



ESSENTIAL FACTORS INFLUENCING THE APPLICATION OF THE SEA DENIAL CONCEPT

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The modalities of applying the concept of sea denial are of high complexity due to the diversity and intensity of the naval tactical actions in the combat environments on the surface of the water, under the surface of the water and aerial. If denial of certain maritime space for the enemy fails, there is the possibility that the enemy will project his force on the shore and destroy the economic and military objectives. The need to prohibit certain maritime space for the enemy arises when the control of the sea cannot be achieved or lost in that maritime space. As a rule, sea denial is intended to be carried out near its own coast in order to thwart the enemy's efforts to attempt an amphibious landing or to interrupt the maritime communications routes. Sea denial can be complementary to the control of the sea in certain areas of the ocean where the control of the sea cannot be maintained. The main factors influencing the application of the concept of sea denial are space, time, forces and means available, the technological development and the degree of instruction of the crews. In the application of the concept of sea denial in addition to the naval forces, the air forces and the ground forces play a particularly important role. The joint characteristic of the combat actions requires a concept of unitary action, most likely, prepared from the time of peace or during the crisis development.

Keywords: sea denial; control of the sea; naval power; obligatory crossing points; tactical naval actions; force projection; amphibious operations; freedom of navigation; semi-enclosed seas; communication channels.

In this article I set out to highlight the main factors that influence the possibilities of applying the concept of sea denial. Usually when analyzing the application of the concept of sea denial, the realization of this concept is attributed to a lower naval power, which in most cases is not able to obtain and maintain control of the sea in a certain maritime space and then uses its forces and its means to deny the enemy access to that maritime space. With the technological development of the naval platforms, the means of discovery and the vectors that can be launched from these platforms, the concept of sea denial can also be implemented by the great naval powers, most probably, in order to avoid direct naval confrontations.

Conceptual approach

The definition given to the concept of sea denial by Joint Doctrine Publication 0-10 / UK Maritime Power: "a way of not allowing the enemy access to a certain area of the sea that no one who forbids the sea can control"¹, is relevant for the type of naval tactical actions to be performed in order to achieve this concept.

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The main feature of the concept of sea denial is that this concept applies mainly during war time but is prepared in time of peace. The application of the concept of sea denial is mainly influenced by the factors of space, time, available forces, technology and crew instruction.

Applying the concept of sea denial for a certain maritime space can be a strategic objective at any stage of a conflict². In the semi-enclosed seas, such as the Black Sea and the Baltic Sea, during the Second World War the application of this concept was a strategic objective and the application of this concept was achieved especially by planting the dams of marine mines.

The concept of sea denial in a maritime space can be carried out partially or totally in air combat environments, on the surface of the water or under the surface of the water. I consider that from the point of view of the time factor, the concept of sea denial is carried out temporarily, and from the point of view of the force factor the application of this concept is limited. The use of forces and means in combat, the technological equipment of the ships as well as the degree of training of the crews contribute significantly to the dimensioning of the maritime space and the duration for which the concept of sea denial is applied.



In the analysis of the space factor for the application of the concept of sea denial an important role is played by length and the configuration of the coast. Thus, an island or peninsular state with a considerable length of defense coast cannot achieve sea denial in most of the maritime space to defend, especially if it does not have a developed military technology. Effort to control the surrounding maritime space requires a great deal of resources and a developed naval power with action capabilities in all combat environments.

On the other hand, an island or peninsular state is obliged to develop its naval power for the protection of the communication paths and its own coast. The control of obligatory crossing points, such as straits, ensures the state that controls the possibility of banning the crossing of ships or submarines considered hostile, from one side to the other, thus applying the concept of sea denial.

The most popular obligatory crossing points in the European area are the Turkish Strait (Bosphorus and Dardanelles), which ensures the communication between the Black Sea and the Mediterranean Sea, the Gibraltar Strait connecting the Mediterranean Sea with the Atlantic Ocean, the English Channel and the Danish Straits (Kattegat and Skagerak) provides the connection between the Baltic Sea and the North Sea.

Usually the application of sea denial concept has the role of protecting the shore from a possible projection of the enemy's force on its own coast. The military actions of force projection, especially in the case of amphibious operations, are influenced by the aircraft actions³. That is why the length of the coast, the characteristics of the land in the coastal area, the arrangement of military and economic objectives, as well as the depths of the coastal area largely determine what forces and means are required to prohibit a certain maritime space. A maritime space in which the depths are small and the land in the coastal area is flat without pronounced forms of relief is conducive to performing amphibious combat actions. In this case, for the sea denial, most likely, actions can be taken to mine certain areas, attacks with fast boats, covering of the maritime space with coastal missiles and execute aviation attacks.

