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## **MARITIME COMMUNICATIONS OF UKRAINE IN THE CONTEXT OF ARMED AGGRESSION OF THE RUSSIAN FEDERATION**

Sea transportation traditionally plays a significant role in the economy of Ukraine. It's they who account for the bulk of the cargo transported by participants in foreign economic activity.

Ukraine has a significant transit potential, because a network of international transport corridors, including sea ones, passes through the territory of the state. The volume of sea transportation and transshipment of goods in Ukrainian ports before the start of the full-scale aggression of the Russian Federation against Ukraine increased annually.

Before the start of the war, Ukraine was one of the world's largest producers of wheat and corn, which were exported by sea. Many countries depend on the supply of Ukrainian grain, the export of which stopped after the start of the full-scale aggression of the Russian Federation. This was the reason for the increase in food prices in the world. Thus, in March, the UN recorded an increase in food prices by more than 12 percent, which was a record since 1990. Due to the reduction in food exports by Ukraine, there are risks of a significant increase in the number of malnourished people in the Asia-Pacific region, Africa and the Middle East.

With the beginning of the full-scale armed aggression of the Russian Federation against Ukraine on February 24, 2022, the main efforts of the enemy Naval Task Force (NTF) deployed to operate in the Black and Azov Seas were focused on achieving the strategic goals of the military-political leadership of the Russian Federation, one of which was to disrupt economic sea transportation by Ukraine. To this end, the enemy declared the areas of the Black and Azov Seas closed for navigation and published appropriate warnings about the danger (Coastal Warning). They actually banned the movement of

sea vessels in the northwestern part of the Black Sea north of Snake Island and in almost the entire water area of the Sea of Azov (with the exception of the "waiting area" in the Taganrog Bay). In addition, certain forces from the enemy's Naval strike TF began blocking Ukrainian seaports and striking civilian vessels located in the outer roadsteads of Ukrainian ports.

As of the beginning of May 2022, 109 vessels were blocked in the ports of Ukraine, in particular, 39 civilian foreign vessels with crews were blocked in the Odesa region. The largest number of ships was in the port of Chornomorsk – 23, ten more were in the port of Odesa and six more – in the port of Pivdennyi. The vessels were also blocked in other ports: in Mykolaiv (25), Kherson (16), Berdyansk (8), Mariupol (5), the port of Nika-Tera (2), Ochakiv (2), Izmail (1) and at the Southern anchorage (1)

Most of the 109 blocked vessels were either bulk carriers (42) or general cargo vessels (38). Other vessels included oil tankers, chemical tankers, tugboats, icebreakers, and motor bunkers. The sailors of the blocked vessels were citizens of 27 different countries, the largest number being from the Philippines and India. Among the crew members were Ukrainians, Russians, Chinese, Danes, Greeks and Turks. Therefore, based on the above, we can conclude that the enemy, while maintaining dominance in the northwestern part of the Black Sea, blocked Ukrainian ports, caused damage to Ukraine's economy by preventing the functioning of ports, prohibiting the movement of goods through them and actually disrupted peaceful international navigation throughout the Black Sea region.

As a result of these actions, the port industry of Ukraine actually ceased to function, and sea transportation almost stopped. This was due to the fact that some seaports (Kherson, Skadovsk, Berdyansk and Mariupol) were captured by the enemy, and some (Belgorod-Dniester, Odessa, Mykolaiv, Chornomorsk, Nika-Tera, Olvia and Pivdenny) were forced to suspend work due to the danger of sea transportation. Only the seaports of Reni, Izmail and Ust-Dunaysk continued operating, but their share in the total cargo processing by seaports of Ukraine is traditionally insignificant.

The establishment of control over Snake Island allowed the enemy to completely block sea transportation from Ukrainian Black Sea ports. Grain exports were carried out only through ports located on the Danube River (Reni, Izmail, Ust-Dunaisk), as they became a key alternative logistics route after the blockade of seaports. However, grain exports from these ports were carried out only through the Sulina estuary (Sulina Canal), which is located on the territory of Romania. The mouth of the Bystre of the Danube River, which passes through the territory of Ukraine, was blocked by the enemy as a result of control over Snake Island. But the capacity and organization of the Sulina Canal, which is one-way, is insufficient for the passage of the required number of ships with grain. The intensification of navigation in the Danube Delta area in Romanian waters led to a traffic jam of more than a hundred vessels.

