

THE STATUS OF ARTILLERY AND ANTI-AIRCRAFT MISSILES AT THE CENTENARY CELEBRATION

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Abstract: *Most military actions conducted by modern armies have started with air operations; the employment of land and navy forces was nearly impossible without a proper air support, which increases the idea that the vertical dimension of war extends more and more involving the use of the latest discoveries of science and technology and the design of an effective use. In this article the author's intention is to review some achievements of missiles and artillery air defense weapon system, at a hundred years of existence, as a specialized entity in planning fire fights against aerial enemy, in the area of responsibility of ground forces groups.*

Keywords: *modern war vertical dimension; air defense artillery; air defense missile; air defense weapon system; fighting against aerial enemy.*

1. INTRODUCTION

The analysis of contemporary military phenomenon highlights a continuous growth of the importance and extension of *vertical dimension* in military actions [1], the role of air aggression systems and the fight-back air defense assets in modern clashes. This role results from air forces capacity to strike quickly, suddenly and with great destroying power the vital enemy targets with strong and long-lasting effects upon their capacities and consistencies of the responses. Within the current and future joint military actions their larger integrated nature is more and more visible, revealed as a complex, conceptual and pragmatic phenomenon as theory, structures and actions. It can be appreciated that for the present and future war air and ground forces will conduct operations under the most diverse scenarios, characterized by the emergence of new strategic and doctrinal aspects of means, including interoperability between states allied forces from states categories.

About the battlefield, Napoleon said that “*the permanent stage is chaos and the winner is the one who owns this chaos*”. Under current conditions, it is necessary to take into consideration to develop a command - control system that would allow the Joint Forces commander to have a complete picture of the battle space, through the information received from land, air, sea and cosmic systems. In our view, the implementation of such system will allow the combat entities involved in military actions to be employed effectively, using complex communication systems, based on accurate complete data (land, own troops and the enemy operating in all environments) in accordance with concepts and procedures for planning, deployment, common action and reaction that pursue joint missions with maximum success and minimum losses.

The contemporary technological revolution's impact, a feature of the of the third wave (electronic-informatics), on the size of modern warfare vertical component, has enabled military specialists to rethink the concept of fight back air defense anti-aircraft and to analyze it in relation with the air threat (aggression) directly, as cause and effect. In this respect we try to present some *concepts and connections developed over the 100 years* of air defense missiles and artillery (air medium / anti-aircraft security, airspace research and surveillance system, riposte fire system, anti-aircraft and missile operation, air and antiaircraft fight back, etc.).

2. INTEGRATION IN NATO EXTENDED AIR DEFENSE SYSTEM - A PRIORITY FOR NATIONAL AIR DEFENSE SYSTEM

Under the circumstances of current international security environment, NATO has defined and validated the concept regarding the implementation of the Integrated Extended Air Defense NATO (NATINADS-NATO Integrated Air Defense System), which contains guiding principles and concepts designed to fulfill the mission of collective Alliance air defense, provides real-time capabilities generated for crisis and conflicts management [2]. Enhancing the NATO role and missions in peacekeeping operation, solve the conflicts and the fight against terrorism, determines a process of adaptation to NATINADS in collective defense, to meet the needs of extended air defense and increase its contribution to crisis management.

The essence of integration is the transfer of responsibility, forces and authority need to be used by Supreme Allied Commander Europe (SACEUR) in order to defend European NATO countries against airstrikes, in peacetime, crisis and conflict. In this context, the integration of Romanian airspace into the NATO should be done with guiding principles and concepts of the Alliance for carrying out the collective air defense.

NATINADS integration represents interconnection of national air defense systems of the NATO member states in a single NATO air defense system, within Europe [2]. It has the means, facilities and operational command and control structures, efficient in peacetime, crisis and war.

In order to achieve the integration and to create a viable NATINADS is necessary to fulfill several *requirements* such as: using common procedures which, applied to the entire system, are enabling the deployment of continuous operations; common standards, the base of NATINADS elements, designed to reveal the performance; common language enabling operators to collaborate and change information quickly and clearly; state of combat readiness, according to the main risk / danger; forces availability due to operational needs, while respecting a fair division of tasks; sufficient opportunities to take part in multinational NATO exercises; joint command structure/unified, ensuring a clear division of responsibilities, which facilitates a quick running decision-making process.

