Comment
'Inhospitable Sea'
The Black Sea and the role of the Russian Navy in the Russia-Ukraine War to mid-September 2022.

This Comment piece is based entirely on open sources
Professor Chris Bellamy

As noted in the Editorial, media coverage of the further Russian attack on Ukraine, known as a 'Special Military Operation', which began on 24 February 2022, focused mostly on the land component. That is understandable as people live on the land and in towns and cities, and pictures of naval operations are comparatively limited. However, many of the missiles striking land targets were fired from the sea and some of the most striking Ukrainian successes were scored against Russian naval assets. These included sinking the Alligator-class (Project 1171) amphibious landing ship, *Saratov* in the port of Berdyansk on the Sea of Azov, on 24 March, the Black Sea Fleet's flagship, the guided-missile cruiser *Moskva*, which sank south of Odesa on 14 April, and the recapture of the strategically important Snake or Serpents' Island at the end of June. Ukraine and US intelligence said *Moskva* had been struck by two Ukrainian Neptune anti-ship missiles. Russia said a fire had broken out and that she subsequently sank in stormy seas. However, the Black Sea Fleet, reinforced by ships and submarines from the Northern and Baltic Fleets, successfully blockaded the Ukrainian coast and particularly the great port of Odesa, preventing Ukraine from exporting 70 percent of its grain and leading to accusations in the UN that it was conducting genocide against people in Africa and the Middle East. At the time this analysis was completed at the end of July 2022, there are being tentative indications the blockade is being relaxed. Whether Russia will completely honor the agreement signed by its Defence minister Sergey Shoigu, Turkey, Ukraine, and the UN, on 22 July 2022 (see the black horse of famine, below), still remains to be seen.

The Black Sea and its Russian Fleet

The ancient Greek name for the Black Sea is Πόντος Ἄξεινος *Póntos Áxeinos* – 'Inhospitable Sea', probably derived from the difficulty of navigation and savage tribes who surrounded it. Most modern names are the equivalent of the English 'Black Sea' which may derive from the ancient system for designating the cardinal directions, red – south, white – west, blue, or green- east and black – north. The conflict between Russia and Ukraine cannot be understood without reference to its history and, in particular, to that coruscating diamond in the Russian Imperial crown – the Crimean Peninsula. Although ceded to Ukraine from the Russian Soviet Federated Socialist Republic (RSFSR) in 1954, Crimea had a largely Russian population and Sevastopol' was still home to the Russian Black Sea Fleet which shared bases on a lease with newly independent Ukraine. The Russian Black Sea Fleet was one of just four fleets opening Russia's windows on the world, along with the Baltic, Northern, and Pacific. Sevastopol, – from the Greek 'Venerable' or 'Magnificent City', was and is the Black Sea Fleet base, and a superb geo-strategically critical harbour. The author visited the Sevastopol naval base in May 1990 accompanying Tom King, then the UK Secretary of State for Defence. Unlike much of the then Soviet Union, everything was very smart including all the kerbstones, in true naval fashion, all painted white. I recall the Black Sea Fleet conference room with a gigantic, old-fashioned globe.

On first espying the harbour at Aki-Yar in 1782, Lt Gen (later FM) Aleksandr Suvorov (1729 or 1730-1801), who took Crimea from the Turks for Catherine the Great, instantly saw its potential. As commander in the Crimea (from 1782), he reported: 'No other such harbour exists, neither on the peninsula, nor on the entire Black Sea, where the fleet and its personnel could be more conveniently and securely stationed' (author's translation) (Sevastopol.org/hist). On 8 April 1783: Crimea, Taman and the right bank of the Kuban were attached to Russia.

On 10 February 1784. Aki-Yar was renamed Sevastopol. On 3 June (14 June new style) 1783 the first stone buildings of the new city were started. The house for the new commander of what became the Black Sea Fleet, one F. F. 'Mekenzy' - Mackenzie, a Russian Scot - was started, together with a chapel, smithy, and wooden quay. This date is considered the foundation of Sevastopol (Sevastopol.org/hist).

The Black Sea Fleet, Sevastopol and Crimea are immensely important in subsequent Russian and Soviet history. In 1853 a Russian squadron under Admiral Pavel Nakhimov destroyed a Turkish squadron off Sinope, leading to the Crimean War. Although the Russians had easily destroyed the Turkish fleet, either sinking ships or forcing them to run aground, they had done so because they were armed with the French-derived Paixhans guns firing explosive shells. However, they would enjoy no such advantage over the British and French fleets, so they withdrew to the great and, by then, heavily fortified naval base of Sevastopol. That is why the Turks, British, French and Piedmont-Sardinians (Italy did not yet exist) besieged it. Among the defenders was a young artillery officer, Count Leo Tolstoy, who recorded his experiences in *The Sevastopol Sketches* (1855, trans. David McDuff, 1986). When the city fell after a bitter eleven-month siege, the sailors scuttled their ships, and the Russian garrison withdrew to the north. Tolstoy, who was among them, wrote that the defenders evinced:

'… a sense of something that was a blend of remorse, shame, and violent hatred. Nearly every man, as he looked across from the North Side at abandoned Sevastopol, sighed with a bitterness that could find no words, and shook his fist at the enemy forces.' (McDuff 1986:184).

The defence, loss, and recapture of Sevastopol in the 1941-45 Great Patriotic War aroused and arouses comparable emotions. When the Germans launched Operation Barbarossa on 22 June 1941, the Red Army and NKVD border guards on land were surprised. Chief of the General Staff Zhukov's indecisive order to the ground components had only been issued an hour after midnight. It was only filtering through to the forces at the front an hour before the Germans struck at 04.00 Moscow time, 03.00 German time (H-30). However, Admiral Kuznetsov, the C-in-C of the Navy, had asked Zhukov' if use of force was authorised' and Zhukov had snapped 'yes'. Kuznetsov therefore ordered his fleets and shore bases to 'Readiness State 1' – full alert, at 02.40 hrs Moscow time. The Navy had far slicker procedures for sending orders and Vice-Admiral Oktyabr'skiy, the Black Sea Fleet commander, had his ships, shore batteries and anti-aircraft guns ready. The first report of the German attack came from the Black Sea Fleet, at 04.17, Moscow time, 03.17 German times. The Black Sea Fleet reported large swarms of German bombers heading for the great fortress of Sevastopol. Within a few minutes, anti-aircraft guns opened on the incoming German planes. The Black Sea Fleet fired the first shots back at the Germans in the Great Patriotic War. Following Germany's initial success, Sevastopol was isolated on 16 November 1941. The last Soviet resistance ended on 9 July 1942, after an epic nine-and-a-half-month siege. The Soviets recaptured the 'Hero City', as it was subsequently honoured, in a week between 5 and 12 May 1944 (Bellamy 2007:158-59, 458-68, 607).

The Crimea's historic and emotional importance to Russia in no way excuses Russia's abuse of international law in its 2014 annexation and the subsequent extension of overt operations into mainland Ukraine on 24 February 2022. But, following the Euromaidan Revolution in February 2014, Ukraine's politics began to move towards the west, EU, and NATO. We can therefore understand why the prospect

of losing such a historic, strategically important, and symbolically Russian icon was too much for President Putin and why he seized it from Ukraine.

The origins of the present problem can be attributed to Nikita Khrushchëv (3 April (NS) 1894 – 11 September 1971). Khrushchëv was actually Russian but was first sent to the Donbas region in what later became independent Ukraine in 1921. From 1938 Stalin sent him to what was then the Ukrainian Soviet Socialist Republic (USSR) in 1938.   During the 1930s Khrushchëv built his power base in Ukraine. Stalin died in 1953. Khrushchëv emerged victorious in the subsequent power struggle, and in 1954, he rewarded The Ukrainian SSR with the gift of Crimea, At the time, it did not matter. It was all about the Soviet Union (SSSR, translated USSR). The Soviet Navy's Black Sea Fleet was still based in Sevastopol, with other bases in the Russian Federated Soviet Socialist Republic (RSFSR), at Novorossiysk, and in Georgia. Travelling between the RSFSR and Ukraine was like travelling from one American state to another.

When Ukraine proclaimed sovereignty on 16 July 1990 and formally seceded from the USSR on 24 August 1991, everything changed. In fact, the Byelorussian Soviet Socialist Republic and the Ukrainian Soviet Socialist Republic had already joined the UN as original members on 24 October 1945. After declaring independence, the Ukrainian Republic changed its name to Ukraine on 24 August 1991, and the Byelorussian Republic became the Republic of Belarus on 19 September. The February 2014 revolution that ousted the pro-Russian Ukrainian president Viktor Yanukovych triggered a political crisis in Crimea, initially marked by demonstrations against the new interim Ukrainian government but rapidly escalated. In January 2014, the Sevastopol city council had already called for the formation of "people's militia" units to "ensure firm defence" of the city from "extremism." On 27 February, Russian special forces seized the building of the Supreme Council of Crimea and the building of the Council of ministers in Simferopol.

On 1 March 2014, exiled President Yanukovych asked Russia to use military forces 'to establish legitimacy, peace, law and order, stability and defending the people of Ukraine.' On the same day, Russian President Vladimir Putin requested and received authorization from the Russian Parliament - not that he really needed it, but it looked good - to deploy Russian troops to Ukraine. The Russians took full, unchallenged control of the Crimean Peninsula by the next day. Although most of the international community did not recognise the Russian annexation of Crimea, it was now a de facto part of Russia, a fact reinforced by the completion of the Crimean bridge between the peninsula and mainland Russia in May 2018. At 12 miles (19 km) long, it is the longest in Europe. Then, on 24 February 2022, Russia launched a further phase of expansion, north from Crimea, south from Belarus and west from Russia and the Russian-controlled parts of the *oblasti* (provinces) of Donetsk and Luhansk further into Ukraine. Ukraine, Crimea and the Black Sea and key locations are shown in Figure 1.

Dividing the Black Sea Fleet

The dispute over the fleet had begun on 5 April 1992 when Ukraine's President Leonid Kravchuk signed a decree on urgent measures to build up the Ukrainian armed forces. The decree put the former Soviet Black Sea Fleet under Kiev (Kyiv)'s control, and all its forces deployed on Ukrainian territory (practically the entire fleet) were to become Ukraine's naval forces. The Russians said Kyiv had no right to make such a decision (Kramnik 2010). Kyiv tried to persuade the sailors to swear an oath to Ukraine, make the fleet Ukrainian and confront Moscow with this fact.
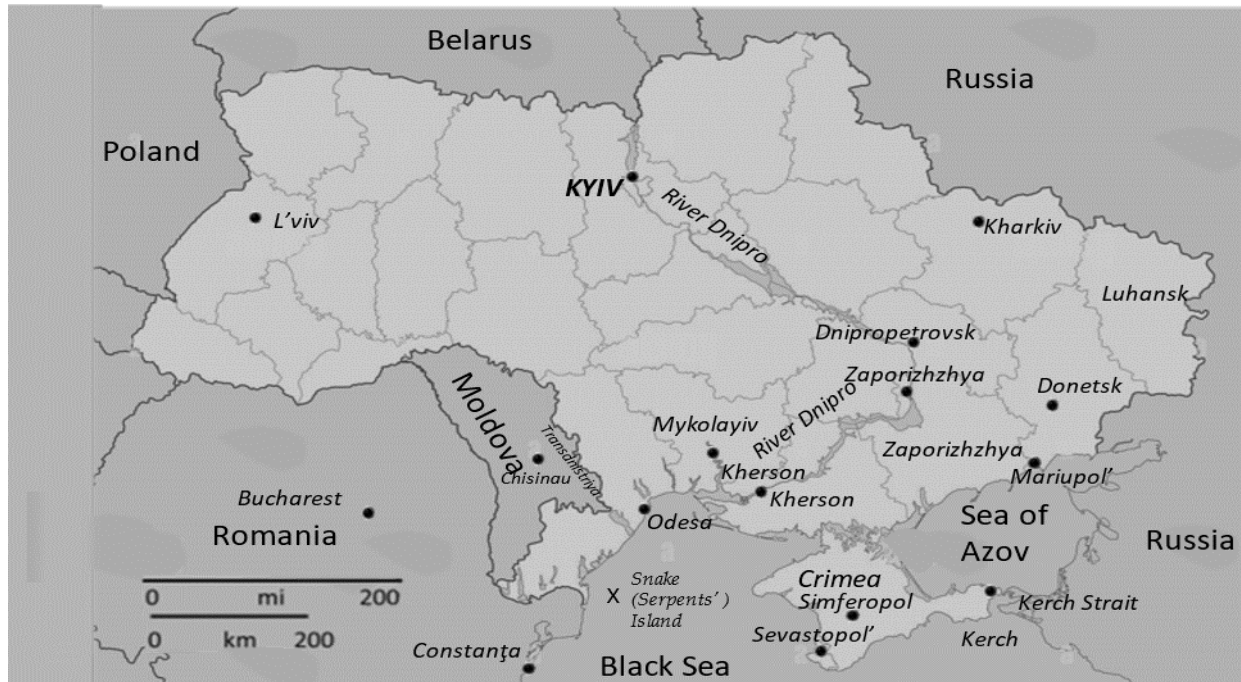
Figure1. Theatre of war

On 15 April 1994, Russia and Ukraine signed an initial agreement on the gradual resolution of the issue. Russia was to get 80 per cent to 85 per cent of all ships and vessels of the fleet. At the same time, Russian diplomats realized the agreement would be tied in with a political treaty between Russia and Ukraine. The Ukrainian side, however, did not want the agreement to be linked to any such political treaty and the issue remained unresolved. On 9 June 1995, an interim agreement was signed, however, two additional years were needed to resolve the remaining issues. The final agreement was signed on 28 May 1997. known collectively as The Partition Treaty on the Status and Conditions of the Black Sea Fleet. This refers to three bilateral treaties between Russia and Ukraine signed on 28 May 1997 whereby the two countries established two independent national fleets, divided armaments, and bases between them, and set forth conditions for basing of the Russian Black Sea Fleet in Crimea.

The three treaties are entitled 'Agreement between the Russian Federation and Ukraine on the Parameters of the Division of the Black Sea Fleet', on the 'Status and Conditions of the Presence of the Russian Federation Black Sea Fleet on the territory of Ukraine', and 'on the Agreement between the Government of the Russian Federation and the Government of Ukraine on Payments Associated with the Division of the Black Sea Fleet and Its Presence on the territory of Ukraine.'

Under the terms of the agreements, the Soviet Black Sea Fleet headquartered in the Crimean Peninsula at the time was partitioned between Russia (81.7 per cent) and Ukraine (18.3 per cent). In exchange, Russia agreed to pay $526 million as compensation for its part of the divided fleet. Ukraine agreed to lease Crimean naval facilities to Russia for 20 years until 2017, with an automatic five-year renewal option. Russia would pay Ukraine $97 million annually for leasing Crimean bases. This payment was deducted from the cost of Russian gas provided and billed to Ukraine. The basing rules were set in a status of forces agreement, namely *Agreement between Ukraine and the Russian Federation on the Status and Conditions of the Stationing of the Black Sea Fleet [BSF] on the territory of Ukraine*. The treaty also allowed

Russia to maintain up to 25,000 troops, 24 artillery systems, 132 armoured vehicles, and 22 military planes on the Peninsula. Finally, Russia was bound to "respect the sovereignty of Ukraine, honour its legislation and preclude interference in the internal affairs of Ukraine" and furthermore Russian military personnel had to show their "military identification cards" when crossing the Ukrainian-Russian border. Russian forces could operate "beyond their deployment sites" only after "coordination with the competent agencies of Ukraine." A fourth agreement, the Kharkiv Pact, was signed on 21 April 2010 and extended the lease until 2042 (with the possibility of renewal for an additional five years) in exchange for a multiyear discounted contract to provide Ukraine with Russian natural gas.

