Thus, in accordance with Article 14 of this Law, coordination in the spheres of national security and defence is carried out by the National Security and Defence Council of Ukraine. Thus, along with other important coordination functions, it has the authority to submit to the President of Ukraine proposals for the establishment of a supreme collegial strategic body of military leadership by the state defence in a special period.

Article 16 of the Law also defines the authority of the Commander-in-Chief of the Armed Forces of Ukraine, who is responsible for the readiness to perform assigned tasks and for direct military command of the Armed Forces of Ukraine, as well as forces and means of other agencies of the defence forces transferred to his subordination. The functions of the strategic command of the Armed Forces of Ukraine and other components of the defence forces in a special period are performed by the General Staff of the Armed Forces of Ukraine. The position of the Commander of the Joint Forces was introduced, who reports to the Commander-in-Chief of the Armed Forces of Ukraine and through the Joint Operational Staff carries out the operational control over the obtaining operational (combat) capabilities, planning the use and direct command of the joint forces and means of the Armed Forces of Ukraine and other components of the defence forces, which are transferred to his command. The Joint Operational Staff of the Armed Forces of Ukraine acquires the status of a body managing joint and inter-services troops (force) formations. Assigning the Joint Operational Staff of the Armed Forces of Ukraine to perform tasks related to the unification and implementation of both military and non-military measures to ensure national security and defence in the East of our country has provided relevant experience that can be used to strengthen the military security of Ukraine as a whole. [53].

It can be noted that the strategies of Article 16 of the Law of Ukraine "On National Security of Ukraine", 2018, are key to the organization of asymmetric use of defence forces in counteracting a militarily stronger enemy, as it defines the system of command, control and coordination of security and defence forces.

To increase the effectiveness of the asymmetric use of the defence forces in counteracting a militarily stronger enemy, it is necessary to develop documents that will define and regulate the activities of the defence forces in the performance of joint tasks. Important steps in this direction have already been taken. Thus, the General Staff of the Armed Forces of Ukraine has developed documents that define the basics of joint training and emplementing the state defence forces, namely:

- Doctrine of organizing joint training of state defence forces (determines the procedure for organizating the measures of joint training of military command echelons (governing bodies) and military units (subdivisions) of defence forces, the role and place of command and control authorities of the Armed Forces of Ukraine in this training);
- Doctrine of state defence forces training (determines the procedure, forms of joint training of military command echelons (governing bodies), military units and subdivisions of defence forces);
- Doctrine "Joint Operations";
- Doctrine of the use of state defence forces (provisional version), etc.

Planning and implementing the concept of conducting the SO (LSO) aimed at the asymmetric counteraction to aggressive actions of another state, the main strategies of which are covered in the publication [7], require rapid and mutually agreed on the place and time formation of forces and means of security and defence agencies, which are involved. At the same time, according to the experts [54, 55], the existing norms of Article 8 of the Law of Ukraine "On the Legal Regime of Martial Law" define a burdensome implementation mechanism for military command and administrations, on which the speed and efficiency of the decisions defined in the interests of SO depend. At the same time, the norms of this law do not establish by what acts the military command may independently or with the involvement of executive bodies, local self-government bodies introduce certain measures of the legal regime of martial law, which requires appropriate regulation.

To address the problematic issue outlined in [56] on the application of military legislation in case of inconsistency between the rules of legal regulation of measures to repel armed aggression, defined in the articles of the Laws of Ukraine "On the legal regime of martial law" dated of 12.05.2015 № 389-VIII [57] and "On the peculiarities of the state policy to ensure the state sovereignty of Ukraine in the temporarily occupied territories in Donetsk and Luhansk regions" dated of 18.01.2018 № 2268-VIII [58], it is advisable to amend the application of the latter Law, which was adopted later.

