



Centre for  
Defence  
Strategies

# The impact of Ukraine's asymmetric approach on russian Sea Power in the Black Sea

Complex evaluation of the russia black sea  
fleet capabilities (on March 2024)

April, 2024

## Summary

*Over the last two years Ukraine has fundamentally changed the balance of power in the Black Sea and the Sea of Azov. russia underestimated Ukraine's ability to adapt and overcome Moscow's military superiority. russia's failure in the Black Sea has global repercussions, undermining its status as a major Sea Power. The Ukrainian asymmetric campaign in the Black Sea region could prove decisive in its efforts to defeat russia and liberate Crimea.*

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## Summary

Due to Ukraine's asymmetric approach leveraging technological superiority, persistent strikes against legal russian targets in Crimea and the Black Sea with air and land-launched cruise missiles unmanned aerial vehicles (UAVs), uncrewed surface vessels (USVs) and Special Operations Forces (SOF), the balance of power in the Black Sea and the Sea of Azov has fundamentally shifted over the past two years.

The Ukrainian Air Force, Ukrainian Navy, Defence Intelligence of Ukraine (DIU), Security Service of Ukraine (SSU), and Special Operations Forces (SOF) are waging a joint campaign aimed at limiting the russian Black Sea Fleet (BSF)'s freedom of operation, reducing russia's ability to sustain offensive operations in all domains, and, not least, setting the conditions for the liberation of the Crimean peninsula and restoration of sovereignty over Ukraine's maritime exclusive zones.

Ukraine has been deliberately targeting russian warfighting capabilities, command and control nodes, A2/AD capabilities, critical logistical hubs, and Ground Lines of Communication (GLOCs) across the Black Sea region.

Having already lost 33% of the Black Sea, russia has lost the ability to freely project maritime power in the Black Sea and beyond. Ukraine has degraded russia's ability to conduct sea denial operations, including its capacity to uphold an effective maritime blockade aimed at undermining Ukraine's capability to withstand the russian onslaught.

The Ukrainian asymmetric campaign is providing invaluable lessons learned for Ukraine and its partners across the world, undermining russia's global standing as a Sea Power, strengthening Black Sea security, undermining the russian war economy, revealing russian geopolitical vulnerabilities and providing Ukraine and its international partners with a window of opportunity to defeat russia in the Black Sea.

This report aims to outline the loss of strategic and operational capabilities of russia's Black Sea Fleet, as well as the effects of the ongoing asymmetric campaign conducted by Ukraine. It also provides predictions for the campaign's further development and recommendations on how to increase both the tempo and effect of the campaign.

The campaign is demonstrating Ukrainian resolve and ingenuity, helping

to underpin international support and domestic resilience. It has, not least, helped prove that russia's declared «red lines» are a fiction, allowing the West to continuously reassess its own self-restricting red lines. Ukraine has repeatedly crossed russia's red lines without triggering nuclear retaliation or moves in that direction.

## Introduction

russia's hybrid war against Ukraine had a maritime element from when the war started on 20 February 2014. The illegal occupation of Crimea had far-reaching implications beyond the loss of territory.

### *Crimea was the Ukrainian «Pearl Harbour»*

Ukraine lost around 17% of its Air Force, 25% of its Air Defence, 50% of its Marine Infantry, 90% of its Navy and 100% of its coastal defence. Ukraine was on paper left unable to contest russian domination in the Black Sea and the Sea of Azov.

russia was left free to exercise control over Ukraine's maritime economic exclusive zones and its immense maritime resources. The occupation helped weaken an already fragile economy.

The illegal annexation enabled russia to establish control over 5 Ukrainian sea trade ports in Crimea (Feodosia, Sevastopol, Yevpatoria, Yalta and Kerch). Even before the full-scale invasion, on 24 February 2022, russia was controlling approximately 19,6% (145 000 km<sup>2</sup>) of Ukrainian territory and maritime areas under its control. That included the Crimean peninsula, the adjacent EEZ and certain areas of the Donetsk and Luhansk regions.

The militarization of the peninsular increased the military threat against Ukraine. Additionally, the occupation allowed russia to project increased power in the Mediterranean and beyond.

Starting in 2014, russia established an extensive Anti-Access/ Area Denial (A2/AD) capability on Crimea based on the following core military capabilities:

#### **The Black Sea Fleet:**

*including submarines (project class 636.3) and warships carrying Kalibr cruise missiles capable of establishing Sea Control and conducting Sea Denial operations across the Black Sea, as well as striking land targets across most of Europe.*

#### **Marine and land "Kalibr" missile systems:**

*capable of hitting both sea (250km) and land targets (2,500 km).*

#### **Iskander-M":**

*a mobile system designed to carry out both conventional (500 km) and tactical nuclear strikes (range up to 700 km).*

#### **Bal and Bastion coastal missile complexes:**

*equipped with X-35 Uranus and Yakhont (Onyx) anti-ship missiles with a range for surface targets of 120 and 300 (600) km from the Crimean coast, respectively. While the "Bal" systems are primarily designed to defend naval bases, land facilities, and the coast, the Bastion – P coast defence systems are also capable of destroying land targets in Ukraine, Romania, and Türkiye.*

#### **Aviation of the Black Sea Fleet and Air-Space Force:**

*including 43. Naval Assault Air Regiment (Su-30SM, Su-24M, and Su-24MR), 37. Mixed Air Regiment (Su-24M, and Su-25SM) and 38. Hunting Regiment (Su-27P, Su-27UB, Su-27SM, and Su-30M2). The russian Federation also regularly deploys a squadron of Tu-22M3, Tu-95, and Su-34 bombers to Crimea.*

#### **Electronic Warfare Systems:**

*capable of jamming electronic transmissions within 300 km.*

#### **Multi-layered integrated air defence systems (IADS):**

*centred around the S-400 anti-aircraft and anti-missile system, covering much of Ukraine, including the temporarily occupied territory, as well as much of the Black Sea, as far as the northernmost headland of Türkiye and the east coast of Bulgaria, and much of Moldova and Romania.*

The maritime component of the war evolved during the first eight years. russia captured Ukrainian energy and mineral deposits and drilling rigs (2014). The latter were later equipped with surveillance and intelligence equipment (2016-18), establishing near-full maritime situational awareness of the Northern Black Sea. russia tracks all ship traffic in and out of the Ukrainian Black Sea ports.

The aggressions included illegal gas extraction, the opening of the Kerch Bridge (2018), a maritime «blockade» of Ukrainian ports with conditioned access in the Sea of Azov (2018) and the attack on and detention of three Ukrainian warships (the Kerch Straight Incident, 2018). Additionally, russia became increasingly

more aggressive towards NATO units operating in the Black Sea (2018). This included aggressive military posture (e.g. simulated attacks against HMS Defender and HNLMS Evertsen, overflight and manoeuvring close to NATO units operating in and over the Black Sea, multiple incidents of spoofing and jamming), and bilateral initiatives aimed at coercing foreign governments.

From 2019 onwards, Russia started imposing increasing restrictions on the Freedom of Navigation in the Black Sea.

Black Sea security deteriorated further when the last non-Black Sea NATO warship departed on 2 January 2022. The Russian Navy then announced «live-fire exercise areas» over a wide swath of the Black Sea and the majority of the Sea of Azov, effectively constraining navigation to Ukraine's commercial seaports from 13 February 2022. When the full-scale war started on 24 February, approximately 2000 seafarers from numerous states were stranded onboard 94 vessels in Ukrainian ports.

On the eve of the full-scale war on 22 February 2022, the Russian Black Sea Fleet (BSF) consisted of approximately 80 warships and vessels, and up to 200 support vessels stationed at seven bases. The main base was Sevastopol (up to 85% of ships, boats, and support vessels), hosting all missile and landing ships and submarines.

Two weeks before the start of the large-scale aggression, the Russian BSF was strengthened by six large landing ships from the Northern and Baltic Fleets.

The BSF was also reinforced by vessels from the Caspian Flotilla travelling along canals into the Sea of Azov. These primarily included various modifications of landing boats (Project 11770 Serna class, Project 03160 Raptor, Project 21820 Dyugon type, etc.).

In contrast, Ukraine had some platforms but no real naval warfighting capability.

