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DILEMMAS FACED IN DEVELOPING SMALL NAVIES

Andrzej Makowski

As a result of the decolonization process that followed World War II, as well as other international events, 193 sovereign states are now members of the United Nations, most of which have access to the sea.[1] For an estimated 67 percent of those countries—whether or not they are members of a military alliance—their littoral waters are areas in which strategic, operational, and tactical maritime activities take place. When the navies of these states seek to contribute to the maintenance of a strategic balance within their respective regions, their contribution to deterrence is limited to conventional methods. These navies' main objective—usually specified in published state-security policies—is to protect national maritime sovereignty by defending the waters adjacent to their nations' coasts, using their capabilities to increase the "costs" to any aggressor coming from the sea to the point of "unprofitability."[2]

The challenge of doing so raises questions, both theoretical and practical, whether small navies can create and maintain credible maritime deterrence in relation to the navies of larger maritime powers, and how to plan their development to enable them to accomplish this. In maritime military theory, one of two assumptions usually is made. The first is that small navies are essentially the same as large fleets, merely on a smaller scale; such an approach seems valid when facing a peer opponent. The second is that they are essentially different and their development needs to be conceptualized

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differently from that of large navies. According to Jacob Børresen, "Coastal Navies should not be modelled on the navies of the Naval Powers. Instead they should be tailor-made to fit the local environment. This is because their tasks are different from that of the bluewater navies, their operating conditions are different, and their force structure is different."[3] The key word in the passage quoted above is *different;* used in relation to the development of small navies, this difference is particularly important when they face the possibility of fighting a stronger opponent.

Analysis of these assumptions indicates that, in modern geopolitical conditions, both approaches can be both right and wrong. After the end of the Cold War (1991), the general international situation suggested the validity of the thesis "Think globally, act locally," but changes in the geopolitical situation after 2014 showed the need to modify this to "Think globally, act globally"—to the extent of one's interests and capabilities, of course.[4] We also can assume that the concepts of development and functioning of navies have become universal: true for all countries, regardless of their size and geographic location, albeit with local, specific factors to be taken into account in each case—the most important of which is the potential enemy's power and capabilities.

The aim of this article is to present the fundamental problems that modern small navies must address when planning their development or transformation: first, if they merely are to "stay afloat"; second, if they are to contribute meaningfully to the security of their own countries; and third, if they are to maintain sufficient credibility and capabilities to join in multinational operations. The challenges these modern small navies face include the following: their characteristics and capabilities, their usefulness in supporting the implementation of their states' respective security policies, and their maintenance of appropriate technical and technological levels. The article also discusses the factors that determine the development of small navies, as well as the issues to be considered when deciding on the appropriate structure of their forces.

THE SMALL NAVY

In the current context, especially with regard to the dynamic development of new technologies, it is not easy to identify the characteristics that define a *small navy* or *small fleet*. The definitional problem is complicated by many navies' preference not to be described in those terms. Eric Grove produced a ninefold naval typology that focuses on a combination of numbers, ranges, roles, and overall capabilities, and suggested that navies in ranks four down to nine generally could be termed *small*.[5] Geoffrey Till identifies *small navies* as having "limited means and aspirations," which means that in Europe only the British, French, and Russian navies are *not* small.[6] However, one can argue the case for the navies of Germany, Italy, and

Spain, which do possess a significant range and scale of capabilities and ambitions. This article will consider all European navies other than these six to be small.

Being *small* in terms of numbers or capabilities does not necessarily mean that a navy cannot be *powerful* relative to its national maritime strategic aspirations.[7] To this point in maritime history, the practical potential of each navy has depended primarily on the following:

- The finances of the country
- The quality of its central administration
- The quality and quantity of its maritime resources
- The number of ships, sailors, and officers
- The maritime infrastructure
- The quality of political decisions, including those concerning the navy[8]

In addition, the importance of the capabilities wielded by a given navy may be heightened by the country's geographic location (e.g., near straits of international significance) or the natural resources present in the accessible maritime area. However, analysts tend to focus their assessments on a navy's combat capabilities, which provide the basis for its overall operational capabilities.

There are many other categorizing systems that attempt to place navies within a hierarchy defined by ship types, tonnage, armament, equipment, effective ranges of weapon systems, and the like, but no single system has been accepted widely.[9] The inadequacy of these previous attempts leads to a conclusion that, for practical purposes, navies at most can be divided into small, medium, and large categories, with superpowers considered a subset of the large category.[10]

The Distinctive Features of Small Navies

This simplified classification system can be used to formulate and focus on the several general problems that apply to smaller navies. One of the most serious is a limited availability of resources to support their development, which tends to make them dependent (sometimes very much so) on foreign suppliers, who may prove reluctant or unable to provide assistance at a critical moment. Another phenomenon concerns acquired weapon systems, equipment, and devices that may not come with full software, an appropriate user-training cycle, spare parts, or doctrine for their effective use. A factor that further aggravates this problem is that different equipment may be acquired from a large number of sources, which works against standardization and rationalization, thereby incurring higher costs for logistic support. The obvious net impact of these developmental factors is pressure on the operations budgets of these navies, which impedes effective individual and collective training.

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One solution is direct cooperation between small and medium-size countries on the one hand and arms-producing companies on the other hand to pursue collaborative procurement and maintenance projects. Alternatively, the governments of arms-producing states can involve themselves, controlling and directing the purchase of equipment and weapon systems—likely granting preferential consideration and greater access to navies whose countries belong to favored international organizations and military alliances.

Capabilities of Small Navies

Small navies usually face a very difficult dilemma regarding their structure. They must decide whether to focus on building a "sustainable fleet" whose individual elements support one another while maximizing its operational range, or to move toward a "specialized fleet" that focuses on one type of mission.[11] Risks can be found on both paths. A "balanced navy" that depends on maintaining a narrow quantitative margin in its individual components may be of little use if one of them fails. However, as Børresen warns, opting for a "specialist fleet" usually entails a dangerous loss of choices, and therefore freedom.[12]

Regardless of the choice made, the "strength of the navy" of a small or medium-size country should be "measured" by comparing it with other navies. At the same time, any measure of its utility should indicate the degree to which it plays an important role in implementing the policies of the country and has the appropriate capabilities to support them. This raises the issue of *credibility:* whether both allies and potential enemies assess small navies' capabilities as enabling them to take the actions assigned by the role chosen (of the two discussed above) and the resultant doctrine. A related problem is the imbalance of potentials and capabilities of large and small navies when groups of allied ships assemble on a given body of water.[13]

Naval wars waged by smaller navies rarely attract the attention they deserve, remaining overshadowed by operations conducted by large navies. On the other hand, those studies that are conducted on this topic illustrate that such conflicts are in fact similar in nature to wars between larger naval powers, simply on a smaller scale. All such conflicts are characterized by a struggle for control/command of the sea, which can be achieved through engagement in a series of naval battles; the use of blockades; a projection of forces onto land through transport of troops by sea, followed by landing operations; missions carried out by special-operations forces; and support provided to land forces from the sea.[14] The similarities of the two models become more evident when large naval forces are tasked to carry out operations characteristic of small forces (e.g., limited wars). When planning allied operations, the navies of large naval powers (i.e., those with ships of high displacement) often are required to be prepared to employ the "skills" typical of smaller navies. For example, during the Cold War the North

Atlantic Treaty Organization (NATO) planned to use the navies of Norway, Denmark, and the Federal Republic of Germany to fight for and maintain control over the Scandinavian fjords and entry into the Baltic Sea.[15] We can assume that even now that paradigm remains relevant.

