METHODOLOGY OF TARGET ANALYSIS FOR THE ACTIONS SPECIFIC TO THE VERTICAL COMPONENT OF THE BATTLE SPACE

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Abstract: *Ensuring an efficient and flexible use of the air space by all the categories of the armed forces, at the same time respecting the rules and measures for maintaining order in the air space, triggers a reconsideration of the vertical dimension of the tridimensional battle space, in the sense of obtaining a certain degree of control over it allowing reaching the objectives set while land and naval operations are conducted. In this context, there is a fully understandable tendency manifested by NATO states' armed forces to integrate the air force and anti-aircraft forces in NATINADS air defense system and to create and use structures capable of engaging the air enemy, rapidly deployable, and which might comprise command-control subsystems and weapons subsystems, interoperable from the point of view of procedures, reaction speed and mobility, at the level of all categories of forces. The approach used in the present paper is centered on a clearly delimited segment of the air threat, to be more precise, on the analysis and planning of the action of air and anti-aircraft means in order to timely and efficiently engage the air enemy. Also, the article includes an analysis of the target setting process within the process of military operations' planning which facilitates the commander's selection of air targets and allocation of the combat means appropriate for engaging them, at exactly the right time during the military operation. Thus, without being complicated, the process of setting targets integrates in a constructive manner the activity of air and anti-aircraft structures and of fire support structures with the system of military intelligence, by exploiting the capacities of analysis, prediction, and intelligence gathering, allowing the engagement of targets in a unitary manner, established during wargames, in a way that has proven to be fully efficient both in conventional military operations and in the stability and support operations.*

Keywords: *battle space, air space, air operation, target, targeting process.*

1. INTRODUCTON

The modernizing and operationalizing process of the new structures acting within the vertical component of the battle space, having profound implications in the domains of military theory and military practice, has led to the necessity of elaborating a new theory to support their training, leading, endowing and manner of acting. Due to the reorganization and modernization of military structures, there is a need to adapt, organize, plan, carry out and control air and anti-aircraft operations, according to regulations in NATO forces, thus, ensuring the flexibility and rapid and efficient reaction capacity for accomplishing the missions. Thus, taking into account the circumstances of the modern battlefield and the density of users of the vertical component of the battle space, the success of operations conducted in the air space depends a lot on the coordination and synchronization of action of all the forces engaging the air enemy.

As the air and anti-aircraft systems constitute the center of gravity of the fight with the air enemy, their evolution includes increasing the reaction speed, the maneuver capacity and precision, as well as increasing the action range, while developing the organization and possibilities of air space surveillance.

The article presents the methodology of analyzing and establishing air targets, defining for the structures involved in the combat against an air enemy, stressing out the massive use of information technology in command and control structures, moreover in ensuring the interoperability of vertical component structures within the targeting process. Also, the article includes tactics, techniques, and procedures for integrating, synchronizing and accomplishing the missions specific to air and anti-aircraft structures, electronic warfare and fire support, as operating systems in the operations conducted in the air space, according to the air operation conception, applicable both in joint and combined operations.

Thus, the article synthesizes a few directions characterizing the passing to a new methodology of analyzing and setting air targets and to a new manner of working, on the basis of mainly large scale processes such as: getting rid of routine activities, massive use of information technology in command and control structures and, most importantly, ensuring the interoperability of the structures engaging the air enemy in the targeting process.

2. TYPOLOGY OF THE SPECIFIC ACTIONS PERFORMED BY THE STRUCTURES OF THE VERTICAL COMPONENT OF THE BATTLE SPACE

The joint defense of air space includes all the measures and means of air and anti-aircraft defense used for annihilating or neutralizing the efficiency of enemy reconnaissance or air attacks against own forces. The purpose of joint defense of the air space is obtaining and maintaining a certain degree of air superiority, by destroying or neutralizing the enemy air force and missiles.

According to the textbook of air defense „defending the air space represents the measures and actions conducted in order to prevent enemy air attacks or reduce their efficiency and diminish loses of own forces, equipment, and means". The mission of forces and means within the vertical component is to ensure air defense, respectively to fight the air enemy to support own forces' operations through the detection, identification, and engagement of air targets in the air space corresponding to the area established through the operation order.

Active air and anti-aircraft defense enclose all the direct defensive actions, carried out in order to annihilate the enemy offensive air actions or to reduce their efficiency. As resources, active air defense uses air and anti-air means, radiolocation sensors, information and electronic warfare systems, as well as command and control systems and weapon systems that do not have air defense as basic mission.

The specific targets for active air and anti-aircraft defense are the following: planes, unmanned aerial vehicles, helicopters and air-launched missiles.

Taking into consideration that no system of air and anti-aircraft defense can completely annihilate hostile air actions, the active air defense actions are completed with passive air defense measures.