The Ukrainian Navy had four Island-class patrol boats (without artillery), seven Gyurza-M river artillery boats, a medium landing ship, and up to 20 assorted boats, ships, and support vessels, mainly of Soviet construction. The flagship of the Ukrainian Navy, the frigate Hetman Sahaidachnyi, as of February 2022, was under repair in Mykolaiv and could not be quickly put into combat. The few naval units were operating in both the Black Sea and the Sea of Azov.

The Ukrainian Navy did not have anti-ship missiles when the full-scale war

started. The RK-360MC Neptune coastal missile system was transferred for experimental use in March 2021 and was not ready for serial production.

The aviation component (10 Naval Aviation Brigade) consisted of a few outdated aircraft and helicopters and was only capable of conducting Intelligence, Surveillance and Reconnaissance (ISR) missions.

The marine infantry was the only element of the navy that was significantly strengthened during the first eight years of the war after 2014.

Ukraine asked Türkiye to close the straits to Russian warships on 24 February, highlighting its role in keeping regional peace. The Turkish government agreed. The Turkish government agreed on Feb. 28, 2022. Türkiye's decision has prevented Russia from reinforcing the Black Sea Fleet with naval units deployed to the Mediterranean or units from its Pacific, Baltic or Northern Fleet, which has, in turn, increased the efficiency of Ukraine's asymmetric naval campaign.

## The asymmetric approach

Ukrainian forces are waging an operation that is aimed to both limit the Russian BSF's freedom of operation, reduce Russia's ability to sustain offensive operations in Kherson and Zaporizhia oblast, and, not least, set the conditions for the future liberation of the Crimean peninsula.

The campaign has demonstrated Ukrainian resolve and ingenuity, helping to underpin international support and domestic resilience. It has been integral to demonstrating that Russia's declared «red lines» are a fiction, allowing the West to continuously reassess its own self-restricting red lines.

*A country without a conventional Navy has so far sunk or damaged vessels of Russia's Black Sea Fleet.*

Ukraine's achievements go further, however. Air and land-launched cruise missiles, unmanned aerial vehicles (UAVs), uncrewed surface vessels (USVs) and Special Operations Forces (SOF) are also targeting Russian warfighting functions, Command and Control centres, A2/AD capabilities, critical logistical hubs, and Ground Lines of Communication (GLOC) nodes across the Crimean peninsula and the Black Sea.

The ongoing campaign is a joint effort by the Ukrainian Air Force, Ukrainian Navy, Defence Intelligence of Ukraine (DIU), Security Service of Ukraine (SSU), and Special Operations Forces (SOF).

While the operation includes the employment of both conventional and asymmetric instruments, this chapter will primarily focus on the asymmetric elements of the campaign.

## Employment of UAVs

At the start of the full-scale war, Ukraine was mostly using off-the-shelf equipment, either for surveillance or skilfully adapted to drop small bombs. Ukraine has since developed a fully-fledged drone industry, giving it a technological edge to set against russia's significantly larger manpower and state industry capable of quantity (at the cost of quality).

According to ISW, «Ukrainian forces began a successful and ongoing campaign of strikes on russian military infrastructure in Crimea in summer 2023, intended to degrade russia's ability to use Crimea as a key staging and rear area for russian operations in southern Ukraine. Ukrainian forces conducted a series of strikes on russian ground lines of communication (GLOCs) in Crimea – including the Chonhar and Henichesk Bridges [...] during the first phases of Ukraine's counter-offensive in June 2023 to disrupt russia's ability to provide personnel and material to defensive operations in southern Ukraine.»

Ukraine is conducting precision strikes on BSF “in addition to strikes on russian logistics routes and hubs, likely disrupting its role as a combined arms – not strictly naval – headquarters coordinating russian ground operations in southern Ukraine. Despite its name, the BSF is a major combined arms formation, roughly equivalent in stature to russia's land Combined Arms Armies. In addition to naval surface and submarine warfare elements, the BSF formally controls several surface-to-surface missile batteries and air defence batteries, which have been deployed to occupied southern Ukraine; the 22nd Army Corps; and Naval Infantry elements. russian fleet and army headquarters are additionally designed to flexibly take control of attached units, and the BSF is likely responsible for commanding some portion of russian volunteer formations and other irregular units in southern Ukraine. The BSF is also likely responsible for maintaining russian logistics between Krasnodar Krai and Crimea to the russian southern grouping of forces, as the BSF is the only formal russian military structure with a long-term presence in occupied Ukraine.»

Ukrainian drone capacity has consistently evolved, allowing it to target russian airfields, air defence systems, command posts, and supply depots deep inside russia and occupied territories. (On 2 April 2024, Ukrainian drones struck a drone production facility in russia's Alabuga Special Economic Zone, more than 1,200 km from Ukraine's border).

Ukrainian UAVs are also becoming smarter. They are increasingly using a basic form of artificial intelligence to help them navigate, avoid being jammed and target russian capabilities. Some of the long-range UAVs have a terminal computer with satellite and terrain data. It does not require any communication once launched and is fully autonomous. It gave the possibility to launch the operation on degrading the russian defence industrial base, its logistics and defensive systems. russia's air defence network is already being challenged. russia has already been forced to redistribute air defence systems to protect cities, military bases, depots, and strategic defence industry. Ukraine's UAV campaign will further undermine the integrity of its multi-layered Integrated Air Defence Systems (IADS).

Western donation of long-range missiles to Ukraine strengthens the ongoing, essential, and timely campaign to weaken russia's ability to conduct offensive operations in southern Ukraine, project maritime power in the Black Sea and beyond, and, not least, render the russian occupation of Crimea increasingly untenable. Ukrainian UAVs are often deployed in swarms, in combination with cruise missile strikes, attempting to saturate the russian air defence network.

As evidence of russia's concern, it has been forced to implement a number of decoy and deception techniques in an attempt to disrupt Ukrainian targeting efforts. At Kirovskoe Airfield on occupied Crimea there are decoy russian fighter aircraft painted on the concrete. Similar paintings have also been observed across at least 12 more russian air bases. The BSF has taken similar measures to distort Ukrainian targeting of its warships.

Additionally, russian Air Defence has shot down several of its own combat aircraft. According to British Intelligence, «there is a realistic possibility that rather than a technical issue, the increased pressure and tension amongst russian air defence operators induced by the fear of further Ukrainian action leads to them inadvertently engaging their own pilots and aircraft.» It highlights a lack of situational awareness and coordination between elements of the russian armed forces, possibly a result of persistent Ukrainian strikes against russian command and control nodes.

## Employment of USVs

Ukraine's employment of USVs has evolved since it was first used in August 2022. As of today, the two most commonly used USVs are the Sea Baby and Magura V5.

The Sea Baby is operated by the Security Service of Ukraine. It has a 400-horsepower engine and a max speed of 50 knots (90 km/h). It has a range of approximately 540 nautical miles (1000 km) and an explosive payload of 850 kg.

The Magura V5 is operated by the Defence Intelligence of Ukraine (DIU). It has a 300-horsepower engine, allowing a cruising speed of 22 knots (40 km/h) and a maximum of 42 knots (78 km/h). The USV has a range of 450 nautical miles (approximately 833 km) and an explosive payload of 320 kg.

Simpler Ukrainian USVs, based on modified jet skis, have also been observed. It is unclear whether these were armed or used as decoys. They are likely to be cheaper and quicker to build than the USVs with custom hulls, but generally less capable.

The preparations, planning and execution of the USV attacks are most likely carried out in several phases. Operations to hunt down a warship can last for days. During the first phase, potential targets are identified and tracked. If in port, a target will be easier to locate, but will be more difficult to attack due to port force protection measures. When the target is in open waters and underway, timely intelligence, reconnaissance, and surveillance activities become essential. Ukraine is most likely receiving both intelligence and real-time tracking data from its international partners. The USV itself will have a very short line of sight against even large vessels like frigates and corvettes.

During the last phase, the USVs are deployed to «hunt in packs or swarms» of five or six to try to overwhelm the target ship's defensive weapons. Russian warships use heavy machine guns to destroy the approaching drones, but also have to resort to small arms. The use of special tracer ammunition, which lights up when discharged, helps Russian soldiers to direct their fire at night. Ironically, these same rounds also help Ukrainian drone operators dodge them. «They show us where the fire is coming from, where they hit and which direction we should take to manoeuvre.»