Implications

The application of the concept of sea denial through the use of large-scale marine mines was

successfully used by the Iraqi navy after the occupation of Kuwait, in August 1990, by launching some mine dams at a distance of 150 nautical miles from the Kuwaiti ports and other mine dams in the coastal area to prohibit the possible landing of allies on the coast. Over 1.300 mines were launched, and the result was the damage of several ships and temporarily blocked the logistical flow necessary to support Operation Desert Shield⁴.

It is known that during the Second World War, between June 15 and 19, 1941, the largest mining operation in the history of the Romanian Navy known as the "Constanta Mining Operation" was executed by the Romanian Navy. Mine dams were installed in the Capu Midia - Tuzla district, about 28 nautical miles long, for the protection of the Romanian coast and ports against surface ships and Russian submarines⁵. The Romanian Military Navy has also executed a series of mining operations "Varna mining operation", "Capu Midia-Sfântu Gheorghe mining action", "Odessa mining action". The mine dam system has proven effective by sinking the Russian destroyer Moskva and over 10 Russian submarines.

In the case of the use of marine mines to carry out the sea denial in a certain maritime space, several aspects must be considered.

First of all, it limits the freedom of navigation on the routes of communication, remaining to be used recommended routes and passes known only to those who built the dam system of mines. The maneuvering of the ships is also limited, and their own submarines forced to use a much-reduced maneuvering space. There is the possibility of affecting the marine environment by sinking vessels with large quantities of fuel on board, the discharge of fuel at sea can lead to ecological disasters. Also, after the conflict is over, the dams must be removed to ensure the freedom of navigation at sea, which requires specialized forces for dredging and hunting of mines, the demining actions stretching for a long period of time.

Most mining operations took place in the semi-enclosed seas because the size of the maritime space and the depths allowed the execution of the mining actions on almost the entire length of the coast of a state.

In support of the above assertion, I can bring as examples the depths in the Baltic Sea which are about 45 meters on more than 60% of its surface,



in the Persian Gulf the depths do not exceed 100 meters, the continental shelf of the Black Sea has a width of about 50 of kilometers where the depths do not exceed 100 meters, and the average depth in the North Sea is 95 meters.

The space in the operations of sea denial is determined especially when aviation acts in support of naval forces. In the semi-closed seas, the lines of operations are short, often being overlapped, so that the use of aviation can cover in a very short time several lines of operations (surface, submarine, and logistics). The short reaction time and the precision of the actions taken in support of naval forces make aviation a decisive role in applying the concept of sea denial in the air combat environment and on the surface of the water.

Of course, the action of aviation is limited in space and time, but the effects resulting from the aviation attacks are decisive through the effects produced in the general framework of the operations of sea denial. The maritime space in the semi-enclosed seas is characterized by a high density of friendly, potentially hostile, neutral vessels, combat vessels, commercial vessels and fishing vessels, which often makes it difficult to identify potential threats especially in time of peace and crisis.

It is possible that during the escalation of a conflict the enemy will act with various forces and means to execute offensive mines in order to prohibit the entry and exit of ports, the mining of communications routes or of concentration camps. In this case it is necessary that the specialized demining forces act in a short time, so that the freedom of navigation is restored as soon as possible.

From the previous examples it follows that the space factor and the time factor influence the mode, the forces and the means used to apply the concept of sea denial.

Next, I will analyze the importance of the technological factor in the effective application of the concept of sea denial. Obviously, the concept of sea denial cannot be applied without the specific forces and means for carrying out naval actions. Mainly submarine, coastal rocket and aviation combat ships are used to prevent the enemy from entering a certain maritime space.

Ideally, the structure of a naval force should be tailored to the military strategy, technological progress and capabilities of potential adversaries.

Technological progress develops opportunities to increase the efficiency of naval actions by exploiting the vulnerabilities of the enemy. The development of autonomous intelligent vectors and autonomous vehicles without a pilot allows efficient actions from long distances on the enemy without endangering their own platforms.

Naval theoreticians believe that in order to act efficiently, it is necessary to have vessels that are difficult to discover (stealth technology) that offer reduced fingerprints in the electromagnetic spectrum. Even with advanced building technology, combat ships will not be able to become totally invisible, "stealth" technology contributing to the delay of discovery and identification by the enemy. A warship equipped with "stealth" technology offers a diminished footprint for acoustic, magnetic, radar, thermal or optical detection equipment⁶. When implementing the emission control plan, the level of emissions of a combat vessel shall not be higher than that of the environment.