Thus, passive air defense includes measures, other than those of active air defense, taken in order to minimize the efficiency of the enemy air attack means and the effects of enemy offensive air actions.

The passive measures include avoiding the enemy attack through engineering and deceit actions, as well as through limiting loses caused by actions of dispersion, engineering protection and recovery after the attack.

In order to defend the air space, the structures within the vertical component conduct joint actions of engaging the air enemy which are complementary, inseparable, and mutually supportive, so as to obtain a certain degree of air superiority and ensure the freedom of maneuver for the land forces.

Anti-aircraft defense includes all the actions prepared and conducted through close and direct access routes of the air enemy and is part of, together with the air structures, in ensuring the combined defense of the air space.

„The anti-aircraft defense structures can be used within offensive operations, defensive operations, stability and support operations, as well as during intermediary operations".

In turn, „the operations conducted by air structures may be divided into four categories: operations of air retaliation, strategic air operations, air operations against ground forces, air support operations, close air support operations", according to the control procedures of the air space.

The air retaliation operations are all the offensive and defensive operations conducted by all the components of joint task forces for countering the enemy air threats in order to obtain and maintain the desired degree of control over the air space.

These operations are joint and are aimed especially at neutralizing the enemy air power and gaining a superior level of control over the air space.

The levels of air space control are the following: the favorable air situation – the level of air space control in which the enemy air effort is insufficient for influencing the success of own military operations; air superiority – that degree of dominating the combat in the air space that allows conducting all types of military operations in a certain place and at a certain time without limitations caused by the interference with enemy forces; and air supremacy – that level of air superiority at which enemy air forces are unable to perform efficient interferences.

The role of air retaliation operations is to protect own forces against enemy air attacks and preserve the desired degree of freedom for accomplishing missions by limiting or forbidding the enemy use of the air space.

In order to gain control over the air space, the efforts of offensive and defensive air retaliation operations must be integrated and synchronized.

The air retaliation operations are considered „offensive“ when performed in order to annihilate or engage the enemy in the place and at the moment chosen by own forces and „defensive“ when performed as a reaction to the enemy initiative.

Strategic air operations are conducted in order to obtain the strategic effects desired, according to the political goals and constraints.

Strategic attacks are carried out against enemy centers of gravity or against other significant targets, including elements of command and basic support infrastructure, having as a purpose reaching a level of annihilation and dispersion of the enemy capabilities up to the point where they are rendered unable of carrying out combat operations or ofensive actions.

Air operations against ground forces are conducted in order to deprive the enemy of the military power necessary to seize a territory or to make use of the maritime space by neutralizing, delaying, or annihilating the ground forces or naval forces.

According to the control procedures of the air space, air operations against ground forces include air interdiction, close air support and the fight against surface naval forces.

Air interdiction is an air operation conducted in order to annihilate, neutralize or delay the enemy military potential before it might be used efficiently against own forces, at such a distance from these that it might not influence the detailed integration of each air mission with the missions of fire support forces and the necessary force maneuver.

Close air support is an air operation conducted by planes and helicopters agains enemy targets found in the proximity of own forces, which necessitates detailed integration of each air mission with those of fire support forces and force maneuver.

Air support operations cover the whole range of missions that may be performed by the air force to its own benefit or to the benefit of the other categories of armed forces, underlining the usefulness of these operations during a crisis situation or a conflict. „Air support operations include the following air support operations: air surveillance and reconnaissance operations, air transportation operations, air electronic warfare operations, air special operations, search and rescue combat operations, search and rescue operations, air replenishment operations and airborne command and control operations”.

Air surveillance and reconnaissance operations are meant to provide early warnings regarding the enemy activities and threats and to detect any changes in enemy capabilities.

The resources used by combined forces may comprise: aircraft equipped for photographic or electronic reconnaissance, TV, early warning airborne sensors, maritime patrol aircraft and airplanes within the combined system of target reconnaisance, surveillance and management, including the unmanned aerial vehicles.

Air transport operations, on the startegic as well as on the operational and tactical levels, provide the speed, flexibility and mobility that allo the components of the joint forces to be deployed, re-deployed, supported, or rapidly evacuated, and are performed both with airplanes and helicopters.

Air electronic warfare, both active and passive, has to be coordinated in order to allow the efficient use of electromagnetic space by the combined forces, at the same time taking electronic measures with the purpose of determining, exploting, reducing, or preventing it from being used by the enemy.

Air special operations are undertaken by

the forces organized, trained, and equipped especially for accomplishing military, political, economic, or psychological objectives by unconventional military means.

Command and control of airborne operations are undertaken with aerial platforms of warning, command and control, airplanes or helicopters ready for use by a commander of command forces and include airborne warning and control systems and airborne command and control centers.