## Employment of SOF

Ukrainian SOF is an integrated part of Ukraine's asymmetric campaign. The Special Operations Forces under the Ministry of Defence constitute one of the seven branches of the Armed Forces of Ukraine. Their tasking includes direct action, special reconnaissance, intelligence gathering, sabotage and psychological warfare. Ukrainian SOF has conducted all the above in Crimea.

It is assessed that thousands of Ukrainians are «involved in resistance networks that operate in the occupied territories, the vast majority of which are involved in the collection of intelligence information necessary for the effective operations of the Armed Forces of Ukraine.» These networks are being organized and controlled by the Ukrainian Special Operations Forces, Ukrainian intelligence, and law enforcement agencies. They have helped provide some of the information needed for the many successful Ukrainian strikes against key targets in Crimea.

While the acts of sabotage and direct actions account for a smaller percentage of resistance movement operations, they still have an impact on Russian logistics and morale. Most of the actions are carried out by «carried out by the Special Operations Forces and special units of the intelligence agencies, occasionally with some support from members of the resistance movement.»

Ukrainian SOF has conducted a number of operations in Ukraine, especially in Crimea and the Black Sea, including (but not limited to):

- Defence of the Kulbakyne Air Base, Mykolaiv oblast, together with the servicemen of the Territorial Defence Forces and the National Police in February 2022.
- Defence of Hostomel Airport alongside elements from the 80th Air Assault Brigade, 95th Air Assault Brigade, 72nd Mechanized Brigade and volunteers in February 2022, decimated assaulting Russian units composed of elite paratroopers, and prevented them from establishing a bridgehead for additional Russian reinforcements.
- Capture of the strategically important Zminiy Island in the western Black Sea on July 7, 2022.
- Capture of four Russian-controlled oil rigs off the coast of Crimea on 11 September 2023. The drilling platforms «Petro Godovanets» and «Ukraine», as well as the jack-up drilling rigs «Tavrida» and «Sivash», were returned to Ukrainian control.



- Raid on Cape Tarkhankut (the same day a russian S-400 air defence system was destroyed in the area) on 24 August 2023.
- Raid on Crimea (location not revealed) on 4 October 2023, destroyed russian military equipment on the coast.
- Establishment of a Ukrainian bridgehead in Krynky (Kherson oblast) on the east bank of Dnipro in mid October 2023.
- Strike against a Black Sea gas rig on 6 February 2024, destroying russian sensors and equipment. The equipment helped the enemy build a recognised maritime picture in the northern Black Sea and enhance the operation of its Iranian-made Mohajer-6 UAV.

Most SOF operations are, however, shrouded in secrecy and never declared. They are diligently working behind the scenes to prepare the ground for future offensives and strikes. There is ample evidence of high-risk operations involving acts of sabotage, drone strikes, and targeted assassinations against high-value targets and collaborators both in occupied territories and russia's border regions. SOF help direct fire on russian units both along the frontline, in Crimea and deep inside russia.

The operations serve many purposes, including intelligence gathering, fixing russian forces on the Crimean peninsula, and the destruction of key capabilities. The liberation of the peninsula is the ultimate goal, and the raids help Ukrainian forces prepare for future, large scale operations.

While striking russian assets with drones and missiles is important, having Ukrainian soldiers on the ground helps distract the Kremlin and forces russia to keep military units in Crimea that otherwise would have been employed to southern Ukraine.

Equally important, the series of tactical and operational victories help convince the West to continue supporting Ukraine. The actions by Ukrainian SOF are, however, also designed to convey a message to Ukrainian citizens in Crimea: They are not forgotten, and Crimea will be liberated.

Success and bravery inspire and help maintain Ukrainian resilience.

## Key capabilities and nodes being targeted

russian key capabilities and nodes necessary to sustain offensive operations in Kherson and Zaporizhzhia oblast, ensure BSF maritime sea control, project maritime power in the Black Sea and defend the Crimean Peninsula have all been deliberately targeted since the summer of 2022. These include:

### **The Black Sea Fleet:**

*Destruction or damage of 35 warships/vessels and one submarine. See Annex A – BSF losses as of April 2024 - for further details.*

### **Marine and land "Kalibr" missile systems:**

*None so far*

### **Iskander-M:**

*None so far.*

### **Bal and Bastion coastal missile complexes:**

*None so far.*

### **Aviation of the Black Sea Fleet and Air-Space Force:**

*Strike on Saky air base ((9 Aug 2022 and 21 Sep 2023), Belbek airfield (31 Jan 2024 31 Jan 2024), and Gvardeyskoye air base (1 Mar 2024 1 Mar 2024).*

### **Electronic Warfare Systems:**

*None so far.*

### **Command and Control:**

*BSF Headquarters (22 Sep 2023), The Deep-Space Communication Center of the russian Aerospace Forces (20 Dec 2023). A BSF Communication Centre (23 Mar 2024). Command post (6 Jan 2024) and a Radar control coordination facility bunker at Saky Air Base (31 Jan 2024).*

### **The BSF flagship «Moskva» was sunk (14 Apr 2022):**

*russia had nine operational Beriev A-50U/M airborne early warning and control (AEW&C) aircraft when the full-scale war started. Ukraine has shot down two (14 Jan 2024 and 23 Feb 2024) and damaged a third (26 Feb 2023 and possibly 9 Mar 2024), reducing russia's capability to detect and counter Ukrainian long-range strikes.*



*On Jan. 14, a long-range Ukrainian missile shot down an A-50 over the Sea of Azov in southern Ukraine.*

*A russian Il-22 command aircraft probably survived a Ukrainian attack (14 Jan 2024) but is probably beyond repair. Unknown persons planted explosives and damaged AN-148 and IL-20 aircraft (both belonging to the 354th Special Purpose Aviation Regiment) at Chkalovsky airfield near Moscow (18 Sep 2023/18 Sep 2023).*

*Ukraine launched missile strikes against three gas rigs (the Boyko towers) equipped with Neva-B radar stations and equipment that helped increase the range of the Mohajer-6 UAV. (20 Jun 2022, Aug 2023, and 6 Feb 2024).*

*The Commander of the BSF, Admiral Viktor Sokolov, was dismissed on 15 February 2024. Vice Admiral Sergei Pinchuk became the commander of the Black Sea Fleet (BSF).*

#### **Logistical hubs:**

*Oil depots and critical infrastructure (unspecified)*

#### **GLOC:**

*Strikes against the Kerch Bridge (8 Oct 2022, 17 Jul 2023 and 12 Aug 2023).*

*Strike against a key railway hub in Dzhankoi (20 Mar 2023/20 Mar 2023). Strikes against bridges between Crimea and mainland Ukraine, including the Chonhar road bridge (22 Jun 2023 and 6 Aug 2023).*

*Chonhar railway bridge (29 Jul 2023) and the bridge over Henichesk Strait (6 Aug 2023).*

#### **Multi-layered integrated air defence systems (IADS):**

*In the years before its full-scale invasion, the russian Air Force deployed five batteries of its best S-400 surface-to-air missiles, plus their radars, to occupied Crimea. In less than a month, Ukraine destroyed two of them. S-400 battery in Cape Tarkhanku (23 Aug. 2023) and Yevpatoriya (14 Sep 2023).*

*A S-300 missile system was damaged in the vicinity of the village of Molochne, Saky district (30 Oct 2023).*

## **Impact on russia's Sea Power in the Black Sea (and beyond)**

### **Strategic impact**

On russian Navy Day, July 31, 2022, russian President Vladimir Putin signed Decree No. 512 «On the Approval of the Naval Doctrine of the russian Federation». The previous Naval Doctrine was approved on July 26, 2015.