At the same time, integration into NATINADS request strict adherence to clear principles: air defense units designed for SACEUR will be under the operational command and control of this body in peacetime, crisis and conflict and will be subject to any restrictions may be imposed related to the use and deployment of forces; air defense forces established will be asked to conduct missions other than air defense only with national approval; centers and command post reported will be employed, particularly with home nation in whose territory is, unless unusual circumstances dictate by other that regulations and only after receiving the national approval; the decision regarding the number, assured force structure and its equipment is a national responsibility; air defense unit will provide for allied NATO countries relevant information, of own interest, to control civil aviation, civil protection and fulfill other national responsibilities; some features, such as internal security and their own commitments outside the framework of NATO, must be covered by national responsibilities [3]. In such circumstances, the required forces can be withdrawn among the designated forces of that country, in accordance with approved procedures; at all levels, commanders are responsible for specific Alliance problems, only to higher allied authorities. In terms of subordination, forces involved in integrated air defense are grouped into several categories: designated forces (under control) NATO; forces subordinate to NATO; forces designed for NATO; forces under national command. This consist in Air Forces, Army and Naval Forces air defense units undergoing continuous training or operational process in order to maintain the required level of efficiency. SACEUR air defense mission in peacetime is to maintain the integrity of NATO airspace and protect European NATO countries and forces against air attacks. Air defense include functions such *air surveillance and police* and is the main factor in maintaining the security of the NATO member states.

In crisis NATINADS extends to support measures undertaken by Allied Command Operations (ACO), to carry out crisis management and to deter aggression, to demonstrate Alliance determination and preparation to withstand attacks from crisis area. In conflicts / war the objectives sought in air defense operations are to defend Allied Command Europe (ACE) area of the responsibility against aerial attacks, causing maximum casualties among enemy air forces through aging and creating a favorable air situation.

The latest theoretical - doctrinal concept, emerged in the last decade of the twentieth century, named *extended air defense* (EAD/AAEx), tries to combine in a revolutionary manner benefits already achieved by *integrated air defense* with benefits that are envisaged to be gained through implementation of organization, equipment and battle training doctrines. This integrated concept of all air defense actions and activities can be extended air defense system - EADS, having opportunities to revolutionize the whole concept on existing operational architecture and mode of action of air defense [4]. At a hundred years of artillery and anti-aircraft missiles existence, the configuration of the extended air defense system as organization, implies the necessity of a distinct form of correlation both between people, technical means and purposes and between people and the existing organizational structures also. At first glance it can be said that the only purpose of extended air defense system is to defend national sovereignty in the own airspace while guaranteeing freedom of operational action in the air space of interest, namely to ensure protection / direct defense and/or some close major objectives in the (task forces, social, political and economic objectives, urban etc.) against attacks taken from aero- cosmic space, by an presumably opponent.

3. LAND FORCES AIR DEFENSE, A VECTOR AIR DEFENSE INTEGRATED SYSTEM

Land forces is the basic component of the army, meant to conduct the full range of operations, terrestrial and airborne, independent, joint, or combined (within multinational forces, NATO or the EU, and UN mandated) on national territory or outside it, in any region and any direction for armed defense of the country or alliance, promoting the values of international peace and stability and the strategic interests of Romania.

According to Handbook for organization of staff and joint operations of the armed forces, citing the source,, ATP35B "Appendix 19 - staff operational language, page 27, states:,, combat forces are those forces using live fire and maneuver to engage enemy forces " and ,, support forces are forces which provides operational support for combat forces". Also, General Tactical Manual of US Land Forces, F.M. 3-90, 04 July 2001 to p.A.-2 lays "combat Arms of Land Forces are units and military in direct contact, destroy enemy forces or ensure compatibility and destructive firepower on the battlefield. Combat weapons of U.S. Army include: artillery and air defense missiles, armored, combat helicopters, genius, field artillery, infantry and special forces".

Land Forces air defense system units are part of the Integrated Air Defense (IADS- national or allied) and include various fire units: antiaircraft missiles / Surface to Air (SAM - Surface to Air Missiles), with very short range, very long-range, portable air defense systems (MANPADS - Man portable Air Defense systems) and gun systems. All air defense forces must have the ability to discover, identify, track and engage a wide range of hostile aerial means.

Air and missile defense, as a battle function of Land Forces missions, contribute to objectives fulfillment by: participating in gaining and maintaining air superiority/ supremacy; air defense forces and vital elements; participation in winning the informational war. The mission is fulfilled through the execution of air defense and missile operations. We face air defense actions at combined forces and groups levels, materialized both through missions and actions of research, control and destroy of enemy air and antiaircraft protection measures. Air defense is achieved through integrated effort of forces and means of artillery and antiaircraft missiles, radar, jamming and countermeasure electronics units, regardless of their organic subordination in a unitary coordination conception.

