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REBUILDING THE UKRAINIAN NAVY

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The Russian Federation's rapid and illegal annexation of Crimea in 2014 has had a profoundly negative effect on the Ukrainian navy. The service lost access to a third of its Black Sea coastline, control of the Kerch Strait, and access to the defense industries located in Crimea.[1] It lost the majority of its service personnel and access to its military and maritime infrastructure and ports in Crimea. The Ukrainian navy also lost two-thirds of its warships, including its most modern platforms. Despite Russia's slow return of some of Ukraine's maritime platforms, the Russian seizure of many of Ukraine's major warships and naval aviation and air assets has dealt a serious blow to the already small Ukrainian navy. Andri Ryzenko, a former deputy head of the Ukrainian navy, has described the fleet as an "operational shadow of its former self" in urgent need of modernization and rebuilding.[2]

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In light of these severe losses and the realization of the important role maritime forces can play in the war in the east and in protecting Ukraine's interests in its exclusive economic zone (EEZ), there is a growing recognition within the Ukrainian government of the need to rebuild the Ukrainian navy. Ukraine's president, Petro Poroshenko, has announced ambitious plans to "revive" the Ukrainian navy, stating that in the future it would be equipped with state-of-the-art precision weapons.

This article examines the Ukrainian government's attempts to rebuild the Ukrainian navy and argues that, while Ukraine faces political,

conceptual, and financial challenges in reviving its maritime power, it has made some modest progress toward building a "mosquito fleet." This fleet has been bolstered by the addition of some small, new ships and the increasing professionalization of Ukraine's naval personnel, in particular its marines. This progress suggests that Ukraine can go in a radically different direction as it redevelops its navy: toward coastal defense.

To make this argument, this article proceeds in three sections. The first examines why maritime power is important to Ukraine. It argues that Ukraine's commercial and economic interests already have been affected adversely by the lack of a navy. The war in the east has revealed the vulnerability of Ukraine's coastline, and Russia's seizure of maritime infrastructure and its attempts to exploit energy reserves in Ukraine's territorial waters have reinforced the urgent requirement to rebuild the fleet. The second section explores the range of difficulties Ukraine faces in rebuilding its navy. These factors include the impact of the Russian annexation of Crimea, the lack of a coherent and realistic concept for the navy, and domestic challenges. The final section evaluates the progress made so far in building a small, coastal-defense navy.

The rebuilding of the Ukrainian navy merits further analysis for several reasons. First, it illustrates the often intrinsic link between land and maritime power: for Ukraine's navy, the loss of Crimea has been equivalent to, or even worse than, a defeat in a fleet action. It demonstrates the problems of "rebuilding in contact," in which medium- to long-term maritime interests may have to be mortgaged to address short-term military needs in the east. Finally, it demonstrates the problems of generating maritime capabilities in a weak-state context in which economic challenges and political instability interfere with the ability to establish and implement effective maritime policy and strategy.

UKRAINE AS A MARITIME STATE

Long land borders and proximity to Russia have given the Ukrainian state a continental focus, but Ukraine also has important maritime interests. President Poroshenko has stated unequivocally that Ukraine, was, is, and will remain a maritime state. Some of its maritime interests are economic in nature, but others are military strategic. In June 2015, the then deputy head of the Ukrainian navy, Andri Ryzenko, pointed out that Ukraine's prosperity, its economy, and the potential growth of tax revenues depend on realization of the country's maritime potential. A quarter of Ukraine's gross domestic product (GDP) is generated by the five regions with access to the sea.[3] Ukraine's maritime ports and maritime infrastructure in the Black Sea are important national strategic facilities. Before the annexation, Ukraine had twenty commercial seaports; eighteen of these were state owned, and together they contributed more than 1.55 billion Ukrainian

hryvnia (UAH) (approximately U.S.$55 million) to the Ukrainian state budget.[4] While Ukraine has lost access to five of its ports located in Crimea, it retains four important commercial ports in Odessa, Chornomorsk, and Yuzhny, located on the northwestern coast of the Black Sea, and Mariupol' in the Sea of Azov.[5] Taken together, these ports account for almost 70 percent of the total commercial cargo into Ukraine. In a sign of their significance to the Ukrainian economy, Ukraine increased its container turnover by almost 6 percent in the first quarter of 2016.[6] Further demonstrating the economic importance of these ports, Cargill, an American global corporation, announced in early 2016 that one hundred million dollars had been invested to build a grain terminal in Yuzhny.[7]