The doctrine outlined russia's maritime strategic goals, which include the development of the russian Federation as a great maritime power and reinforcing its standing among the leading maritime powers; building up capabilities to secure and protect national interests of the russian Federation in the world's oceans; ensuring the guaranteed access of the russian Federation to the world's oceans environment, its marine, fuel and energy, mineral, and biological resources according to standards and norms of international law; maintaining strategic stability in the world's oceans, strategic and regional deterrence of potential adversaries, and preventing aggression against the russian Federation from the ocean and the sea; exercising and defending the state's sovereign rights over the continental shelf of the russian Federation to explore and develop its resources; improving operational (combat) capabilities of the russian Navy to ensure the national security of the russian Federation and defence of its national interests in the world's oceans; and, improving the efficiency of defending and safeguarding the russian Federation state borders at sea.

The list of important areas for ensuring russian national interests is also noteworthy; these include the Sea of Azov and the Black Sea, the Baltic and Kuril straits, the eastern part of the Mediterranean Sea, as well as sea transit areas which are vital to world maritime transport interests.

*Instead of achieving its maritime strategic goals, the russian Navy has been forced to «leave the battlefield» by a country without a conventional Navy.*

Ukraine has so far disabled about 33% of russia's warships in the Black Sea. The mediocre performance of the russian Black Sea Fleet (BSF) will have global repercussions. russia has once again lost credibility as a global Sea Power.

Ukrainian strikes have exposed inadequate command and control, low levels of training, lack of warfighting skills, technical shortcomings, and structural problems. Ukraine's relentless strikes against the BSF, critical infrastructure in Crimea, and the Turkish closure of the Bosphorus and Dardanelles straits have huge impact on Russia's ability to project maritime power in the Black Sea, the Mediterranean and beyond.

The Ukrainian campaign also helps undermine the Russian war economy. Equally important, since arms export has long been a core tool of Russia's foreign policy, a weakened presence in the global arms market undermines Russia's geopolitical role (According to the Stockholm International Peace Research Institute (SIPRI), Russian arms exports fell by 53% between the periods 2014-2018 and 2019-2023. As a result, Russia dropped from second to third place in the global arms export rankings.)

The psychological impact of the Ukrainian Black Sea campaign in both Russia and Ukraine should not be underestimated. Historically, the Russian Navy has lost decisively before. The war started in Crimea on 20 February 2014. Ukraine believes that the war will also end in Crimea.

## Operational impact

The Ukrainian cruise missile, UAV and USV strikes have reduced the BSF's ability to uphold both its security and warfighting functions.

Additionally, the campaign against Russian military infrastructure, headquarters, and logistics routes in Crimea is designed «to degrade the Russian military's ability to use Crimea as a staging and rear area for Russian defensive operations in southern Ukraine. Ukrainian strikes on logistics routes are disrupting Russian supplies to Kherson and Zaporizhia Oblast. Strikes on Black Sea Fleet assets are degrading its role as a combined arms headquarters but have not defeated it as a naval force.»

Ukrainian strikes massively erode morale amongst Russian commanders and in the Russian information space.

### Sea Control

*Lost.* The BSF established Sea Control in the Black Sea before the launch of the full-scale invasion. This allowed the BSF freedom of action throughout the Black Sea while denying Ukraine its use. The Ukrainian

*Armed Forces were initially unable to contest Russian control, allowing it to focus on delivering maritime manoeuvre or maritime power projection.*

*Russia no longer controls the northern part of the Black Sea. Ukraine has been able to open a shipping lane for imports/exports. Ukraine continues to limit the freedom of manoeuvre of the BSF.*

### Sea Denial

*Reduced ability to conduct Sea Denial Operations. Ukrainian strikes against BSF assets on land and at sea have changed the Russian naval modus operandi, forcing it to relocate most of its warships away from its main base in occupied Sevastopol, Crimea. This is hampering the BSF's ability to uphold a maritime blockade, allowing Ukraine to reopen a shipping lane for imports/exports of goods.*

*Russia's maritime freedom of operations has been reduced. The BSF is forced to operate at a safe distance from shore-based anti-ship missiles. It is more vulnerable to air-launched anti-ship missiles than it was two years ago. It has proven itself vulnerable to USVs.*

*Its endurance in theatre has been reduced due to its relocation to the Russian coast around Novorossiysk, while the transit distance to the area of operations has increased.*

*Russia is, however, still able to deny Ukraine freedom to use the maritime domain to its advantage through its still fairly robust A2/AD capabilities (ASM, SSM, MW, submarine). Russia has increased the involvement of Black Sea Fleet naval aviation for control and operations in the Black Sea.*

### Power Projection

*Limited.* Despite Russia's attempts to limit its losses, Ukraine continues to demonstrate success in diminishing the Black Sea Fleet's ability to project power in the region.

*As stated, the BSF has lost its ability to conduct anything but tactical-level amphibious operations.*

*Limited ability to establish an effective maritime blockade.*

*Its strike capability against objectives ashore has been temporarily reduced because of fewer Kalibr-carrying platforms and a reduced ability to load missiles. The BSF has been stockpiling Kalibr missiles in*

recent months. Launching the missiles from a greater distance («safe distance»), which helps provide the Ukrainian air defence network more time to react.

russia's ability to project and sustain maritime power beyond the Black Sea has been reduced due to the Ukrainian campaign and Türkiye's use of the Montreux Convention.

### **Support Land and Air Operations**

Limited. russian Naval Gunfire Support (NGS) is no longer possible due to Ukrainian anti-ship capabilities.

Having lost many cruise missile carriers, russia still has 9 warships and submarines with Kalibr cruise missiles in the Black Sea (two Project 11356R frigates (Admiral Essen and Admiral Makarov) — up to eight missiles each; three Buyan-M missile corvettes (Vyshny Volochyok, Ingushetia, Grayvoron) — up to eight missiles each; one Karakurt missile corvette (Tsiklon) — up to eight missiles; and three Varshavyanka submarines (Stary Oskol, Velikiy Novgorod, Kolpino) — up to four missiles each). russian forces have rarely used Kalibr missiles in recent months because the BSF naval base in Sevastopol remains extremely vulnerable to Ukrainian strikes.

The BSF is unable to conduct more than tactical-level amphibious operations. It has currently only five large landing ships and only three remain operational if the latest Ukrainian strike seriously damaged the Yamal and Azov.

### **Contribute to Recognised Air Picture**

Limited. The BSF has lost its primary maritime long-range Air Defence and Air Surveillance. Additionally, russia has lost at least two A-50 airborne early warning planes and crucial command and control nodes in Crimea.

### **Protect Maritime Interests**

Limited due to reduced maritime presence in the Black Sea because of vulnerability to Ukrainian Sea Drones. Its ability to continue wider regional security patrols is also reduced.

### **Maritime Interdiction Operation**

Limited due to reduced maritime presence in the Black Sea because of vulnerability to Ukrainian Sea Drones. Its ability to enforce its de facto blockade of Ukrainian ports is reduced.

### **Maritime Security Operations**

Limited due to reduced maritime presence in the Black Sea because of vulnerability to Ukrainian Sea Drones. Its ability to continue wider regional security patrols is reduced.

### **Command and Control**

Degraded Command and control due to the loss of the BSF flagship Moskva, and cruise missile strikes on the BSF Headquarters and the communications centre in Sevastopol; the downing/damage up to three A-50 airborne surveillance planes; and not least, the enduring limited naval presence in the theatre. russia's ability to build and maintain a Recognised Maritime Picture has been reduced.

### **ISR**

Degraded ability to build a Recognized Maritime Picture due to a reduced naval presence in the Black Sea, loss of gas platforms in the northern Black Sea, and being forced to operate outside the range of land-launched SSM has reduced russia's maritime situational awareness.

### **Logistics**

Degraded. russian vessels of a higher value, which would ordinarily use port infrastructure in Sevastopol, have been forced to deploy to alternative port facilities further east.

It also likely has a degraded ability to defend its assets in port and to conduct routine maintenance.

Ukraine's ability to launch attacks on naval facilities and vessels in Sevastopol has had a significant impact on russia's ability to launch Kalibr cruise missiles. Having Sevastopol heavily compromised means russia has lost several critical logistic enablers (e.g. the loading of Kalibr missiles, drydocks and the ability to maintain and repair the BSF).