One of the main conclusions on counteracting hybrid threats in Ukraine`s experience is the need to strengthen information security and effectively organize

counteraction to destructive information and psychological influences on all the SDSU components by the aggressor, including the state defence forces. A significant part of the necessary measures for this is provided by the legislation of Ukraine, where in particular the Ministry of Defence of Ukraine is tasked with countering special information operations against the Armed Forces of Ukraine and other MF, as well as measures to repel armed aggression in cyberspace (cyber defence), military cooperation with NATO and other defence agencies on cyber security, information resource protection and joint protection against cyber threats. But according to [3], there is no stable theory on this issue at this time, despite numerous national and foreign professional publications. Moreover, there is not even a single understanding of the basic terminological categories of this subject area. This is detrimental to the creation of an adequate regulatory framework in this area, which negatively affects practical actions. That is why another recommendation for improving the legal support of asymmetric use of defence forces is the need to clarify the basics, mechanisms and tools for information security in regulations from the standpoint of a systematic approach, taking into account the organization and conduct of asymmetric counteraction to a militarily stronger enemy by means of defence forces.

The results of a study conducted by a group of experts [3] showed that the Armed Forces of Ukraine lack a system of preventive detection and quantification of the level of negative IPI on the personnel of troops (forces) during their training and employment. This significantly complicates precautionary measures to stabilize the moral and psychological condition of the Armed Forces and other components of the Defence Forces, especially during their asymmetric use, despite the fact that the Ministry of Defence and the Armed Forces have many units that can directly perform these functions as part of the specified system.

In general, the functions of structural units of the Ministry of Defence and the Armed Forces of Ukraine in the information sphere, which are defined by the current legal framework, make it possible to propose options for the division of powers of each of the structural unit, namely:

- Defence Inelligence of the Ministry of Defence, Strategic Communications Coordination and Monitoring Department;
- Communications and Press Office;
- Directorate of Information Technologies;
- Main Directorate of Psychological and Moral Support, etc.

The working body of the enemy`s IPI counteraction may be the Center for Information Counteraction of the Joint Operational Staff of the Armed Forces of Ukraine, which on the basis of the received reports determines the level of negative informational and psychological impact on personnel and prepares proposals to the leadership of the Armed Forces of Ukraine.

Given that the defence forces restrain the main burden in countering aggression by Russia, we can agree that it is appropriate to consider the issue of asymmetric counteraction in the information sphere on the basis of legislative axioms, the essence of which is set out in [3]. At the same time, it is expedient to consider fundamental the strategies of Article 17 of the Constitution of Ukraine, which stipulates that ensuring information security of Ukraine is the most important function of the state, the concern of the entire Ukrainian people. This requirement is placed on a par with the protection of the sovereignty and territorial integrity of Ukraine and ensuring the economic security of the state, which means, according to the team of experts, the highest state priority [3].

In the course of asymmetric use of defence forces in counteracting a stronger enemy, it is also advisable to use the mechanisms and tools of strategic communications as an important part of information security. The issue of developing strategic communications in Ukraine was first raised in 2014 as part of the implementation of the decisions adopted at the NATO Summit in Wales. The Alliance provided advisory, practical and logistical assistance. Continuous improvement of legislative and regulatory support for the use of strategic communications in the interests of the use of defence forces is a priority. Now we can say without exaggeration that the development of strategic communications is one of the main directions of improving the defence forces command and control system.

Thus, the need to improve the legal framework for the asymmetric use of security forces against a militarily stronger state is generally determined by the strategies of the National Security Strategy of Ukraine, which states that the systemic protection of Ukraine from threats to national security requires the development of the security and defence sector. To this end, Ukraine should take the following measures: review and ensure the implementation of legislation in the field of national security and defence, in particular to clarify and implement the strategies of the Law of Ukraine “On National Security of Ukraine”; to create a system of effective management and coordination of the security and defence sector activities, to improve its architecture, etc. [1].