However, in the future, the Defense Forces of Ukraine disrupted the enemy's dominance in the northwestern part of the Black Sea. This became possible as a result of the successful use of available weapons against the enemy's strike forces, primarily the Neptune coastal missile system.

Thus, on April 2, 2022, the coastal anti-ship missile system "Neptune" struck the frigate "Admiral Essen" of the Black Sea Fleet of the Russian Federation, which

performed tasks to block ports and the actions of the Ukrainian Naval Forces, as well as to ensure the functioning of the so-called "humanitarian corridor" – the route of movement of foreign ships from Ukrainian ports declared by the Russian Federation. As a result of the strike, the ship was damaged, the enemy withdrew the ships to a distance of up to 80 km from the coast of Ukraine, and then to the base of Sevastopol.

Subsequently, on March 13, 2022, a missile attack was launched on the cruiser Moskva of the Black Sea Fleet of the Russian Federation, which performed the same tasks as the frigate Admiral Essen in the area of the gas production platforms of the Odesa gas field. As a result of the hit of two anti-ship missiles, the ship was destroyed, and this significantly affected the situation at sea. Thus, with the destruction of the missile cruiser Moskva, the enemy lost its dominance in the northwestern part of the Black Sea, the areas of operations of its forces were moved to the coast of Crimea. Later, at the end of June 2022, the Defense Forces of Ukraine liberated Snake Island, which created conditions for the resumption of navigation along the Bystre mouth of the Danube River, and in the future – for the conclusion of a "grain agreement".

With the liberation of Zmiinyi Island by the Defense Forces of Ukraine at the end of June 2022, an opportunity opened up for navigation along the Bystre mouth of the Danube River for ships exporting Ukrainian grain. However, shipping along this route did not allow Ukraine to provide the necessary volume of grain exports. This is primarily due to the insufficient depth of the mouth, which does not allow large bulk carriers to move along it, as well as to the insufficient capacity of the existing infrastructure of Ukrainian ports on the Danube River. Therefore, the issue of unblocking Ukrainian Black Sea ports to resume grain exports has become acute.

As a result of diplomatic work, with the mediation of Turkey and the UN, representatives of Ukraine and the Russian Federation signed two mirror documents entitled "Initiative for the Safe Transportation of Grain and Food from Ukrainian Ports" in Istanbul on July 22, 2022. The parties to the agreement were Ukraine – UN – Turkey and Russia – UN – Turkey. It provided that:

before the start of operations, a coordination structure will be established – the Joint Coordination Centre (JCC) under the auspices of the United Nations, which will include representatives of the Parties and the United Nations;

inspection teams will be established in Turkey and will consist of representatives of all Parties and the UN. The vessels will transit to Ukrainian ports and call at them in accordance with the schedule approved by the JCC, after inspection of the vessels by an inspection team;

all activities in Ukrainian territorial waters will be carried out under the jurisdiction and responsibility of Ukraine;

the Parties will not carry out any attacks on merchant ships and other civilian vessels and port facilities participating in this Initiative;

no warship, aircraft, UAV may approach the maritime humanitarian corridor closer than the distance agreed by the JCC without the permission of the JCC and after consultation with all Parties.

The agreement was valid from August 1, 2022 to July 17, 2023. During its validity, navigation is provided:

to/from the ports of Odesa and Pivdennyi, Chornomorsk: departure of 1005 vessels; entrance of 965 vessels;

to/from the ports of the Danube River: departure of 935 ships; The entrance of 1869 ships.

During this time, almost 33 mln. tons of agricultural products, exports took place to 45 countries of the world. It should be noted that the Russian Federation systematically blocked the export of agricultural products.

After Russia unilaterally withdrew from the grain agreement on July 17, 2023, it began to prevent the export of agricultural products from Ukrainian ports by launching massive strikes using Kalibr sea-based cruise missiles, Onyx anti-ship missiles and Shahed-136/131 attack UAVs on the infrastructure of southern Ukraine, in particular at ports in Odesa, Reni, Izmail, etc. Thus, as of October 14, 2023, less than three months after withdrawing from the "grain agreement", the armed forces of the Russian Federation launched 17 strikes on Ukrainian ports, as a result of which their export potential was reduced by 40%, and about 300 thousand tons of grain were destroyed.