On 28 March 2014, after annexing Crimea, Russian President Vladimir Putin submitted proposals to the State Duma (parliament) on terminating several Russia–Ukraine agreements, including the Black Sea Fleet partition treaty and the Kharkiv Pact. All 433 members of the State Duma approved the abrogation of these Russian-Ukrainian agreements unanimously on 31 March 2014.

Maritime Boundaries

Following the annexation of Crimea, Russia had *de facto* control of the territory shown in Figure 3. Russia also claimed the maritime area around Crimea – 12 nautical miles of Territorial Sea, and with the Exclusive Economic Zone (EEZ) divided with adjacent states (the equidistance principle), as also shown in Figure 3.

There had also been a dispute between Romania and Ukraine over their Territorial Sea and EEZ stretching back to 2004 which was resolved in 2009. In 1997, Romania and the newly independent state of Ukraine signed a treaty in which both states reaffirmed that the existing border between them was inviolable Both sides agreed that if no resolution on maritime borders could be reached within two years, either side could seek a final ruling from the International Court of Justice (ICJ), which is the authority determines international boundaries, both land and maritime. Ten million tonnes of oil and a billion cubic metres of natural gas were discovered under the seabed nearby.

In September 2004 Romania brought a case against Ukraine to the ICJ, as part of a dispute over the maritime boundary between the two states in the Black Sea, and claimed that Snake Island had no socioeconomic significance

Because of its location, 45°15′N 30°12′E, Snake Island – *Ostriv Zmiinyi* (see Figures 1 and 2) – potentially affected the maritime boundary between the two countries. If Snake Island was an *island* – meaning that it had a human settlement on it, its continental shelf area would be considered not only Ukrainian Territorial Waters, but also contribute to determining Ukraine's EEZ. Although under Article 121(3) of the 1982 UN Convention on the Law of the Sea, rocks are taken into account in delimiting maritime boundaries, they may be overlooked, discounted or enclaved – that is, regarded as being completely surrounded by another state - if they have an inequitable distorting effect in light of their size and location. Even if such islands are not discounted, their influence on the delimitation may be minimal. If it was an uninhabited *islet* following international law, the maritime boundary between Romania and Ukraine would not consider it. Romania claimed that Ukraine was developing Snake Island to make it qualify as an island, rather than an islet. In 2007, Ukraine founded a settlement, Bile, on Snake Island for that purpose (Ciufudean 2022). By the start of the full-scale Russian invasion on 24 February 2022 there were about 100 people on it, but mostly border guards and their families. The subsequent military role of Snake Island in 2022 and its colossal strategic importance are covered in the section on it, 'Strategic Speck of Land', below.

The court delivered its judgment on February 3, 2009, dividing the Black Sea with a line between the original claims of each country (See Figure 2). On the Romanian side, the ICJ found that the landward end of the Sulina dyke (see Figure 1 [Constanza]), not the manmade end, should be the basis for the

equidistance principle. The court noted that a dyke has a different function from a port, and only harbour works form part of the coast (ICJ 2009).

On the Ukrainian side, the court found that Snake Island did not form part of Ukraine's coastal configuration, explaining that 'to count [Snake] Island as a relevant
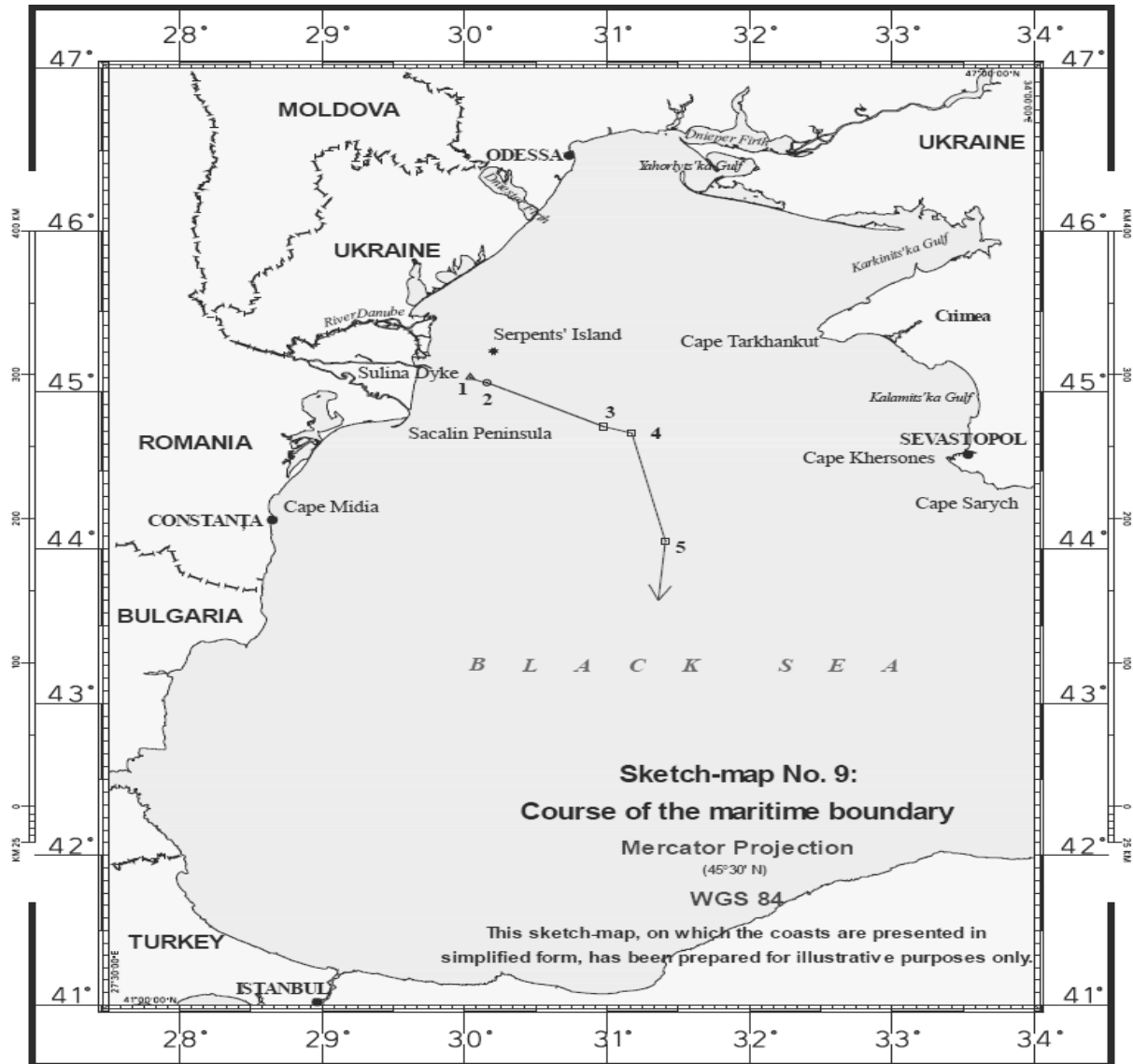

Figure 2. Resolution of Ukraine – Romania maritime boundary dispute. Source ICJ 2009.

part of the coast would amount to grafting an extraneous element onto Ukraine's coastline; the consequence would be a judicial refashioning of Geography'. (Yushenko 2009, Wayback 2009, Euractiv 2009, RFE 2009). The ICJ concluded that Snake or Serpents' Island 'should not affect the delimitation in this case, other than that stemming from the role of the 12-nautical-mile arc of its territorial sea'. While the judgment drew a line that was equitable for both parties, Romania received nearly 80 per cent of the

disputed area, allowing it to exploit a significant but undetermined portion of an estimated 100 billion cubic metres of natural gas deposits and 15 million tonnes of oil under the seabed. However, the Romanians said they were satisfied with it.

The question of maritime boundaries resurfaced when the Russians annexed Crimea in 2014. Figure 3 shows the maritime boundaries – Territorial Sea and EEZ -before 2014 and then the area claimed by Russia, though not internationally recognised, after the annexation.
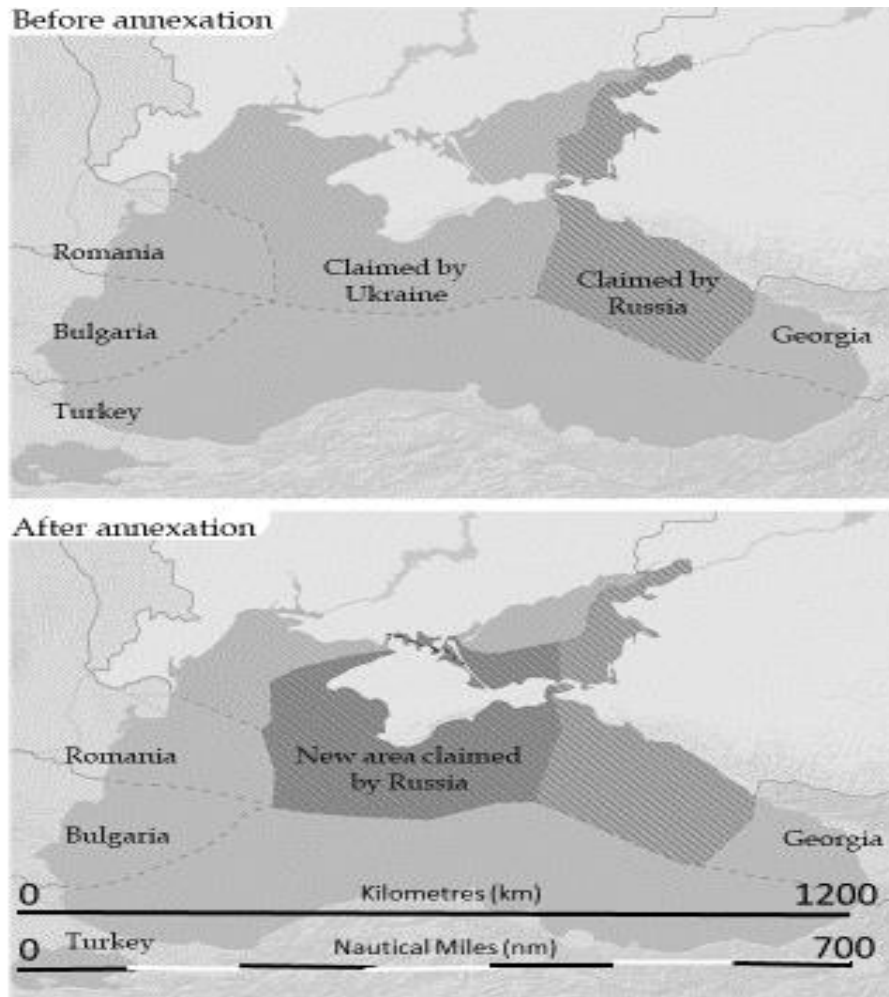
Figure 3. Maritime boundaries before March 2014 (Territorial Seas and EEZs) and the Russian claim afterwards

The Crimean Bridge

The Crimean Bridge, also called the Kerch Strait Bridge or Kerch Bridge, is a pair of parallel bridges, one road, one rail, spanning the Kerch Strait between the Taman Peninsula of the Crimea and the Krasnodar Krai (Kuban) on the mainland. Following Russia's annexation of Crimea in 2014, Ukraine's first step was to cut off the water supply. This had profound consequences for people and agriculture Vynogradova 2020). Some 85 per cent of Crimea's fresh water came from mainland Ukraine. Besides

water, Ukraine also cut vital transportation links as Russia had no overland access to or from Crimea. There was only the ferry across the Kerch Strait (see Figure 4) which had limited capacity and was often halted by bad weather. Practical need and symbolism combined to resuscitate a project that had been on the cards since 1903. A great bridge linking mainland Russia with the re-annexed Crimean Peninsula. The longest bridge ever built in or by Russia and the longest bridge in Europe.

 The opening of this bridge had been waited for more than a century. The first plan to connect Crimea and the Kuban was approved as far back as 1903 by the last Tsar, Nicholas II. By 1910, all project documentation was ready, and estimates had been drawn up, but the First World War prevented the ambitious project from going ahead (rgo.ru 2018). After the German invasion of the Soviet Union in 1941, the Germans built a 'ropeway' over the strait. It was more than just a rope bridge Finished in June 1943 it had a daily capacity of 1,000 tonnes. Construction of a combined road and railway bridge started in April 1943, but before it was finished, the Germans were in retreat, so they blew up the already completed parts of the bridge and destroyed the ropeway.

In 1944, the advancing Red Army constructed a 4.5-kilometre (2.8 mi, 2,43 nm) bridge across the strait. This bridge was not designed to be permanent and was destroyed by floating ice in February 1945. The idea of repairing it was quickly dismissed and the remains of the destroyed bridge were dismantled, with permanent bridge designs envisaged instead, the first of which surfaced in 1949.

In 2010, President Viktor Yanukovych of Ukraine and President Dmitry Medvedev of Russia signed an agreement to build a bridge across the Kerch Strait,[and Russia and Ukraine signed a memorandum of mutual understanding on the construction of the bridge on 26 November 2010. An agreement between Ukraine and the EU was shelved in November 2013 and that led to greater cooperation between Ukraine and Russia, resulting in an agreement on the construction of that bridge forming part of the 17 December 2013 Ukrainian-Russian action plan. A joint Ukrainian–Russian company would handle the construction of the bridge.