3. CONCLUSIONS THE TARGET SETTING PROCESS FOR AIR AND ANTI-AIRCRAFT DEFENSE STRUCTURES

In accordance with the operation doctrine of the air force, „the target setting process is a process of selecting the objetives to be hit and of identifying the appropriate solutions for launching air and anti-aircraft attacks, taking into consideration the demands and possibilities existing at the operational level".

The process is determined by the trend set by the commander of the joint force, the possibilities of the own forces and the enemy threats and is performed at all the levels of command so as the structures specialized in fighting the air platforms both with lethal and non-lethal means.

The range and flexibility of means allow the air force and anti-arcraft forces to engage the targets at any of the three levels: strategic, operational, and tactical. Thus, the commander of the joint force establishes the objectives that have to be fulfilled and, at the same time, decides upon the targets to be hit, the apportionment of air resources and the anti-aircraft defense forces available, as well as the order of striking targets.

Establishing strategic targets is specific to the air component, in strategic level operations, and has as main objective striking the enemy through direct or indirect attacks against its centers of gravity. These operations may include hitting both military targets and targets other than the military ones, such as: communication knots, energy sources, production facilities and infrastructure.

Establishing the operational targets is meant to set those targets which, when hit, will affect first and foremost the military capabilities of the enemy and include both mobile and fixed targets. Against these, the commander of the combined force may use air and anti-aircraft means, together with the intelligence and electronic warfare structures and the special forces, within concerted actions.

Establishing the tactical targets has the purpose of setting those targets that comprise the enemy forces, means, and facilities placed in the contact zone with own forces, where both the air and the land component could act. That is why it is essential to integrate air operations in the operation plans, maneuver schemes, and firing plans of the land component, and at each echelon, the commander has to identify the high-value targets and the targets allowing a maximal efficiency of own air operations.

The methodology of target analysis, specific to the vertical component structures is a flexible process, which may adapt to any type of military operation and which allows the commander to use efficiently the available resources in order to fulfill the goals set, it is not limited in time and its stages may overlap. The deliberate and dynamic character of the methodology of target analysis supports all the short-term, medium-term, and long-term planning, creating the conditions in which the adaptability of the target-combating process allows fulfilling the commander's objectives. The commanders of the structures fighting the air enemy identify the own objectives, tasks and lists of targets leading to the accomplishment of the combined force commander and the air defense commander implements a unitary selection process of targets in order to minimize the probability of emergence of conflicting situations or the unwanted overlapping of efforts in undertaking military actions.

The actions directed at combating the known targets in a combat zone are planned actions that are performed within the targeting process. According to the doctrine for joint target management "the targeting process is a particular element of the military decision-making process and consists of six stages as follows: intention, orientation and objectives of the commander, setting the targets, validating, designating and prioritizing them, an analysis of capabilities, including establishing weapons, force planning, and mission allotment and, last but not least, evaluating the actions". Commanders use their own cycles of combating targets according to the specific needs and missions, having as common goal fulfilling the objectives of the task group commander, through the systematic selection of targets and the use of appropriate means for obtaining the desired effects. All these activities are the starting point within the decision-making process against the targets emerged in the dynamics of actions, whether anticipated or unanticipated.

Setting, validating, designating and prioritizing targets constitute the second stage of the target-setting process and includes a series of stages that contribute together to accomplishing the commander's goals.

Within this stage, in the first phase, the list of targets is elaborated, by analyzing the data base with targets for the respective operation which, in turn, is analyzed and adapted function of the strategic commander's directives and the constraints imposed by the provisions of national law. The contents of the target list is permanently updated, on the basis of the information obtained during the operation and by analyzing and integrating the list with the designated targets and the list with restricted targets in the context offered by the target list, the lists with prioritized targets will be elaborated, which are in fact the targets allotted to each structure. Depending on the level of the operation, different target lists are made in the following manner: at operational level, the list with the prioritized targets and the list with the targets that must not be engaged, and at tactical level the list with the designated targets, the list with the prioritized targets and the list with restricted targets.

Target setting is the process in which an analysis of the air enemy is carried out, in order to determine the importance and the prioritization of the targets to be engaged, in order to accomplish the commander's goals. The commander's directives, the distribution, the allotment of engagement means and demands from the structures are elements that influence the target setting process.

The final outcome of this process is the combined list with the targets selected and ranked according to priorities, list which contributes to the accomplishment of the goals of the combined operation and is part of the commander's directive. Thus, according to the commander's goals and the structures' requirements, the order of air space control is elaborated, simultaneously setting the manner of using most efficiently the air and anti-aircraft means of engagement.