## Russian vulnerabilities

### Multi-layered integrated air defence systems (IADS)

Ukraine has targeted russian S-400 air defence systems, airborne early warning planes, and both a command post and a radar control coordination facility bunker at Saky Air Base. Additionally, numerous strikes by both cruise missiles and UAVs against russian naval bases, command and control nodes, GLOC, and logistical infrastructure have helped both reduce the BSF by approximately a third already and reduced its freedom of action.

The many successive Ukrainian strikes against targets on the Crimean peninsula may be indicative of wider systemic issues with russian air defences.

### Russian drone «ingenuity»

Russia and Ukraine are engaged in a technological race. Russia is using its state-controlled industry to ensure a massive output of few drone systems, whereas Ukraine is engaging private business enterprises to ensure diversity and quality.

Ukrainian industry is not limited by sanctions and their consequential supply chain problems. It has better access to technology – including top end high-speed microchips – than Russia.

Moscow Duma Deputy Andrei Medvedev recently stated that Russia's prioritisation of mass production of drones is leading to the production of large numbers of drones that lack the technological adaptations needed to compete with Ukrainian drones. He argued that Ukrainian forces are constantly improving their drones based on battlefield experience and warned that constant Ukrainian innovation may eventually make Russian mass-produced drones ineffective.

### Ability to detect, locate and defend against USVs

Reports suggest that Ukraine's USVs are hard to detect visually beyond two nautical miles (3.7 km). Depending on relative speed, this gives the target a two to four minute window to respond to the attack, provided that it is visually observed. Night time attacks greatly reduce the response time.

The Sea Baby is fitted with a system between the engine and the outer top cover that cleans fuel vapour and helps reduce the infrared signature of the drone.

According to DIU, it does not emit a lot of heat and is claimed to be almost invisible to thermal cameras. Being made from plastic and riding low in the water, it is also difficult to detect by radar.

The successful USV attacks might, therefore, indicate one or more BSF vulnerabilities, ranging from lack of training to passive sensors (acoustic and infrared) shortcomings and/or themselves generating too much noise (reducing the performance of onboard passive sonars).

The evidence is, however, not conclusive. Most destroyed and damaged targets of the Ukrainian drone attacks manoeuvred while taking active countermeasures before being hit. This indicates pre-warning. The many successes suggest, however, that they had insufficient time from detection to impact and/or lacked effective countermeasures.

If the Russian Navy is unable to detect USVs at long range, they will be unable to detect torpedoes at close range.

## Structural problems of the Russian Navy

The scale and scope of Russian losses are indicative of several BSF shortcomings. Lack of training and professionalism are but some of its structural problems. The sinking of the Russian flagship «Moskva» is the most obvious proof thereof.

Operating within the striking range of both land-launched Neptune cruise missiles and the Ukrainian combat aircraft, it kept its fire control radars in stowed position. Despite operating its Air Surveillance radars, it was unprepared and/or unable to respond to the small, «slow», radar-homing and sea-skimming cruise missiles.

Ukraine has sunk or disabled a third of the BSF in slightly more than two years. All have operated within the range of known Ukrainian weapon systems – ranging from ATGM, «Tochka-U», Neptune, Harpoon, Storm Shadow/SCALP-EG cruise missiles, Bayraktar TB2 and other undetermined UAVs, and not least, the Sea Baby and Magura V5 USVs. The maritime task groups have not been set up or provided with the means needed to operate effectively and safely within their area of operation. This is indicative of both poor command and control and planning as well as inadequate intelligence and situational awareness.

Only after having lost 33% of its fleet, did the Russian Ministry of Defence instruct the BSF to strengthen its point defence systems and increase training to counter the asymmetric threat. The commanders of both the Russian Navy and the BSF were replaced. The Russian Navy is slow to adapt to new threats and changes to the strategic environment.

## Predictions

### Russian A2/AD degradation

While the Russian A2/AD capability has degraded over the last two years, it is still robust. Russia is still capable of conducting Sea Denial Operations, supporting offensive operations in southern Ukraine, and defending the Crimean peninsula.

The BSF still possesses the means (air and sea-launched missiles, mines and torpedoes) to close the shipping lanes if it so desires, but has so far refrained. Attacking civilian shipping within the territorial waters of Türkiye, Bulgaria, and Romania can potentially trigger NATO to respond. Russian attacks against foreign-flagged ships might cause the same response. While two civilian ships have been sunk and two damaged, the low numbers are still an indication of Russian restraint to avoid prompting NATO to become militarily involved.

Crimea remains, however, within reach of Ukrainian long-range strike weapons. Ukraine's ability to destroy and reduce the BSF, Russian Air Defence and Air Power will likely increase over time.

The mobilisation of the Russian defence industry, its partnerships with China, Iran and North Korea, and the Unified Deep Water System of European Russia - linking the White Sea, the Baltic Sea, the Volga River, Moscow, the Caspian Sea and—via the Sea of Azov—the Black Sea - might all, however, allow Russia to reverse the recent setbacks, reinforce the BSF and strengthen its ability to counter Ukrainian UAVs and USVs.

### Ukrainian long-range strike capacity

On 6 February, President Zelensky signed a decree creating a separate branch of Ukraine's Armed Forces dedicated to drones. The Unmanned Systems Forces will «focus on improving Ukraine's work with drones, creating special drone-specific units, ramping up training, systemizing their use, increasing

production, and pushing innovation.» According to the President's Office, the new branch will aim to «increase the capabilities of Ukraine's Armed Forces and to use unmanned and robotic air, sea, and ground systems.»

Ukraine has dramatically increased its production of long-range UAVs. It will produce thousands of long-range drones capable of deep strikes into Russia in 2024. The range is set to increase this year. By the end of 2024, 10 manufacturers are expected to produce drones with a range of up to 2,500 km. Kyiv's «Luch» Design Bureau has developed a drone («Sokil-3000») with a reach of 3300 km. The new Ukrainian weapon will be able to strike targets as far afield as the Murmansk region and Abkhazia, the Georgian breakaway territory. Many of the Russian strategic bombers that are employed against Ukraine are based in the former Ochamchire naval base in Abkhazia.

Ukraine is continuing to develop its technological advantage in the maritime domain, exploring new technology to increase the surprise, stealth, survivability, and lethality of drones.

Ukraine is investigating ways to develop its USVs further. This could include the addition of air defence systems and other weapons systems to help improve the country's protection, but also allow it to seek out other targets: ground, surface, and air. There are also plans to allow the USV to submerge slightly, making it even less visible during its final approach.

Ukraine is also seeking to introduce highly capable underwater drones to the war. Several Ukrainian underwater drone - Autonomous Underwater Vehicle (AUV) - projects have already been made public. The AUVs could be equipped for a range of missions and will likely be able to carry stand-off weapons such as mines or torpedoes.

It is entirely likely that there are other models of maritime drones which we have yet to learn about. The BSF will most likely be the first to know about their existence.

Additionally, a «drone coalition» under the lead of Latvia and the UK was established on 17 February 2024. Six other countries - the Netherlands, Lithuania, Estonia, Sweden, Denmark and Germany - have joined the initiative. Ukraine is seeking to expand the coalition to include at least 20 new countries to help supply drones, cooperate on technology, and strengthen its newly formed separate branch of the armed forces devoted to drones.

The coalition intends to deliver 1 million drones to Ukraine. Aiming to supply Ukraine with advanced drone technology and bolster its offensive capabilities, the coalition might potentially help increase Ukraine's long-range strike capacity.

A donation of long-range Army Tactical Missiles (ATACMS) and Taurus cruise missiles would greatly increase the tempo of Russia's military demise and concomitantly enhance Euro-Atlantic safety. The combination of long-range cruise missiles, ATACMS, UAVs, USWs and AUVs would ensure the collapse of the Russian A2/AD umbrella over Crimea, making the peninsula untenable for the Russian Armed Forces.

These systems would also enable Ukraine to cut Russian GLOCs between Crimea and the mainland, reducing Russia's ability to sustain ground operations in Kherson and Zaporizhia oblast. They would, not least, negate the effect of the new Russian railway being built to link Russia's port city Rostov-on-Don and occupied Crimea, as an alternative to the Kerch Bridge.

During the next year, Ukraine will likely refocus its efforts on the destruction of Russia's naval base in Novorossiysk. Being denied that base, the BSF will cease to be a credible Black Sea naval force.