Ukraine's ports also matter because Ukraine has an export-oriented economy; it is a major exporter of machinery, grain, coal, steel, and fertilizers, which are shipped out through its ports. Indeed, these are of growing importance, and from 2015 to 2016 Ukraine increased its export volume by 12 percent.[8] Mariupol', for example, is the busiest commercial maritime hub on the Sea of Azov, and before the Russian annexation of Crimea it produced almost a third of the Donets region's total industrial output, including over 70 percent of the region's steel production.[9] Considering these important maritime economic and commercial interests, rebuilding the Ukrainian navy clearly is necessary to protect Ukraine's national interests.

Ukraine's maritime interests are also military in nature, and the ongoing conflict in eastern Ukraine against separatist and Russian forces has only sharpened them. This protracted conflict and the vulnerability of the strategically important city of Mariupol' also have created incentives to rebuild the Ukrainian navy. Mariupol' constitutes a key battleground—the front line and a decisive point in the ongoing conflict. For the separatists, Mariupol' represents an important strategic prize: taking it would give them control of the two hundred miles of coastline running from Donetsk to Crimea, effectively halving Ukraine's Sea of Azov and Black Sea coastlines. The seizure of Mariupol' also would represent a symbolic coup for the separatists, as President Poroshenko named the city Ukraine's provisional capital of the Donets region in 2014. Importantly, the capture of Mariupol' also could provide a land corridor from Russia to the Crimean Peninsula.

Although Ukrainian forces have secured control of the city, Mariupol' remains contested, and Ukrainian positions in the surrounding area are under almost-constant attack. After separatists seized its administrative buildings in the spring of 2014, the city was brought back under Ukrainian control in June 2014.[10] In August 2014, the rebels launched another offensive to take Mariupol'; it was halted by the signing of the Minsk Agreement. However, in a sign of the importance of this port to the separatists, Mariupol' was shelled again in January 2015, killing

thirty people and injuring eighty-three others.[11] This protracted battle for Mariupol' is far from over. In August 2016, one Ukrainian soldier was killed and five were wounded after the separatists launched an intense artillery barrage near Mariupol'. Shyrokyne, a seaside village just east of Mariupol', was attacked sixteen times by Russian-backed separatists, nine of those times with heavy weaponry.[12] A month later there were reports from Ukraine's Anti-Terrorist Operations Headquarters that rebels again had fired on Ukrainian positions near Mariupol'.[13] The constant attacks around Mariupol' clearly demonstrate a very real and ongoing threat from the separatists to Ukraine's maritime interests and security.

More widely, Ukraine faces a growing threat from Russia's maritime capabilities. Ukraine's military doctrine identifies the Russian Federation as a direct threat to Ukraine.[14] This threat encompasses not just support to Ukrainian separatists but a more general military buildup. For example, since the annexation, estimates suggest that Moscow has spent almost $750 million upgrading its forces in Crimea, and essentially has "turned the peninsula into an iron fortress capable not just of defending itself, but also of delivering missile strikes on ground targets in central and southern Ukraine."[15] In the early months after the annexation, Russia moved quickly to develop a fully capable air-defense system and deployed mobile, long-range, antiship systems. These, together with similar systems installed on the coast of Krasnodar, give Russia the ability to strike surface targets from its ground-based locations across about a third of the Black Sea.[16] As part of the more recent military buildup, the Russian navy will deploy batteries of Buk missiles in Crimea, which, along with the S-300 and S-400 missile systems already stationed in Crimea, effectively will secure (Russian) airspace over the peninsula and the Black Sea.[17]