The fundamental difference between large and small fleets becomes clear when they confront one another directly. The weaker party usually will attempt to apply an asymmetric strategy appropriate to its structure and naval capabilities, which may involve skillfully taking advantage of local geographic and physical conditions. Experience has shown that the credibility of such a strategy depends primarily on membership of the smaller navy's state in a stable military alliance. Another reinforcement for a weaker navy is incorporating modern technologies (e.g., antiship missiles and small, fast naval platforms) that can compensate to some extent for the overall imbalance in capabilities.

However, the armed conflict in the Persian Gulf at the turn from the twentieth to the twenty-first century showed that such solutions cannot guarantee the survival, or even maintenance of the operational capabilities, of small maritime forces. On the other hand, in that same conflict, the use of sea mines (of diverse types and categories, deployed on a massive scale) posed a constant threat to large navies. Other challenges included unconventional actions, such as the possibility of Iraq releasing oil into the sea and igniting it and the maritime guerrilla warfare carried out by Iran's Islamic Revolutionary Guard Corps (e.g., scattered attacks carried out by Boghammar fast boats).[16]

An option for small navies is to employ conventional submarines (designated SSKs)—along with other means—to establish a defensive zone across the approaches to their countries' coasts (e.g., Singapore) or near enemy naval bases or their approaches. Yet while this concept may be valid theoretically, it has not been tested in practice since the end of World War II. When a large navy achieves sea control, the smaller one at most may win single successes (albeit sometimes spectacular ones) without ever having a realistic chance of changing the final outcome.[17]

Today, smaller navies may place their hopes for a solution to this problem in the development of cheaper-to-produce unmanned systems and their use in large numbers to perform reconnaissance tasks, including the identification of suitable targets for kinetic actions (e.g., employing combat drones or loitering munitions, or in the future perhaps swarms of specialized killer drones). However, such a solution requires an advanced command-and-control (C2) system, a network-centric environment, and a maritime situational awareness system, all of which require substantial financial outlays and may require a navy to build a *hybrid* structure.[18] Perhaps in the future such an approach—combined with operations in cyberspace and the use of special-operations forces—will diminish, to some

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extent, the difference in capabilities between large and small navies. However, for now this remains only a hypothesis. In the meantime, the proven methods of operation practiced by large navies remain fairly effective.

It is worth noting that in most cases today small navies must be prepared to cooperate jointly with land and air forces in a multidomain operational environment, with all branches contributing to a common strategic plan, which further emphasizes the need for them to operate in a common network-centric environment. This is of particular importance to the planning process for developing the different branches of a country's armed forces and their particular capabilities (e.g., inverse synthetic-aperture radar [i.e., ISAR]; command, control, communications, computers, and intelligence [i.e., C4I]; and cyber), as well as their ability to participate in and contribute to joint and combined operations, with maritime problems receiving appropriate consideration.

What might be the result of a confrontation between a small navy and a stronger opponent? Two assumptions must apply. First, the superiority of the stronger navy does not mean that the weaker party can take no actions. The actions of the latter might involve "classic" or completely innovative methods (i.e., either consistent with the accepted theories and principles of maritime warfare or undermining them). Second, the result of any direct confrontation that takes the form of high-intensity conflict almost certainly would be negative for the weaker navy. Why would a small navy undertake such a struggle, given the disparity in capabilities? The objective it seeks might not be so much to "win" the conflict by engaging in a set battle at sea but to diminish the opponent's will to continue and to exert influence over the course of events. The weaker force will be able to shape events comprehensively only rarely, but it may raise the costs of confrontation substantially. This may force the state wielding the larger navy to rethink the total costs of the campaign in relation to the expected gains. This line of thinking is not unusual; a good example can be found in the field of antisubmarine warfare, in which the objective may be merely to dissuade a submarine from attacking at all rather than to destroy it, which is much more difficult.

What level of effectiveness can a weaker navy achieve against a stronger opponent? The theoretical solution to this question involves adopting the concept of the *critical point indicator.* The "costs" of doing nothing can be high—for example, suffering incursions into one's maritime zones. However, the costs of conducting maritime operations sufficient to prevent such offenses also may be high. How high does a given country want to set the levels it is willing to pay? The aim should be to build the highest risk barrier it can afford financially.[19]

If building the force necessary to establish such a barrier were deemed to be impossible for some reason, the state instead might create a capability sufficient

to achieve a limited degree of sea denial. However, achieving this objective likely will require creating forces that are sufficiently technologically advanced to survive a fight against the most-capable adversaries. Such weapons, systems, and capabilities are very expensive yet must be maintained at the necessary quantitative level as well, as they would have to constitute a fundamental component of a sustainable navy of this type.

For small navies, membership in military alliances, or negotiation of and participation in similar confidence-building and security measures, may prove to be more effective and to offer a better chance of success in opposing aggression by a stronger maritime state than the measures just discussed. The reality is that what may constitute a struggle for survival for a small navy and its country may qualify as merely a limited maritime conflict for a major maritime power.

Usefulness of Small Navies

The importance and impact of a small navy depend strongly on the diplomatic strategies of its state; the service's overt military potential has less impact. Even its symbolic participation in the naval activities of a formal alliance (or just an ad hoc coalition) may bring disproportionate positive effects. These may be in relation to internal policy (e.g., national pride), or the security policy of the state (e.g., its impact within its region), or both. The relationship with a reliable ally or alliance secures the various interests of the weaker party (often its national interest writ large) while gaining full legitimacy for its operations within a given body of water (especially high-sea areas). Through its participation, the weaker party displays its overt influence on the actions of its allies, in comparison with the opponent—exactly what is consistent with its interest. The participation of ships of a weaker country, even in small naval operations in peacetime (including their inclusion in standing forces), is a kind of public reminder and demonstration of their continued existence and serves as a representation of their state's basic interests. (However, in a situation in which the actions of such a navy only make a dispute between two more-powerful adversaries multilateral, with no discernible benefits accruing to the small navy, such steps are not advisable.)

