MILITARY THREATS TO THE SECURITY OF UKRAINE'S MARITIME TRADE

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Abstract. The aggressive policy of the russian federation remains a source of threats to the security of Ukraine's maritime trade today. The main military threats to the security of Ukraine's maritime trade are: damage to port infrastructure; damage to merchant ships in ports and at sea passage to/from ports; mine hazard; cyber threats.

Keywords: military threats, maritime security, threats to the security of Ukraine's maritime trade.

Background

Since 2014, the russian federation (rf) has been trying to establish external political control over Ukraine and cease to exist as a sovereign state. To do this, the rf uses a wide range of means: political, diplomatic, economic, informational, and with the beginning of large-scale armed aggression, military. At the same time, the rf is taking actions to reduce the economic potential and disruptthe economic stability of Ukraine, in particular by obstructing maritime trade. Given that about 90% of Ukrainian products (ore, rolled metal, grain, etc.) are exported by sea, in order to weaken the economy of Ukraine, rf is conducting systematic actions to hinder merchant shipping.

The issue of the influence of the russian federation on the conduct of Ukraine's economic activities at sea during the russian-Ukrainian war has been studied by scientists, since the beginning of the armed aggression of the rf against Ukraine in 2014, in particular (Kuprienko et al. 2023, pp. 57–65), (Vdovytskyi 2023, pp. 15–22), (Shevchuk et al. 2023, pp. 59–64). However, over time, the list of threats increases, which requires further research in this direction.

An analysis of the situation in the Black Sea shows that today the main military threats to the security of Ukraine's maritime trade are:

damage to port infrastructure;

damage to merchant ships in ports and at sea crossing to/from ports;

mine hazard;

Cyber threats.

1. Damage to port infrastructure

Attacks on the infrastructure of Ukrainian ports began from the first days of russia's large-scale invasion of Ukraine. Thus, in 2022, the enemy struck Ukrainian seaports seven times. In 2023, the number of attacks has increased. The russian federation began to actively hit the port infrastructure of Ukrainian seaports in July, after withdrawing from the "grain agreement". During the specified year, the enemy launched 13 strikes, in 2024 their number increased to 36, and in 2025 to 96. At the same time, the scale of destruction has also increased: since the beginning of the war, 651 port infrastructure facilities have been damaged, of which 325 are in 2025 (HROMADSKE, 2026). As a result of massive attacks on the infrastructure of seaports, elevators, warehouses for storing grain, oil and oil products, pipelines, administrative and other buildings, transport, cargo, including grain, were damaged or partially destroyed.

The attacks were carried out from the temporarily occupied territories (TOT) of the Autonomous Republic of Crimea, the TOT of the mainland south of Ukraine and from the territory of the russian federation.

The following weapons were used for enemy strikes:

ballistic missiles "Iskander";

Sea-Launched Cruise Missiles (hereinafter referred to as SLCMs) "Kalibr";

anti-ship missiles (hereinafter referred to as ASMs) "Onyx";

cruise missiles (hereinafter referred to as CMs) Kh-22;

guided aircraft missiles X-59/X-69;

anti-radar missiles X-31P;

attack unmanned aerial vehicles (hereinafter referred to as UAVs);

guided aerial bombs;

barrage ammunition with a jet engine of the "Banderol" type (BlackSeaNews, 2025/1).

It should be noted that since 2022, the enemy has significantly increased the number of strike UAVs for attacks on seaports. The most massive and effective type of attack UAV used by the russian federation to destroy the port infrastructure of Ukraine is the Shahed-type UAV. The analysis of innovative solutions implemented by the rf in modernized samples of the Shahed UAV was investigated by a number of scientists, in particular (Muraveynyk et al. 2025, pp. 118–126). As researchers have shown, today UAVs of this type have become more technically complex compared to the first samples: the mass of the warhead has been increased from 50 to 90 kg, the installation of modules using the GLONASS radio navigation satellite system has begun, which has increased their resistance to the disabling of GPS signals, jet engines are installed on new versions, which allows them to accelerate to 500 km/h. The use of night vision cameras in new versions of UAVs has also been confirmed, which allows to gain a significant advantage at night. Modifications of Shahed-type UAVs with built-in cameras and two LTE modems were detected. This provides the ability to transmit video in real time, make course adjustments. Changes were also made to the design parameters (fiberglass body over carbon fiber, painting UAVs black for camouflage at night), which made it possible to reduce their visibility for air defense. Updated engines, stabilizers, controllers - all this made Shahed-type UAVs more accurate. The number of hits on targets has increased. The updated "technical base" allows it to perform maneuvers with descents from a height of 2 km at a speed of up to 400 km/h (VGI-9, 2025).