Russia almost has doubled the number of service personnel in Crimea, creating seven new military formations and eight military units in addition to those available to the Black Sea Fleet.[18] Russia also has increased the number of tanks and combat armored vehicles in Crimea by a factor of almost seven, artillery systems are 7.2 times more numerous than before the annexation, and the numbers of helicopters and submarines also have doubled.[19] Russia has replaced the aviation component of the Black Sea Fleet, landing its first fourteen multirole Sukhoi Su-27SM and Su-30 fighters at Belbek Airport in Crimea.[20] Advanced Russian missile systems deployed to Crimea include batteries of Pantsir-S1 combined surface-to-air (SAM) antiartillery systems, capable of engaging both airborne and land-based lightly armored targets, as well as conducting fire on military and industrial targets. Russian Bastion antiship missile systems also have been deployed along the Crimean coast; these can engage both surface ships of different classes and land-based targets. Lastly, Russia has deployed the Bal coastal missile system from the Caspian to control its territorial waters, and the air-defense

troops stationed in Crimea also received S-300PMU SAM systems.[21] Commenting on the upgrading and renewal of Russian capabilities in Crimea, NATO's then supreme allied commander Europe General Philip M. Breedlove, USAF, stated in early 2015 that the new weapons systems have made Crimea "a great platform for power projection in this area."[22]

Russia has ambitious plans to strengthen the Russian armed forces in Crimea further over the period 2020–25, to include increasing service personnel, armaments, air assets, and missile systems, as well as the size, power-projection capabilities, and antiaccess/area-denial ability of the Black Sea Fleet.[23] The Black Sea Fleet will be augmented with up to six new frigates, two new missile corvettes, and six Kilo-class diesel-powered submarines.[24]

The emergence of a separatist micronavy complicates further the traditional Russian naval threat. There is increasing evidence to suggest that the separatists are building their own maritime capabilities, including cutters armed with large-caliber weapons.[25] A report by a pro-Russian newspaper in May 2015 claimed that the rebels had set up an Azov Flotilla, with a maritime Spetsnaz element, in the Donetsk People's Republic.[26] This development by the separatists—of a small, highly mobile fleet equipped with antitank guided missiles, automatic grenade launchers, and machine guns, able to carry out attacks on Ukrainian shipping and ports or to land forces and conduct raids or sabotage missions—is clearly a serious threat to Ukraine's coastline and the country's ability to protect its maritime domain.[27] In August 2016, there also were reports that the separatists had practiced carrying out and defending against an amphibious landing.[28] A video of the landing posted online shows soldiers coming ashore in several dozen small speedboats and BTR-80 amphibious armored personnel carriers.[29] Although the reach of this potential amphibious force currently is limited by a lack of landing ships, local media reports claimed that the separatists had demonstrated a high level of combat readiness in both defensive and offensive coastal operations.[30] In a sign of the seriousness of this threat, the Ukrainian Defense Ministry announced that Ukrainian marines, coastal artillery, and other naval detachments were taking part in antiterrorist operations to prepare to "deter an armed aggression from the sea."[31]

Ukraine clearly faces many challenges to its maritime interests. In meeting these threats, Ukraine's government has attached significant importance—at least in theory—to the rebuilding of the Ukrainian navy. In rebuilding its navy, Ukraine could be assessed as having a number of advantages over other states attempting to develop their maritime capabilities. For example, Ukraine has a clear threat against which to frame its maritime policies and capabilities; the war in the east has removed some of the domestic barriers to increased defense spending; and the loss of so much naval equipment might reduce the physical

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and intellectual constraints that legacy systems impose. In practice, however, Ukrainian naval regeneration has been impeded by a number of key difficulties.

THE CHALLENGES TO UKRAINIAN MARITIME REGENERATION

One clear challenge facing those rebuilding Ukraine's navy is the losses suffered at the hands of Russia. The key losses that impinge on the future development of the Ukrainian navy were of the maritime infrastructure and ports in Crimea. The loss of these facilities has had a devastating effect on the Ukrainian navy—as noted, equivalent to a major defeat at sea. The Ukrainian navy lost its headquarters in the Black Sea and much of the service's signals-intelligence, training, administration, maintenance, and logistics infrastructure, including its ammunition storage facility in Inkerman Valley.[32]