The principle discussed above works both ways. The stronger party also benefits from its alliance with the weaker one, as the latter can provide capabilities the former does not possess in sufficient quantity or quality (e.g., littoral-combat capabilities). The existence and activities of such a multilateral alliance also can be a way to demonstrate a lack of intent by any particular state to impose hegemony over a body of water. In addition, in some political and military situations, maritime diplomacy may be more effective when carried out by ships of smaller navies than by ships of large maritime powers; fulfilling this role is not reserved for the strongest. As one analyst has pointed out, "Medium-sized warships are probably a perfect compromise in a diplomatic role. They have a deck

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large enough for official functions, a range sufficient to reach an enemy country, weapons visible enough to make the appropriate impression, and are affordable for developing countries."[20]

This type of maritime cooperation or collaboration is particularly desirable and fruitful in times of peace, when the primary mission of navies is to maintain legal order and peace at sea—a function related directly to compliance with the provisions of the United Nations Convention on the Law of the Sea (UNCLOS), which entered into force in 1994.[21] Its provisions cover delimitation of sea boundaries, exploitation of marine resources, safety of navigation, protection of the marine environment, settlement of disputes, and the conduct of maritime scientific research. UNCLOS has influenced significantly the development of small navies—for instance, by providing solutions to such existing problems as a two-hundred-mile exclusive economic zone (EEZ) and recognition of archipelagic waters. However, the ensuing process of individual states attempting to delimit their shared sea boundaries has led to the rise of so-called disputed areas (e.g., in the South China Sea and Aegean Sea), as well as to coastal states attempting to impose additional restrictions, such as over normal military activities conducted in their EEZs (e.g., India, Maldives, Malaysia, and Brazil).[22] One of the essential provisions of the convention is the exercise of universal jurisdiction on the high seas by warships and ships in state service in accordance with article 110, paragraph 1 (i.e., the right of visit).

Today, many of the world's bodies of water are characterized by increased political and military tension (e.g., the Indian Ocean, western Pacific, eastern Mediterranean, and Persian Gulf), yet maintaining peace there is vital to the functioning of global supply chains, and therefore to the effective functioning of national economies and the world economy. As awareness grows of the importance of the seas to the modern world, it is important to realize and remember that both large (including superpower) and smaller navies have unique capabilities to perform as global police forces—a function whose performance can be highly desirable, whether in local conflicts or larger crisis situations.[23]

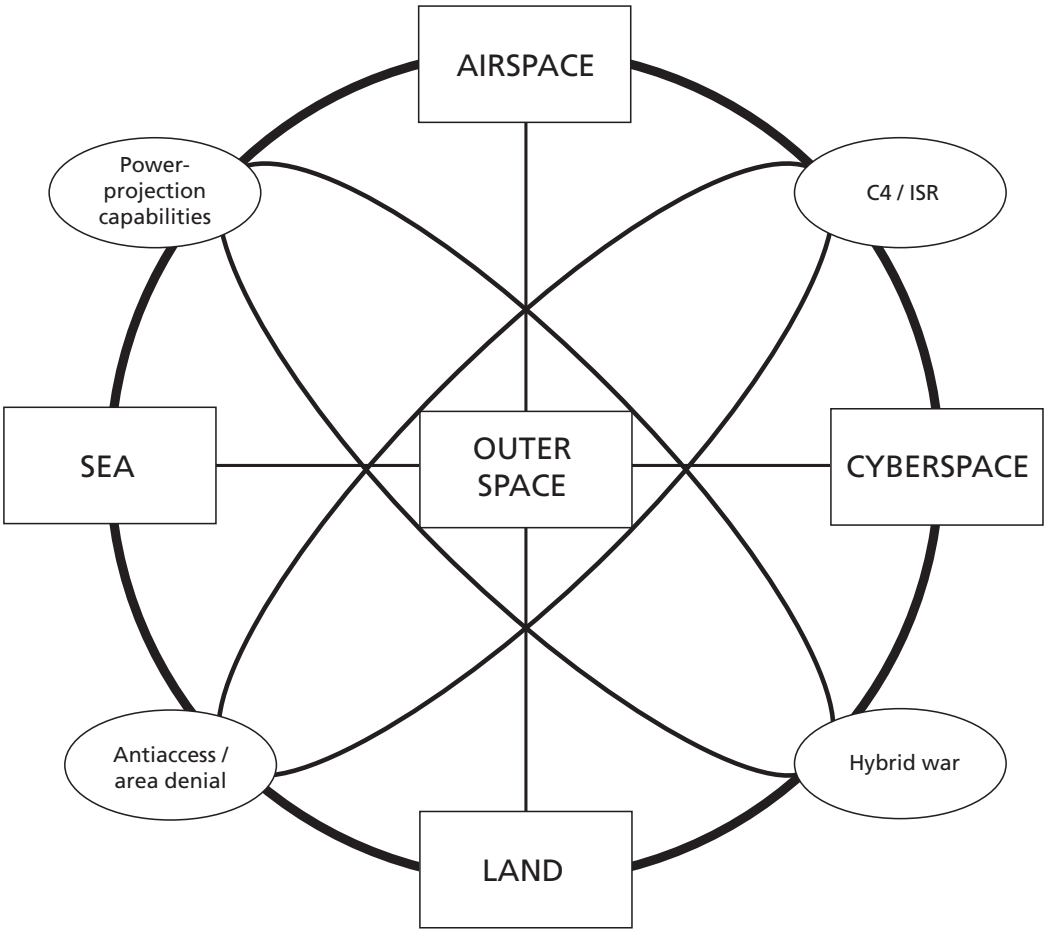
The Future of Small Navies

Smaller navies face particular challenges in terms of formulation of policy, management of financial resources, and maintenance of operational capabilities, and all these affect their credibility. The increase in the cost of modern armament and equipment puts at risk the ability of such services to maintain the necessary technological level to cooperate with the navies of other countries. This may lead to a situation in which such a navy will not be able to contribute to the stability of its region or take part in international maritime operations, whether in peacetime or during armed conflicts of varying intensity.[24] The basic problem of a smaller navy is how to attain and maintain a sufficient degree of interoperability with allied

navies to enable it to operate in multidimensional, multidomain, and network-centric environments and to participate in joint and combined operations (see figure 1).[25]

The traditional operational environments for navies after World War II consisted of the surface of the seas, their depths, the seabed, and the airspace over the maritime area, and included the element of force projection from the sea onto land. With the introduction of missile weapons, this environment expanded significantly to include large areas of land and the airspace (now including outer space itself) above them; modern C2 systems cover cyberspace as well. Obtaining reliable maritime situational awareness and preserving capabilities for communication, navigation, rapid data exchange, and the employment of technologically advanced weapons require data acquisition that relies on the use of space, or at

FIGURE 1
DIMENSIONS (DOMAINS) OF MODERN NAVAL OPERATIONS



Source: Author.

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least the availability of data from satellite systems. For small navies to be able to contribute, gaining access to such data is essential.

Building in the capability to operate in such a multidomain environment generates higher costs directly, and indirectly by increasing the necessary size (tonnage) of the ships involved. This change has been demonstrated since the last decade of the twentieth century by small and medium-size navies building ever-larger warships. While during the Cold War era small platforms (e.g., missile boats) were the norm for small navies, at present there is a clear trend toward procuring larger and more-universal platforms (corvettes, or even frigates).[26] Therefore, today the conceptual difference between large and small navies is more a matter of quantity than quality.

Regarding missions, power projection is a more difficult task for small navies than defensive operations over their own maritime areas. The difficulties in executing *both* these tasks increase, potentially exponentially, as the area of operations increases in size and the counteraction intensifies. Nonetheless, experience shows that the effectiveness of a small navy does not have to relate directly to its size.