The Russian annexation of Crimea and the collapse of relations between the two countries abruptly ended the bilateral Kerch Bridge agreement. Russian President Vladimir Putin announced that Russia would build a road-rail bridge over the strait on 19 March 2014, just one day after Russia officially claimed Crimea. In January 2015, the contract for construction of the bridge was awarded to the SGM (*Stroygazmontazh*) Group, whose owner Arkady Rotenberg, reported to be a close personal friend of Putin, was internationally sanctioned in response to the Russian military's involvement in Ukraine. SGM, as its name implied, typically constructed pipelines, and had no experience building bridges, according to (BBC News 2015)

From April 2014, the Ukrainian government has actively condemned Russian construction of the bridge[as illegal because it stood by its ownership of the Crimean peninsula. It called on Russia to demolish 'those parts of that structure located within temporarily occupied Ukrainian territory' (Interfax Ukraine 2019; UNCLOS 2019). The United States and the European Union introduced sanctions against companies involved in the construction, and from December 2018 the United Nations General Assembly repeatedly condemned the construction and opening of the bridge as 'facilitating the further militarization of Crimea' (UNGS 73/194 2019)   and "restricting the size of ships that can reach the Ukrainian ports on the Azov coast".(UNGS 74/17 2019) Russia, inevitably, said it would not ask for anybody's permission to build transport infrastructure 'for the sake of the population of Russian regions.'(*Moscow Times* 2018).
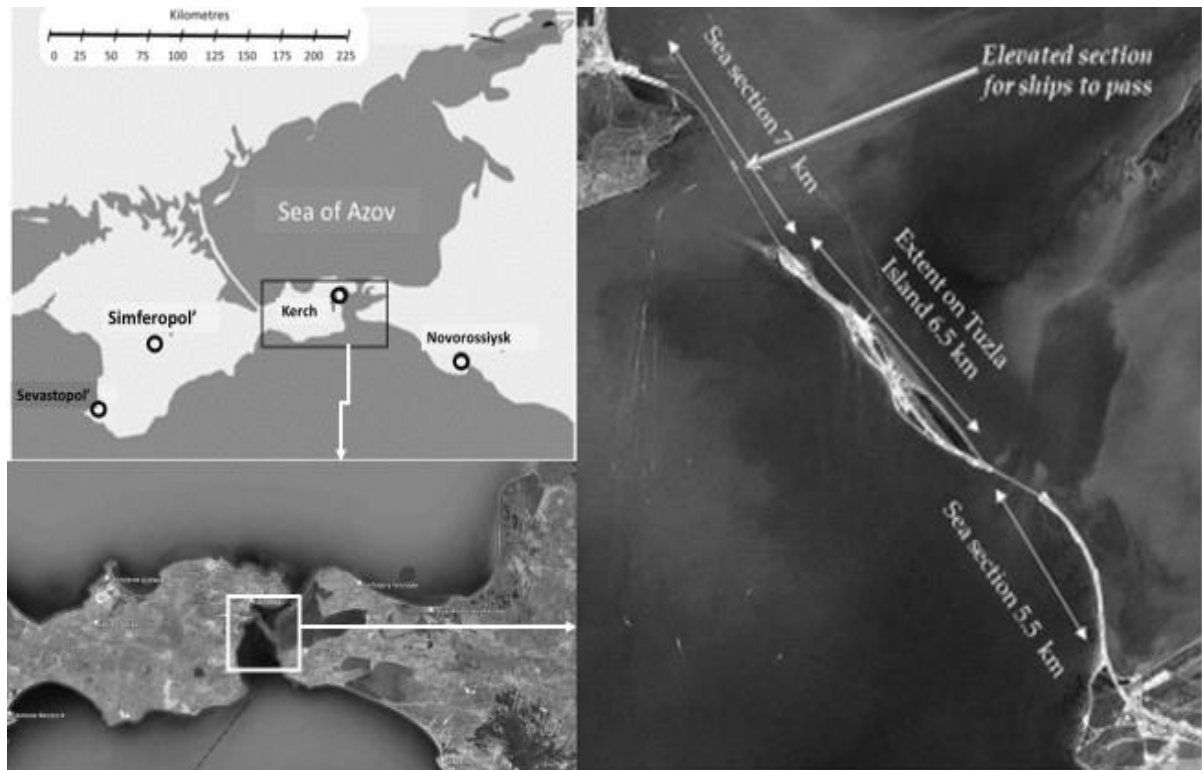
Figure 4. The Crimean Bridge. Source Google Earth/Russian Geographical Society.

Construction of the bridge began in February 2016; The bridge's location and extent are shown in Figure 4. It was christened the Crimean Bridge after an online vote in December 2017, while Kerch Bridge and Reunification Bridge were the second and third most popular choices, respectively. President Putin inaugurated the road bridge on 15 May 2018 and opened for cars on 16 May and for trucks on 1 October. The rail bridge was inaugurated on 23 December 2019 and the first scheduled passenger train crossed on 25 December 2019. The bridge was opened for freight trains on 30 June 2020. A record amount of traffic was recorded on 15 August 2020, totalling 36,393 cars (*avtomobiley*) (TASS 2020). This appears to refer to motor cars only, in which case we need to add a daily average of 200 buses and 2,000 trucks. (TASS 2020).

Following the Russian invasion of more of Ukraine on 24 February 2022, Ukrainian plans and calls for the bridge's destruction spiralled. It was a key strategic target, and the Russians knew it. As soon as the bridge opened for road traffic in 2018 and before the rail bridge opened at the end of 2019. The Russian commentator Viktor Zolotov, speaking to the Moscow newspaper *Novye Izvestia* on 13 September 2021, underlined its importance and obvious vulnerability. It is worth quoting him in full:

> 'Since 2019, the strategic object of the Crimean Bridge has been guarded by a *special naval brigade of the Russian Guard*, based in Kerch. Its task is to counter terrorists and saboteurs. Daily, they inspect the supporting structures: pipes, supports, concrete rings and piles. Inspection is carried out for sabotage and normal damage. Guardsmen patrol the water area on sabotage boats of the *Grachonok* type. They are equipped with machine guns, grenade launchers and even portable anti-aircraft missile systems. The soldiers are armed with *Nepryadva* anti-sabotage grenade launchers. They can jam enemy combat swimmers even at a depth of 40 metres. In addition, each

fighter has a dual-medium assault rifle capable of firing underwater and on land. If necessary, the guards will use the anti-sabotage Fin, which *does not allow saboteurs-submariners to approach the object without losing their combat effectiveness*' (Emphasis added) (Newizv.ru 2021).

The reference to the National Guard (of the Russian Federation) (*Rosgvardiya*) is highly significant, since 2019, the Crimean Bridge has been protected not by units of the Russian Navy, Army, or Border Guards, but by a special naval brigade of Russia's internal military force, which was only established in 2016. The Kerch brigade was established in 2017 before the bridge opened (Tiwari 2022) It is an independent agency reporting directly to President Putin under his powers as Supreme Commander-in-Chief and Chairman of the Security Council. The coat-of-arms features the span of the bridge able to accommodate large ships, but also conveniently easy to block, surmounted by a gryphon (griffin) clutching a key. The symbolism is clear. With the body of a lion and the head and wings of an eagle, the mythical gryphon has great power and superb eyesight. Arising from central Asian mythology, it also has a reputation for guarding gold. The gold here is the $3.7 billion bridge.

The central span of the bridge, which is 33 to 35 meters (108 to 115 ft) above sea level high, is shown in Figure 5. Many ships are too tall to pass safely under the bridge. The bulk carrier *Copan* (<u>deadweight tonnage</u> 17,777 tons) solved this problem by cutting off the top of her mast

Figure 5. The Crimean Bridge in November 2018, when the Russians placed a large cargo ship across the channel during the Kerch Strait Incident (see below).

Initially, the brigade was equipped with anti-saboteur ships and combat divers, and a sonar system (sonobuoys) was deployed around the perimeter of the Kerch Bridge. Back in 2018, it was reported that Russia was planning to launch unmanned underwater vehicles (UUVs) into neighbouring waters, including the Sea of Azov, and deploy sophisticated air defence systems. Even before the start of the full-scale conflict on 24 February 2022, US and Ukrainian sources cited the potential threat to the bridge from Ukraine's domestically produced Neptune R-360 anti-ship missiles, which had first been tested in 2016 and had a maximum range of 280 km (185 nm) but the Russians dismissed the capabilities of these missiles. Subsequent events, including the sinking of the flagship *Moskva*, proved this confidence to be unfounded. After the start of the full-scale conflict, Ukraine was

supplied with Harpoon anti-ship missiles by the UK and Denmark, but with a range of 70 nautical miles - 130 km – there is no realistic possibility of these missiles reaching the bridge.

The airspace over the Crimean bridge is guarded by two regiments equipped with S-400 complexes. Thus, the S-400s form a protective dome out to a distance of 400 km (216 nm). But even if attacking aircraft pass this line, the *Pantsir* C1 complexes will come into operation at close range. No one will be able to leave undetected, which means they will be destroyed (Tiwari 2022). The *Pantsir*′ ('Carapace') system comprises *Pantsir* (Nato codename SA-22) missiles with a reported range of 18 km (9.7 nm) and a 30 mm rapid-firing cannon with a range of 4 km (2.1 nm), The fire control system for both can detect targets two square meters or more across out to 36 km (19.4 nm), or further in favourable conditions.

The most recent changes seem to be aimed at shielding the bridge from a standoff missile attack to the extent that on 13 July the Ukrainian Secretary of the National Defense and Security Council, Oleksiy Danilov described it as an 'insane amount of air defence' (Mazurenko 2022). The Russian fears are not unfounded as US officials indicated that Ukraine could strike the bridge from its sovereign territory that it has been defending from Russia, although it is not clear how.

Russia deployed several countermeasures to the Kerch Strait Bridge connecting Russia and Crimea, including decoy barges covered in radar reflectors as well as smokescreen capabilities that were used in test exercises over the weekend of 2-3 July 2022. Two target barges coming from Novorossiysk Naval Base had been towed to the location and moored on the east side of the bridge. The vessels were covered with multiple radar reflectors, and metallic devices affixed to a barge to make it more visible to radar. Independent analyst H I Sutton, who writes for the *US Naval Institute News*, used the term 'target barges' to identify the ships because the Russian Navy is known to have utilized such vessels as targets during exercises with the Black Sea Fleet. It appears their intended purpose might be to act as decoys, confusing incoming missiles aimed at Kerch Bridge. Other radar reflectors were also seen in the shallows near the bridge. It was not clear if these were part of the countermeasures or navigational features (Helfrich 2022). In addition, the Russians also tested smokescreens, enveloping the bridge in white smoke, much to the chagrin of private motorists trying to use it, and causing at least one road accident (Axe 2022, Timari 2022).

The bridge is an obvious target for the Ukrainians as Russia's wider war on Ukraine grinds into its fifth month—and the Russians know it. However, the Ukrainian armed forces still do not have the means reliably to strike the $3.6 billion, a steel-and-concrete bridge which is crucial to the reinforcement and resupply of Russian forces in Crimea, as well as being highly symbolic.

'The Kerch Strait Bridge is target number one for the Ukrainian armed forces,' Ukrainian major general Dmitry Marchenko said in June. 'This is not a secret either for their military or for our military. Neither for their civilians nor our civilians. It will be the number-one target for hitting,' (Axe 2022,)

However, the bridge is way out of range of the MLRS and HIMARS supplied to Ukraine by the UK and US. Manned aircraft and long-range drones such as the newly developed Ukrainian Sokil (Falcon)-300 drone, the first version of which has a range of 1,000 km (540 nm) could reach the bridge, but the massive Russian air defences make it a very hard target. Submarine attacks are very rare, but the only way of seriously damaging the bridge would seem to be the use of special forces. The other problem is political. The Russians have claimed Crimea as their own since 2014, and the bridge itself links Crimea with mainland Russia. Attacks on Russian territory would provoke enormous Russian anger and probably an even more disproportionate response.

Russian re-armament and Confrontations: March 2014 to February 2022

In December 2021, David Axe published an article entitled 'In 2014, Russia's Black Sea Fleet Was Aging and Weak. Today, It Can Fire Cruise Missiles at Kiev' (Axe 2021). He correctly forecast that a new front would open at sea, where Russia should have enjoyed an even greater advantage over Ukraine than it did on land. In fact, despite eight years of massive investment, the Black Sea Fleet's performance was quite poor. He correctly forecast that the naval battle would extend deep inland. Individual Ukrainian leaders might even come under attack, made possible by Russia's swift modernization of its Black Sea Fleet. In the previous eight years, the Kremlin had spent years and billions of dollars enhancing the fleet with new ships, submarines, military aircraft and, perhaps most importantly, the *Kalibr* missile. First introduced in 1994, these missiles can be fired against ships, submarines, and land targets. In the Black Sea, the latter has proved most significant. The *Kalibr,* also known in Russian as *Biryuza* (Topaz), known to Nato as the 'Club' or SS-N-27 Sizzler and SSN-30-A, can be fired from surface ships, submarines and aircraft. The Klub K can even be placed in a 12-metre [40-foot] long shipping container commonly used in maritime transport, aboard merchant ships. Thus camouflaged, it cannot be detected until it is fired, creating moral and legal issues. *Kalibr* can be used to attack surface vessels, submarines and, most relevant in this case, land targets. It begins its flight as a subsonic cruise missile, but some variants can make a supersonic (Mach 3) sprint in the final stages making them far harder to intercept, although the all-subsonic variants have a longer range. It can carry a conventional warhead of 400 to 500 kg, and also a thermonuclear warhead. The land attack version is designated the 3M14 in Russia and the SS-N-30 by Nato. The U.S. Department of Defense estimates its range at 1,400 km (870 mi, 756 nm), and Russian Defence Minister Sergei Shoigu put its range at 'almost 1,500 km [930 mi, 781 nm].'   The submarine-launched weapon has a basic length of 6.2 m (20 ft), with a 450 kg (990 lb) warhead. Its range may be longer is 2,500 km (1,600 mi, 1350 nm), allowing the Russian Navy to strike targets throughout Central and Western Europe. From the start of the war, the Russian navy sent volleys of *Kalibr* land-attack cruise missiles from ships and submarines from the Black Sea at targets in Ukraine (see below).

When the Russian Government determined to seize Crimea, specialist Russian military units appear to have played the central role. In March, the Ukrainians claimed that units of the 18th Motor rifle Brigade 31st Air Assault regiment and 22nd *Spetsnaz* Brigade were deployed and operating in Crimea, instead of Black Sea Fleet Personnel Which violated international agreements signed by Ukraine and Russia. Nevertheless, at minimum, the Black Sea Fleet played a supporting role including with respect to preventing the departure of Ukrainian naval vessels from Crimea. Other sources suggested that the 810th Naval Infantry Brigade of the Fleet was also involved.

From March 2014, Russia proceeded to consolidate its military position in Crimea, which it now regards as an integral part of the Russian Federation and it is, de facto Russian, though this position is not supported by most of the international community. After the 2014 Crimean crisis, the Ukrainian Armed forces and the Ukrainian Navy were evicted from their bases and subsequently withdrew from Crimea. Russia then moved to integrate several vessels from the Ukrainian Navy into the Black Sea Fleet. Inspections of all ships were to be done by the end of 2014. Fifty-four out of sixty-seven ships of the Ukrainian Navy were then transferred to the Black Sea Fleet, with the Russian naval ensign, the St Andrew's Cross, raised on them.

On 8 April 2014 Russia and Ukraine agreed to return the Ukrainian Navy matériel to Ukraine proper, but not all the Ukrainian vessels were returned to Ukraine after the Russians suspended this process after the breakdown of the ceasefire in the Donbas on 1 July. According to the Black Sea Fleet commander from 2013 to 2018, Admiral Viktorovich Vitko, this happened because the vessels were so old that, if the Ukrainians used them, they might injure themselves (!), In June 2018 he was briefly replaced by Aleksandr Alekseyevich Moiseyev, who must get much of the credit for overseeing the important developments in

the Fleet. On 3 May 2019, Moiseyev was in turn replaced by Igor Vladimirovich Osipov, who was fired on 14 April 2022 after the sinking of the *Moskva* (see below).

After the 2014 annexation of Crimea, the composition of the Black Sea Fleet shifted to focus on the improved Kilo-class submarines (Naval Technology 2020), SSK Kilo Class (Type 636). The Russian Navy also moved forward in the late 2010s, with the construction of Project 636.3, an improved version of the Kilo class. By November 2019, six units had been built for the Black Sea Fleet and further boats were planned for the Pacific and Baltic. Fleets. The Kilo, nicknamed *Varshavnika* – 'Warsaw Lady' - has many qualities that make her ideal for operating in relatively shallow and littoral waters. The Type 636 submarine is considered to be one of the quietest diesel-electric submarines in the world. It is capable of detecting an enemy submarine at a range three to four times greater than it can be detected itself. With a displacement of 2,325 tons surfaced and 3,075 tons submerged or 3,100 tons for the Improved Kilo, it can dive to 300 metres. It can travel at 17 knots surfaced and 20 knots underwater, it has six 533mm (21-inch) torpedo tubes and its standard armament is 18 torpedoes and four Kalibr land-attack cruise missiles, plus 24 mines. However, as the Kalibr missiles are fired from the torpedo tubes it might presumably be possible to dispense with the torpedoes and carry more missiles.