Land forces air and missile defense system is all specialized and non-specialized means and forces available for carrying out the defend forces and vital infrastructure elements. It must follow the principle of centralized management and decentralized execution.

We consider that, after a hundred years of experience, to achieve the goals, air and missile defense forces and means systems must be part of operational and tactical systems, which meets the following requirements: unitary organization and management; short reaction time; appropriate detection and permanent aerial target acquisition; weapons systems to their maximum possibilities; effort focuses on decisive directions and uninterrupted cooperation; stable performance; interoperability with neighboring air defense systems both national and NATO.

The vertical component of the operation summarizes all the actions and measures to be applied by own forces to counteract air and cosmic enemy [5]. Starting with the system definition, we can say that system of antiaircraft response represents a number of factors (air and missile defense forces and means) dependent each other and forming an increasingly organized structure, among which are established dynamic relations (interactions) based on which it can perform certain functions within a process suitable for the standard purpose (objective).

Air defense and antimissile respond is the *vertical element* of operations conducted by land forces, summing up all the actions and measures to be taken by own forces to counteract air and cosmic enemy. It is placed at least at the same level of importance with the operation *horizontal component*, which sums up all the actions and measures to be executed own forces, obviously in ground space and (or) water. In our view, antiaircraft and missile strikes have a particularly important role, contributing decisively to achieving the armed struggle goal through operational missions executed in all phases of military conflict.

Air defense response is a battle system with a sphere of action defined by area of responsibility airspace, putting together all activities conducted by tactical and operational forces and structures designed to prepare and conduct specific military actions within air defense fire system. Lines of evolution of air defense riposte system must satisfy certain efficiency conditions. In this respect it must: be organized and managed in a unitary conception, in peacetime and must cover the entire area of responsibility, to provide research, finding timely and continuous tracking the opponent air assets, in order to avoid surprise and to have the ability of leading combat operations against aerial enemy in all probable directions of action. Within air defense system riposte, to defend forces and the main objectives in the Land Forces area of responsibility, missiles and air defense artillery units are conducting combat *missions*: surveillance, discovery, recognition, tracking and indication of enemy air assets; fighting against aerial enemy in order to protect the main governance system; fighting against the enemy in order to participate in Land Forces air defense groups, in their area of responsibility during preparation and conducting their operations; fighting against airborne enemy, forbidding its supply and air discharge; protect the main elements of the logistics system (headquarters, combat support units). Air and missile defense takes part in air defense response against the enemy using its main component, fight against aerial enemy. With the other part air defense is involved in carrying out forces measures for insurance and protection, of warning, concealing and dispersal of forces, research and to limit the effects of aerial hits. Therefore, fight against aerial enemy in Land Force area of responsibility is a core aspect of operation [6, pp.126-128]. It covers all actions taken against aerial enemy by forces and means of antiaircraft fire system, according to commander concept, in the acting space, corresponding to area of responsibility. Air defense fire system is part of task force riposte system, developed by the combined ground forces, independently or in cooperation with structures belonging to Air Forces. It consists of: management, informational, runtime (operational), logistics insurance; security subsystem.

Fighting against aerial enemy includes all actions taken against enemy fire subsystem means and force, according to group's commander conception within the action area, in accordance with its area of responsibility [6, pp121-123]. This is characterized by: great firepower and destruction, precisely at high flight speeds, greater opportunities to destroy in short time enemy assets, maneuvers of forces and means to avoid enemy surprise, obtaining intelligence about the air strikes danger in the shortest time.

It can be carried out in any time, season and weather condition, based on information regarding enemy air system provided by own research radars and from the National Air Command Control System as the Local Aerial Picture.

The overall goal of combat actions is thwarting the air enemy assets actions during surveillance and air hits, supplies and air extraction of airborne troops and. In our opinion, the commander will achieve success in the battle against aerial enemy air by the way will require rational application of complex principles of fight, namely: freedom of action, concentrating efforts, unity of action, dispersing forces and resources, the economy of forces and means, uninterrupted cooperation and avoiding surprise, maneuver, real-time information.