Technological progress has not made building and maintaining a capable navy less expensive. For example, small navies often construct only individual platforms, or at most a small number of platforms in any series, which does not offer opportunities for savings. Moreover, to support their operations, navies require significant industrial and technological infrastructure—which to smaller navies may seem disproportionate to the combat capabilities they generate. In addition, in the absence of political and economic stability in a state, laying out development plans for the navy can become extremely difficult, and reliable, long-term financing of such plans can become a fiction.

The above-mentioned conditions indicate that within the current general division of navies into large, medium, and small categories, the last one may become subdivided into small navies with high capabilities and small, symbolic navies. The main criterion for this division, according to Jeremy Stöhs's analysis, for small navies (and medium-size ones as well) will be their capabilities to conduct multidimensional, multidomain operations. For large and medium-size navies that already have such capabilities, the number of platforms with the ability to conduct high-intensity operations will be the main criterion (see figure 2).[27] Stöhs's research indicates that fifteen European navies, including those belonging to some NATO "frontline" countries, do not have the capability to fire missiles using vertical-launch systems, and the systems they do possess cannot be regarded as modern combat missile systems.[28] Considering the recent development of hypersonic missile systems (e.g., Russia's Tsirkon and Kinzhal), it is essential for a navy to have the most-modern self-defense systems against sea-, air-, and

land-based ballistic missiles or to have allies that will provide such protection (e.g., in the form of platforms with the Aegis system).[29]

FACTORS DETERMINING THE DEVELOPMENT OF SMALL NAVIES

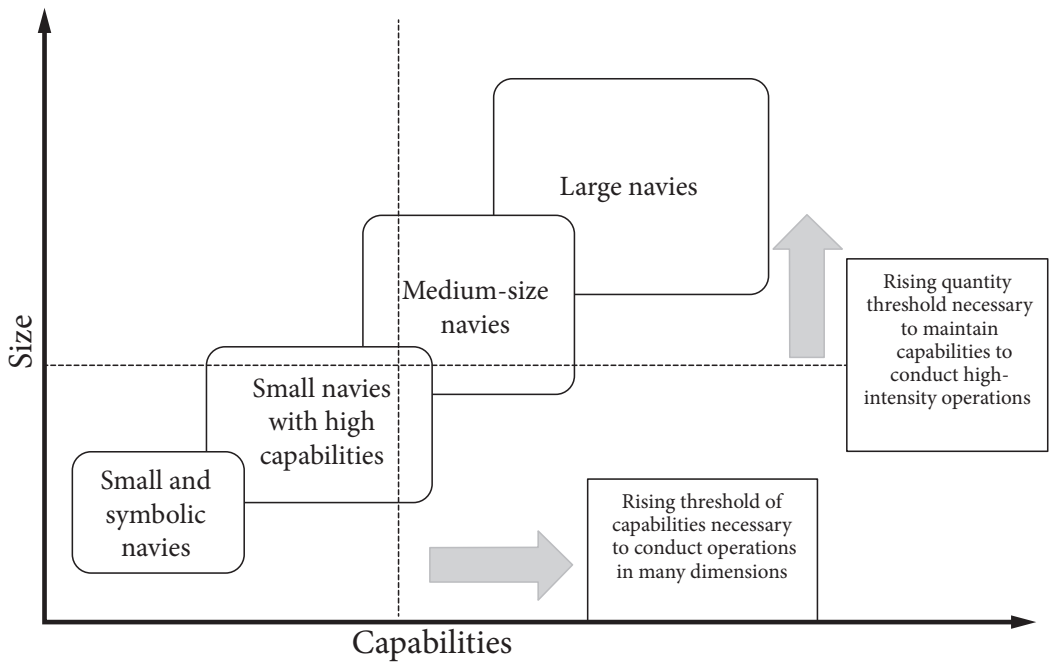
It follows, then, that in classifying modern navies, the following factors should be considered:[30]

- size and structure
- geographic coverage
- functions and capabilities
- access to highly advanced technologies
- reputation

This leads to the next question: What factors should be taken into account in developing (mostly modernizing) small navies?

First, the purpose of having a navy must be established—that is, what is its prospective value in ensuring the maritime security of the country? This is in fact a difficult issue to confront for a country that never has had a strong awareness of the importance of the sea and therefore has not taken it into account previously

FIGURE 2
HIERARCHY OF NAVAL CAPABILITIES



Source: Author, based on Stöhs, *How High?,* p. 25.

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in national policy. The naval service in question needs to know the purpose for which it exists, because without that answer it cannot develop its doctrine or concept of operations, or design its procurement policies, or motivate its personnel—or, above all, justify to its government the necessary expenditures.

A second element is cost-effectiveness (economy in spending), which requires effective resource management. The problem for many small navies is a lack of adequate institutions and an appropriate level of administrative efficiency to translate assigned functions and tasks properly into an appropriate combination of platforms, armament, and personnel. Also important in this area is transparency of expenditures (notwithstanding the necessity for confidentiality with regard to some programmatic details); the other side of this coin is due attention to anticorruption efforts.

A third important factor is flexibility in the selection, procurement, and adaptation of new technologies, and the education and training requirements of personnel. Well-educated and -trained personnel guarantee that a navy will function better, if only because of their collective ability to analyze all issues naval and reject wrong ideas, regardless of the source of information and the supposedly "winning" argument.

Fourth, cooperation is a requirement for a country when there is a gap between its naval resources and the resources needed in the event of a crisis or armed conflict, which for obvious reasons (usually financial realities) it cannot bridge. In such cases, the response may be to join an alliance, cooperate with local partners, or become a stronger naval power. However, two phenomena should be noted. Membership in a strong maritime alliance may lead to a decrease in the government's expectations of its own navy. A certain paradox is observable here. On the one hand, one of the main reasons for having a navy is to demonstrate maritime independence; on the other hand, when limited resources cause the government to seek cooperation, independence actually may be weakened.

In addition, to execute its missions the navy must cooperate effectively with its country's coast guard, maritime police, and relevant civilian maritime agencies; similarly, the navy's effectiveness in carrying out its military missions may depend on good cooperation with the other branches of the national armed forces. While competition among the different branches of the armed forces does not necessarily have negative consequences, it can create institutional resistance, duplication of efforts, and delays in naval modernization; this is especially true of countries that face challenging security environments and whose land forces dominate. In this regard, it is worth repeating the point, mentioned earlier, that modern network-centricity is blurring the functional differences among the separate branches of the armed forces, making joint, combined, and common operations increasingly important for the efficiency of the navy.

Fifth is administration (or management), which refers primarily to the implementation of long-term development concepts for the navy. Many governments carry on a strong and continuous effort to effect reductions in the scope of navy-modernization programs. An equally important factor is the existence (or lack thereof) of a "healthy" supply system. The importance of logistics in military operations continues to increase, and the ratio of "teeth" (capability) to "tail" (logistic support) continues to alter in favor of the latter. In contrast, navies have had a historical tendency to invest in the more "spectacular" aspects of the naval force (i.e., platforms) at the expense of more-mundane aspects such as base infrastructure, command systems, ammunition stocks, and communication systems. This approach leads to draining the budget, leaving a low-capability navy good only for show. Efficient management of resources is key to maintaining the capability and effectiveness of small navies; they simply cannot afford the "fat" that larger navies can.