The replacement of the Black Sea Fleet's Soviet-era missile boats and corvettes with vessels of more modern design had also been a priority since 2010. A similar modernization also took place in the Baltic F leet and the Caspian Sea Flotilla. Utilizing Russia's internal waterways provides the Russian Navy with the capacity to transfer both corvettes and other light units, such as landing craft, among its three western fleets and the Caspian Flotilla as may be required. It might even be feasible for the Russian Navy to move its Kilo-class submarines between the Black Sea and the Baltic via the internal waterways.

The projection of power into the Mediterranean re-emerged as an important mission for the Black Sea Fleet with the reconstitution of its 5th Operational Squadron. Both the Black Sea Fleet and the Caspian Flotilla have supported Russia's involvement in the Syrian Civil War, supporting the Assad Government. Black Sea Fleet ships now routinely deployed into the Mediterranean This included submarines carrying Kalibr missiles, although the 1936 Montreux Convention which monitors warships' access to and egress from the Black Sea means that they must ostensibly be en route for maintenance in the Baltic. The Montreux Convention was crucial to the conduct and deployment of Russian warships after 24 February 2022 (see below) In October 2021 TASS reported that one of the new *Priboy*-class helicopter assault ships, the *Mitrofan Moskalenko*, had been earmarked to enter service with the Black Sea Fleet in the latter 2020s in the role of the fleet flagship. Such a deployment would significantly enhance the Black Sea Fleet's ability to project power. The Mitrofan *Moskalenko* had only begun construction at the Zalyv shipyard on the Kerch Strait in 2020, as reported by TASS in February 2021, and was therefore nowhere near ready to take over as flagship when the *Moskva* was sunk on 14 April 2022 (see below),

The build-up of Russian surface-to-surface and surface-to-air missile assets in the region was also significant. Russia's expanded military footprint in Crimea allows it to carry out a range of operations of which it was incapable before 2014. The deployment of S-400, Bastion, and Bal missiles allow the Russian military to establish an anti-access/area-denial zone (A2/AD) covering almost all of the Black Sea (Gorenburg 2018). The Russians do not have a formal concept of A2/AD, but they can now clearly do it.

There were minor incidents in 2015 when the Ukrainians warned of the Russian frigate Ladny as it approached Ukrainian territorial waters and in 2017 when, in separate incidents, a Ukrainian diving support vessel and a Navy aircraft came under small-arms fire from drilling rigs now occupied by Russians.

The first major incidents were in 2018, On 21 September 2018, a Russian Su-27 fighter, from Russian-occupied Crimea, created an air emergency, coming dangerously close to a Ukrainian Navy An-26

military transport aircraft, which was executing a scheduled task above the Black Sea.] On 25 September 2018 during the Volia-2018 Ukrainian strategic command and staff exercises, Russian Su-27 fighter jets flew dangerous close to Ukrainian warships.

The big incident – the Kerch Strait incident - occurred In November. On 25 November 2018, three Ukrainian navy vessels which attempted to redeploy from the Black Sea port of Odesa to Berdyansk on the Sea of Azov were damaged and captured by the Russian FSB security service.

On the morning of 25 November, three Ukrainian naval vessels, two lightly armoured gunboats and a tug approached the Kerch Strait (see above), The Russians accused the Ukrainian ships of illegally entering Russian territorial waters and ordered them to leave. The Ukrainians refused, citing the 2003 Russia-Ukraine Treaty on freedom of navigation in the area, The Russians attempted to intercept them and rammed the tugboat *Yany Kapu* several times. When they tried to ram the more agile gunboats, two Russian ships collided, and a Russian Coast Guard patrol boat *Izumrud* was damaged. The Ukrainian naval vessels then continued their journey, stopping near the anchorage 471 waiting zone, about 14 kilometres (7.5 nm) from the Crimean Bridge (see Figure 4), and remained there for the next eight hours. During this time, the Russians placed 'a large cargo ship under the bridge, blocking the route into the Sea of Azov '(see Figure 5). Concurrently, Russia scrambled two fighter jets and two helicopters to patrol the strait. In the evening, the Ukrainian ships turned back to return to port in Odessa. As they were leaving the area, the Russian Coast Guard pursued them, later firing on and capturing the Ukrainian vessels about 23 kilometres (12.3 nm) off the coast of Crimea, this time in international waters, even allowing for the Russian claim to waters around Crimea (see Figure 3). The Ukrainian Navy later reported that six servicemen had been injured by the Russian actions. *Berdyansk* was damaged in her bridge, either by a Su-27 fighter or by 30 mm naval gunfire from the Russian Coast Guard patrol ship *Izumrud*, Russia detained and held all 24 sailors.

Moscow said the gunboats and the tug had illegally entered Russia's territorial waters. Kyiv said its vessels did nothing wrong and accused Russia of military aggression. Russia did not immediately or directly respond to the allegation, but Russian news agencies cited the (FSB) as saying it had incontrovertible proof that Ukraine had orchestrated what it called a 'provocation' and would publicise its evidence soon. A Crimean court ordered the 24 sailors, who were not accorded the status of Prisoners of War, to be detained for two months but they were later transferred to Moscow and thence to other prisons. Despite numerous protests, they were still there nine months later. Once full-scale conflict broke out on 24 February 2022, their prospects looked even grimmer. At the time of writing, they are still in jail in Russia.

There were a few minor incidents in 2019 as the Russians blocked access to large areas of the Black Sea. There were also simulated operations. On 14 November 2019, during the Third International Conference for Maritime Security, in Odesa, Ukrainian Navy commander Admiral Ihor Voronchenko said that a Russian Tu 22M3 had been observed simulating the launch of a missile strike on the key coastal city, Voronchenko added that Russian bombers had made several similar attempts during exercises on July 10, conducting a virtual airstrike 60 kilometres from Odesa.

The situation escalated again in 2021. With hindsight, these incidents mark logical signposts on the road to war.

On 29 January 2021, three US naval vessels entered the Black Sea for the first time in three years. On 1 February, Ukrainian president Volodymyr Zelensky argued for Nato membership for Ukraine. On 19 March, another significant US naval deployment to the Black Sea took place, as the cruiser USS *Monterey* and destroyer USS *Thomas Hudner* entered the sea on 19 and 20 March respectively.

The Russian cruiser and Black Sea Fleet flagship *Moskva* made an exit to sea from Sevastopol and on 19 March all six submarines of the Black Sea Fleet went to sea, which was an unprecedented event. Russian ground forces also started a buildup on the border with Ukraine. In April Ukraine's President Zelensky began pressuring Nato to speed up the Ukrainian path to membership. On 8 April, Russia started moving ten of its Caspian Flotilla warships to the Black Sea, via internal waterways and conducting exercises usually associated with amphibious landings.

On 23 June 2021, the United Kingdom's HMS *Defender* made a patrol through the disputed waters around the Crimean Peninsula (see Figure 3) designed to test Russia's commitment to the freedom of navigation principle enshrined in the 1982 UN Convention on the Law of the Sea. The Russian Ministry of Defence forces and border guards said they fired warning shots from coast guard patrol ships and dropped bombs from a Su-24 attack aircraft in the path of *Defender* after, according to the Russians, it had allegedly strayed for about 20 minutes as far as 3 km (1. 6 nm) into waters off the coast of Crimea, which Russia annexed in 2014 in a move which, as noted, was mostly unrecognized internationally. The UK MoD denied any warning shots were fired and said the ship was in an innocent passage in Ukraine's territorial sea. Warships are usually allowed to pass through other states' territorial sea (out to 12 nm), as long as they pose no threat to that state. Later the UK MoD admitted that clarifying that heavy guns were fired three miles astern, possibly as part of an exercise, and could not be considered to be 'warning shots.

In late September 2021, the Ukrainian Navy launched an operation to move the search-and-rescue ship Donbas and the tugboat *Korets* from Odesa to Mariupol. The operation was the first deployment of Ukrainian Navy ships through the Kerch Strait area since the Russian annexation of Crimea, although the three ships in the 2018 Kerch Strait incident had been trying to. The vessels proceeded from Odesa with the 48-year-old *Donbas* towing the 45-year-old *Korets*. Commanded by Dmytro Kovalenko, Ukrainian Naval Forces Deputy Chief of Staff, the ships radioed their intention to enter the Azov Sea via the Kerch Strait as they approached it on 23 September but did not follow the official procedure to request permission. According to Kovalenko, this was an intentional form of 'naval diplomacy', carried out to assert the Ukrainian claim to the surrounding waters. While the ships received pilot services from the Kerch port authority free of charge, they were also tailed by at least 13 Russian vessels, and overflown by Russian aircraft. The Ukrainian vessels complied with transit procedures which did not require a request for permission to transit, Russia did not hinder the ships' passage under the Crimean Bridge, and they successfully reached Mariupol. In an interview with the *Kyiv Post*, Ukrainian naval expert Tara Chmut opined that the Russians had not expected the Ukrainian operation, and so decided to take the least risky option by allowing them through. For the first time, the Ukrainians were not being merely reactive but setting their own game rules. On 14 April, the planned deployment of the two US destroyers was cancelled. On 17 April, the amphibious ships *Aleksandr Otrakovsky* and *Kondoponga* of the Northern Fleet and *Kaliningrad* and *Korolëv* of the Baltic Fleet strengthened the amphibious warfare capabilities of the Black Sea Fleet (Yaylali 2021). On 30 April, the cruiser *Moskva* fired a Vulkan anti-ship missile for the first time.

In November, further tensions started amidst the build-up of Russian ground forces on the Ukraine border. On 2 November, the destroyer USS *Porter* entered the Black Sea, followed on 25 November by the destroyer USS *Arleigh Burke*. In late October, the Russian Black Sea fleet held a large exercise with a cruiser, a frigate and three corvettes.

As 2022 dawned, the indications that a conflict was imminent should have been obvious but despite intelligence warnings that it was, the political leadership in Ukraine and the west played them down. A 30 January report published in *Naval News* concluded that in the event of all-out conflict Russia would dominate the Black Sea, a conclusion which proved largely but not entirely correct (Ozberk/ *Naval News* 2022).   The analysis noted that 'While much attention has been focused on the regional conflict and expanding militarization along the borders, the situation at sea is rarely highlighted'**.**   The analysis correctly surmised that 'comparing the two forces is a futile effort' (Ozberk/*Naval News* 2022).

 On the eve of the full-scale war, The Ukrainian navy consisted of 15 ships, one of which was a frigate, while the others were small combatants and landing ships.   At the same time, according to open-source information, the Russian Black Sea Fleet had around 49 ships and 7 submarines. These included Ssx new Project 636.3 (Improved Kilo) diesel submarines, three Admiral Grigorovich class frigates, one *Buyan*-M class corvette, and three Project 22160 patrol boats, all delivered between 2015 and 2020 All these were able to deploy Kalibr land-attack cruise missiles. Admiral Grigorovich's frigates were declared to carry Tsikon hypersonic missiles, but the actual deployment was as yet unknown. *Moskva*, the Fleet's flagship, was armed with P-1000 Vulcan supersonic anti-ship cruise missiles and 3M41 Fort long-range air defence missiles, among other guided weaponry. The amphibious fleet comprised seven ageing *Ropucha*-class and Alligator-class amphibious warships, as well as a few small landing craft, but these were about to be reinforced by more amphibious ships.

As in any such circumstances Ukraine's response to Russia's overwhelming superiority at sea had to be asymmetric, and it was., Ukraine 's ground-based Neptune anti-ship missiles with a range of 280 kilometres (128 nm). The Ukrainian Navy's surveillance and small-strike capacity were enhanced with the procurement of the Turkish-made TB2 Bayraktar Unmanned Combat Air Vehicles (UCAVs). (Ozberk/*Naval News* 2022). The combination of drones for surveillance and the Neptune missiles, which the Russians grossly underestimated, proved crucial once the real war started (see below).

In February the Russian build-up around Ukraine moved into a new phase when six landing ships and a Kilo-class submarine sailed into the Black Sea. On 8 February it was reported that the first part of a Russian Navy amphibious landing ship force, had entered the Dardanelles. Due to traffic regulations, ships do not turn around. Six amphibious warfare ships and a submarine were expected to pass north into the Black Sea over the next few days. These ships had come from the Baltic and Northern Fleets. They were clearly part of President Putin's Ukraine build-up. These ships due to their amphibious warfare role, were suitable for offensive troop landings. Or vital logistics support to land operations along the coast. (Sutton/Naval News 2022(1)). But, with hindsight, this was, at least in part, part of a Russian deception plan. Deliberate ambiguity, *maskirovka*. The ships had only recently arrived at Tartus, Syria, which is Russia's forward naval base in the Mediterranean. Their stop there was fleeting, and they were soon on their way towards the Black Sea.

Western observers had been tracking their progress since they left the Baltic. The ships passed north over several days. Because no official 'war' was underway, the Turks did not prevent the ships' transit under the rules of the 1936 Montreux Convention. However, the Convention does limit the tonnage that can pass the Straits at any one time. The first package comprised the three *Ropucha* class landing ships: *Minsk* (127), *Korolëv* (130) and *Kaliningrad* (102). The second package followed on February 9th. This comprised the *Ivan Gren* class Pyotr *Morgunov* (117) and two *Ropucha* class ships *Georgy Pobedonosets* (016) and *Olenegorsky Gornyak* (012). The submarine, Kilo -Class boat *Rostov-na-Donu* (B-237) followed on February 11th.

The 6,600-ton *Ivan Gren* class can carry up to 13 main battle tanks, or 40 armoured vehicles, and 300 troops. It can also carry two helicopters for airborne assault and logistics. The smaller 4,080-ton *Ropucha* class ships can each carry up to ten main battle tanks and 340 troops.

This gives the ships a combined capacity of up to 63 main battle tanks and about 2,000 troops. The exact load of the vessels was, naturally, unknown. However, the massive cargo capacity will greatly add to Russian capabilities off Ukraine. (Sutton/Naval News 2022 (1)).

The submarine, *Rostov-na-Donu* (B-237), was a separate variable, and she sailed independently through the Bosphorus on February 11th. But the timing of her return to the Black Sea after operations in the Mediterranean was inevitably seen as part of the Ukraine situation.

She had been sent for repairs in the Baltic, using the long sea route. This involved spending a lot of time in the Mediterranean along the way. This is controversial because the Montreux Convention limits the reasons submarines can transmit the Bosphorus. She returned to the Mediterranean in March 2021 and now, eleven months later was heading back to the Black Sea. Her return to the Black Sea brought the Russian submarine force there up to three operational boats, all Improved Kilo-Class. Two more remained in the Mediterranean and two were undergoing maintenance. (Sutton/Naval News 2022 (1)).

There was a widespread belief that Russia would carry out amphibious operations, but even before the full-scale conflict broke out observers were sceptical, not least because such landings would probably entail huge casualties.

The 197th Assault Ship Brigade provides the Black Sea Fleet's amphibious lift, with three *Alligator*- and four *Ropucha*-class landing ships. With reinforcement from Russia's Baltic Fleet's *Ropucha*-class landing ships *Korolёv* and *Minsk*, this gave an amphibious lift capacity of about two naval infantry battalion tactical groups, each typically 1,000 strong.