As a result, the truncated Ukrainian navy has been relocated to Odessa, which, as a commercial rather than a military port, lacks the maritime infrastructure necessary to support and maintain the fleet effectively. Compared with Sevastopol's waters, the sea near Odessa is shallow, which creates practical challenges if Ukraine is to realize its plans to build an underwater capability to deter a potential enemy. Considerable investment will be required to turn Odessa into an effective maritime base for the fleet, and the Ukrainian government has been slow to develop maritime infrastructure there. In April 2016, more than two years after the loss of Crimea, the Ukrainian Defense Ministry finally announced plans to begin construction of a modern maritime base in Odessa for the Ukrainian navy.[33] Three months later, the defense minister confirmed that UAH 100 million (almost four million dollars) had been allocated to construct the navy headquarters in Odessa.[34]

Given the challenging security environment in the east, the eventual construction of a safe and effective naval base in Odessa is likely to remain problematic, however. Not only has there been a spate of terrorist attacks, but the situation on the ground in Odessa remains difficult. In January 2016, a Ukrainian sailor prevented an attack on a naval facility in Odessa, and Ukrainian military patrols also recently foiled an attempt to plant a mine near a military checkpoint in the city.[35] There has been a series of terrorist attacks in Odessa that call into question the safety of the fleet and its service personnel.[36] A recent Jane's Sentinel Security Country Risk Assessment on threats to Ukraine states that government assets, transport infrastructure, and assets associated with progovernment troops and businessmen in Odessa are currently at risk of attack.[37]

The loss of Ukrainian naval platforms also created a serious challenge in terms of rebuilding the fleet, because those lost included a majority of the navy's most modern ships.[38] In total, the service lost eleven ships and boats, eight auxiliary vessels, and its only submarine. These vessels included three of the navy's most

modern: two corvettes, *Ternopil* and *Lutsk,* and the command ship *Slavutich.*[39] Other key losses included the landing vessel *Olshansk;* two of Ukraine's minesweepers, *Cherkasy* and *Chernihiv;* the antitorpedo boat *Kherson;* and the antisabotage boat *Feodosiya*.[40] As a result, the fleet currently operates only ten ships, with thirty-three support vessels. Reports suggest that half of these platforms need to be repaired and all are outdated, due to end their operational lives in 2018.[41] Highlighting the poor state of the current fleet, Vice Admiral Serhiy Hayduk, a former commander of the Ukrainian navy, stated in January 2016 that the fleet had "lost its fighting capacity."[42]

Personnel losses also posed a significant problem. When Russia annexed Crimea, about twelve thousand of the Ukrainian navy's almost sixteen thousand service personnel were based in the region, and almost 75 percent of Ukraine's maritime personnel remained in Crimea.[43] The loss of so many of the navy's experienced personnel had a damaging effect on its operational effectiveness, at least in the short term.

Another set of difficulties in regenerating the Ukrainian navy is conceptual and policy related: it has proved easier to define the threats to Ukraine's maritime interests than to determine clearly what sort of navy is needed to meet those threats. While there has been some discussion of what a revived navy actually would or should look like, many of the suggestions have been conservative in outlook, focusing on a balanced fleet and traditional roles—ignoring the high cost of and other challenges to building such capabilities. Admiral Ihor Kabanenko, a former Ukrainian deputy defense minister, has suggested that the Ukrainian navy should be a small, modern, and balanced fleet that consists of surface ships and submarines, naval aviation, naval infantry, special operations forces, and other components that can react adequately to threats from the sea. Vice Admiral Serhiy Hayduk has stated that Ukraine should revive its submarine force, purchasing between two and four subs, probably secondhand from Turkey. The naval staff also recognizes the need to purchase new minesweepers.[44]

A paper written by former deputy navy chief Ryzenko provides the most comprehensive outline of the naval staff's vision of what a future Ukrainian navy should look like. In this paper, Ryzenko examines what assets and capabilities, investment, and organizational changes the Ukrainian navy will need in the future to perform its core mission of protecting Ukraine's maritime sovereignty and national interests at sea. According to Ryzenko, the fleet's core mission will be divided into three tasks. The first of these is defending Ukraine's coastal area, including its harbors and ports; securing critical infrastructure; and countering landing operations. The second task is performing general maritime operations and wider sovereignty protection; this includes securing sea lines of communication, performing antisurface and antisubmarine warfare, and carrying out

defense diplomacy missions. The third task is conducting what Ryzenko terms offensive maritime operations; these would include destroying enemy ships at sea, controlling the air where needed, and conducting amphibious landings.[45]