Sixth, offensive operations constitute the main mission contributing to a state's active maritime policy; many navies will attempt to maintain the initiative in a dynamic, sometimes unpredictable, world. Of course, this approach is conditioned by external events; maintaining it, however, also requires working out ahead of time clear views on and intentions for how the navy will be used in future conflicts and crisis situations. The process of formulating a suitable doctrine and concept of operations requires time and some intellectual effort; there is no simple, unambiguous recipe for solving this problem. There also is no alternative to working out an appropriate method for testing current doctrine constantly by asking penetrating questions.

Seventh is addressing technological progress, which is a particular challenge for smaller navies, as their limited financial capacity allows them to invest only in certain areas. The experiences of various countries show that navies that push for new developments are not always successful (e.g., America's littoral combat ship, Denmark's earlier Standard Flex program).[31] This phenomenon can be explained using the S technology-development curve (see figure 3). The steep slope indicates a period of rapid development of a given technology; the flattened section indicates that a period of stabilization follows. Hence, significant investments in the early periods of development result in making or buying equipment that quickly becomes operationally obsolete. To officials responsible for smaller navies, it seems reasonable to wait some time before purchasing new technologies on a large scale—it is better to be just behind the leaders. Any strategy for investing in new platforms, sensors, and effectors should be devised in advance, and its derivation should include careful analysis of the S curve in relation to individual technologies. In the end, it must be borne in mind that both excessive enthusiasm for a new technology and excessive resistance to it can be harmful.

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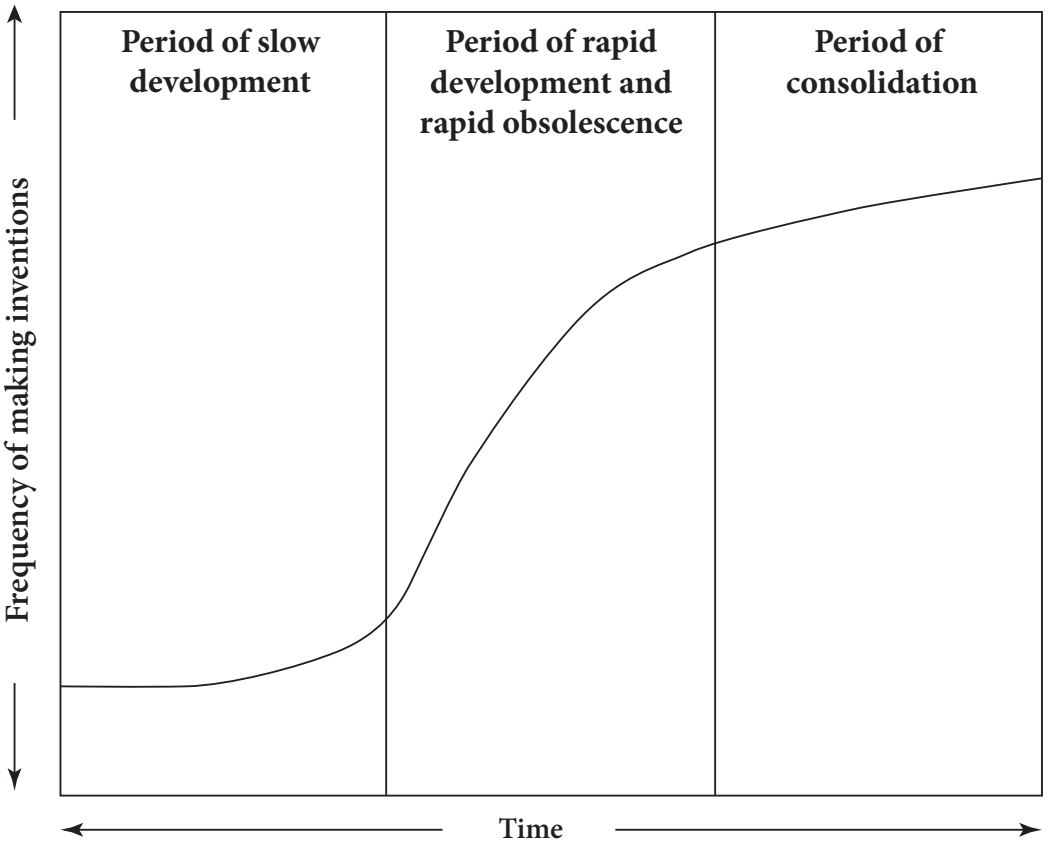
FIGURE 3
THE S CURVE IN THE DEVELOPMENT OF TECHNOLOGY



Source: Till, *Seapower,* p. 174.

Technological progress for small navies is related directly to the technological capabilities available to them and the sources thereof. As noted earlier, dependence on foreign technologies can lead to strategic vulnerability, if not weakness. In their efforts to avoid this, individual countries tend to provide for their requirements through their own production as much as possible, no matter how difficult accomplishing that may be in the realms of finance, design, and manufacturing.

A variety of measures can be used to assist in this, such as partnership agreements to conduct joint research, carry out joint production, or assemble products in national shipyards. Smaller navies—especially those of European Union countries—seem to have reason for optimism regarding this issue, although such arrangements always are subject to political-military decision-making. Other solutions available—finances allowing—in building the state maritime policy and implementing it include establishing and maintaining close production links with domestic industries and constantly and directly employing scientists and engineers.

The problem, however, is that keeping pace with technological developments can be very expensive for small navies. The effort can lead to producing a "navy of samples" that cannot carry out its missions, owing to a lack of a coherent operating organization. Yet in the present period of rapid technological change, small navies may not be able to avoid such a situation; it is still better than allowing the creation of large generation-capability gaps and block obsolescence that over time become increasingly difficult and expensive to bridge.

THE DILEMMA: CHOOSING A STRUCTURE FOR A SMALL NAVY

For each navy, designing a viable structure is a fundamental problem. Settling on an answer requires decisions on priorities, primarily in the technology and procurement areas. Once these priorities are established, they should determine the types of platforms, weapons, and sensors on which a smaller navy should concentrate. In the real world, each of the possible priorities will have its own supporters (and probably lobbyists). In contrast, the decision *should* result from a rigorous analysis of geographic location, possible threats, geopolitical ambitions, and financial capabilities. It should be remembered that implementing any naval-modernization plan rarely takes less than ten years and that making expensive decisions is not an attractive prospect for the political classes of small and medium-size countries.

Options

Surface Ships. As a rule, the basic force type for smaller navies is surface ships.[32] As discussed earlier, since the end of the Cold War the trend has been toward larger ships (frigates, corvettes, or lighter-armed patrol vessels). This reflects the growing demand for ships capable of staying longer at sea. Owing to their seaworthiness and endurance, such platforms offer greater versatility, combat capability, and quality of executed tasks. In addition, their large displacement and capacity reserve allow them to be modernized later in their service cycles (which can range from thirty to forty years) by replacing weapons and equipment. Note that this aspect also can apply to patrol vessels, which can be retrofitted with additional and updated offensive weapon systems.