Given the asymmetric use of defence forces to counter a strong state, it is positive to start developing a completely new document at the strategic level – the Defence Plan of Ukraine as part of defence planning, which contains a set of documents defining the content, scope, executors, procedure and timing of political, economic , social, military, scientific, scientific and technical, informational, legal, organizational, other measures of the state to prepare for the armed defence in case of the armed aggression or armed conflict [57]. It is also worth mentioning the political and legal event of significant and historical significance, which took place in Ukraine in late 2018. After five years of actual war, martial law was imposed for one month. The reason is the aggression of Russia`s border ships in the Kerch Strait.

Time has shown that the military and political consequences of this step have been quite positive. At the same time, the introduction of martial law led to a number of legal consequences and revealed weaknesses, including the imperfection of certain strategies of Ukrainian legislation [3, p. 46]. In view of the above, the National Security and Defence Council of Ukraine adopted a decision “On the results of the imposition of martial law in Ukraine” [58].

It can be noted that the nature of modern military conflicts and changes in the security environment around Ukraine determine the features and forms of use of the Armed Forces, other MF and law enforcement agencies, which undoubtedly requires changes in the national legislation and clarification of guiding documents on their joint application appropriate to the needs for the use of defence forces (asymmetric and symmetric).

Measures and topical issues of the adaptation of military legislation in accordance with the needs of functioning and projected conditions of defence forces in case of aggressive actions against Ukraine by other states, taking into account the declared course of the European and Euro-Atlantic integration require the involvement of scientists, lawyers and defence experts.

Certain strategies of legislative acts in the sphere of defence require the continuation of active work of specialists on their appropriate coordination with each other, taking into account the Law of Ukraine “On National Security of Ukraine” 2018, the implementation of international law and European countries in the national legislation.

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CONCLUSIONS

Part 1 "Methods and technologies for complex employment of military and non-military forces and means in the security and defence sector for countering modern threats to the military security" presents the results of the development of a methodology for the integrated employment of military and non-military forces and means of the security and defence sector to counter modern threats to Ukraine's military security. They all are set out below.

The security environment in the 21st century, which is formed in the conditions of globalization, is qualitatively more complex and requires readiness to counteract the more complex threats to both individual and society. Such threats include the so-called hybrid threats that combine military and non-military components.

The peculiarity of hybrid threats is purposeful, adaptive to the target state and to the specific political situation. The complex of hybrid threats has characteristics that ensure its effective use at all stages of the so-called hybrid warfare. Such complex, thanks to unique synergy ,carries much more devastating force than a simple sum of threats that are part of it. This feature predetermines their powerful destructive potential. The synergistic effect from the threat of this type is ensured through the implementation of a system of integrated and interdependent preparatory and follow-up activities related to the coordination of a significant number of actors operating on the territory of the target country and beyond.The success is facilitated by the effective use of factors that determine the high dynamics of the situation and the process of controlling the use of both non-military and military solutions.

The purposeful nature and high dynamics of the transition of hybrid threats from the category of potential to the actual ones require careful preliminary elaboration of countermeasures at the state level.

To solve these problems, the state should focus on analytical structures, creative politicians, militarymen, diplomats who have to respond adequately to the rapidly changing situation in the country and region.

Military power remains a legitimate tool in resolving political, economic, ethno-national and other contradictions.

Transformation of views on the conduct of modern wars and conflicts is in change of their goals, they are destruction, looting, occupation, regime change, immersion in chaos, usage as an instrument for the realization of its geopolitical interests, for a example, the country's involvement into an armed conflict with the chosen for destruction (weakening) by the enemy.Characteristic is the fact that due to the technologies used at the present stage, such goals can be achieved without the employment of lethal weapon.

In the late 20th century, new concepts of a “war of controlled chaos”, a “color revolution”, “hybrid wars/warfare” and “hybrid threats “, according to researchers, are the new types of on-going conflicts, based on subversive innovation technologies. The SDSU must be ready to respond appropriately in the specified conditions.

In order to ensure the realization of Ukrainean national interests and to eliminate or neutralize the threats to the security of the state, in particular the military, it is necessary to forcas providing the necessary capabilitiesof the SDSU agencies. At the same time, the experience shows that in view of the complexity (hybridity) of these threats, to prevent their influence (to reduce such influence to a safe level) is possible only by joint (integrated) efforts of both “hard” power and “soft” power agencies of the SDSU.