## The impact of Lessons Learned

The Russian Armed Forces are «turning into a learning organization» after two years of war in Ukraine and are currently resolving their battlefield problems, usually within a timeframe of months. They will undoubtedly adapt to and counter the ongoing Ukrainian campaign in the Black Sea. The replacement of both the Commander in Chief of the Russian Rederation Navy and the Commander of the Black Sea Fleet are two steps in that process. Admiral Moiseyev's first task as Commander in Chief of the Navy will likely be to stabilise the security situation in the Black Sea and implement changes designed to improve the Black Sea Fleet's combat capability in the region.

According to British Intelligence, the Russian Ministry of Defence has announced new measures for BSF units to mitigate the threat of UAVs and USVs. Emphasis has been given to the conducting daily anti-UAV/USV preparedness exercises to enable ships' crews to quickly repel attacks during the day and at night. Defence Minister Shoigu also ordered additional large-calibre weapons to be fitted to unspecified assets to augment their defences.

## BSF basing, maintenance and repair

Ukraine's ability to strike high-value targets across the Crimean peninsula will evolve and increase. Russia has been forced to relocate most of its warships and, consequently, necessary spare parts, handling equipment, ammunition and expertise to Novorossiysk. Its ability to conduct ship repair and properly maintain its BSF fleet is, therefore, presently degraded.

The dry docks in Sevastopol are not fully functioning and are within striking distance from mainland Ukraine. There are a limited number of other floating docks in Crimea, but these lack the specialized infrastructure needed to do complicated repairs, on submarines or many naval ships. The port of Novorossiysk in the eastern Black Sea does not have the same capability, especially for submarines.

With warships requiring regular maintenance – and an indefinite number in need of repair due to the recent attacks – a backlog will inevitably build up. «Thus, the Black Sea fleet will have to be very prudent with its remaining assets, which might result in a reduced number of operational deployments in the foreseeable future. The fewer Russian ships there are operating in close vicinity to Ukraine, the more room for manoeuvre there is for Kyiv to launch further attacks on Crimea and the Black Sea fleet, contributing to a positive loop of victories and opportunities.»

The new strategic reality will force Russia to further develop existing and new naval bases in the Black Sea. New docks and facilities will be built. Force protection will be strengthened. British Intelligence reports that recent satellite images show the entrance to the port of Novorossiysk has been partially blocked by four barges in an attempt to strengthen the port's defence against Ukrainian USV attacks.

A new Russian naval base in Ochamchire in Abkhazia, a breakaway territory internationally recognised as part of Georgia, may become partially operational in 2024. Construction and dredging have already started. As of December 26, approximately fifty vessels were reported in the port. The exact number and type of ships are currently unknown. Currently, the port operates as a base for the Russian FSB Border Service patrol boats.

Russia's ability to repair and maintain the BSF is temporarily low, but will – if Ukraine and the West allow it – increase over the next one to two years.



## Threat to shipping

Both Russia and Ukraine have deployed maritime minefields. Ukraine might have deployed mines to deny the BSF freedom of operations and hinder an anticipated amphibious landing during the spring of 2022. Russia has laid mines to block Ukrainian ports.

Drifting mines are routinely being detected and deactivated in the Western Black Sea by coastal nation's authorities. Romania alone has neutralised 97 mines. According to the NATO Shipping Centre (NSC), «the threat of drifting mines in the Southwest part of the Black Sea still exists. National Coastal Warnings have been broadcast recommending safe routes for shipping in the Western Black Sea (ref. Coastal Warning NW 18/29.03.2022. BLACK SEA. ROMANIA). Shipping is advised to use these routes and stay in contact with relevant authorities.

The threat of collateral damage or direct hits on civilian shipping in the War Risk Area (NAVAREA III 0124/2022) of the Black Sea area remains HIGH. The threat of GPS jamming, AIS spoofing, communications jamming, electronic interference and cyber-attacks in the area are also considered HIGH. Harassment and diversion of shipping in the area cannot be excluded.»

The presence of active mines in the Black Sea not only threatens trade routes but also poses a significant threat to Türkiye, Romania and Bulgaria.

Türkiye, Bulgaria, and Romania signed an agreement on 11 January 2024 on a joint plan to clear mines floating in the Black Sea. The task force will consist of three mine-hunting vessels from each country and one flagship. According to Türkiye, potential contributions to the initiative by non-Black Sea NATO allies would not be allowed until after the end of the war.

According to the Ukrainian Navy, the demining of primary maritime sailing routes will take three to five months, but the broader demining operation might take 3-5 years.

If Türkiye were to lift its restriction on passage through the Strait of Bosphorus to its NATO partners only, they would probably be able to swiftly ensure the safety of shipping by creating and expanding safe corridors.

## Recommendations

### Explore window of opportunity

Russian forces are learning painful lessons. They have shown the capacity to adapt and will likely aim to scale lessons learned from the war in Ukraine to ongoing efforts to prepare the Russian military for a potential long-term confrontation with NATO.

Despite the closure of the Bosphorus Strait, the BSF is still receiving new warships. The occupation of Crimea in 2014 enabled it to expropriate and develop further Feodosiia Shipyard and Kerch Zaliv Shipyard. Several state defence orders were issued for the development of missile corvettes of the new Project 22800 Karakurt and missile corvettes of Project 22160.

One corvette (Project 22160) partly built in Crimea joined the BSF in the summer of 2022. The first small missile boat of Project 22800 – also built in Crimea – was commissioned by the BSF in the summer of 2023. One more unit is expected by the end of the year. Project 22160 was terminated in 2022 due to insufficient seaworthiness, light armour, a vulnerable propulsion system, as well as weak armament.

Additionally, the Unified Deep Water System of European Russia allows Russia to relocate further smaller warships to the Black Sea.

Unless evolved further, Ukraine's technological advantage in the Black Sea might be temporary. The window of opportunity should be explored to bring about the collapse of Russian naval capabilities and the destruction of the Kerch Bridge.

No single Western-provided system will provide Ukraine with a decisive advantage or directly enable Ukrainian victory. However, the combined effect of the asymmetric campaign using Western and Ukrainian cruise missiles, UAVs, and USVs – including future potential capabilities like ATACAMS, Taurus, and AUVs – to strike BSF assets will help speed up its demise.

Ukraine and its international partners should:

- Provide Ukraine with long-range missiles (e.g. ATACMS, Taurus, Storm Shadow/SCALP-EG, NSM) in sufficient numbers to strengthen an ongoing, essential, and timely campaign to weaken Russia's ability to defend southern Ukraine and Crimea.



- Continue developing new drone capabilities to ensure that Ukrainian quality (technological advantage) prevails over Russian quantity.
- Increase the tempo of the campaign to offset the effect of Russian countermeasures.
- Strengthen sanctions against the Russian defence industrial base and parties supporting its war efforts.

## Develop the drone war

With (or without) the support of its international partners, Ukraine must continue to develop its UAVs and USVs. To succeed, it needs to either increase their drones' range and speed or reduce their signature (radar, thermal, acoustic) to increase their effectiveness.

Ukraine and its international partners should:

- Develop USVs capable of launching homing torpedoes. This would increase the lethality of the USVs. It would allow them to engage from outside the range of Russian point defence systems. This would enable Ukraine to reuse the USVs.
- Develop weaponized Autonomous Underwater Vehicles (AUV) for offensive minelaying and attack. This would allow Ukraine to lay mines in Russian ports and approaches.
- Develop USVs capable of carrying guided rockets or cruise missiles. This would allow Ukraine to engage Russian key nodes and capabilities with minimum warning time, increasing the lethality of the missiles.
- Provide Ukraine with Air Defence systems to protect its ports and cities from Russian ballistic missile and drone attacks.

## Increase allied naval presence in the Black Sea

A key constraint on naval power in the Black Sea has been the limited ability of non-littoral nations to get their warships through the Bosphorus and the Dardanelles. Türkiye sees itself as a responsible party to the Montreux Convention and has denied requests to sail any warships through the strait. Since 1936, the Montreux Convention has restricted the number and size of warships that can be operated in the Black Sea, as well as how long they can stay there. The convention also gives Türkiye the right to close its straits to warships

in times of war or when it perceives a threat. Türkiye has exercised that right in the current war, preventing both Russia and Ukraine from reinforcing their Black Sea Fleets, while also limiting access to the sea by other NATO nations.