It is worth noting, however, that small, fast, strike vessels also may constitute a rational solution, given a specific operational environment (e.g., coastal waters or other areas with favorable geographic characteristics) and concept for the use of force (e.g., defense of narrow straits or canals, or blockade of such passages). As an example, the Royal Swedish Navy takes this approach.[33] Obligations to alliance partners, responsibility for regional maritime security, or expected contributions to multinational operations may make it necessary for navies to operate frigates as part of their maritime force, but the perceived "necessity" to possess such

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platforms must be addressed in a naval-staff-driven, ruthless cost-benefit, and zero-sum assessment of modernization plans.

Submarines. Some smaller navies make submarines their main force type, operating them in combination with limited numbers of surface ships. Submarines provide deterrence and maritime defense and perform additional, complementary tasks (e.g., intelligence collection). They can reduce gaps in operational capabilities between large and smaller navies. Submarines make the navies that incorporate them more reliable and versatile in terms of their capabilities.

A navy without submarines may need to reorganize its forces to compensate for their lack thereof using other means, such as unmanned underwater vehicles (UUVs). However, the ability to use submarines depends strongly on the geographic and physical conditions of the maritime environment; in many cases, their main task will not be to combat an enemy's maritime trade but to collect reconnaissance data in semienclosed waters—another function that UUVs could undertake.

But until UUVs become a replacement, the mere presence of a submarine necessitates a highly disproportionate financial and technical response by an adversary in the form of antisubmarine warfare (ASW) assets. A review of modern navies reveals that most small and medium-size fleets operate submarines with relatively small displacements and diesel-electric propulsion (sometimes with additional air-independent propulsion); examples include the German, Swedish, and soon the Norwegian naval services.[34] To date, such navies have not armed their submarines with long-range (up to 2,000 km) cruise missiles, probably because of cost, but nothing prevents them from equipping them with antiship or antiaircraft missiles. In any case, none of these navies has any experience in using such weapons under combat conditions. It also should be remembered that operating submarines incurs high costs for specialized training, maintenance and logistics, and combat support.

Mines. Sea mines, even of older types, pose a serious threat in maritime areas having depths of twenty to sixty meters. The damage that mine explosions can cause is quite high in relation to the weapons' production costs. Their continued viability as a weapon was shown clearly during the Gulf War (1990–91). Currently, thirty-two countries produce mines, of which twenty-four export them, and about fifty navies hold them.[35]

On the other side, developing mine countermeasures (MCM) technologies is an expensive, technologically demanding, time-consuming, and therefore difficult undertaking.[36] Specialized MCM (i.e., mine-hunter) vessels can be effective, but they are expensive, which has led to the development of containerized mine-hunting and -disposal systems that can be deployed on other platforms.[37] In the future, unmanned systems may prove to be more cost-effective for small navies.

Yet the expense will remain of maintaining the necessary cadre of highly skilled personnel trained in MCM warfare. (It also should be noted that mine removal after the cessation of hostilities is always a long and serious operation.)

Logistic Support Ships. A separate issue for smaller naval forces is logistic support ships (LSSs). Only forces that expect to conduct expeditionary operations incorporate them, yet practice shows that they provide small navies operating within a military alliance a way to make a valuable contribution by providing afloat support to the operational forces of allies.

In addition, LSSs are useful for transporting troops, vehicles, supplies, and equipment; as research-and-development platforms; and as training ships. (Currently, except for sail-training vessels, ships designed exclusively for training purposes are rare.)

Naval Aviation. Small navies tend to employ naval aviation for maritime patrol and surveillance, ASW, noncombat search and rescue (SAR), and combat SAR. It tends to manifest itself in the form of shipboard helicopters and unmanned aircraft. Small navies cannot be expected to operate multirole fighter aircraft (i.e., strike fighters); increasingly, it is the tactical aviation of (land based) air forces that is being used in operations in the airspace over closed and semienclosed seas.[38]

A key element of the development of small navies today is the need for the acquisition of military aircraft to be carried out jointly. In the decision-making process, considerable weight must be given to weapon systems (effectors) and sensors instead of overfocusing on platforms—that is, aircraft carriers. In the current maritime battle space, it is the weapon systems and sensors that should determine the natures and roles of the various platforms, with the combined operational capabilities being obtained by networking all the capabilities of the armed force. This larger perspective takes into account the multitude of tasks that today's small navies must perform, alongside the possibility, under certain conditions, of coming up with unusual ways of performing those tasks (e.g., using civilian vessels, such as offshore craft, as warships). The development of dual-purpose technology and the containerization of task-specific modules (e.g., reconnaissance, mine countermeasures, minelaying, ASW, shipboard drones) will facilitate such projects in the future.

Cost

The second fundamental factor in structuring the fleets of small navies is that planning must be driven by costed priorities. The problem of prioritization comes down to whether the commanders of such services can, or should, build and maintain a sustainable navy. Is it better to be a master in some fields, or mediocre in many? As a practical matter, a navy that limits itself to, then maintains, the capabilities it has the resources to support is better able to deal with

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operational challenges, both expected and unexpected. However, developing a niche specialization involving particularly high standards in one area (e.g., mine warfare) requires international cooperation to conduct operations at sea.

The best solution may be to set up task forces. The task-force structure gives smaller navies opportunities to maintain multiple capabilities, operate as part of a multinational force, conduct long-term operations, and exercise command. It also provides the governments involved a greater range of options for using their navies than otherwise would be possible.[39]

Morale

The third important factor to consider when structuring small navies is the morale of their personnel. This factor often derives from a combination of the other factors already discussed. Personnel are a navy's most valuable asset, and it is extremely important to attract the right people to serve and to retain them, and to grow leaders. (Contrary to popular opinion, high unemployment does not facilitate this task, although competition from the private sector is a factor.)[40] A lack of any combination of certain factors—well-established maritime traditions, available posts, publicly issued promotion criteria, clear career prospects, and social security for families during servicemembers' time at sea—hampers recruitment and retention of the right type of officers and sailors. Practice shows that people perform best when they are properly trained, their professional activities contribute to effectiveness, they know their service is effective, and their performance is appreciated. For these conditions to apply to naval personnel, the service must know why it exists and it must operate—"steam"—to accomplish that purpose; otherwise the atmosphere becomes toxic.

As previously mentioned, one of the main problems of modern smaller navies is the constantly increasing costs of acquiring ships and armaments and of their subsequent use. However, at least in the case of European navies, there seems to be no clear reason why smaller navies should not combine their efforts to develop both traditional nautical and naval skills and modern combat capabilities. Unfortunately, in reality this remains quite a problem. This is largely for political reasons; nothing is as potent a symbol of sovereignty or a reflection of a country as its navy. However, if government officials demonstrate the right strategic culture and credibility, programs of this type could create efficient operational forces for all concerned. Such a partnership among smaller countries would provide another way for their navies to overcome limited resources to enable effective actions in the international arena.

POSTMODERN NAVIES

Given the preceding analysis of small navies, how should they be evaluated on their capabilities, and what should their role be in ensuring the maritime security

of their states in the first half of the twenty-first century? Before addressing these questions, two preliminary remarks are needed. First, application of the traditional Mahanian concept of naval power and capabilities would place all small navies at the very bottom of any hierarchy. Second, by way of contrast, the Western, postmodern understanding of naval power considers all capabilities for ensuring *maritime security,* defined in a broad sense—going much beyond purely military considerations in the employment of naval power.