Some have argued that Ukraine should implement a much more modest "mosquito fleet," or coastal-defense, navy concept. A mosquito fleet–type force aims to deny command of the sea to adversaries with larger and more powerful navies.[46] Such a fleet consists of small, fast, and relatively cheap platforms, backed up by gunboats, mines, and coastal-defense ships. The goal is to make it impossible for an enemy to approach the country's coastline.[47] Under such a plan, the Ukrainian navy would have a much smaller force, with no submarines, more-limited coastal-defense and combat-support units, and very limited air-control ability over the fleet. In effect, it would focus on performing just one of the three tasks Ryzenko laid out: the defense of Ukraine's coastal area, including its harbors and ports, securing critical infrastructure and countering landing operations. As will be discussed later, Ukraine has made some modest progress toward building both the quantitative and qualitative elements of a coastal-defense force.

A third key challenge in rebuilding the Ukrainian navy is the gap between the Ukrainian government's rhetorical commitment to such a reconstitution and its actual funding priorities. In light of the ongoing conflict in the east, the government made the decision in its defense spending to prioritize increasing the combat effectiveness of its land and air, rather than its naval, forces.[48] As a result, while Ukraine's defense budget has increased significantly, the navy's share of the overall budget has remained small.[49] Ukraine's 2016 defense budget is four times higher than 2014's, and 2017's will increase further.[50] The Ukrainian navy's budget, however, amounts to just 2 percent of the defense ministry's total budget, and only 0.5 percent of the total budget is spent on procuring weapons and military equipment for the fleet.[51] The lack of investment in the fleet, in comparison with the other two services, can be seen clearly in the so-called *White Book,* the Ukrainian Ministry of Defense's annual publication on the current state of the armed forces. For example, in 2015 the army acquired nine new weapon systems; the air force had twelve new acquisitions, including four helicopters and ten unmanned aerial vehicles; but the navy added no new weapon system or capabilities to its arsenal.[52]

At the root of all these difficulties is the parlous state of the economy, which has necessitated hard choices. The Ukrainian government still is fighting a costly war in the east, and the Ukrainian economy has been slow to recover from the crisis. In a speech at the UN summit in New York in September 2015, President Poroshenko spelled out the high economic costs of the conflict in the east: he claimed it was costing Ukraine five million dollars a day. He went on to point out that Ukraine had lost about a fifth of its economic potential with its eastern

territories.[53] Production within the Donets region has plummeted 70 percent, and estimates suggest this has cost Ukraine 7 percent of its GDP. Russia's annexation of Crimea has contributed to the loss of another 4 percent of Ukraine's GDP.[54] In addition, the flow of refugees from the region either to Russia or to other parts of Ukraine not only represents an important loss of manpower but puts additional strain on the Ukrainian economy.[55] Although there have been some positive signs that Ukraine's economy will begin to recover in 2017, structural shortcomings and domestic impediments to economic growth—such as unsustainable fiscal policies and the difficulty of attracting foreign capital—suggest that this recovery will be slow at best.[56]

Thus, even if the Ukrainian government were able to allocate a larger share of the defense budget to the navy, the capital-intensive nature of naval investment and the poor state of the Ukrainian shipbuilding industry would make it difficult to effect any quick transformation in naval capabilities. Estimates suggest that rebuilding a navy capable of performing all three of the core tasks discussed earlier —defending Ukraine's coastal and maritime area, conducting wider maritime operations, and carrying out offensive maritime operations—would require the navy's budget to increase by a factor of about twenty. To procure the necessary platforms (artillery boats, landing craft, corvettes, submarines, and auxiliary support vessels) and coastal-defense and combat-support units, as well as to invest in maritime aviation and personnel, Ukraine would need to spend about $3.6 billion over the next five years, according to Ryzenko.[57] Indicating the scale of the challenge facing the Ukrainian government, this amount constitutes significantly more than Ukraine's whole defense budget for 2016. In contrast, development of a mosquito fleet that would enable the navy to perform one core task effectively would require a more modest fourfold increase in the current naval budget.[58]