Along with this, to overload Ukrainian air defense during massive attacks, the russian federation uses Gerbera UAVs – decoy drones that imitate Shahed-type UAVs.

In addition, the enemy also used surface strike maritime unmanned surface vehicles (hereinafter referred to as USVs) to destroy the port infrastructure of Ukrainian seaports.

Thus, in 2024, as a result of the use of the enemy's strike USV on the Odesa Commercial Sea Port (hereinafter referred to as CSP), the berth front was damaged. Subsequently, in early June 2025, the enemy made an unsuccessful attempt to attack the Yuzhny CSP using an experimental USV of the Murena-300 type (NV, 2025). Also, in 2025, there were several more attempts by the enemy to use experimental models of USV, but all of them did not reach the goal and detonated on the approaches to the territorial waters of Ukraine.

Thus, it can be stated that most of the episodes of combat use of strike USVs by the enemy were unsuccessful, but at the same time, the enemy continues to improve them and gradually increase their production.

2. Ураження торговельних суден в портах та на переході морем до / з портів.

Damage to merchant ships, as well as attacks on the infrastructure of Ukrainian ports, have been noted since the first days of russia's large-scale invasion of Ukraine. Thus, on February 24, 2022, a bomb hit the Turkish ship Yasa Jupiter (flag of the Marshall Islands) near the coast of Odesa. As a result of the shelling on February 25, 2022, two civilian vessels were damaged: "Namura Queen" (flag of Panama), which was at anchorage of the Pivdenny CSP, as well as "Millenial Spirit" (flag of Moldova), which was 12 miles from the port. On March 2, 2022, in the roadstead of the port of Olvia (Mykolaiv), a Russian missile hit the ship "Samriddhi" (flag of Bangladesh). On March 3, the bulk carrier HELT (flag of Panama), which was 12 miles from Odesa, received a hole below the waterline as a result of a missile strike and sank (Legal newspaper 2024).

After the conclusion of the "grain agreement", no attacks on merchant ships by the russian federation were recorded. However, after russia's unilateral withdrawal from this agreement in July 2023, they resumed. Already on November 8, 2023, the bulk carrier Kmax Ruler (flag of Liberia) was hit by an X-31P anti-radar missile during an entry into the Pivdenny CSP.

In the second half of 2024, the russian federation intensified attacks on civilian shipping in the northwestern part of the Black Sea, carrying out targeted strikes on merchant ships on the high seas and at anchorages. Thus, on September 12, 2024, for the first time since the beginning of the full-scale invasion, the Russian Federation attacked a civilian ship with grain (bulk carrier "Aya" under the flag of St. Kitts and Nevis) with a cruise missile on the high seas immediately after leaving Ukrainian territorial waters, and during October, ballistic missiles hit the ship Optima (flag of Palau) and the ship Paresa (flag of St. Kitts and Nevis) with ballistic missiles (Forbes, 2024).

In 2025, the intensity of russian attacks on ships in the Black Sea increased significantly compared to the previous year: in the period from January to November 2025, 15 attacks on ships were recorded in the Odesa Sea Port, the Chornomorsk Sea Port, the Izmail Sea Port, in the ports of the Danube and in the coastal waters of the Black Sea. The situation escalated in the last weeks of 2025. On December 30, Russian strike UAVs attacked the bulk carriers Emmakris III and Captain Karam (both Panama-flagged), which were entering the port for loading wheat. The aggression continued in January 2026 – on January 12, two civilian ships were attacked, a Panama-flagged tanker was hit by a Russian attack UAV while waiting for an approach to the Chornomorsk Sea Port to load vegetable oil, and a San Marino-flagged vessel was attacked by an attack UAV leaving the same port with a cargo of corn (Ukrinform, 2026). And already on January 15, a ship under the flag of Malta was hit by a ballistic missile at the Chornomorsk Sea Port (Apostrophe, 2026). As a result, at the end of 2025, some shipowners began to require separate insurance against war risks, which is why the cost of insuring ships to operate in Ukrainian ports continues to grow.