The strategic direction for ensuring military security is the combination of (complex) employment of “hard” power and “soft” power agencies of the SDSU, which requires a thorough scientific justification, the development of theoretical foundations and scientific and practical recommendations to counter the threats to the military security of Ukraine.

The scientific problem solved in this research is to develop a methodology that could be used to justify methods for the integrated (complex) employment of military and non-military powers and means of the security and defense sector to counter current threats to the military security of Ukraine.

The developed organizational and methodological bases of security support for the realization of national interests provide an opportunity to carry out a scientific justification of tasks for the joint activity of the agencies ensuring the NS to eliminate or neutralize the identified threats to national interests at a specified time interval. The distribution of tasks carried out in this way also enables to allocate responsibility for their implementation in the system of ensuring national security, improve management and expand the possibilities for civilian control, move to centralized comprehensive provision of the process of realization of national interests, strengthen the influence of non-governmental organizations on the ensuring the defence of the state.

The concept of the integrated employment of “hard” power and “soft” power agencies of the SDSU for the ensuring the sufficient level of military security of the state, the essence of which is to form a holistic approach to the definition of goals, objectives, tasks, necessary capabilities and resources, as well as principles and a conceptual model for the formation and management of integrated potential of countering the military threats to the character, it allows to provide the given level of de-escalation of the detected (predicted) threats and rationally use of the resources. The proposed conceptual model of creating the integrated potential for counteraction to MThs, provides an opportunity not only to justify the rational composition of forces and means for de-escalation of detected (predicted) threats, to

evaluate the real possibilities for neutralization of specific MThs in accordance with the military security strategies adopted in the state, but also to assess the effectiveness of the individual forces and means of the security and defence sector, which are integrated to de-escalate the threats to the state.The considered conceptual descriptions of partial models contain doctrinal positions that should be used during the formation of technical tasks for the development of partial computer programs that are communicated with the software of the Main Situation Awareness Center.

The monograph presents a methodological apparatus, that was developed for the first time. It is aimed at the de-escalating threats to military security with the integrated employment of "hard" power and "soft" power means. The main components of it are:

- *method of adaptive management of the integrated potential for counteracting military threats,* the essence of which is the consistent implementation of certain procedures aimed at obtaining the necessary information on the threat of warfare and its characteristics, assessing on their basis the required level of de-escalation, identifying the capabilities (the required capacity) of the SDSU agencies for complex employment in the management of counteraction to these threats, the formation of partial neutralization objectives for each entity involved in. As a result, it enables to justify the rational composition of forces and means and their necessary capabilities for de-escalating detected (predicted) threats to the desired level within the resources allocated by both the state and non-governmental resources;
- *method of adaptive management of the integrated potential of counteraction to military threats,* which implements the objective function of the method by connecting a set of functional blocks, which perform predictive, computational and comparative procedures for assessing the level and nature of the identified threat, determining the necessary "neutralization shift" of this threat applying Ishikawa methods, expert evaluation and advanced method of analysis of hierarchies, formation of group of agencies and justification of neutralization tasks for each agency, applying expert estimation methods, generation of ideas, forecasting and mathematical modeling, in such a way that the joint use of the selected agencies under a single guidance ensures the de-escalation of the identified threat to an acceptable level;
- *method of creation of a group of SDSU agencies for a comprehensive counteraction to the identified (predicted) threat,* the essence of which is to determine on the basis of received information about the MThs and their characteristics of the rational (desired) level of de-escalation ("neutralization shift") threat and formation of the necessary for this group of "hard" power and "soft" power agencies, each of which defines its vector of neutralization tasks and establishes the necessary level of their implementation in such a way that the projected level of de-escalation of the threat has reached the desired level, if

sufficient resources are provided, that allows more rational use of resources in the system of military security of the state;