The long-term decline of the Ukrainian shipbuilding industry also has had an impact on the rebuilding of the Ukrainian navy. After the collapse of the USSR, Ukraine inherited a significant shipbuilding capacity, with plants in Kiev, Mykolayiv, Kherson, Sevastopol, Kerch, and Feodosiya. They were capable of building missile and aircraft carriers, large antisubmarine ships, heavy transport ships, boats, lighter carriers, and multipurpose icebreaking supply vessels.[59] During the last three decades, however, Ukraine's shipbuilding industry has become increasingly unprofitable and has lost much of its competitive edge in both international and domestic markets.[60] Several large enterprises are close to bankruptcy, and many of the shipyards have been operating at 15–30 percent of their production capacity.[61] As a result of these challenges, the shipbuilding industry's contribution to Ukraine's overall industrial output has dropped from 5 percent to less than 1 percent.[62] This decline in the shipbuilding industry has been caused by a number of factors, including increasing steel prices, limited credit resources, a lack of

government support, and the investor-deterrent effect of the conflict in Ukraine's east.[63] As a result of these challenges, many of Ukraine's shipbuilding enterprises have had no new orders over the last few years, have large wage arrears, and suffer an acute shortage of experts.[64]

Because of weak domestic demand for shipbuilding and a lack of government investment in the country's shipbuilding industry, Ukraine is unlikely to receive any new major warships in the imminent future.[65] Ukraine's Project 58350 corvette program not only has failed to produce a single ship but appears to have been shelved. Under plans announced in 2011, ten corvettes were to be built for the Ukrainian navy by 2026. However, construction of the Project 58350 flagship, *Volodymyr Velykyy,* had been progressing extremely slowly, and a decision was made in October 2015 to allocate funds toward upgrading the existing fleet rather than developing new platforms.[66] While the manufacturers claim that 80 percent of the hull is ready, the ship's technical readiness stands at closer to 17 percent, suggesting that even if the platform secures sufficient funding it is unlikely to be brought on line until at least 2018.[67]

Ukraine's tumultuous domestic politics further complicates all the previously discussed difficulties in building an effective navy. Despite the president's commitment to implementing wide-ranging economic reforms, they will be difficult to achieve, given the fragility of the new government coalition and endemic corruption.

In April 2016, the former prime minister Arseniy Yatsenyuk was replaced by the former speaker of the Verkhovna Rada (the Ukrainian parliament) Volodymyr Groysman. The new coalition, made up of the political parties of the president and the former prime minister, has only a very small parliamentary majority, so it relies on support from other parliamentary factions and groups. This weakening of the government majority will complicate all policy making further.[68]

Endemic corruption in Ukraine compounds all these problems. Highlighting the extent of the problem, Transparency International ranked Ukraine 143rd out of the 173 countries on its Corruption Perceptions Index, and estimates have suggested that over twelve billion dollars per year disappear from the Ukrainian budget.[69] Thomas de Waal, a senior fellow at Carnegie Europe, has argued that *corruption* is an inadequate word to describe the conditions in Ukraine; the problem is not that a well-functioning state has been corrupted, but that the "corrupt" practices themselves now constitute the "rules" by which the state is run.[70] Calling into question the ability of the government to engage in reform in the future, the worst corruption "occurs at the nexus between business oligarchs and governmental officials," where a few oligarchs control over 70 percent of

Ukraine's economy and have captured and corrupted Ukraine's political and judicial systems.[71]