At the same time, the Russian authorities announced their intention to expand the geography of strikes on ships heading to Ukrainian ports, calling it a "response" to the successful operations of the Ukrainian special services against the Russian "shadow fleet".

The analysis shows that the intensity of russian strikes on merchant ships involved in the export of products from Ukrainian seaports is constantly growing. The geography of attacks on ships and the range of weapons used by the enemy are also expanding.

3. Mine hazard.

The impact of mine hazard on ensuring the protection of Ukraine's economic activity in the Black Sea in the context of the russian-Ukrainian war was studied by a number of scientists, in particular, (Servatiuk et al., 2023, pp. 363–372) та (Kuprienko 2023, pp. 57–65). According to the results of research, the use of sea mines makes it possible to block seaports, which, as a result, can cause significant economic losses due to the restriction of shipping and a decrease in cargo flows through seaports. To this can be added the psychological impact on shipowners and crews of ships.

The russian federation, in flagrant violation of international maritime law, has turned the Black Sea into a minefield, posing a deadly threat to civilian shipping. According to the analytical report provided by the Navy of the Armed Forces of Ukraine and local self-government bodies, only during the period of the full-scale invasion of the Russian Federation into Ukraine, more than 1136 units of explosive objects, including missiles, bombs, mines and other ammunition, ended up in the Black Sea.

Sea mines laid by the enemy are especially dangerous. Thus, in the territorial sea of Ukraine, the enemy laid more than 420 mines of the "YM" and "YRM" types (Defense Express, 2022), as well as large bottom mines "MDM-1" and "MDM-2" weighing about a ton and small bottom mines "MDM-3". In addition, after the explosion of the Kakhovka hydroelectric power station, a significant number of mines that were previously in the Dnipro River fell into the Black Sea – these are river mines, and they also pose a danger to merchant shipping.

Also, to block shipping and create a danger to civilian ships, the enemy used tactical and bomber aviation to create a mine threat by dropping explosive devices equipped with unified planning and correction modules into the areas of vessel traffic.

3. Cyber threats

The enemy is actively using electronic warfare in the northwestern part of the Black Sea for GPS spoofing - creating false navigation coordinates that can direct merchant vessels moving to/from Ukrainian ports in the wrong direction and create emergency situations. The issue of Russia's use of electronic warfare for GPS spoofing and its impact on the safety of navigation was studied, in particular (Horb V. 2024. pp. 3–11), (Pleshko, E., 2019. pp. 33–39).

In the future, taking into account the trends in the development of means of armed struggle at sea, as well as the nature of the enemy's actions, in the short and medium term, potential threats to the security of Ukraine's maritime trade may be:

the enemy's use of underwater sabotage forces and means to destroy elements of physical protection of ports, port infrastructure, merchant ships (in ports, on external/internal roadsteads of seaports, in anchorage areas);

the enemy's use of USVs to destroy merchant ships (in ports, on external/internal seaport roads, in anchorage areas, on recommended routes for ships to/from ports);

use of unmanned underwater vehicles by the enemy in order to destroy merchant ships (in ports, on external/internal roadsteads of seaports, in areas of anchorages), as well as

hidden installation of sea mines (in port waters, on approach routes to ports, on recommended routes of vessel movement to/from ports);

the use of mine-carrying UAVs by the enemy in order to create a mine threat in the waters of ports, on the approach routes to ports, on the recommended routes of vessel movement to and from ports;

carrying out terrorist actions – both by special operations units and sabotage and reconnaissance groups recruited from among the local population in order to destroy port infrastructure facilities, potentially dangerous objects in ports (near ports), as well as ships carrying dangerous goods.

Conclusions and recapitulations

The main source of threats to the security of Ukraine's maritime trade today remains the aggressive policy of the Russian Federation. The main goal of which is to deprive Ukraine of access to the Black Sea and create maximum pressure on the state's economy by obstructing Ukraine's maritime trade by conducting hybrid (sabotage activities at port infrastructure facilities, hidden mining of port water areas and recommended routes of vessel movement to/from ports of Ukraine, etc.) and military operations.

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