- *methodology of creation of a group of SDSU agencies for a complex counteraction to the identified (predicted) threat* , the essence of which is to determine the order of creation of such a group of "hard" power and "soft" power SDSU agencies that are capable of preventing exceeding the level of insecurity from the detected (predicted) threat of warfare compared with it is acceptable, if the sufficient resources are provided, by sequentially executing certain procedures with information on the characteristics of the identified threat, and determining the desired level of de-escalation of the threat, determine necessary group of "hard" power and "soft" power agencies SDSU. This makes it possible to make more economical use of the resources allocated to ensure the military security of the state;
- *methodology for designing the necessary capabilities of the integrated potential of de-escalation of threats at the executive level,* the essence of which is the formation of a target function that formally describes the process of implementing the necessary "neutralization shift" of the identified threat by a group of "hard" power and "soft" power agencies of the SDSU. The project capabilities of the agencies to form an integrated potential for neutralizing the threat is determined by the solution of the inverse problem with the employing the improved analytical hierarchy process (AHP), taking into account the nature of the threat and resource limits.This makes it possible to adapt to the level and nature of threats and to make the most integrated use of the existing integrated potential and thus more rational use of military and non-military (hybrid) instruments, as well as resources allocated in the state for providing its military security;
- *method for assessing the effectiveness of the integrated employment of military and non-military forces and means in the military security system*, which, based on the information received on the threats detected, their characteristics, the selected group of military and non-military agencies, the integrated potential of countering the identified threat, the form of the use of a certain group of agencies and the assessment of the achieved "neutralization shift", taking into account the resources spent on this criterion for the relative "saving" of resources to provide the necessary "neutralization shift" at the time of forecasting, gives the opportunity to receive a quantitative assessment of the effectiveness of the existing integrated potential of the selected group of military and non- military agencies and means in the system of ensuring the military security of the state, which can be used in the future in the military security system to assess the quality of management decisions regarding the options for involving military and nono-military agencies to counter threats to the military security of the state on the criterion of relative "economy" of resources;forecasting the effectiveness of asymmetric and other power or hybrid measures that may be proposed to eliminate or de-escalate the detected threats, as

well as to justify the necessary resources to achieve a given level (degree) of neutralizing a wide range of threats.

Furthermore, the conceptual apparatus in the field of military security has been specified and systematized, in particular, the following new concepts have been introduced:

- “integrated potential of countering threats” - formed the rational composition of SDSU agencies and identified their necessary capabilities, the realization of which is planned to be carried out with intention to eliminate and neutralize the threats to the state's military security within the limits of resources allocated by the state;
- “management of the integrated potential of counteraction to military threats” – the process of neutralizing the detected (predicted) threat by a certain group of agencies by executing at a certain time interval by each agency the assigned tasks in a single executive system of SDSU т to achieve the desired (given) level of threat de-escalation etc.

Recommendations for improving the effectiveness of counteraction to the threats to the state's military security in the conditions of resource limits are justified. They are:

- clarification of tasks and improvement of technologies for monitoring threats to the national and military security of Ukraine;
- integration of efforts of military and non-military agencies of the security and defence sector to neutralize threats of war;
- automation and informational and analytical support of management of the integrated potential for counteraction to military threats to ensure a certain level of military security of the state;
- creation of databases of non-military measures that can be used to form an integrated potential for the de-escalation of threats at different stages of conflict development.

Part 2, the “Methods and technologies for asymmetric response of the security and defence sector to threats to the military security of Ukraine”, presents he results of the development of the methodology for asymmetric response of the security and defence sector to threats to military security in the interests of ensuring a sufficient level of military security of Ukraine. They are set out below.

There is an analysis of the views of the military leaders of developed countries on the use of asymmetric actions in armed conflicts of the 20th-21st centuries. It is established that in modern conflicts there is a paradigm shift in warfare. The role of non-military ways of achieving political and strategic objectives is growing, which in terms of their effectiveness mostly exceed military means. Significantly increases the power of information and psychological influence on the population of the target state, aimed at changing the main geopolitical potential of the state – national mentality, national values, history, culture, moral condition of people.