Given the termination of the "grain agreement", on August 10, 2023, Ukraine announced the opening of a temporary corridor for civilian ships involved in the export of Ukrainian products from Black Sea ports. This corridor is still functioning, and since the beginning of its operation, the ports of Greater Odesa (Odesa, Pivdennyi, Chornomorsk) have handled 120 million tons of cargo, of which 76 million tons are agricultural products. Up to 30% of exports of metal products pass through this route. It should be noted that, unlike the grain corridor, the new sea route allows to transport not only agricultural products, but also other goods. This became one of the key factors of economic stabilization during the war.

To regulate the entry of vessels to the ports of Ukraine, a coordination center was created in the city of Odesa, rules for the navigation of civilian vessels along the temporary humanitarian corridor were developed, alternative routes of vessel movement to the ports of Greater Odesa were determined and brought to shippers. The Naval Task Force ensured the movement of civilian vessels day and night. To ensure the functioning of the temporary sea corridor, the Ukrainian fleet is taking the following measures:

ensuring situational awareness of the maritime situation from stationary and mobile observation posts;

escort of vessels on routes;

systematic mine action on vessel traffic routes and in ports;

repelling attacks by maritime unmanned complexes;

search and rescue support;

anti-underwater sabotage support;

ensuring the physical protection of ports from the actions of the enemy's unmanned sea complexes (in the system of anti-ship defense);

ship-lifting operations.

It should be noted that the priority goal of the Defense Forces of Ukraine employment in the Black Sea operational zone was to prevent the superiority at sea of the Black Sea fleet of the Russian Federation to ensure the safety of international shipping to the ports of Ukraine.

To achieve the goal, the Defense Forces of Ukraine, in particular the Naval Task Force, performed the following main tasks:

maritime surveillance and reconnaissance in the Black Sea Operational Zone;

destruction of enemy ships at sea and bases by strikes of anti-ship missiles and maritime unmanned complexes;

missile (by the Neptune missile system) and air strikes on objects on the coast controlled by the enemy (TOT of the Autonomous Republic of Crimea, Krasnodar region, Rostov region of the Russian Federation);

control of navigation in the area of responsibility;

protection of navigation in the area of responsibility and vessels heading along the temporary corridor to the ports of Ukraine and vice versa.

The total losses of the enemy in the period 2022-2024 amounted to 34 ships and boats (Table 1), of which 25 were destroyed, 19 were disabled (damaged), and important coastal military facilities and aircraft of the enemy were also hit.

Table 1

### Enemy losses in the Russian-Ukrainian war at sea during 2022-2024

№	Ship	Date of defeat	Site of defeat	Means of defeat
Destroyed				
1.	missile cruiser "Moskva"	13-14.04.2022	Black Sea	Coast missile complex "Neptun"
2.	large landing ship "Saratov"	24.03.2022	port of Berdyansk	missile complex "Tochka-U"
3.	patrol boat Raptor-type	02.05.2022	Black Sea	UAV "Bayraktar TB2"
4.	patrol boat Raptor-type	02.05.2022	Black Sea	UAV "Bayraktar TB2"
5.	patrol boat Raptor-type	07.05.2022	Black Sea	UAV "Bayraktar TB2"
6.	patrol boat Raptor-type	07.05.2022	Black Sea	UAV "Bayraktar TB2"
7.	landing boat Serna-type	07.05.2022	Black Sea	UAV "Bayraktar TB2"
8.	tugboat vessel "Spasatel Vasilij Bekh"	17.06.2022	Black Sea	Coast missile complex "Harpoon"
9.	special purpose boat, Tunets-type KS-701	03.09.2023	Black Sea	UAV "Bayraktar TB2"
10.	large landing ship "Minsk"	13.09.2023	Black Sea	Air-launched cruise missile "Storm Shadow"
11.	submarine "Rostov-on-Don"	13.09.2023	Sevastopol	Air-launched cruise missile "Storm Shadow"
12.	small missile ship "Askold"	04.11.2023	Kerch	Air-launched cruise missile "Storm Shadow" ("Scalp")
13.	2 landing boats, Shark-type and Serna-type	10.11.2023	Chornomorske	Strike USV
14.	large landing ship "Novocherkassk"	26.12.2023	Feodosia	Air-launched cruise missile "Storm Shadow" ("Scalp")
15.	missile boat "Ivanovets"	01.02.2024	Novoozerne	Strike USV
16.	large landing ship "Caesar Kunikov"	14.02.2024	Black Sea	Strike USV
17.	patrol ship "Sergey Kotov"	05.03.2024	Kerch Strait	Strike USV
18.	large landing ship "Yamal"	24.03.2024	Sevastopol	Air-launched cruise missile "Storm Shadow" ("Scalp")