The building of new ships equipped with modern "stealth" technology, with efficient detection and hit systems are among the priorities of any naval force. The accomplishment of the endowment programs depends to a large extent on the economic factor and on the security threats. The endowment programs are difficult to fully realize even for countries with developed economic possibilities and that is why in many cases it is decided by the decision-makers to modernize the existing platforms with new generation technology.

The main focus is on discovering targets as far away as possible, identifying them and combating them from a distance large enough so that they do not pose a danger to their own forces. In confined maritime spaces, each party in conflict carries out continuous surveillance so that for large battleships it is difficult not to be discovered. An advantage for fast boats is the presence of commercial traffic, which offers them the possibility of concealment and freedom of maneuvering.

In applying the concept of sea denial in the context of water surface of fighting environment, as a rule, the mostly used forces and means are the fast boats, the aviation and the rocket launching devices from the coast. Each of these forces and means has advantages and disadvantages depending on the degree of enemy's action. The fast boats have the advantage of being equipped with new-generation



rockets and torpedoes, they can operate in many directions, they are difficult to detect especially near the shore, and the production cost is not very high.

However, fast boats have a number of disadvantages. They do not have high autonomy (they cannot be maintained for a long time at sea), they cannot act under heavy weather conditions, due to lack of space, they cannot install complex systems of close and anti-aircraft defense, and they have the possibility of discovering and identifying a limited number of targets.

In the semi-enclosed seas, the lack of maneuvering space for maritime platforms is a disadvantage, especially for frigates or destroyer vessels. The loss of such a ship in combat would significantly diminish the fighting power of a state through the effects produced on the physical component and the moral component. However, the possibilities of conducting combat in the three combat environments (aerial, on the surface of the water and below the surface of the water), firepower, high autonomy, the systems of discovery and launch necessarily include the presence of these types of ships in the structures of a modern fleets.

Submarines can also be used to apply the concept of sea denial. The submarine is a very important weapon for any naval force, especially for its ability to act secretly, away from its own shore, sometimes even in enemy-controlled waters. In addition to gathering information on enemy naval movements, launching and recovering diversion research teams, the submarine can also perform combat actions such as offensive or maneuver mining and attack on major naval targets.

However, I consider that for the submarines, the application of the concept of sea denial is more likely to occur in the open ocean, complementary to the application of the concept of control of the sea. I argue this claim through the actions of German submarines during World War II operating in the Atlantic Ocean, where German battleships did not have control of the sea. In limited maritime spaces, submarines that perform specific tactical combat actions must be very maneuverable and stable in order to be able to adapt quickly to environmental conditions.

By achieving an effective system of striking from the shore, the concept of sea denial in the fighting environment can be applied to the surface

of the water in the maritime space delimited by the range of the anti-ship missiles used. The coasting or coastal defense system has the advantage of launching from predetermined positions, based on its own information or on the basis of information received from the forces with which it cooperates. The possibility of rapid change of launch positions offers the system of hitting from the coast mobility and the possibility of taking the enemy by surprise. The disadvantage is the very weak air defense and vulnerability to the actions of the diversion research teams.

The use of aviation in the application of the concept sea denial is especially necessary to ensure a certain airspace control fence in the area of action of the naval forces. Surface ships, especially fast boats and ships used for mining actions are vulnerable to enemy air strikes and therefore, during their specific combat actions, their own aviation action is required. The effects produced by aviation following the attack on a group of enemy ships are very important. In addition to the damage of certain categories of technique and weaponry, aviation attacks can also cause the enemy combat device to change, delay or change the direction of movement. The aviation resource available and the short period of time during which aviation can act in support of naval forces can count as a disadvantage.

In order to reduce the risk of loss of human life, technique, armament and even ships, technological discoveries offer solutions for the use of autonomous unmanned vehicles in actions of discovery, recognition and even of hitting the enemy in all areas of combat. In the actions against mines there are autonomous underwater vehicles (AUVs) capable of discovering mines, transmitting information about the type of mine used and even destroying them. Unmanned Aerial Vehicles (UAVs) are widely used for a long time, especially for research, monitoring, target identification, bacteriological and chemical attack detection, enemy target hit actions⁷. Autonomous unmanned vehicles can be used from ashore or embarked on ships and submarines depending on the autonomy of operation and the type of mission to be accomplished.