The concept of asymmetric response of the security and defence sector to threats to military security to ensure a sufficient level of military security of Ukraine is developed. That presents a holistic approach to defining goals, objectives, capabilities and resources, as well as principles and conceptual model of integrated asymmetric countermeasures to the military threats, which makes it possible to justify the rational composition of forces and means to ensure a given level of de-escalation of threats and rational use of the resources allocated for this purpose.

The methodical apparatus was developed to substantiate the necessary potential of asymmetric reaction, entities and their necessary abilities for achievement of the defined level of efficiency of asymmetric counteraction, which basic components are

a) the developed method of substantiation of the administrative decision on asymmetric reaction to the state MS ‘ threats as well as methods of the analysis of the security environment and substantiation of the administrative decision on asymmetric reaction to the military security’s threats are developed on its basis.

The developed methodologies enable to identify in advance the interests of other states projected on the territory of Ukraine, the destructive processes they generate to disrupt the sustainable development of Ukraine, assess the strength of their impact on significant spheres of national security, predict threats that will require deascalation;

b) the developed method and technique for forming a group of defence forces to implement the plan of the asymmetric counteraction to the detected (predicted) threat, bringing in the operation of asymmetric counteraction of the maximum damage to the enemy in the selected vulnerability, while having provided sufficient resources;

c) the developed method and technique for assessing the effectiveness of asymmetric counteraction in the interests of ensuring a sufficient level of military security of the state, which, on the basis of information on military threats and their characteristics, the design of the asymmetric counteraction operation, the selected group of entities, the most appropriate scenario of asymmetric impact on the enemy at the chosen vulnerability, allows to predict such a level of damage to the enemy by the criteria of allowable casualties, AME of the aggressor state, under which he is forced to refrain from further aggression.

Recommendations for improving the effectiveness of de-escalation of threats to Ukraine's military security through asymmetric actions of the security and defence sector are substantiated, including:

- on the choice of vulnerabilities of the aggressor to inflict unacceptable damage on it;
- on defining the oblectives of the components of integrated capacity in LSOAC;

- on automation and IAS of command and control of the integrated potential of asymmetric counteraction;
- on improving the regulatory and legal support for the asymmetric use of defence forces.

The conceptual apparatus in the field of military security has been clarified and systematized, in particular, the following new concepts have been introduced:

- “the integrated potential of asymmetric counteraction to threats ” – a set of SDSU agencies or forces and means, allocated by them, with certain necessary capabilities, which are planned to be realized according to a single plan for asymmetric unacceptable damage to the opposite side, for which it is forced;
- “ formation of the integrated potential of asymmetric counteraction to threats to military security of the state ”– iterative process of selection of SDSU agencies and determining their necessary capabilities for asymmetric unacceptable damage to the opposite side, for which it is forced to refuse further aggressive actions;
- “enemy vulnerabilities ”– objects, systems and resources (or their combination) in certain areas, which under conditions of destructive impact on them significantly limit the enemy's ability to continue aggressive actions and create favorable conditions for neutralizing threats in the areas to which they are directed. Such vulnerabilities may be the objects of military, economic, information and moral-psychological potential of the aggressor country and its armed forces; security of critical infrastructure facilities; survivability of reconnaissance, command and control, fire damage systems; security of life support systems of the enemy's MFs, its law enforcement agencies, especially special purpose ones; security of its critical information infrastructure; international image of the country and its political leaders, etc.

The ways of using the formed integrated potential of asymmetric counteraction to the detected military threat in the single executive system of SDSU concerning reaching the necessary (given) level of de-escalation of threat, has received further development.

Practical significance of the results is to develop the recommendations for improving the de-escalation of threats to Ukraine's military security by introducing in addition to symmetrical measures scientifically sound asymmetric effects at selected vulnerable points for the aggressor state to inflict unacceptable damage, for which it is forced to abandon further aggression. The developed recommendations are proposed for implementation in the activities of certain agencies of the security and defence sector of Ukraine.

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Monograph

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