BUILDING A MOSQUITO FORCE

Faced with problems in funding and procuring maritime capabilities, Ukraine has prioritized, at least in the short term, the acquisition of smaller, faster platforms, in effect building the elements of a small coastal-defense force. In November 2015, the Ukrainian navy began acquiring the fast-attack elements of a mosquito fleet when it received two Gurza-M (Project 51855)–class small armored artillery boats designed for patrolling coastal areas. Currently undergoing sea trials, each boat carries a combat module fitted with automatic cannon, a grenade launcher, a machine gun, and two antitank missile systems with laser guidance.[72] In March 2016, the Ukrainian Defense Ministry signed a contract with the state-owned Ukroboronprom Company in Kiev to provide four more of these small armored gunboats for the Ukrainian navy.[73] Two of these gunboats are likely to be Centaur armored amphibious assault ships based on the Gurza-M, but with extended functionality. They would be designed to deliver marines or special forces, and to deliver fire support to land forces under engagement in littoral and inland waters (estuaries, rivers, and water-storage basins) at distances up to one hundred miles.[74] In addition, these boats will be highly deployable and could be sent by land to Mariupol' to operate in the Sea of Azov. Each boat can fit into two trailer trucks: one truck for the hull with the weapons removed; the other for the tower, plus a container with the dismantled weapons.[75] Further augmenting Ukraine's mosquito fleet, a U.S. contractor, Willard Marine, also will supply four high-speed patrol boats to the Ukrainian navy, accompanied by on-site crew training in the design, operation, maintenance, and repair of the boats.[76]

It is interesting that the combination of a lack of government funds, consequent equipment shortages, popular engagement in the war, and the leveraging of the opportunities that new technology affords actually has facilitated the development of the fleet, in particular via some very innovative forms of equipment procurement. For example, in December 2015 the navy's flagship, the frigate *Hetman Sagaidachny,* was fitted with a modern navigation radar system financed by a charitable organization, a part of the Come Back Alive volunteer movement. The movement raised the funds through Internet crowdfunding.[77] This organization has funded similar systems for other maritime platforms.[78]

Beyond the headway it has managed in developing the physical capabilities of a mosquito fleet, Ukraine has made much more progress in developing the qualitative aspects of its maritime power.[79] In this regard, the conflict in the east has had a paradoxically positive spillover effect on the building of a coastal-defense

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navy. Training to fight and actually fighting the separatists have enhanced the professionalism of Ukraine's naval personnel, particularly its marines; this has served as a force multiplier, by improving the ability of the fleet and its personnel to operate. In a visit to Odessa in September 2015, Vice Admiral James G. Foggo III, then commander of the U.S. Sixth Fleet, commented positively on what he saw of the professionalism of the officer corps and sailors of the Ukrainian navy. In September 2014, the fleet demonstrated its commitment to developing the ability to conduct joint operations. Special units of the Ukrainian navy and Interior Ministry as well as naval aviation units practiced a joint search-and-attack training operation involving the detection and destruction of illegal armed groups in the Odessa region. In July 2015, another joint tactical training exercise took place in the Southern Bug estuary in the Mykolayiv region of Ukraine, in which the Ukrainian navy, air force, and ground forces practiced conducting an amphibious assault and an airborne landing, further enhancing their joint skills.[80]

Indeed, Ukraine's marines in essence have been rebuilt from scratch into one of the most combat-ready elements of Ukraine's naval forces. When Russia annexed Crimea, only one-third of the six-hundred-strong Feodosiya-based marine battalion opted to return to Ukraine, depriving the fleet of its most combat-ready element.[81] The marines subsequently have been reconstituted and have gained valuable combat experience fighting in eastern Ukraine. In recognition of their enhanced combat abilities, units of the marine corps were deployed to the outskirts of Mariupol' in July 2015 to bolster the city's defenses. Commenting on this deployment, Ukraine's president stated that the marines "will enhance the protection of Mariupol significantly."[82] The marines also have benefited from an increase in the number and scope of their training exercises. In 2015, the numbers of marine corps battalion and company tactical exercises increased seven- and 5.5-fold, respectively, and platoon field-firing exercises also went up fivefold over the previous year.[83] In July 2015, they also held their first brigade-level tactical training exercise, and they developed their joint skills further by practicing their ability to coordinate with air and maritime platforms to capture a shoreline and destroy enemy forces.[84] Ukrainian navy commander Hayduk claimed that by these exercises the "marine corps have [*sic*] completely renewed its battle readiness."[85] More recently, in August 2016, in response to the Russian Federation's announcement of a large naval exercise in the Black Sea, Ukraine's president announced that the country's marines and coastal artillery units also would hold a large military exercise, which would seek to heighten further the combat readiness of all naval forces, especially the marines.[86]