The technological development is carried out at a very fast pace and sometimes certain categories of technique are replaced in a relatively short period

of time with more efficient ones. Therefore, the way they are used depends very much on those who operate it and on the new tactics of use in combat that need to be developed in order to integrate them effectively. Crew instruction is essential for any type of naval action and in the operation of any technical category on board. Sensors and armament aboard ships may not function properly if not operated at the appropriate parameters. Forms of training through courses, on-board or offshore instructional activities are meant to enhance crew skills and increase confidence in technique and weaponry.

Considering the technological evolution, the means used, the methods and the procedures for conducting military actions during a conflict, in which the main objective of a participant is to limit the use of sea environment, the typology of such a confrontation, sends me thinking at a majorly asymmetric action. This characteristic is given by the methods of putting into practice the principles of armed struggle, under the conditions of a much stronger and more technologically developed enemy. Asymmetrical conflicts are characterized by a difference between forces, manifested at the level of the employed forces, organization, goals, methods, processes and mode of action⁸.

Currently, the Romanian Naval Forces are undergoing a period of transformation derived from the security context in the Black Sea area, and the full application of some concepts, specific to the maritime domain, such as the concept of sea denial, is not possible especially due to the insufficient forces and means for the application of such a concept. Therefore to avoid any confusion regarding the application of the concept sea denial, the phrase "Limiting the use of the sea" is agreed. This specific concept for the Romanian Naval Forces derives from the concept of sea denial and expresses very clearly that if it is not possible to prohibit the sea simultaneously in air combat environments, on the surface of the water and under the surface of the water the concept of sea denial does not apply, but only limits the use of the sea.

Conclusions

Naval confrontations, in general, are short-lived and very intense, the party which is lower numerically trying to focus the effort on banning a certain maritime space. From the above stated facts, it can be deduced that sea denial cannot be carried

out over a very long period of time, nor on a very large area of the sea. It is important that the time during which the application of the concept of sea denial has been achieved ensure that the planned tactical or operational objectives are achieved.

The Romanian Naval Forces through the forces and means available to them are not able to apply the concept of sea denial, but they can apply limiting the use of the sea through a narrower range of measures, mining being the most efficient action, given the length of the Romanian coast.

The application of the concept "Limiting the use of the sea", from the point of view of the response modalities regarding the methods and procedures for the use of forces, does not differ from the application of the concept of sea denial, the difference lies in the way in which the concept is realized in the three fighting environments (aerial, at the surface of the water and below the surface of the water), the size of the maritime space and the period of time as long as the application of this concept can be maintained.

From certain points of view, the ways of applying the concept of limiting the use of the sea are very similar, but on a smaller scale, with the guerrilla warfare, the main methods of action being the tactics of hitting the enemy by surprise or deterring its actions.

From the point of view of the main characteristics of the confrontation, the application of the concept of sea denial or of the concept of limiting the use of the sea, particularizes the maritime actions in a conflict rather than asymmetrical, disproportionate, dissymmetric, than in a symmetrical confrontation.

Both the application of the concept of sea denial and the application of the concept of limiting the use of the sea require a joint leadership of the forces, a unitary concept of action in which the naval forces have the main responsibilities being supported by the air forces and the ground forces.

NOTES:

1 *** *Joint Doctrine Publication 0-10, UK Maritime Power*, 5th Edition, 2017, p. 43.

2 Milan N. Vego, *Naval Strategy and Operations in Narrow Seas*, Frank Cass, London/ Portland, 2003, p. 137.

3 Lucian Valeriu Scipanov, *Proiecția Puterii Navale-soluție la consolidarea securității regionale*, "Carol I" National Defence University Publishing House, Bucharest, 2018, p. 38.



4 Otto W. Spahr, *Sea Denial: Disaster is waiting!*, Naval War College, Newport, Rhode Island, 1993, p. 4.

5 Ioan Damaschin, *Război submarin la Marea Neagră*, Military Publishing House, Bucharest, 2016, p. 154.

6 Ștefan Nitschke, *Stealth in Modern Naval Warfare*, Naval Forces, 2004, Military Database, p. 38.

7 *** *Autonomus Vehicles In Support of Naval Operations*, The National Academies Press, Washington, 2004, p. 35.

8 Valentin Marian Toma, Lucian Valeriu Scipanov, *Acțiunile asimetrice – pericol permanent in zonele de instabilitate, Puterea navala in acțiunile militare contemporane*, Annual Scientific Conference, 12 July 2017, Military Publishing House, Bucharest 2017, pp. 166-170.

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