Reinforcing the risk of a repetition of Omaha Beach, the Ukrainian coastlines do evince certain similarities with that bloody 1944 objective. Ukraine's coast is marked by high hills and cliffs to the seashore, with few beaches exits and few beaches suited for a mechanized amphibious assault force. As Colonel Philip Wasielewski, a retired US Marine, noted, 'The coastal areas not bounded by cliffs are urbanized, which means that it would be very difficult for the landing force if these places were defended toughly, and the fight could evolve into an urban combat with different outcomes.' (Cited in Sutton/Naval News 2022 (1)).

By creating what looked like a convincing amphibious assault force in the Black Sea, the Russians had exploited one of such a force's key roles. A highly credible deception. Up to mid-July, there has been no amphibious attack from the Black Sea, but the possibility has certainly diverted Ukrainian forces who need to be prepared in case one happens (see below). A similar deception took place during the 1991 Gulf War when, before the great flanking movement in the desert, the US Marines briefed the press pack on how to do an amphibious assault. The aim was to deceive the Iraqis and undoubtedly succeeded to some extent. The media present, including this author, obediently reported on the briefing.

The War at Sea and threats to the Littoral: 24 February to mid-August 2022.

By 24 February and the start of the Russian invasion of Ukraine, the Russian Navy had in the Black Sea, the *Slava*-class cruiser *Moskva* (flagship of the Black Sea Fleet), two *Admiral Grigorovich*-class frigates, three *Buyan-M*-class corvettes and a *Varshavyanka*-class diesel-electric submarine (SSK), which apart from the *Moskva*, are all armed with the Kalibr family of cruise missiles. At least ten Landing Ships Tanks (LSTs) were also in the Black Sea. In the eastern Mediterranean, the Russian naval force comprised two *Slava*-class cruisers, two *Udaloy*-class destroyers, two frigates (a *Gorshkov* and *Grigorovich*-class), one *Buyan-M*-class corvette and two *Varshavyanka*-class SSKs.

On 24 February, before 05.00 hrs Kyiv time, Putin announced a 'Special military operation' in eastern Ukraine and 'effectively declared war on Ukraine'. In his speech, Putin said he had no plans to occupy Ukrainian territory and that he supported the right of the Ukrainian people to self-determination. He said the purpose of the 'operation' was to 'protect the people' in the predominantly Russian-speaking region of Donbas. (*Kyiv Independent* 2022). Attention focussed on land-air operations and the multi-pronged Russian offensives towards Kyiv and Donbas. The only naval incident, later on, the first day, was Russia's attack on the Ukrainian Snake Island. The flagship *Moskva* signalled to the border guards on the island to surrender, which was met with the famous and historic reply roughly translated as 'Russian warship. Go fuck yourself'. The Russians occupied the island later that night until it was retaken on 30 June. The subsequent bitter contest for Snake Island and its enormous strategic significance are analysed in the section on it below.

On 28 February, Turkey invoked the 1936 Montreux Convention and sealed off the straits to Russian warships not registered to Black Sea home bases and not returning to their ports of origin. This prevented the passage of four Russian naval vessels through the Turkish Straits – Dardanelles and Bosphorus (see Figure 1) - in late February. The Ukrainian government appealed to Turkey to exercise its authority under the Montreux Convention to limit the transit of Russian warships from the Mediterranean to the Black Sea. As noted above, at least six Russian warships and a submarine had crossed the Turkish straits earlier in February. After initial reluctance, attributed to the country's close ties with both Russia and Ukraine, Turkish Foreign Minister Medviüt Çavuşoğlu announced on 27 February that his government would legally recognise the Russian invasion as a 'war', which provides grounds for implementing the Convention concerning military vessels. This blockage of naval vessels also applied to Nato powers who could not now move their vessels from the Mediterranean to the Black Sea. However, Çavuşoğlu reiterated that under the agreement, Turkey could not block Russian warships based in the Black Sea from returning to their registered base. Around February 27–28, Turkey refused permission for three out of four Russian warships to enter the Black Sea, as three did not have a home base there. Meanwhile, on 26 February, Russia said that US drones had supplied intelligence to the Ukrainian navy to help target Russian warships in the Black Sea, which the US denied.

On 3 March, the Ukrainian frigate *Hetman Sahaidachny*, the flagship of the Ukrainian navy, was scuttled in Mykolaiv to prevent its capture by Russian forces who were advancing on 14 March, the Russian source RT reported that the Russian Armed Forces had captured about a dozen Ukrainian ships in Berdiansk, But the Russians were far from getting it their own way. As the naval analyst H, I Sutton observed on 4 May, 'The Russian Navy, on paper one of the most powerful on the planet, has lost 4 or 5 vessels to enemy action. In a land war, against a country with barely any navy' (Sutton/ Naval News 2022 (2)).

The first Russian naval losses, perhaps inevitably, occurred near the besieged eastern city of Mariupol on the Sea of Azov (see Figure 1). The siege was part of the Russian eastern Ukraine and southern Ukraine offensives which started on 24 March. Mariupol, a multi-ethnic and multi-religious which had been a jewel on the Sea of Azov, was fully surrounded on 2 March and ended on 20 May 2022, when the remaining Ukrainian forces who had holed up in the Azovstal steel works surrendered after a long and heroic resistance and after they were ordered to cease fighting.

On 20 March the Deputy Commander of the Russian Black Sea Fleet, Captain First Rank Andrey Paliy was shot dead near Mariupol (*Sun* 2022). The first ship to be destroyed was small: a Raptor assault boat taken out by a Ukrainian anti-tank missile near Mariupol on 22 March. (Sutton/ Naval News 2022 (2)). The second was much more significant and spectacular. Two days later, on 24 March, an Alligator Class landing ship - first reported to be the *Orsk* and then its sister ship, the *Saratov* was blown sky-high in

Berdyansk. The exact mode of attack remains unclear. A leading theory is that Ukraine fired an OTR-21 *Tochka* ('Point') Short Range Ballistic Missile at the port. It had done so two days earlier, with parts of that missile landing on the pier. The missile would have carried small cluster munitions, but one of these appears to have landed in the landing ships' hold. The explosion and fire then detonated ammunition stored there. The subsequent chain of explosions was dramatic, and the ship sank at the pier. Two *Ropucha* class landing ships which were docked nearby were also damaged, though they sailed away. The captain of one of them later died of wounds. Russia does not appear to have used the port similarly since then (Sutton/ *Naval News* 2022 (2)).

Next, on 13 April, came the most symbolic and strategically significant loss. The *Slava* Class cruiser *Moskva*, the Black Sea Fleet's flagship. It was the first time the Russians had lost a flagship since the loss of the *Knyaz Suvorov* at the Battle of Tsushima against the Japanese in 1904. The last comparable ship to be sunk in the war was the Argentinian cruiser *General Belgrano* sunk by the British submarine HMS *Conqueror* during the 1982 Falklands War. But the *Moskva* is the most significant ship ever sunk by missiles. The Ukrainian border guards on Snake Island (see below) who had told the Russian warship where to go on the first day of the war had their wish fulfilled.

Moskva was a mighty ship, one of three in service, along with *Marshal Ustinov*, which had been assigned to the Northern (Arctic) Fleet and the *Varyag*, which was with the Pacific Fleet. However, both the latter were deployed to the Mediterranean, entering the sea on 23 February, just one day before the Russian attack on mainland Ukraine. (Manevski/Zenger 2022). *Moskva* was 186.4 m (611 ft 7 in) long, 20.8 m (68 ft 3 in) wide (beam) and 8.4 m (27 ft 7 in) draft – that is, the depth underwater. When she moved, she displaced 12,490 tons of seawater. Her crew was about 500-strong. The cruiser had previously served in military operations in Georgia (2008), Crimea (2014), and Syria (2015) (*Engineerin*e 2020). Reports of the *Moskva*'s sinking varied massively, a symptom of the ferocious information war that characterises the Russia-Ukraine conflict with either side issuing wildly

Figure 6. Neptune missile, developed by the Luch design bureau, Kyiv.

contradictory statements. All they agree on is that *Moskva* eventually sank. Ukraine said two Neptune missiles (see Figure 6) had been fired at it, while the Russians said it sank because of an explosion in rough seas. British and US Intelligence reports, which have been published on a continuous and regular basis, provide a useful corrective or corroboration to the warring sides' statements. In this case, they tend to support Ukrainian accounts, but not entirely.

On 13 April *Moskva* was reportedly hit by two Ukrainian *Neptune* missiles, a report subsequently confirmed. *Neptune* missiles (see Figure 6) have a maximum range of 300 km (160 nm). She sank the next day while being towed back to Sevastopol. (Hill 2022, Sutton 2022, TASS 2022). Subsequent analysis of the film of the stricken ship indicates two missile impacts on the forward port side. Anti-ship cruise missiles home in on the centre of the radar return which tends to be just forward of the superstructure, although photographs of the stricken ship before it sank indicate that it was struck further aft. From the plans of the *Moskva* (see Figure 8), these hits would have taken out   The Ukrainian missiles that were apparently fired from a land-based launcher near Odessa while *Moskva* was located 60–65 nautical miles (110–120 kilometres) offshore. The operation to sink Moskva may have been assisted by the use of Turkish BayraktarTB2 Unmanned Combat Air Vehicles (UCAVs) (weapon-carrying drones) to be a deception.

Estimates of casualties vary greatly. Russia said that 396 crew members had been evacuated, with one sailor killed and 27 missings, but there are unverified reports of more casualties. Ukrainian sources reported on 15 April that some of *Moskva*'s crew were killed, including the Commanding Officer, Captain First Rank Anton Kuprin Stewart 2022). The Russians later broadcast a film of 'survivors' from the ship, about a hundred of them. Which, interestingly, included Captain Kuprin. Without wishing to take sides in the information war, this may suggest that the film actually dated from before the sinking. The fact that

the Russians reported one sailor killed, who happened to be the captain, may have been symbolic or, at any rate, convenient. On 15 April, a senior US official said the US Government also believed there had been casualties. At a US Department of Defense briefing on 18 April, a senior defence official revealed they had also seen lifeboats in the water with sailors in them but did not have an accurate count. The independent Russian newspaper *Novaya Gazeta Europe* reported some 40 sailors had been killed at the time of the sinking. According to an eyewitness, there were some 200 injured sailors in a hospital in Crimea. At 10:59, 14 April 2022 [EEST], the Lithuanian Defence Minister, <u>Arvydas Anušauskas</u>, reported on Facebook that an SOS signal had been sent at 01:05, the cruiser rolled onto its side at 01:14, and the electricity went out half an hour later. According to the Minister, 'From 2 a.m., a Turkish ship evacuated 54 sailors from the cruiser, and at about 3 a.m., Turkey and Romania reported that the ship was completely sunk'. However, a Turkish official denied to BBC News that a Turkish ship rescued any Russian crew, despite Turkish reports. (TRT 2022).

The layout of the *Slava* class ships is shown in Figure 8. Based on an analysis of Russian plans for the ship, the missiles may have destroyed the local damage control spaces. The first known report of a missile hitting the ship was at 20:42, 13 April 2022 Ukrainian time (Eastern European Summer Time), which is three hours ahead of Coordinated Universal Time (UTC), better known as Greenwich Mean Time (GMT). It came in a Facebook post by a Ukrainian volunteer connected to the military. Later that evening Ukrainian Presidential adviser Oleksey Arestiovych reported *Moskva* was on fire in rough seas and Odes Governor Maksym Marchenko officially confirmed that Ukrainian forces hit *Moskva* with two R-360 *Neptune* anti-ship missiles which 'caused very serious damage.' The Neptune missiles carry a 150 kg (330 lb) warhead. At 12:43, 14 April EEST, the Ukrainian Southern Command posted a video on Facebook with a report stating the ship had received damage within the range of the Neptune anti-ship missile, there was a fire and other vessels in *Moskva*'s group 'tried to help, but a storm and a powerful explosion of ammunition overturned the cruiser, and it began to sink.' (Ukrinform.net 2022)
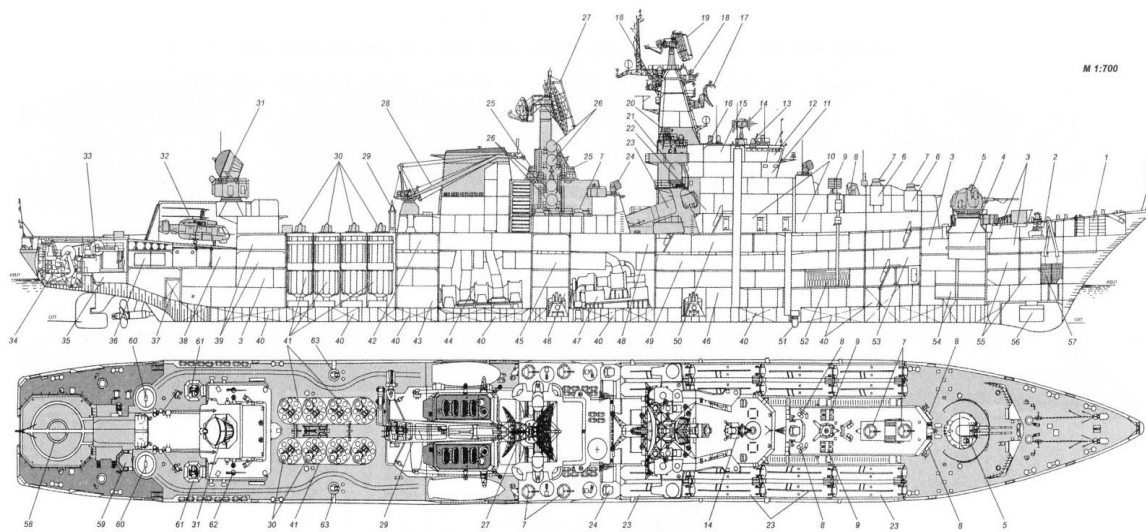
Продольный разрез и вид сверху РКР пр. 1164

1 – кладовые различного назначения; 2 – отделение шпилевых машин; 3 – кубрики команды; 4 – подбашенное отделение 130-мм АУ АК-130; 5 – 130-мм АУ АК-130; 6 – подбашенное отделение 30-мм АУ АК-630М; 7 – 30-мм АУ АК-630М; 8 – ПУ СППП ПК-10; 9 – РБУ-6000; 10 – каюты офицеров; 11 – рубка флагмана; 12 – ходовая рубка; 13 – оптический перископический визир ходовой рубки; 14 – АП РЛС СУАО «Лев»; 15 – штурманская рубка; 16 – оптический перископический визир ГКП (боевой рубки); 17 – АП РЛС СУО «Аргон-1164»; 18 – АП РЛС «Вайгач»; 19 – АП РЛС «Фрегат-М»; 20 – стабилизированный пост ТВ системы наблюдения за ближней наружной обстановкой; 21 – АП комплекса «Корвет»; 22 – кают-компания офицеров; 23 – ПУ ПКРК «Базальт»; 24 – АП РЛС СУАО «Вымпел»; 25 – АП комплекса РЭБ «Кольцо»; 26 – АП станций постановки активных помех «Гурзуф А» и «Гурзуф Б»; 27 – АП РЛС «Восход»; 28 – грузовой кран; 29 – устройства для приема жидких и сухих грузов на ходу системы «Струна»; 30 – стартовый стол ВПУ ЗРК «Форт» (С-300Ф); 31 – ФАР РЛС СУО ЗРК «Форт» (С-300Ф); 32 – ангар для вертолета; 33 – помещение приводов и агрегатов подъемно-буксируемого устройства (ПБУ) ГАК «Платина»; 34 – буксируемая антенна ГАК «Платина»; 35 – румпельное отделение; 36 – погреб авиационного боезапаса; 37 – цистерны авиационного топлива; 38 – помещения 533-мм ТА ДТА-53-1164; 39 – посты ЗРК «Форт» (С-300Ф); 40 – топливные цистерны; 41 – ВПУ ЗРК «Форт» (С-300Ф); 42 – кормовая электростанция; 43 – энергоотсек; 44 – кормовое МО (форсажные ГТД); 45 – ПЭЖ; 46 – отсеки вспомогательных механизмов и активных успокоителей качки; 47 – носовое МО (маршевые ГТД); 48 – носовая электростанция; 49 – боевой информационный пост (БИП); 50 – главный командный пункт (ГКП); 51 – обтекатель антенны ГАС ЗПС; 52 – погреб РБУ-6000; 53 – посты АУКСППО ПКРК «Базальт»; 54 – погреб 130-мм выстрелов; 55 – посты акустиков; 56 – антенна ГАК «Платина» в бульбовом обтекателе; 57 – цепной ящик; 58 – ВПП; 59 – стартовый командный пост вертолета; 60 – ПУ ЗРК «Оса-МА»; 61 – АП СУО 4Р-33 ЗРК «Оса-МА»; 62 – 45-мм салютная пушка; 63 – ПУ СППП ПК-2; 64 – 30-мм АУ.