In the latter context, a binary division of navies into categories of large and small loses its utility as an indicator of naval power; it ceases to be an appropriate criterion for assessing navies in the current century.[41] In the postmodern context, naval power is a collective concept, mostly liberal, less state-centric, and oriented toward security management in the world's oceans. This is because no countries except the world's great powers are capable of ensuring their own security—considered in all its dimensions—independently. Such a situation necessitates cooperation, of which one form is membership in an alliance. Yet we must acknowledge that in naval operations involving high-intensity armed conflict, or even expeditionary operations, the participation of smaller navies will not extend beyond the political and symbolic level, owing to their limited capabilities and resources.[42] Ken Booth's "classic triangle" reinforces this point; smaller navies' capabilities are more suitable for performing policing functions than diplomatic and military ones.[43] On their own, small navies may be capable of confronting an equal or weaker opponent; in any other situation, under current global geopolitical conditions, they are forced to combine with others to build a collective, postmodern maritime power, most often on a regional basis, for which maintaining peace and the legal order is the fundamental mission until armed conflict begins.

This article's review of the problems facing small navies in the first half of the twenty-first century has identified the two most important ones. The first is the difficulty of acquiring the requisite financial resources and managing them properly; the second is the need to transform these navies so they are capable of cooperating in the international environment as parts of multinational teams. Acceptable performance in the latter respect—participation in allied operations or ad hoc coalitions, if required—should be considered the most important factor affecting their continued existence.

The article has reviewed the factors affecting the development of small navies, giving particular attention to the problem of determining the force structure of such services. A promising direction affecting these areas is the development of autonomous systems (aerial, surface, and underwater), which can provide a valuable complement to existing capabilities, especially in littoral waters. In general, the development of new technologies—especially in the areas of

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maritime situational awareness, naval armament (e.g., missiles, torpedoes, mines, precision-guided weaponry), robotization, and unmanned vehicles—should feed the development of smaller navies' capabilities. Some important included technological aspects of these advances are network-centric operating systems, the minimization and miniaturization of electronic systems and weapons, the use of similar technologies for unmanned surface and underwater vehicles, the use of dual-purpose (civilian/military) technologies, the use of renewable-energy-source technologies, and the modeling of operations at sea using the principles of chaos theory.[44]

A final question is whether it is possible to come up with a general theory of the development of small navies, which at least might limit the "torment" wrought on small-navy planners by attempting to address these dilemmas. Sadly, the analysis herein seems to indicate it is impossible. The most that can be done here is to present the issues bearing on the theory of planning the development of small navies.[45] Beyond that, the determination of which issues must and will be prioritized will depend primarily on geopolitical conditions, available resources, political will, and the wisdom of those political-military officials responsible for planning and decision-making.

NOTES

1. *Wikipedia,* s.v. "List of Countries—UN Members" [in Polish], pl.wikipedia.org/.
2. See Andrzej Makowski, *Maritime Forces of a Modern State* [in Polish] (Gdynia, Pol.: Impuls Plus Consulting, 2000), p. 318.
3. Jacob Børresen, "The Seapower of the Coastal State," in *Seapower: Theory and Practice,* ed. Geoffrey Till (London: Frank Cass, 1994), p. 174. For a broad discussion of this issue, see Ze'ev Almog, *Israel's Naval Force: Development and Buildup following the 1973 Yom Kippur War,* ed. D. Marcus, trans. T. Shany (Tel Aviv, Isr.: Tel Aviv Univ., Yuval Ne'eman Workshop for Science, Technology and Security, 2018), pp. 11–92.
4. J. F. Dunford, J. W. Greenert, and P. F. Zukunft, *A Cooperative Strategy for 21st Century Seapower: Forward, Engaged, Ready* (Washington, DC: March 2015), pp. 1–11, 14–16, available at www.navy.mil/; *Poland's Strategic Concept for Maritime Security* [in Polish] (Warsaw: National Security Bureau, 2017).
5. Grove counts among them the following: medium regional-force-projection navy, adjacent force-projection navy, offshore territorial-defense navy, inshore territorial-defense navy, constabulary navy, and token navy. Eric Grove, *The Future of Sea Power* (Annapolis, MD: Naval Institute Press, 1990), pp. 237–40.
6. Geoffrey Till, "Can Small Navies Stay Afloat?," *Jane's Navy International* 108, no. 4 (May 2003), p. 25.
7. Robert McCabe, Deborah Sanders, and Ian Speller, eds., *Europe, Small Navies and Maritime Security: Balancing Traditional Roles and Emergent Threats in the 21st Century* (London: Routledge, 2021), pp. 4–6.
8. Richard Harding, *Seapower and Naval Warfare, 1650–1830* (London: UCL Press, 1999), p. 21; Makowski, *Maritime Forces of a Modern State,* p. 15.
9. See Geoffrey Till, *Seapower: A Guide for the Twenty-First Century,* 4th ed. (London: Routledge, 2018), pp. 147–54; Krzysztof Ficoń, *Operational Analysis of Naval Forces*

of European Countries [in Polish] (Warsaw: BEL Studio, n.d.); Tomasz Szubrycht, *Problem Outline: Maritime Security of the State* [in Polish] (Gdynia, Pol.: Naval Academy, 2011), pp. 139–41; *Poland's Strategic Concept for Maritime Security,* pp. 54–55; and Francisco Eduardo Alves de Almeida and Ricardo Pereira Cabral, "Navy Classification: Proposal for a Comparative Methodology," *Austral: Brazilian Journal of Strategy & International Relations* 7, no. 14 (July/December 2018), pp. 13–39, available at seer.ufrgs.br/.