4. ROMANIA PARTICIPATION IN ACHIEVING US MISSILE SHIELD

Ballistic missile proliferation, at the beginning of this millennium, represents a continuously growing threat for territory, populations and Alliance forces. The threat counteracting is performed by missile defense and other specific measures. Considering that missile defense is only one section of an extended response to this major threat, it was established that “*Alliance has to develop a missile defense capability to fulfill the fundamental objective of collective defense*” [7]. NATO missile defense capability analysis was carried out, following some principles: solidarity and indivisibility of Allied security, equitable sharing of risks and tasks. Other analysis elements were: the level of threat, affordability, technical feasibility, all in accordance with risk analyzes carried out as recently which were approved by the Alliance.

Romania, after a hundred years of experience in operational environment, has become a constant spearhead of missile defense, adopted at the NATO Summit in Bucharest (2008) by which was laid down the implementation of an integrated defense system against ballistic missiles throughout Alliance members, respecting the principles of Alliance security and collective solidarity. As American partners highlight, the program of SM-3 interceptors development is rated as one of the most successful programs run by the Department of Defense, was labeled as a system with purely defensive features. It is intended to defend against any attack taken with intercontinental missiles, with medium or short acting range, hitting the warhead in their terminal phase. Besides that, the agreement stated that the missile defense system will be used only for self-defense in accordance with UN Charter. In accordance with the Revising report of the US missile defense system, published on 1 February 2010 by the US Department of Defense, there were established four implementation stages for US missile defense system (shield) in Europe, as follows:

- **Phase I** - protection of the European South East area by placing an advanced radar system and SM3-IA interceptors on ships. This stage started in March 2011, by deployment in the Mediterranean Sea of the USS Monterey, equipped with the Aegis system and through radar from Kurecik, Turkey;

- **Phase II** – extending the missile defense to NATO Allies, by rendering operational a new generation of SM3- IB interceptors, disposed at the land base from Deveselu, made operational at the end of 2015;

- **Phase III** – extending, by the end of 2018, of NATO member states coverage in Europe with SM3 missile systems, located at land base Redzikowo in Poland;

- **Phase IV** – extending, by 2020, of the intercontinental missile attacks cover, further development of SM3 missiles and radars, emplacing new class of SM3-IIB interceptors in Poland.

In Romania Phase II was completed at Deveselu Base, Olt County at the end of 2015, when the interception missiles type SM-3 (Standard Missile 3) Block IB, became operational. The system is composed of terrestrial interceptors and their target guidance system. Radar systems designed to discover ballistic missiles launched by potential opponents will be placed in other states. The planned funds for this system have been allocated by the US Congress (over \$ 265 million in the fiscal year 2013). This reconfirms that Romania and US commitment to achieve one of the most important joint projects was a strong, purposeful who brought extra security for Romanian state.

Placing system components in our country does not affect neighboring countries security nor relations between Romania and those, the defensive nature and the deterrent effect of this system bringing greater security in the region. The small size of the system placed in Romania, the limited action capacity and its endowment structure draw the conclusion that this potential is unable to alter the strategic balance in Europe.

The system configuration will include three batteries, each having eight missiles interceptor SM-3 (a total of 24 missiles). By participating in this program, it is considered that Romania could become a target, but not to a greater degree than before. NATO and collective defense is supposing both privileges and obligations and risks assumption. The benefits conferred by high levels of security are significantly higher than disadvantages; the benefits are clearly greater compared with costs.

CONCLUSIONS

- Romania, at the artillery and anti-aircraft missiles centenary celebration, needs to have air and missile defense / anti-aircraft under NATO command authority from peacetime, to be employed, within the country or outside our territory, against air and aerospace aggression, against air and cosmic platforms unauthorized to use national airspace

- artillery and missiles air defense units, as combat forces, directly engage enemy's surveillance, attack and transport aircrafts, conducting within this process, airspace research, aerial targets discovery, recognition, tracking, control and destruction

- the use of missile and artillery air defense army units, their distribution and maneuver in dynamic progress of land forces operation, is the exclusive competence of the ground forces group's commander and battle fire control is the sole responsibility of missile and artillery air defense army units commanders, according to the operation plan and situations;

- our country participation in US missile defense system is the result of diplomatic approaches made in the previous period, and a major success in bilateral relations between Romania and US, an example of Romania's affirmation within NATO, as a reliable partner;

- the involvement in missile shield project will lead to a significant increase of Romania's national security, and, through the implementation of new missile defense system, in addition to strengthening the national security system, a major contribution will be made at increasing the security of neighboring states, this project having regional dimension importance.

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