The Montreux Convention does not, however, limit non-Black Sea countries' right to send warships to the Black Sea. Türkiye does. The Turkish government appears to exercise its rights under Article 20 and 21, which states that passage of warships should be wholly at the discretion of the Turkish Government when it feels itself to be threatened with imminent danger of war.

Ukraine's international partners should:

- Engage Türkiye to amend its present policy on passage through the Strait of Bosphorus of warships of non-belligerent countries to strengthen NATO security in the Black Sea.
- Help strengthen the naval capabilities of Romania and Bulgaria to reinforce NATO's ability to impose its will on the Russian Federation in the Black Sea.
- Re-deploy naval units to the Black Sea to help protect humanitarian shipping to fight global famine, uphold Freedom of Navigation and, not least, demonstrate the will and ability to counter Russian aggression.
- Develop the Danube River to bypass the Strait of Bosphorus for transport of both goods and military equipment to the Black Sea.

## Apply lessons learned

As the medium to long-term risk of an armed confrontation with Russia increases, NATO urgently needs to adapt its force structure and force generation process to the evolving drone warfare. This includes (but is not limited to):

- Increasing force protection measures to counter UAVs and USVs.
- Strengthening its maritime force's ability to detect, locate and destroy UAVs and USVs.
- Developing and introducing maritime UAVs and USVs to the force structure.
- Improving offensive long-range strike capabilities to help undermine a potential opponent's ability to lead and sustain operations.

## Annex A – BSF losses as of April 2024

Ship (submarine, vessel)	Date	Results	Notes
Patrol boat pr. 03160 (class «Raptor»)	21.03.2022	Destroyed	ATGM strike (Mariupol)
Landing ship pr. 1171 «Saratov» (class «Tapir»)	24.03.2022	Destroyed	Strike by the missile complex «Tochka-U»
Frigate pr. 11356R «Adm. Essen» (class «Admiral Grigorovich»)	05.04.2022	Damaged	Missile strike with 1 P-360 Neptun missile.
Missile cruiser pr. 1164 «Moskva» (class «Slava»)	14.04.2022	Destroyed	Missile strike with 2 P-360 Neptun missile
Patrol boat pr. 03160 (class «Raptor»)	02.05.2022	Destroyed	Strike by the Bayraktar TB2 UAV (Zmiinyi Island)
Patrol boat pr. 03160 (class «Raptor»)	07.05.2022	Destroyed	Strike by the Bayraktar TB2 UAV (Zmiinyi Island)
Landing craft pr. 11770 (class «Serna»)	07.05.2022	Destroyed	Strike by the Bayraktar TB2 UAV (Zmiinyi Island)
Patrol boat pr. 03160 (class «Raptor»)	07.05.2022	Destroyed	Strike by the Bayraktar TB2 UAV (Zmiinyi Island)
Landing craft pr. 02510 (class «BK-16»)	May 2022	Destroyed (requires clarification)	Strike by the Bayraktar TB2 UAV (Zmiinyi Island)
Rescue tug pr. 22870 «Spasatel Vasilij Bekh» (class Project 22870)	17.06.2022	Destroyed	Strike with 2 Harpoon anti-ship missiles
Landing craft pr. 1776 (class «Ondatra»)	02.07.2022	Damaged	Sustained damage due to a mine barrier near the city of Mariupol
Patrol boat pr. 03160 (class «Raptor»)	24.07.2022	Destroyed (damaged)	Strike by the Bayraktar TB2 UAV
Patrol boat pr. 03160 (class «Raptor»)	24.07.2022	Destroyed (damaged)	Strike by the Bayraktar TB2 UAV
Patrol ships (corvette) pr. 22160 «Vasilij Bykov»	04.08.2022	Damaged (requires clarification)	Strike by unmanned maritime vessels (drones) (presumably) near the anchorage of Sevastopol

Naval minesweeper pr. 266M «Ivan Golubets» (class «Naty»)	29.10.2022	Damaged	Strike by unmanned maritime vessels (drones) near the anchorage of Sevastopol
Frigate pr. 11356R «Adm. Makarov» (class «Admiral Grigorovich») (presumably).	29.10.2022	Damaged	Strike by unmanned maritime vessels (drones) near the anchorage of Sevastopol
Intelligence ship pr. 864 «Priazovye» (class «Vishnya»)	11.06.2023	Damaged	Strike by unmanned maritime vessels (drones) in the area southeast of Sevastopol
Landing ship pr. 775 «Olenegorsky Gornyak» (class «Ropucha»)	04.08.2023	Damaged	Strike by unmanned maritime vessels (drones)
Oil tanker-chemical carrier pr. 52 «Sig» (used in the interests of the MoD RF).	05.08.2023	Damaged	Strike by unmanned maritime vessels (drones) near the city of Kerch
Small patrol boat pr. 640 KC-701	03.09.2023	Destroyed	Strike by the Bayraktar TB2 UAV (northwest part of the Black Sea)
Conventional attack submarine pr. 636.3 «Rostov-on-Don» B-237 (class «Improved Kilo»)	13.09.2023	Sustained significant damage	Missile strike by the Storm Shadow (SCALP-EG) cruise missile (presumably)
Landing ship pr. 775 «Minsk» (class «Ropucha»)	13.09.2023	Sustained significant damage	Missile strike by the Storm Shadow (SCALP-EG) cruise missile (presumably)
Corvette pr. 1239 «Samum» (class «Bora»)	14.09.2023	Damaged	Strike by unmanned maritime vessels (drones) near the anchorage of Sevastopol
Patrol ships (corvette) pr. 22160 «Pavel Derzhavin»	12.10.2023	Damaged	Sustained damage due to a mine barrier (presumably) near the anchorage of Sevastopol
Sea tug pr. 22870 «Professor Nikolay Muru»	12.10.2023	Damaged	Sustained damage due to a mine barrier (presumably) near the anchorage of Sevastopol while towing the damaged patrol ship pr. 22160 «Pavlo Derzhavin»
Large hydrographic survey boat pr. 23040G «Volodymyr Kozitsky»	26.10.2023	Damaged	Sustained damage on a minefield (probably) near the Sevastopol roadstead while surveying the area for sea mines

Corvette pr. 22800 «Askold» (class «Karakurt»)	04.11.2023	Sustained significant damage	Missile strike by 2 «Storm Shadow» (SCALP-EG) missile systems (probable)
Landing craft pr. 11770 (class «Serna»)	10.11.2023	Destroyed (damaged)	Attack by unmanned marine boats (drones) near Chornomorske
Landing craft pr. 11770 (class «Serna») (possibly pr. 1776, class «Ondatra»)	10.11.2023	Destroyed (damaged)	Attack by unmanned marine boats (drones) near Chornomorske
Landing ship pr. 775 «Novocherkassk» (class «Ropucha»)	26.12.2023	Destroyed	24.03.2022 - damaged by a Tochka-U missile system;
Corvette pr. 12411 «Ivanovets» (class «Tarantul»)	01.02.2024	Destroyed	Attack by unmanned maritime boats (drones) on Donuzlav Island
Landing ship pr. 775 «Caesar Kunikov» (class «Ropucha»)	24.02.2024	Destroyed	Attack by unmanned maritime boats (drones) on Donuzlav Island near Alupka
Patrol ships (corvette) pr. 22160 «Sergei Kotov»	05.03.2024	Destroyed	Attack by unmanned marine boats (drones) near Kerch
Landing ship pr. 775 «Yamal» (class «Ropucha»)	24.03.2024	Damaged (requires clarification)	A missile strike by the Storm Shadow (SCALP-EG) missile system (probably) in Sevastopol
Landing ship pr. 775 «Azov» (class «Ropucha»)	24.03.2024	Damaged (requires clarification)	A missile strike by the Storm Shadow (SCALP-EG) missile system (probably) in Sevastopol
Intelligence ship pr. 18280 «Ivan Khurs» (class «Yury Ivanov»)	24.03.2024	Damaged (requires clarification)	A missile strike by the Storm Shadow (SCALP-EG) missile system (probably) in Sevastopol

As of April 1, 2024:

- Destroyed (excluding those whose damage cannot be restored): 18 units of the BSF.
- Damaged (including those that are not subject to restoration): 18 units of the BSF.