Figure 7. *Slava* class cruiser *Moskva*. She had been the original *Slava,* renamed in 1996 after the end of the Soviet Union.

An image from a satellite with cloud-penetrating synthetic aperture radar (SAR) revealed that at 18:52 local time (EEST) (15.52 GMT) on 13 April 2022, *Moskva* was located at 45º 10'43..39" N, 30º 55' 30.54" E, about 80 nautical miles (150 km) south of Odesa, east of Snake island and around 50 nautical miles (90 km) from the Ukrainian coast, putting it well within the range of Neptune missiles which were probably deployed on mobile truck launchers under cover just back from the shore. Analysis suggested this was not long after the damage occurred which caused the ship to eventually sink. In the image, the cruiser is accompanied by other vessels (see Figure 6). Russia later claimed that the ship, which was rolling to its port side, had sunk in 'stormy weather', although the weather was reportedly mild. On 15 April, the sinking was briefly reported on Russian news media and television, where it was said to be due to 'stormy seas' However, all the film of the blazing *Moskva* and its sinking shows the weather to be calm.

However, we should not dismiss the Russian account entirely. The initial strikes by one or two Neptune missiles did not sink *Moskva*. She either moved under her own power or was towed back towards Sevastopol, billowing smoke, and sank the following day, quite possibly after, as the Russians said an ammunition explosion.

Moskva was an immensely powerful ship with no fewer than three layers of anti-aircraft and missile defences. The latter did not include the 16 P-500 Bazalt or P-1000 Vulkan missiles, which are offensive and designed to take out US carriers. The three defensive layers were provided by 64 S-300F anti-aircraft and anti-missile missiles with a range of between seven and 90 km (four to 48 nautical miles), 40 Osa (SA-8) missiles, to shoot down low-flying aircraft and anti-ship missiles out to 30 km (16 nm), and, as the

goalkeeper, or Close-In Weapons System (CIWS) six AK-630 Gatling -type guns, each with six 30mm barrels (hence the designation). The ship also has a twin 130mm gun turret but anti-missile defence is not its primary role.

So how could Ukrainian Neptune missiles penetrate such defences? Analysis of *Moskva*'s defensive systems reveals a surprising Achilles heel. The S300F and Osa both have a minimum target altitude of 25 metres. Anything coming in below that altitude is unlikely to be hit.   Ukraine's Neptune missiles are fired from a truck on the ground. After its initial launch, the missile starts descending over the seawater to an altitude of about 10-15 m. It continues to descend until reaching just three to ten metres above the wave crest before reaching its target. This very low altitude makes it very difficult for a ship's target acquisition radars to detect it. Any kind of swell on the sea – a 'rough' sea, according to the World Meteorological Society's definition would have a wave height of 2.5 to 4 metres (Faltinsen 1990) – would raise the floor for detecting incoming missiles correspondingly. The S-300F and Osa defensive missiles both have a minimum altitude of 20 to 25 metres above the wave crest, making it impossible to hit a *Neptune* flying at that low altitude.

So far, it looks as if only the close-in weapon system AK-630 would be able to engage the approaching missile(s). The AK-630 has an engagement range for incoming missiles of about 1.5 km - less than a nautical mile. And since the *Neptune* missile was flying at a speed of 900 km/h (480 knots), that means the AK-630 turrets would have had just six seconds to respond (*Engineering* 2022).

There was another problem, apart from the radar and missile engagement floor. *Moskva*'s most important radar was the 'Top Dome' SA-N-6 fire control radar used to target the S-300F missiles (see Figure 8). These were the missiles that the *Moskva* relied on mostly to target missiles and air threats. This radar covers an arc of just 180 degrees and might be distracted by the drone. *Moskva* also had *Voskhod* MR-800 and *Fregat* MR-710 radars, which are both 360 degrees search radars that can detect enemies in all directions. However, as a search radar, they were less accurate than fire control or target radars.

This is where the Ukrainian use of the Turkish-supplied TB2 Bayraktar drone or drones may have been critical. With 'Top Dome' distracted to the starboard side, it would not have been able to see the incoming missiles (see Figure 9).
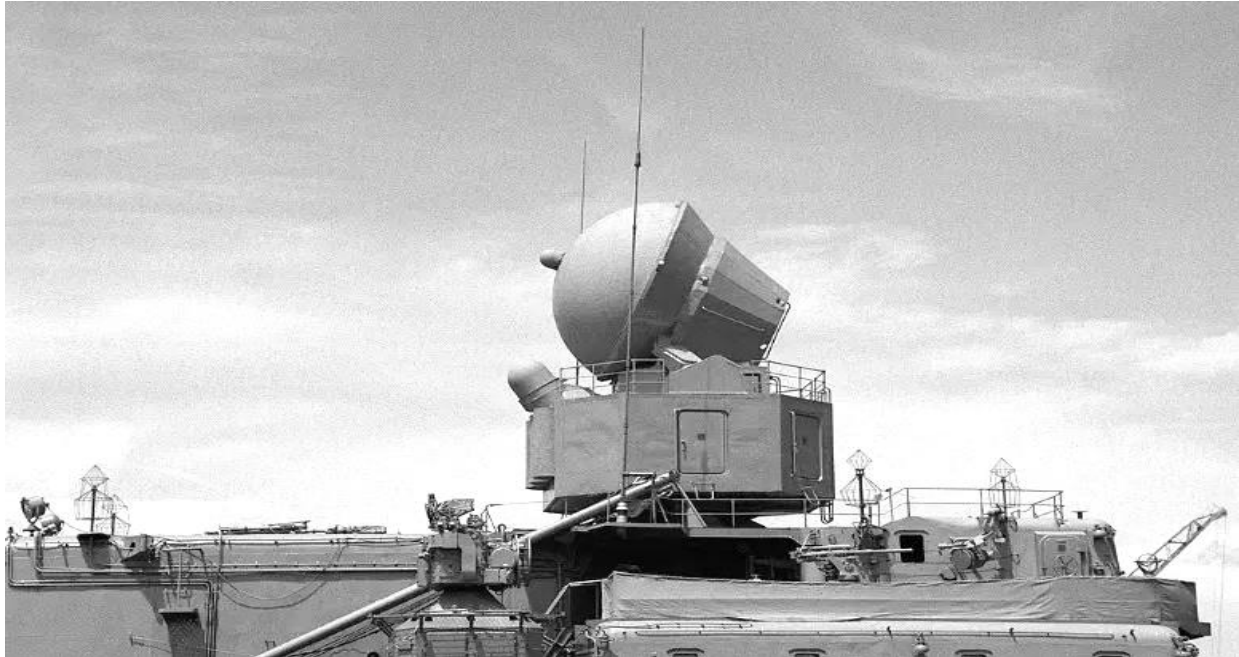
Figure 8. 'Top Dome' (Nato designation) target acquisition radar.
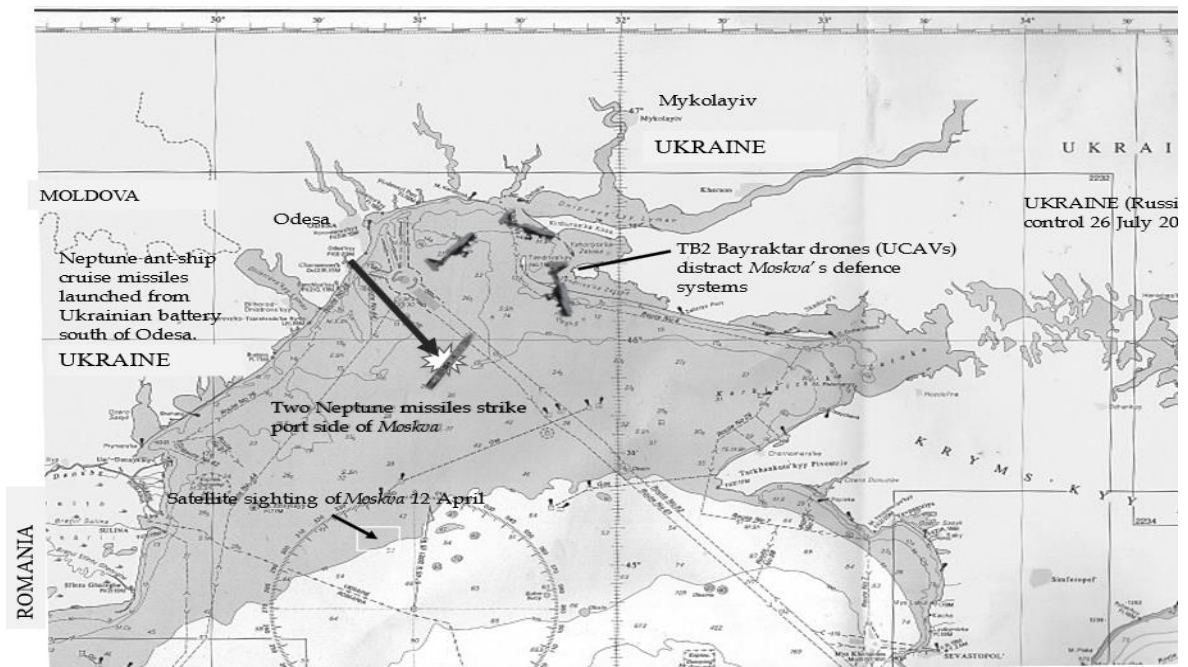(Original Source: Don S. Montgomery, U.S. Navy, via Engineering 2022)

Figure 9. Likely deception plan using a drone(s) to distract *Moskva*'s 'Top Dome' radar. Source Admiralty chart WG S84 scale 1.2 m at 42º 30'. Scanned and annotated by the author. Also drew on Dewars and Pleasance, *Daily Mail*, 14-15 April 2022).

The loss of the *Moskva* represented a catastrophic blow to the Russian Navy overall and the Black Sea Fleet in particular. Besides the Achilles' heel in the ship's systems, which clearly could not cope with low-flying incoming missiles, especially in an elevated sea state, and the very plausible effect of the Bayraktyar drone(s) as a decoy(s) to distract the main Top Dome radar, western analysts speculated, not without reason, that the ship's damage control was poor. Many highlighted deficiencies in crew morale and training. The loss of *Moskva* may well prove to be the most significant warship loss outside a major multinational conflict in a century. Naval architects are no doubt assessing it, and the lessons are obvious. These include the need to make the main radar(s) able to scan the full 360 degrees, not just the 180-degree semi-circle, and to mount anti-missile systems higher up so they can strike down to hit very low-flying anti-ship missiles flying just – three metres, or fewer – above the wave crest. The fact that a guided missile cruiser designed to take out US carriers and able to operate in the north Atlantic, Baltic and Pacific, never mind the Black Sea, could not cope with high sea states, and possibly wind and rain, almost beggars' belief *(Engineering* 2022. The latter includes a superb computer-simulated reconstruction).

The outcome of the Black Sea Fleet command was predictable. On 19 May 2022, the U.K. Ministry of Defence reported that Putin had fired two senior commanders - Lieutenant General Serhiy Kisel, who had commanded the 1st Guards Tank Army, and Vice Admiral Igor Osipov, commander of the Black Sea Fleet (*Newsweek* 2022). Osipov had reportedly signed off *Moskva* as fit and ready for service. It looks like she was not.

Russia might possibly try to replace the lost *Moskva*. As noted above, currently two more *Slava* Class cruisers are operating in the Mediterranean. These cannot transit through the Bosporus into the Black Sea, because Turkey closed them to warships, under the terms of the 1936 Montreux Convention, on 28 February.

The TB2 Bayraktar drone proved its worth again a fortnight later. On 2 May 2 Russian forces experienced another setback. Two Russian Raptor assault boats were engaged by a Ukrainian Navy TB2 drone near Snake Island, which Russia had captured from Ukraine at the start of the war. The two engagements took place just minutes apart and resulted in both vessels being hit. While their total loss is unconfirmed at this point, it seems likely from the footage (Sutton/Naval News 2022 (2)).

Ukraine's ability to deploy a drone over Snake Island illustrated the damage done by the attack on *Moskva*. The cruiser had provided area air defence over that sector of the Black Sea. So, unless Russia changes its pattern of operations, we may expect to see further losses caused by the Turkish-supplied TB2 UCAV drones, which are emerging as the robotic heroes of this war.

At the time I write this, Russia enjoys total superiority at sea - Ukraine has no ships or combat vessels left – but not in the air above. Ukraine's Navy was mostly scuttled, captured in port or, in the case of non-operational vessels, sunk at the pier. And Russia has achieved some significant if unwelcome, strategic goals. The blockade on merchant vessel traffic to and from Ukraine is absolute. At the start of the war, attacks on some merchant vessels strong warnings, and active patrolling have effectively starved Ukraine of its vital imports and exports. The key role of Snake Island and the effect of the blockade are detailed in the separate sections below.

One of the Russian Navy's big successes, however, has been the use of the *Kalibr* cruise missiles fired from submarines. On 22 March 'high-precision missiles launched from a Buyan-M class, corvette had struck a Ukrainian armaments depot in the village of Orzhev near Rivno, far inland in the northwest of the country. The Russians said the site was used to store weapons and equipment provided by western countries. The loss of *Moskva* may well have contributed to a decision to use these formidable missiles which can fly up to between 1,500 to 2,500 km (800 to 1,330 nm), launched from submarines. The 6.2-metre-long missiles carry a 450-kilogram conventional explosive warhead. They can also carry nuclear

warheads, though not in this case. Unlike surface warships, submarines are virtually immune to Ukrainian shore-based defences. So, there's the rub … On 26 April a photograph was published showing *Kalibr* missiles being loaded on board the submarine *Velikiy Novgorod* (see Figure 10). The sea-launched land-attack cruise missile is now being used by the Russian navy to target Ukrainian cities.

Figure 10. *Kalibr* missiles are being loaded onboard the Kilo-class submarine *Velikiy Novgorod* (IBT 2022).

A major strike from Russian submarines took place on 14 July, when an unnamed sub fired five *Kalibr* missiles at Vinnytsia, well to the southeast of Orzhev but still a good way inland. The Russians apparently fired five missiles. Ukraine shot down two, but the other three struck a business centre. Some 23 civilians were killed and more than 100 were injured (Reuters 2022(2), AP 2022, Mongillo 2022).