The target setting cycle is complementary to the process of planning, preparing and conducting operations. This process starts with the commander's directives and priorities and continues with identifying the demands of the subordinate structures' commanders regarding the targets which are about to be hit, the ranking of these demands function of priorities, establishing and alloting the targets or groups of targets on structures, hitting the targets, evaluating the hits by the commanders and restating their directives for the future actions. Structures state their demands and designate both the targets they are able to hit and those which influence their actions and which are outside the technical-tactical means available.

After the commander sets and ranks the targets and decides upon the distribution of air resource and the allotment of the anti-aircraft defense systems, the structures plan and perform the missions given. During the operations, the air component commander leads the process of planning, coordinating, and avoiding conflicting situations connected to setting the targets that are to be hit by the vertical component structures, making sure that this process is undertaken within a single conception. Also, the air component commander makes sure that the other components' commanders of hitting certain targets are solved through the master air attack plan (MAP).

The stages of air target setting are the following:

- *The joint intelligence preparation of the battle-space* is the analytical process used by intelligence structures in order to elaborate assessments, estimates, and other intelligence products within the decision-making process of the commander. This is a continuous process involving four important phases: defining the operational environment, defining the operational environment's influence upon the own and the enemy military capabilities, assessing the air enemy, as well as determining and describing the enemy's potential courses of action.
- *Analyzing the target system* is a systematic approach meant to determine the air enemy's vulnerabilities and weaknesses, elements which may be exploited to the advantage of the own forces.
- *Identifying the components of the target system* signifies identifying the activities and functions of each component of the target system, which ensures the identification of the critical and vulnerable points.
- *Developing the model of the system* is used in order to analyze the relations among the target system components and the relations with other target systems, afterwards being used for estimating the outcomes of different scenarios resulting from the courses of action of own forces.
- *Establishing the intelligence needs* allows the permanent update with intelligence products about the air target and ensures, in case of a lethal attack, minimal risks for own forces or avoiding collateral damages with implications upon the environment.
- *Identifying the component elements of air targets* consists of establishing the most important elements of the target: position, itineraries of movement, and possibilities of repelling the attack.

Air target validation is performed according to the commander's objectives, directives and intentions, with the legal principles specific to target combating, as well as with the rules of engagement implemented. Validating the targets means checking the correctness and credibility of the sources used in the process of updating targets and is performed in order to guarantee coordination upon engaging the target in the area of operations. Targets are validated by evaluation and approves as designated targets, before planning the respective mission.

Air target designation ensures better visualizing of all the targets identified at different command levels. The list with designated targets comprises the targets proposed and ranked in order of priority, according to the commander's order, and includes two types of targets: completely new targets, not included previously in the target list, that are submitted in order to be included, and targets which are already on the list of targets selected to be included in the target prioritizing list in order to be engaged. Designated targets are centralized in a single list with designated targets which is correlated with the objectives of structure commanders and the force commander's objectives.

Air target prioritization is done starting from the objectives and guidelines given by the air defense commander in order to allow using the capabilities of force structure at maximal potential, so as to reflect the successful engagement of targets. Each target has to receive a code made of two figures in the following manner: the first one will characterize the importance of the target for the commander's objectives, that is, the level of priority, and the second one, in case two or more targets have the same level of importance, to show the level of urgency established on the time scale, that is, the level of urgency. The *priority* of a target shows its importance in reaching the commander's goals and corresponds to the degree of difficulty and the effort needed in order to obtain the desired effect upon it. The following system is used to show priority: 1-*critical*, 2-*important*, and 3-*accepted* and 4-*potential*. The *urgency* establishes the time of engagement of the targets by using the following letters thus: *A-immediately, B-urgently* and *C-normally*.

All things considered, we may say that the air target setting process contributes to fulfilling the main objective of air and anti-aircraft operations, that is, the annihilation, dispersion or neutralization of air means, missiles, enemy launching platforms, as well as the support systems and structures, as closely as possible to their base, before they initiate mission execution.

Also, it is very important that within the target-setting process, during operations, all the potential enemy targets be taken into consideration and analyzed: air means, manned and unmanned, airfields and operation bases, electronic warfare systems, C3 installations and facilities, surveillance and control systems, logistics and infrastructure, as they all have their well-defined role in supporting the air operations of the enemy.

4. CONCLUSIONS

In conclusion, in order to perform an efficient process of analyzing, setting and engaging the enemy air targets, it is vital to integrate and synchronize the actions of preparing, planning, executing, and evaluating the operations undertaken by the forces and means of air and anti-aircraft defense, intelligence and electronic warfare structures and fire support structures available, through the direct cooperation of targeting structures from the air force with those from the land forces and from the navy, with special operation forces and other specialized elements within a single conception that might allow accomplishing the mission.

Thus, training the structures fighting the air enemy with respect to the manner of selecting and engaging air targets during the operation planning and execution processes represents an imperative prerequisite of the successful participation of the forces in military operations within multinational or joint structures of forces.

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