## Annex B – Ukrainian strikes on infrastructure across Crimea

Since the beginning of the full-scale war, the Armed Forces of Ukraine, Security Service of Ukraine and Defence Intelligence of Ukraine have carried out about 100 attacks on military units and infrastructure across the Crimean Peninsula. Attacks have been carried out by land- and air-based missiles, UAVs and USVs.

The list below is based on open-source intelligence and does not include all the Ukrainian strikes on Russian units and infrastructure across the Crimean Peninsula. The list is made to illustrate the extent of Ukraine's strikes across Crimea. Strikes on BSF naval units are listed in Annex A.

Target	Date	Results	Notes
Petro Godovanets and Ukraina drilling rigs	20.06.2022		Harpoon missile
Saky Air Base	09.08.2022	5 Su-24M/Su-24MR and 5 Su-30SM destroyed	
Ammunition depot near Maiske	16.08.2022	Explosions recorded	
Kerch Bridge	08.10.2022	Road and rail spans both damaged, road traffic not fully restored until 5 May 2023	Truck-borne IED containing 21 tonnes of Hexane
Balaklava Thermal Power Plant	27.10.2022		UAVs
Sevastopol Naval Base	29.10.2022	Damage to the minesweeper Ivan Holubets, possibly to frigate Adm. Makarov, and the barrier in Pivdenna Bay	USVs
Railway track in Bakhchisaray district	23.02.2023	Explosions recorded	
Railway hub in Dzhankoy	20.03.2023	Destruction of Kalibr cruise missiles under transport	
Sevastopol Naval Base	22.03.2023	Damage to the barrier in Pivdenna Bay	USVs
Sevastopol oil depot	29.04.2023	Explosion and fire	

Railway line in Simferopol district	18.05.2023	Explosions recorded	
Road bridge between the Kherson region and Crimea	22.06.2023	Damaged, temporarily closed	Storm Shadow/SCALP-EG missile
Kerch Bridge	09.07.2023	None	Attempted S-200 missiles attack
Kerch Bridge	17.07.2023	Section in one direction of road span destroyed, road traffic restricted	USVs
Ammunition depots at the Starokrymsky training ground	19.07.2023	Explosions recorded	
Oktyabrsk air base	22.07.2023	Explosions recorded	UAVs and possibly missiles
Elevatorna railway station	22.07.2023	Fire	UAVs and possibly missiles
Oil depot in Krasnogvardiy district	22.07.2023	Explosions and fire	UAVs and possibly missiles
Ammunition depots in the Dzhankoy district	24.07.2023	Explosions, evacuation within a 5 km radius	Storm Shadow/SCALP-EG missile
Ammunition depots in the Kozacha Bay	28.07.2023	Damaged (requires clarification)	
Railway bridge between the Kherson region and Crimea	29.07.2023	Damaged, temporarily closed	Storm Shadow/SCALP-EG missile
Oil depot in Feodosia	04.08.2023	Damaged (requires clarification)	
Chongar and Henichesk bridges between the Kherson region and Crimea	06.08.2023	Damaged, temporarily closed	Storm Shadow/SCALP-EG missile
Sevastopol Naval Base	10.08.2023		Attempted USV attack
Two 5P85CM2-01 launchers of the S-400 "Triumph" complex at Olenivka	24.08.2023	Destroyed	Neptune missiles adapted for land attack
Cape Tarkhankut	24.08.2023		A SOF raid by the DIU

Military unit 73954 and 83526 in the city of Simferopol	09.09.2023	Explosion and fire	
Sevmorzhavod shipyard in Sevastopol	13.09.2023	Two docks, one submarine "Rostov-Na-Donu" and one landing ship «Minsk» destroyed	Storm Shadow/SCALP-EG missile
S-400 "Triumph" complex in Yevpatoria	14.09.2023	Destroyed	UAVs and Neptune missiles adapted for land attack
26th Marine Radio Technical Detachment in Sevastopol	17.09.2023	Explosions recorded	UAVs
744th Communications Centre, BSF Command centre near the village of Verkhnosadove (near Sevastopol)	20.09.2023	Damaged (requires clarification)	Storm Shadow/SCALP-EG missile
Cape Fiolent and Balaklava Bay in Sevastopol	21.09.2023	Explosions recorded	Missiles
Saky Air Base, Yevpatoria and Novofedorivka	21.09.2023	Explosions recorded	UAVs and Neptune missile
BSF Headquarters in Sevastopol	22.09.2023	Destroyed (requires clarification)	Storm Shadow/SCALP-EG missile
Military unit in Bakhchysarai	22.09.2023	Explosions recorded	Missile
Russian GRU special forces base located near Dzhankoy	07.10.2023	Damaged (requires clarification)	Missiles
RAF 3413th Technical Missile Base and unit 13189. BSF's weapons depots at military unit 63876 near the Sakharna Golivka village	18.10.2023	Damaged (requires clarification)	Missiles
Military airfield in Novofedorivka	30.10.2023	Damaged (requires clarification)	Missiles
Air defence unit, probably part of a S-400 in Olenivka	30.10.2023	Destroyed	Missiles

Southern Bay area in Sevastopol	01.11.2023		UAVs and missiles
Kerch Shipyard	04.11.2023	Project 22800 "Askold" damaged and the "Zaliv" shipbuilding plant damaged	Storm Shadow/SCALP-EG missile
Railway in Dzhankoy	05.11.2023	Damaged (requires clarification)	Missiles
Barracks in Chornomorskyi	10.11.2023	Damaged (requires clarification)	Missiles
Radar and air defense equipment at a military unit at Dzhankoy	24.11.2023	Damaged (requires clarification)	
Sevastopol	24.11.2023	Explosion and emergency power outages	
Helicopter landing pad, a P-18 Terek radar and the control system of Baikal-1M anti-aircraft missile units	05.12.2023	Damaged (requires clarification)	UAVs
"Marine Oil Terminal" oil depot in Feodosia	05.12.2023	Damaged (requires clarification)	UAVs
Nebo-M radar system in Berehove	12.12.2023	Damaged (requires clarification)	UAVs
The Deep-Space Communication Center of the Russian Aerospace Forces, Vityne, and FSB unit 28735, Sonyachnohirske	20.12.2023	Damaged (requires clarification)	Storm Shadow/SCALP-EG missile
Depot (likely) in Armyansk	22.12.2023	Explosions recorded	
Military unit 03121 of the 31st Air Defence Division and the command post, Sevastopol	03.01.2024		UAV and missiles
Depots in Yevpatoria and Saki	04.01.2024	Explosions recorded	UAV and missiles

Ammunition depots near Grishino and the command post in Saki Air Base	06.01.2024		Storm Shadow/SCALP-EG missile
Saki and Sevastopol	17.01.2024	Kerch, Yevpatoria, Sudak, Rozhdilne without light, Saki, Sevastopol, Simferopol, Feodosia and Dzhankoy partially. Allegedly due to problems at the Balaklava TPP	UAV and missiles
Sevastopol	21.01.2024	Explosions recorded	UAV and missiles
Russian radar station used in coordination with air defense systems near the village of Rozdolne	30.01.2024		
Belbek Air Base, Saky, Dzhankoy, Gvardiyske Air Base, Feodosia, Nizhnegirske and Simferopol	31.01.2024	Explosions recorded, two Su-27s and one Su-30 were lost at the Belbek airfield	Storm Shadow/SCALP-EG missile
Sevastopol Naval Base, Saky Air Base, Yevpatoria, Simferopol and Gvardiysky Air Base	01.03.2024	Explosions recorded	
Main pipeline at the oil depot in Feodosia	03.03.2024	Explosions and fire recorded	UAV and missiles
Two communication centres in Sevastopol, Belbek Air Base, oil depots in Gvardiysky district, and railway station in Dzhankoya.	24.03.2024	Explosions recorded. Destroyed and damaged at least three Su-27 fighters	UAV and missiles



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