Meanwhile, the Russian Navy exercised a significant effect on the land operation by poising off the key port – Ukraine's principal port – of Odesa. Besides imposing an economic blockade, which had profound strategic and grand-strategic consequences (see below), it also had a profound operational purpose. Although analysts had speculated about a possible Russian amphibious assault, as noted above, this might prove very costly. As Figure 11 shows, Odesa's international airport lies about seven km from the coast and Naval Infantry could potentially have seized the Commercial Port, using their specialist expertise, combined with an airborne assault on the airport. However, that would still have been very risky. In any case, on 30 April the Russians knocked out the new runway, which had only been opened in July 2021.
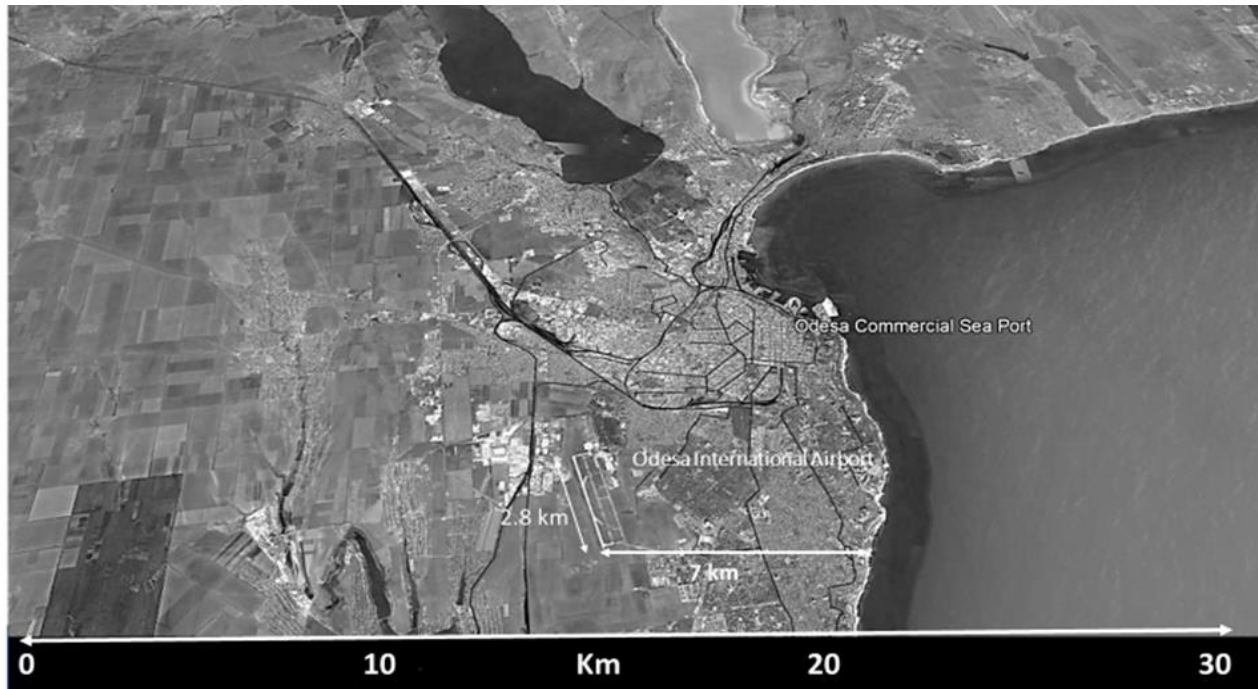
Figure 11. Odesa. Source: Google earth, adapted and annotated by the author.

Instead, the Russian Navy has been carrying out what the US Navy defines as amphibious demonstrations. According to the *Dictionary of Military and Associated*

In terms, an amphibious demonstration is a show of force that stops short of an actual landing. Demonstrations are conducted to deceive the enemy or, in situations short of hostilities, to signal presence and intent. (US DoD 2005).

On 14 March the Russians carried out a landing at Berdyansk on the Sea of Azov, but that followed success on the land there and was unopposed. But the following day a force including landing ships was observed heading for Odesa. There were three groups, two comprising combatants and one including landing ships (see Figure 12).

The northern group, in a line-astern formation, appears to be led by a tugboat or minesweeper. This vessel appears to be towing a mine-clearing device. Behind it are two *Ropucha* class landing ships, another tugboat and, at the back, another *Ropucha*.

The second group, labelled Group 2 on the graphic, is in a square formation. These appear to be smaller warships such as missile corvettes.

The southern group, labelled Group 1, is led by the now-deceased *Slava* Class cruiser *Moskva*. This appears to have two *Alligator* class landing ships, and the *Ivan Gren* class landing ship *Pyotr Morgunov*. There is also a smaller warship, possibly a Buyan-M class missile corvette (Sutton/Naval News (2)).

Figure 12. Russian amphibious demonstration off Odesa 15 April 2022. Source Sutton/Naval News (2)
Analysis by Damian Symons. Adapted by author.

1.1 Another demonstration took place on 24 May. The demonstration can be seen in a Sentinel-2 satellite overpass of the western Black Sea at ~0900 UTC on May 24. It was widely dispersed and so not picked up initially, as can be seen in figure 13. A series of such demonstrations can also act as a feint. That may mean, in turn, that a real assault, when it comes, is not taken seriously enough by the defenders until it is too late. These demonstrations threaten an amphibious assault, to divert Ukrainian ground forces from focusing on the primary threat which clearly, at the time of writing. Is on land, and to create uncertainty. 'All war is based on deception (Sun Tzu C5 BCE). Absolutely.

There were two groups of ships, north and south. The southern group was the larger, with four landing ships: two *Alligators* and two *Ropuchas*. These were escorted by two *Buya-M* missile corvettes and a minesweeper. That group was southwest of Crimea and had probably been heading back to Sevastopol after a foray towards the Ukrainian coast. This is supported by the fact that their order was reversed, with the minesweeper at the back. They might have been reconnoitring the Ukrainian coast near Moldova (see Figures 1, 2 and 14), where Russia may launch an offensive to link up with the rebel Government in Transdniestria or acting as a diversion to cover Russian efforts to reinforce Snake Island (see below), which Ukraine seized back at the end of June, or both. The northern group poising off Odesa, comprised two landing ships and a frigate.

Figure 13. Sutton/Covert Shores 2022(2).

The Russians were clearly trying to create the impression of a threat in the western Black Sea adjacent to Ukraine by constantly performing amphibious demonstrations off Odesa, thus keeping Odesa on constant alert, which causes it to keep soldiers in this region. This situation precludes troops from waiting to defend the Odesa coastline from supporting forces fighting in other places.

Strategic speck of Land – Snake Island

The importance of Snake Island – Острів Зміїний, latinized as *ostriv Zmiinyi* or Island of Serpents – cannot be overestimated. Snake Island is located 35 km (18.6 nm) from the coast, east of the mouth of the Danube River (see also Figures 1, 11 and 16). Its coordinates are 45°15′N 30°12′E / 45.250°N 30.200°E. As can be seen from Figure 16A, it also lies outside the 20-metre submarine contour but within 50, so it dominates the shallow waters along the Ukrainian coastline. The island is X-shaped, 690 meters from S-W to N-E by 682 meters from N-W to S-E, covering an area of just 0.205 km (0.079 sq mi). The highest area is 41 meters (135 ft) above sea level. The island does not have a prominently featured mountain but a gently sloping hill. Although tiny, the island's location makes it of cardinal operational and even strategic importance. It assumed the role of an unsinkable aircraft carrier and anti-aircraft platform, and in Ukrainian hands might shield merchant ships sailing to or

A.   Note that the sea off Odesa down to the Romanian boundary is relatively shallow, only 50 meters deep, meaning that it is relatively easy to sweep for mines. from the key ports of Odesa. It is close to the Romanian border and therefore to NATO territory.
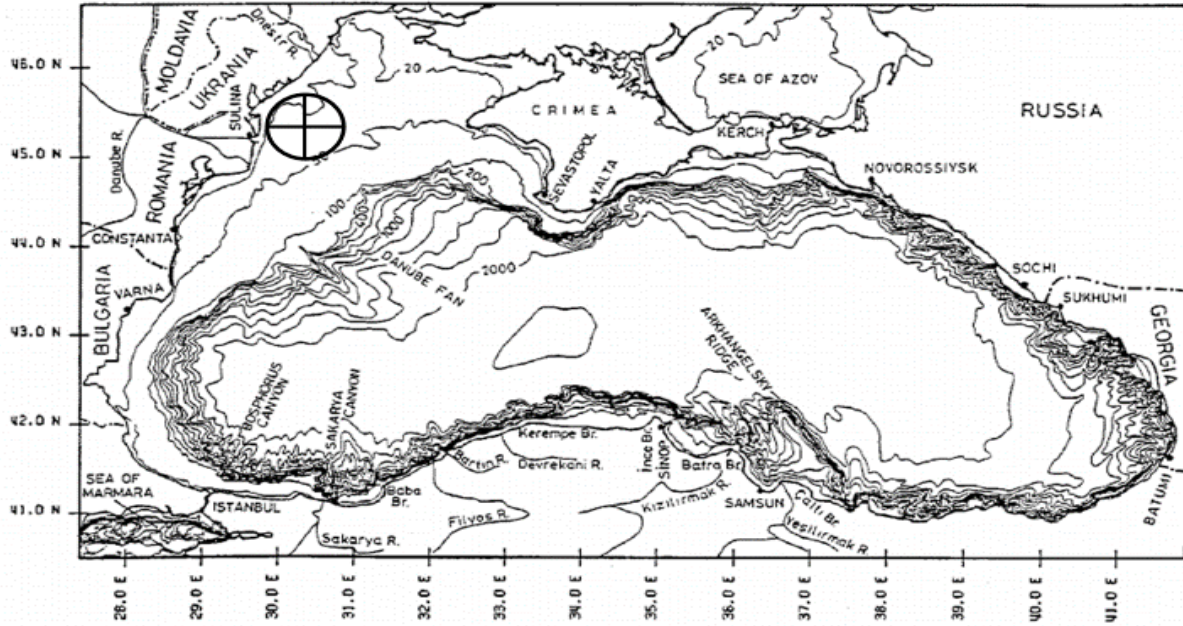
B.

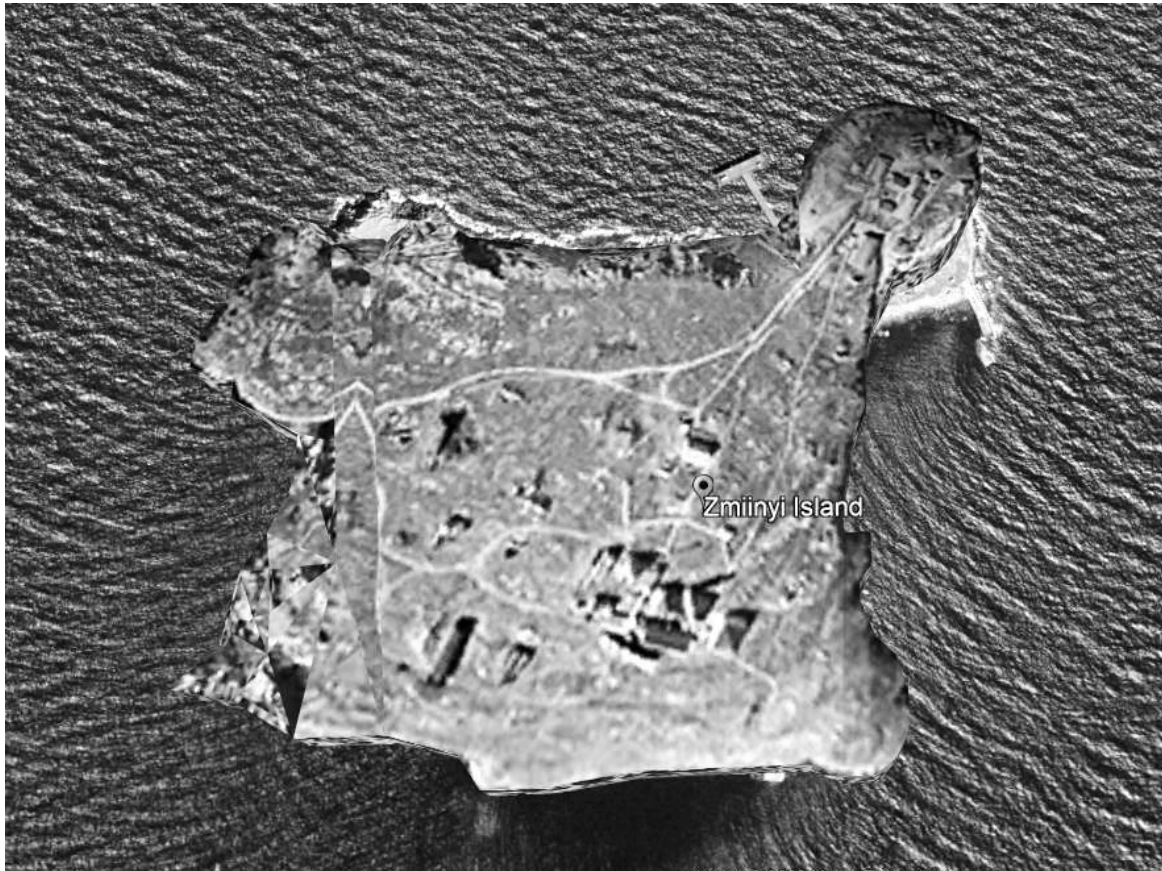

C. The island. Source: Google Earth

Figure 14. A strategic speck. The Isle of Serpents. A) bathymetry of the Black Sea,
(the island is illustrated by a gunsight), B) Admiralty Chart showing the island's
position relative to the shore, C) The island photographed from space.

On 24 February 2022, on the first day of the full-scale Russian invasion of Ukraine two Russian warships, *Vasiliy Bykov* and *Moskva* attacked the island. The Ukrainian Government said that 13 Ukrainian State Border Guards were on the island although the Russians later claimed to have captured 82. On receiving a transmission from *Moskva* demanding surrender and threatening to open fire, a Ukrainian border guard responded in Russian '*Russky voyenny korabl, idi na khuy*,' usually translated as 'Russian warship, go fuck yourself.   The profane response went viral and gained worldwide attention. It became a symbol of Ukrainian resistance. Later on, the same day, Russian forces landed and captured the island. On 26 February 2022, Ukrainian authorities announced that the civilian search-and-rescue ship *Sapphire (Sapfir)* had been seized by the Russian Navy off Snake Island.

The Ukrainian government initially reported that they believed all 13 members of the garrison had died in the attack and President Volodymyr Zelensky posthumously awarded the country's highest award, Hero of Ukraine, Ukraine's highest award, to the 13 defenders. On 27 February 2022, the State Border Guard Service of Ukraine said that they believed the 13 Border Guards might still be alive. On 24 March 2022, Ukraine and Russia conducted a prisoner exchange that freed 19 Ukrainian sailors, which included the crew of the *Sapphire (Sapfir)*, but it is unknown whether it also included any guardsmen. Sapphire herself returned to the Ukrainian port of Izmayil on 11 April, on 29 March 2022, the Ukrainian

Defence Ministry posted on Twitter that the author of the infamous phrase had been freed from captivity and given a medal for bravery. In April, the Ukrainian post office issued a commemorative stamp celebrating the garrison's defiance with a Border Guard making an appropriate gesture to the *Moskva*, which sank two days after the stamp was issued (see Figure 15).