№	Ship	Date of defeat	Site of defeat	Means of defeat
19.	patrol boat, Mongoose-type	06.05.2024	Chornomorske	Strike USV
20.	small missile ship "Cyclone"	19.05.2024	Sevastopol	missile complex "Atacms"
21.	2 special purpose boat, Tunets-type KS-701	30.05.2024	Chornomorske	Strike USV
22.	raid tug "Saturn"	06.06.2024	Panskoye Lake	Strike USV
23.	special purpose boat, Tunets-type KS-701	18.07.2024	Chornomorske	Strike USV
24.	special purpose boat, Tunets-type KS-701	09.08.2024	Chornomorske	Strike USV
<b>Виведено з ладу</b>				
1.	patrol boat Raptor-type	21.03.2022	Azov Sea	ATGM
2.	large landing ship "Novocherkassk"	24.03.2022	port of Berdyansk	missile complex "Tochka-U"
3.	large landing ship "Caesar Kunikov"	24.03.2022	port of Berdyansk	missile complex "Tochka-U"
4.	logistics support vessel "Vsevolod Bobrov"	12.06.2022	Black Sea	Coast missile complex "Neptun"
5.	frigate "Admiral Essen"	02.04.2022	Black Sea	Coast missile complex "Neptun"
6.	frigate "Admiral Makarov"	29.10.2022	Sevastopol	Strike USV
7.	sea minesweeper "Ivan Golubets"	29.10.2022	Sevastopol	Strike USV
8.	reconnaissance ship "Ivan Khurs"	24.05.2023	Black Sea	Strike USV
9.	large landing ship "Olenegorskiy Gorniyak"	04.08.2023	Novorossiysk	Strike USV
10.	tanker "Sig"	05.08.2023	Kerch Strait	Strike USV
11.	patrol ship "Sergey Kotov"	14.09.2023	Black Sea	Strike USV
12.	small hovercraft "Samum"	14.09.2023	Black Sea	Strike USV
13.	patrol ship "Pavel Derzhavin"	13.10.2023	Black Sea	Sea mine
14.	tugboat "Professor Nikolay Muru"	13.10.2023	Black Sea	Sea mine
15.	hydrographic boat "Kozytskyi"	27.10.2023	Black Sea	Sea mine
16.	reconnaissance ship "Ivan Khurs"	24.03.2024	Sevastopol	Air-launched cruise missile "Storm Shadow" ("Scalp")
17.	rescue vessel "Kommuna"	21.04.2024	Sevastopol	Air-launched cruise missile "Storm Shadow" ("Scalp")
18.	Mi-8 helicopter	06.05.2024	Chornomorske	Strike USV
19.	2 special purpose boat, Tunets-type KS-701	30.05.2024	Chornomorske	Strike USV

Thus, the successful joint actions of units of the Defense Forces of Ukraine in the northwestern part of the Black Sea at the initial stage of hostilities led to the disruption of the enemy's dominance at sea and the limitation of the areas of operations of its strike forces to coastal waters around the Crimea, and further actions led to the displacement of the enemy's main strike forces into the northeastern part of the Black Sea. It created conditions for the restoration and further increase of agricultural exports to the Black

Sea ports of Ukraine. These actions were carried out as part of joint operations at sea, which testified to their high efficiency. Success in performing tasks at sea, including ensuring sea transportation from Ukrainian ports, was primarily due to the use of asymmetric means of influencing the enemy (sea unmanned systems and unmanned aerial systems), the use of modern technologies, and the achievement of intellectual superiority over the enemy.