10. Till, "Can Small Navies Stay Afloat?," p. 25.
11. See Tomasz Szubrycht, *Balancing Naval Forces in the Maritime Policy of European NATO Countries* [in Polish] (Warsaw: National Defense Academy, 2008).
12. Børresen, "The Seapower of the Coastal State," p. 159.
13. Reflections on this issue appeared in the Polish literature on the subject as early as the interwar period; see J. Ginsbert, *Is the Baltic Sea a Closed Sea?* [in Polish] (Warsaw: Naval and Colonial League Propaganda Branch, 1938).
14. See Krzysztof Kubiak, *Case Studies: Activities of Naval Forces after the Second World War* [in Polish] (Warsaw: Book and Knowledge, 2007), pp. 31–35, 289–96, 393–423, 424–39, 440–67, 480–90; Ze'ev Almog, *Flotilla 13: Israeli Naval Commandos in the Red Sea, 1967–1973* (Annapolis, MD: Naval Institute Press, 2010); and Jim Bloom, "Israeli Sea Power a Growing Factor in the Middle East Calculus of Deterrance [*sic*]," *Academia,* 22 April 2021, pp. 2–9, www.academia.edu/.
15. See Barry Clarke, Jurgen Fielitz, and Malcolm Touchin, *Coastal Forces,* ed. Geoffrey Till (London: Brassey's, 1994), pp. 137–39.
16. "Swarming Small Surface Craft," Global Security.org, 14 September 2022; Fariborz Haghshenass, *Iran's Asymmetric Naval Warfare,* Policy Focus 87 (Washington, DC: Washington Institute for Near East Policy, September 2008), available at www.washington institute.org/.
17. See V. E. Tarrant, *The Last Year of the Kriegsmarine: May 1944–May 1945,* trans. S. Kędzierski [in Polish] (Warsaw: Wydawnictwo Oskar, 2001); Andrzej Makowski, "The Submarine Squadron of the Polish Navy in the September Campaign: Evaluation of Operational and Tactical Use" [in Polish], *Studies in the History of Polish Military Historiography* 13 (2012), pp. 55–83; Steven R. Harper [Lt. Cdr., USN], "Submarine Operations during the Falklands War" (paper submitted to the Dept. of Operations, Naval War College, Newport, RI, June 1994), available at apps .dtic.mil/; and Kubiak, *Case Studies: Activities of Naval Forces.*
18. A *hybrid* naval structure should be understood as a balanced navy, having as a component of its structure unmanned vehicles operating proportionally in the air, surface, and underwater environments.
19. See Makowski, *Maritime Forces of a Modern State,* pp. 262–65.
20. Wayne Abrahamse, "Developing Countries and Naval Diplomacy," in *Maritime Policy for Developing Nations,* ed. G. Mills (Johannesburg: South African Institute of International Affairs, 1995), p. 134.
21. *The Law of the Sea: United Nations Convention on the Law of the Sea with Index and Final Act of the Third United Nations Conference on the Law of the Sea* (New York: United Nations, 1983).
22. "China One of an Estimated 26 Other Countries That Are Challenging U.S. Navigation Rights with Excessive Claims," *UNCLOS Debate,* www.unclosdebate.org/; Didier Ortolland, "The Greco-Turkish Dispute over the Aegean Sea: A Possible Solution," *Diploweb .com: La revue géopolitique,* 10 April 2009, www.diploweb.com/; "Background Note on Aegean Disputes," *Republic of Türkiye—Ministry of Foreign Affairs,* www.mfa.gov.tr/.
23. Daniel Moran, "Geography and Strategy," in *Strategy in the Contemporary World: An Introduction to Strategic Studies,* ed. John Baylis et al., trans. W. Nowicki [in Polish] (Kraków, Pol.: Jagiellonian Univ. Press, 2009), p. 140.
24. It should be assumed that in the first half of the twenty-first century maritime operations will have an international character, given that the number of maritime platforms available in individual national fleets will be insufficient in relation to operational needs.
25. S. Papadopoulos, "The Combined Framework: How Naval Powers Deal with Military Operations Other than War," introduction

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to *You Cannot Surge Trust: Combined Naval Operations of the Royal Australian Navy, Canadian Navy, Royal Navy, and United States Navy, 1991–2003,* ed. Sandra J. Doyle (Washington, DC: Naval History and Heritage Command, 2013), pp. 1–22.

26. Among others, the Danish, Norwegian, German, and Polish navies are decommissioning missile boats and replacing them with corvettes and frigates. See "Squadron 2020," *Ministry of Defence [Fin.],* defmin.fi/; Felix K. Chang, "Southeast Asian Naval Modernization and Hedging Strategies," *ASAN Forum,* 29 December 2021, theasanforum.org/; and Rafał Lipka, "Analysis: The Modernisation of the Polish Navy according to the [*sic*] 'Poland's Strategic Concept for Maritime Security,'" *Fundacja im. Kazimierza Pułaskiego,* 7 March 2017, pulaski.pl/.
27. See Jeremy Stöhs, *How High? The Future of European Naval Power and the High-End Challenge* (Copenhagen: Djøf Publishing, in cooperation with the Centre for Military Studies, 2021).
28. Ibid., p. 37. These are the navies and other types of naval forces of Albania, Bulgaria, Croatia, Estonia, Finland, Iceland, Ireland, Latvia, Lithuania, Malta, North Macedonia, Poland, Romania, Slovenia, and Sweden.
29. *Wikipedia,* s.vv. "3M22 Zircon" and "Kh-47M2 Kinzhal," en.wikipedia.org/.
30. Till, "Can Small Navies Stay Afloat?," pp. 25–26.
31. See Emma Salisbury, "Lessons from the Littoral Combat Ship," *War on the Rocks,* 15 November 2021, warontherocks.com/, and Clarke, Fielitz, and Touchin, *Coastal Forces,* pp. 155–59.
32. See K. Ligęza, R. Miętkiewicz, and K. Gawrysiak, *Naval Operations: Naval Tactics—an Outline of the Problem* [in Polish] (Gdynia, Pol.: Naval Academy, 2018), pp. 70–86.
33. Niklas Granholm, "Small Navies and Naval Warfare in the Baltic Sea Region," in McCabe, Sanders, and Speller, *Europe, Small Navies and Maritime Security,* pp. 71–83.
34. Geoffrey Till, "Small Navies in the Current Strategic Context," in McCabe, Sanders, and Speller, *Europe, Small Navies and Maritime Security,* pp. 23–24; "Oceanic Range Submarines," *Saab,* www.saab.com/; "Type 212CD Submarines, Germany," *Naval Technology,* 28 July 2021, www.naval-technology.com/.
35. Till, "Can Small Navies Stay Afloat?," p. 33.
36. See M. Ilnicki, A. Makowski, and S. Pejas, *"Mine Warfare" at Sea* [in Polish] (Toruń, Pol.: Wydawnictwo Adam Marszałek, 1998), pp. 123–35.
37. Mike Ball, "Naval Minehunting Vessels Equipped with Unmanned Systems," *Unmanned Systems Technology,* 23 May 2019, www.unmannedsystemstechnology.com/.
38. Milan N. Vego, *Naval Strategy and Operations in Narrow Seas,* 2nd ed. (London: Frank Cass, 2003), pp. 173–75.
39. This problem is discussed in detail in the appendix to M. Zieliński, *European Naval Forces in the Activities of Combined Multinational Task Forces,* Scientific Journals of the National Defense Academy [in Polish] (Warsaw: National Defense Academy, 2005), pp. 111–52. In the case of Poland, a task force consisting of, say, a missile boat, a minesweeper, and a tugboat—a peculiar combination—might be formed; but immediately the question would arise of what such a task force could be used for.
40. Till, *Seapower,* pp. 114–15.
41. See Basil Germond, "Seapower and Small Navies: A Post-modern Outlook," in McCabe, Sanders, and Speller, *Europe, Small Navies and Maritime Security,* p. 27.
42. Ibid., pp. 31–32.
43. Ken Booth, *Navies and Foreign Policy* (New York: Holmes & Meier, 1979), pp. 15–25.
44. See Konstantinos Grivas, "Affordable Naval Power Projection: Geopolitical and Technological Factors Favoring the Development of Small Naval Forces," *Academia,* 19 July 2021, sec. 3-5, www.academia.edu/.
45. See B. Pac, *Engineering of Managing Modernization Programs in the Naval Forces: Selected Issues* [in Polish] (Warsaw: CeDeWu, 2021).