The fleet's active participation in multinational maritime operations also has played an important role in enhancing the combat effectiveness of its service personnel. In September 2014, just months after the annexation of Crimea, Ukraine

held its annual SEA BREEZE exercise, demonstrating its commitment to developing the professionalism of its maritime forces. As part of this cohosted multinational exercise, Ukrainian naval personnel practiced setting up and securing a maritime safety zone in a crisis area. In October 2015, Ukraine's frigate *Hetman Sagaidachny* also took part in a joint PASSEX drill with Bulgarian, Romanian, U.S., and Turkish ships in the western part of the Black Sea. Vice Admiral Hayduk claimed that this operation was a testament to the high level of cooperation between the Ukrainian and NATO navies and that multinational operations such as this allow fleet personnel to master NATO standards and enhance their interoperability.[87]

Ukraine's marines also have benefited from taking part in multinational maritime exercises. These exercises have allowed the marines to develop a number of important skills, ranging from conducting amphibious landings or tracking down an enemy submarine to protecting critical maritime infrastructure. In July 2016, over 220 U.S. and Ukrainian marines, along with other naval forces, conducted an amphibious landing during another annual SEA BREEZE exercise in Odessa. During this exercise the marines practiced establishing a safe beachhead ashore and protecting critical infrastructure. Commenting on the progress Ukrainian naval forces had made, Captain Richard Dromerhauser, USN, stated that he had witnessed the flawless execution of a very difficult and complex operation.[88] In August 2016, Ukraine's marines also practiced tracking down an enemy submarine as part of the SEA SHIELD multinational military exercise, which took place in the western part of the Black Sea off Odessa. A month later, Ukrainian marines participated in the PLATINUM LYNX 2016 exercise held in Romania. Working alongside NATO allies, they enhanced their interoperability in a combined training environment.[89] The United States also recently announced the funding of a two-week training course in Mykolayiv for noncommissioned marine corps officers to enhance further their operational and combat effectiveness.[90]

Despite the many challenges Ukraine faces in rebuilding its fleet, the government has made some modest progress in developing a mosquito force. Recent additions to the fleet include two small armored artillery boats designed for patrolling coastal areas. In 2017 the navy will be augmented further by additional small attack craft.

Ukrainian naval forces, in particular the marines, have enhanced their combat effectiveness significantly, including their ability to operate in a joint environment. By increasing their training and their participation in multinational exercises, Ukraine's marines have enhanced significantly their ability to protect Ukraine's maritime interests.

However, while increasing the operational effectiveness of its naval personnel is an important enabler in allowing the Ukrainian navy to protect the country's immediate maritime interests, it cannot substitute for, and could be compromised by, the current lack of maritime platforms. Owing to the low number of serviceable maritime platforms, the Ukrainian navy has struggled to increase the time spent training its naval personnel at sea.

Nonetheless, it is clear that, while Ukraine will continue to face some tough challenges in building a small mosquito force, Kiev is moving, albeit slowly, in the right direction. Faced with building a "navy in contact," Ukraine should be encouraged to adopt a more pragmatic—but ultimately a more radical—model for its navy of the future. Ukraine can neither afford nor sustain a balanced, blue-water maritime force. In contrast, developing an effective and efficient mosquito fleet would give Ukraine the capability to protect its EEZ and deter threats to its maritime infrastructure and coastline. The Ukrainian naval staff's ambitious plans to build a balanced force able to perform all three roles discussed in this article (protecting the EEZ, engaging in wider operations, and conducting offensive maritime operations) need to be discouraged actively. Such plans are unrealistic and unrealizable, and pursuing them will delay the construction of a more modest and achievable mosquito fleet. By continuing to invest in the development of small, highly mobile attack craft and in the enhancement of the professionalism of its naval forces, Ukraine can continue to be a maritime state, at least in the short to medium term.

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