Figure 15.

On 27 April, the Ukrainian army stated that it had struck Russian military positions on the island, and Ukrainian air and artillery attacks continued throughout May and June. On 7 May, the Ukrainian military released a video of a Bayraktar TB2 UCAV missile attack on a Russian Serna- class landing craft near the island. Ukraine claimed the craft, used for amphibious landings, was destroyed, but the Russians claimed had been repaired and would soon return to service. Meanwhile, Russia claims it has been repaired and would soon return to service. Two Ukrainian Su-27 aircraft carried out a bombing raid on or before 7 May, which was also filmed by a TB2 drone. On 31 May, Ukraine claimed that Russia had reinforced its forces on Snake Island, with extra S-300 missile systems and more ships from the Black Sea Fleet. The report claimed an extra 15 units of equipment were added. On 1 June, Ukraine claimed that Russian forces had installed multiple rocket launchers on the island.

Only 35 miles from the mainland shore, the island was a compact target for Ukrainian artillery and missiles. And it was close to Ukraine's western border which meant that new western-supplied weapons systems did not have to travel far across the country where they would be more vulnerable to Russian interdiction. These included US- supplied MIMARS missiles and French César 155 mm howitzers which could reach the island from the shore.

On 30 June 2022, Russia announced that it had withdrawn troops from the island in a 'gesture of goodwill' after military objectives were complete. According to Ukraine, a hasty withdrawal of Russian

forces followed what Ukraine's armed forces claimed to be a series of devastating attacks on the strategically important island and any vessel bringing in troops and weapons. On 30 June 2022 Reuters reported that 'New weapons sent by the West made the Russian garrison even more vulnerable, especially HIMARS, a rocket system supplied by the United States which Ukraine began fielding last week'. Russia's abandonment of the island was 'likely a tangible result of NATO arms deliveries to Ukraine', said Rob Lee of the U.S.-based Foreign Policy Research Institute (Hunters and Balmforth/Reuters 2022).

On 20 September 2022, the Russian Defence Ministry announced that it was withdrawing its submarines from the Black Sea Fleet headquarters at Sevastopol following drone strikes in August. A Ukrainian drone strike hit the headquarters, as well as a nearby air base (Telegraph 20 Sep 2022).

The Black Horse of Famine

One of the reasons given by the Russians for this very atypical 'gesture of goodwill was the growing demand for the resumption of grain shipments out of the three ports of wider Odesa, which had been paralysed by the Russian naval blockade. Some 20 to 25 million tonnes of grain had been stacked in silos in the ports since February. Ukraine is a leading grain exporter, producing enough to feed 400 million people a year, but that grain had been trapped for months in silos and on ships blockaded by Russia in the Black Sea. The U.N. says 276 million people were severely food insecure before Russia's February 24 invasion. At the time of writing, officials project the number to be 345 million. It is expected that the deal will bring relief to millions who have been struggling with rising food prices as a result of the war.

The effect of the 'war' – or 'special military operation' as the Russians would prefer you to call it – on the global economy has been highlighted in an extremely important, if brief, the report by the UN Conference on Trade and Development (UNCTAD), published on 28 June 2022. According to UNCTAD,

'Between February and May 2022, the price paid for the transport of dry bulk goods- such as grains- increased by nearly 60 per cent. The concomitant increase of grain prices and freight rates would lead to a nearly 4 per cent increase in consumer food prices globally. Almost half of this impact is due to higher shipping costs. The Russian Federation is a giant in the global market for fuel and fertilizer, which are key inputs for farmers worldwide. Disruptions in their supply can lead to lower grain yields and higher prices, with serious consequences for global food security, particularly in vulnerable and food-import-dependent economies. The Russian Federation is also a leading oil and gas exporter. Confronted with trade restrictions and logistical challenges, the cost of oil and gas has increased as alternative sources of supply, often at more distant locations, are called upon. Higher energy costs have led to higher marine bunker prices, increasing shipping costs for all sectors. By the end of May 2022, the global average price for very low sulphur fuel oil (VLSFO) had increased by 64 per cent since the start of the year. Taken altogether, these increased costs imply higher prices for consumers and threaten to widen the poverty gap. Global trade depends on a complex system of ports and ships that connect the world. If global trade is to flow more smoothly, it must be ensured that Ukrainian ports are open to international shipping and that collaboration among transport stakeholders continues to provide services. Alternative ways of transport must also be pursued. And investment in transport and trade facilitation should be fostered as well as support for the most vulnerable economies (UNCTAD 2022).

The war in the Black Sea had also prevented Russia from exporting its own grain, whether grown by Russians or stolen from Ukraine. But Russia is also the world's biggest producer of fertiliser and had also been hit by western sanctions, so had something to gain from what the UN Secretary-General called a 'package deal'. Since the war, the price of fertilizer on the global market has doubled, in turn driving up the cost of crops. (Besheer 2022, Voanews 2022)

Russia, Ukraine, Turkey, and the Secretary General of the United Nations. signed the deal on 22 July 2022 in Istanbul. The aim was to resume Ukraine's Black Sea grain exports and facilitate Russian grain and fertilizer shipments. Russia's defence minister, Sergei Shoigu, and Ukraine's infrastructure minister, Oleksandr Kubrakov, took turns at the table signing the deal, known as the Black Sea Initiative. It was also signed by Turkey's defence minister and the U.N. secretary-general, Antonio Guterres as Turkish President Recep Tayyip Erdogan looked on (Besheer 2022, voanews 2022). Just before the public signing of the grain deal, the U.N. chief and the Russian defence minister privately signed a memorandum of understanding to address the disruptions to the trade of Russian food and fertilizer.

The Black Sea Initiative did not represent an armistice or ceasefire. Within 24 hours of its signature, Russian missiles crashed into Odesa, supposedly aimed at 'military targets' (*The Week* 2022(2)). As I write, it remains to be seen whether the initiative can be made to work. The Russian Foreign Minister Sergey Lavrov meanwhile embarked on a tour of Africa, visiting Egypt, the Republic of Congo (Congo-Brazzaville), Uganda and Ethiopia to blame the shortage of grain and high food prices on the western sanctions. Before the war, Russia and Ukraine supplied more than 40 per cent of Africa's wheat.

Under the package deal, Ukraine will continue as it did before the war to handle the internal logistics of getting its grain from its fields and silos to the ports. Ukraine has mined its territorial waters, and under the deal, it will help guide commercial cargo ships carrying its grain through 'safe corridors,' which, a U.N. official said, is a faster solution than the months it could take to completely sweep the waters. The official said cargo ships will be inspected as they enter Ukrainian ports to be sure they are not bringing in any weapons shipments, as well as when they exit, by teams of Ukrainian, Russian and Turkish monitors, who will be part of an Istanbul-based Joint Coordination Centre.

Turkey plays an important role in the operation, as the ships will pass from the Black Sea out through the Bosphorus. The presence of Turkish monitors in the neutral city of Istanbul could, in the longer term, facilitate some sort of agreement between the Russian and Ukrainian Governments which, at the time of writing, stand poles apart.

Both parties pledged not to attack any ships that have been identified as sailing under the deal through the safe corridors. The U.N. official said if there were an incident, it would fall to the Joint Coordination Center (JCC) to resolve it. The official said the JCC would be the 'heartbeat' of the operation. The package deal helps Russia overcome obstacles to the sale of its fertilizer and food products. While U.S. and European sanctions on Moscow do not include those exports, the private sector has been hesitant to work with the Russians, fearful of running afoul of the sanctions.

The U.N. has now set up a team to follow up and coordinate with countries and the private sector. 'This task team will be focused on addressing the disruptions to the food and fertilizer trade largely due to the de-risking and over the compliance of the private sector, particularly in the sectors of finance, insurance and logistics,' U.N. Spokesman Farhan Haq told reporters. He said this effort was fully coordinated with the grain initiative.

'A deal that allows the grain to leave Black Sea ports is nothing short of life-saving for people across the world who are struggling to feed their families,' said International Committee of the Red Cross Director-General Robert Mardini, but he noted that efforts must continue to tame rocketing food prices in places like Sudan where they have risen by 187 per cent – nearly three times -in the first half of 2022 (Besheer 2022).

The first ship to leave Odesa under the Initiative, Sierra Leone flagged *Razoni* carrying 26,000 tonnes of grain, left Odesa on 1 August. Unfortunately, when it eventually reached its destination in Lebanon, the person who had ordered the grain refused to accept it, saying that it had taken too long.

The grain had been inspected en route so it should still have been usable. So the ship eventually ended up in the port of Tartus in Syria. That was very ironic as Tartus is now Russia's principal Mediterranean base! (BBC 2022)

However, the second ship, the Lebanese-flagged, UN-chartered *Brave Commander*, carrying 23,000 tonnes of wheat, left the port of Pivdennyi, near Yuzhne, on 16

Figure 16. *Brave Commander* arrives in Djibouti, Source: https://www.voanews.com/a/first-ship- carrying-Ukrainian-grain-to-Africa-since-beginning-of-conflict-arrives-in-Djibouti-/6722878.html

swiftly and efficiently unloaded and put in sacks to be loaded onto trucks to be taken to Ethiopia., the first wheat cargo bound for hungry and cash-strapped Africa (Reuters August 2022). Although trucks were used on this occasion, the grain could in future be transported by the new railway to Ethiopia built as part of the Chinese global 'Belt and Road' initiative. That is an interesting reminder of how, though vast, in one way, yet small, in another, the world of maritime trade, development and security.

Any expansion or acceleration of the programme to get more grain out of Ukraine by ship will depend on clearing more mines, rather than just using the known safe corridors. On 26 August 2022, the Royal Navy announced that it was to train Ukrainian sailors to operate autonomous vehicles to search for mines on the seabed. As Figure 15A shows the sea immediately off Odesa and other ports are relatively shallow – less than 50 metres – so the autonomous underwater drones which are effective down to 100 metres can find mines. Alongside their comrades from the US Navy, experts from the Diving and Threat Exploitation Group are teaching Ukrainians how to operate the devices, which search large areas of seabed for mines and unexploded ordnance without putting the operators in harm's way.

The UK is giving six of the underwater drones to Ukraine and training its personnel here in Britain to use them so they can clear their coastline of mines when they return to their homeland. It is also training Ukrainians to operate Sandown class Mine Countermeasures Vessels (MCMVs). The lightweight autonomous vehicle is designed for use in shallow coastal environments, operating effectively at depths of

up to 100 metres to detect, locate and identify mines using an array of sensors, so the Ukrainian Navy can destroy them (Royal Navy 2022).

Conclusions and lessons

In the first seven months of the full-scale Russia-Ukraine war, which has been the first all-out European war since 1945, the Black Sea and the Sea of Azov have been the principal, and so far the only, maritime theatre, although the attacks on the Nordstream 1 and Nordstream 2 pipelines in the Baltic on 26 September 2022 arguably mark an extension of non-linear warfare – attacks on energy security – to that sea also. Loss of pressure in both pipelines was reported on 26 September (BBC 2022 2,). It is clear that underwater explosions were responsible, although initiated by whom, and why, is unclear at the time of going to press.

Returning to the Black Sea and the kinetic warfare underway there, the loss of the Russian Black Sea fleet flagship *Moskva* on 13-14 April and the recapture of Snake Island on 30 June underline the vulnerability of blue-water warships to land-based missiles and even guns. Naval forces operating close to the littoral - and 'close' now means at least 300 km, or 160 nm – the range of a Neptune missile – are very vulnerable. Littoral warships, with layers of air defence systems able to scan 360 degrees, and maybe even armour, maybe the way ahead. Islands cannot be sunk, however, and the disproportionate importance of Snake Island in enabling the Russians to substitute for *Moskva*'s air defence dome after she was lost, is also noteworthy, as is the potency of Ukrainian-operated systems firing from the adjacent shore, including US and French systems which, sensibly, were deployed close to their point of entry into Ukraine. The importance of drones in reconnaissance, deception and striking has been emphasized by the extraordinary success of the Bayraktar TB2s widely used by Ukraine. Having taken in the vulnerability of their surface ships, the Russians resorted to using submarines - the excellent, very quiet Kilo-class conventional subs, to launch long-range and extremely accurate cruise missiles – *Kalibrs* - at land targets far from the sea. The interruption to the grain supply from Ukraine – the 'breadbasket of the world seems not to have been foreseen in the west, but it has emerged as another tool of the Russian non-linear warfare toolbox. And Information Warfare and Cyber-Warfare have been especially prominent.

The vulnerability of surface ships to shore-based fire echoes the views of Admiral Sir Jackie Fisher going back 120 years. In his *Records,* published in 1919, he relates his views on 'submersibles' going back to 1903. He related that as early as 1907 he had told the King (Edward VII) that 'The Submarine will be the Battleship of the future!' (Fisher 1919: 180) He was right.

Although the media focus since 2014 has been on land operations, one key question arising from the analysis above is whether the Black Sea Fleet has performed better and more professionally that the Russian Army during the war. There has been widespread analysis and surprise at how badly the Russian Army has performed but very little, apart from Sutton's (cited above) about the Navy. Sutton noted that the Russian Navy was sent packing by a much small country which hardly had a navy. In this author's view, the verdict is mixed. The Russian Navy's ability to launch missiles from its surface and submarine vessels against cities – and civilian targets - proved highly effective. The sinking of the flagship *Moskva* and the evacuation of submarines from Sevastopol were ignominious for the Black Sea Fleet and its commander at the outset, Osipov, was fired, unsurprisingly. Both these events were the results of missiles fired from land. In the case of the Kilo-class submarines fleeing Sevastopol, missile strikes on their base and neighbouring ammunition dumps were critical. As noted above, 'blue water' navies, especially surface ships, and the ports in which they are based, are now very vulnerable to attack from land. Unlike ships and submarines, land cannot be sunk.

It is not the author's place to suggest how the warring sides might resolve their differences. At the time of writing their aims and objectives are utterly irreconcilable. Ukraine wants Crimea and the eastern

provinces of Donetsk and Luhansk (and now Zaporizhzhya and Kherson) back. Russia will not agree to that. A Ukrainian offensive to take back the port city of Kherson and push the Russians back from another territory they have occupied in southern Ukraine might create a Line of Contact (LOC) that could form the basis for negotiations. However, at the end of September, Russian occupying forces conducted four referendums, widely condemned as 'sham', in the four *oblasti* of Luhansk, Donetsk, Zaporizhzhya and Kherson. It is estimated that no more than about two per cent of the populations of those regions voted to be annexed by Russia and in many cases that may have been at gunpoint. However, that allows Putin to make the fantastical claim that any Ukrainian counteroffensives to recover territory there are attacks on Mother Russia itself.

There are many areas around the world where sovereignty and de facto governance are contradictory. Kashmir, contested between India and Pakistan, and also areas contested between India and China, are obvious examples. So is the case of the Baltic states, occupied by the Soviet Union in 1940, which the US never officially recognised as part of the USSR. This analysis of the first seven months of the war in and around the Black Sea has constantly harked back to history. Russia took Crimea from Turkey in 1783. In the first seven months of this war, Turkey has played an important role, supplying Ukraine with highly effective Bayraktar TB2 drones, and brokering the Black Sea Initiative on 22 July. A strong Nato country, with a strong man in charge whom Putin probably respects, Turkey could perhaps play a role in brokering peace.

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