

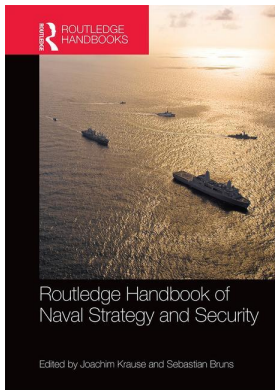
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### **The Future of Naval Conflict and Lessons From History**

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# 3

## THE FUTURE OF NAVAL CONFLICT AND LESSONS FROM HISTORY

*Tim Benbow*

This chapter considers how naval conflict might develop through to the middle of the twenty-first century.<sup>1</sup> It outlines some of the broad factors that will influence it, in particular the international strategic context, and then explores the impact of technology in the form of new and emerging capabilities. This second section in particular draws on history to explore previous examples of debates about the impact of new technologies on navies; this is not to claim that history provides either objective ‘lessons’ or even exact parallels. It does, however, offer a useful guide that clarifies to some extent the questions that must be asked as well as the answers that might be offered. It is not realistic to put forward detailed predictions of how the future might unfold over a decade, let alone over 30 or 40 years; yet, it is possible and even useful to look forward and to think about how events might develop in outline, if not in great detail.

When considering the future, there are two opposite pitfalls to be avoided. The first is in assuming continuity or linear development of the present. There is always the possibility of a major shock in international politics that fundamentally affects what happens thereafter; the end of the Cold War would be one example and the attacks on the United States of 9/11 would be another. Looking forward, there could well be an event – or several – that might have a similarly seismic impact, whether that would be the US turning decisively to isolationism, China fragmenting, the Euro collapsing with the consequent impact on the European Union, or the international economic order moving from free trade to protectionism. None of these is particularly far-fetched and any of them would have enormous consequences for international affairs as a whole and for naval conflict specifically. The second pitfall is focusing exclusively on change and consequently underestimating continuity. This has frequently been a vice of those trying to interpret the impact of a new military technology. Armed conflict, as well as the international system more broadly, is adaptive but also has greater resilience than is sometimes attributed to it. The challenge is to achieve a sensible balance between emphasising continuity and change, while also remaining open to the possibility of more significant turning points.

### **The strategic context**

The context for naval conflict is established by the character of the international system. There have occasionally been idealistic predictions that the era of great power war was over, or that history (albeit defined in a rather narrow sense) had ended. Alternatively, some commentators have

given in to the temptation to perceive what they wish to see, hence announcing the unusability of armed force or even the demise of the state. Any of these major transformations in the international system would have great impact on naval conflict, yet they are vanishingly unlikely. The state has proved remarkably resilient as the bedrock of the international system. It is not the only significant actor on the world stage, but many of the others (including most international organisations and many terrorist and insurgent groups) are important as agents of a state – though that is not to deny that some companies, international organisations, non-governmental organisations or terrorist groups can have an important role in world affairs in their own right. The state will continue to form the basis of world politics. These states will also continue to have competing interests that they will see as justifying the use of force. While the resort to military means will be constrained to varying degrees, the restraints are mainly self-imposed and will therefore apply more to some states (such as the United States and the UK) than others (such as Russia or China).

The contemporary world order involves a range of rising powers – not only the obvious examples such as China and India but also many regional powers. These states are increasingly able to afford advanced weapons and there is lively competition to supply them. The result is that there is a growing number of states with advanced military capabilities, which they can use to defend their perceived interests. Advanced weapons systems can lead to a rather shallow military capability without wider competences that are more difficult and time-consuming to acquire, but this has not in the past prevented states from attempting to use them.

It is difficult to foresee any decline in the causes of disputes which can lead to the use of force. The classic sources of conflict have not gone away, such as access to resources, which could well broaden to include water and agricultural land, as well as new resources which hitherto could not be exploited, such as in the Arctic or on the sea bed. There is no shortage of disputes over territory, while ideology (with religion as a subset) remains a potent source of conflict. A range of widely acknowledged pressures on economies, societies and states – such as climate change, mass migration and unstable political structures – can easily lead to internal conflict that spreads into neighbouring states or otherwise affects the international system. It would not be difficult to add many more potential causes of armed conflict to the list but these suffice to justify an assumption that armed conflict will continue to be a significant factor in international politics. Such conflict may remain confined within a single state but can also spread more widely or, alternatively, a regional or extra-regional power (of which, as argued above, there is an increasing number) could determine that its interests are threatened to an extent that demands intervention.

The use of force by states will therefore continue to be a prominent feature of world politics. This applies particularly at sea. There is always a competition to find a catchy label for an emerging period in history; the current century is variously predicted to be a ‘Chinese century’, an ‘Asian century’ or a ‘Pacific century’. Each of these is sufficiently vague to have some plausibility while also being incomplete and even a little intellectually lazy, as such headline terms often are. A more plausible candidate could be offered: the twenty-first century will be a *maritime* century. The sea has always played a central, although often surprisingly overlooked role in international affairs. It was enormously important in the nineteenth century in peacetime, conflict and war, and even more so in the twentieth century. It is difficult to see the use of the sea being any less significant over the rest of the current century.

There are many reasons for this prediction. First, there is a growing concentration of population centres and economic activity close to the sea, while its commercial use is continuing to increase as world trade expands. Second, many of the causes of conflict referred to above apply particularly at sea, whether in the form of disputed maritime boundaries, access to fisheries, minerals and other resources, or even challenges to the rights of passage and access enshrined in

international law. The UK Ministry of Defence paper *The Future Character of Conflict* concluded with convenient alliteration that the future battlespace will be ‘congested, cluttered, contested, connected and constrained’.<sup>2</sup> It might well have added a sixth adjective in the form of ‘coastal’. Third, the major existing powers such as the US, UK, France and Japan all place considerable importance on their use of the sea for economic, diplomatic and political purposes. While they might be in relative decline to some degree, this does not mean – as some of the more excitable headlines suggest – that they will not continue to be important actors. The same can be said of many medium powers for which the sea is, if anything, of growing importance, such as Australia or Canada. Moreover, the rising powers (which are joining the existing powers rather than usurping them), such as China and India as well as various other key regional powers in Asia and Latin America, all look to the sea. The states that are likely to be the most significant players in international politics in the future – both established and rising – share the important characteristic of a heavy dependence on the sea for economic purposes, as well as an established or growing awareness of its benefits for military purposes.

UK maritime doctrine lists several attributes of the sea that make it appealing for the use of force, such as the legitimate access and presence that it allows, as well as the mobility and flexibility that it provides to military forces.<sup>3</sup> These characteristics have long made naval forces the option of choice for many states when intervening beyond their borders, not least because they permit deployment without the need to seek permission to station troops or aircraft on the territory of other states, with all the diplomatic complications, political compromises and military disadvantages that this often entails. Clearly not every military operation can be conducted from the sea and there will remain some aims that can only be achieved by committing large numbers of troops on the ground – though there might well be an increasing wariness about taking on such costly and demanding commitments. Further, naval capabilities are expensive to acquire and difficult to master; yet on the other hand, a large number of states evidently see the effort as well worth it.

The argument from this first section is that the state will continue to form the foundation of the international system and that the use of force will be no less prominent a feature of the next 50 years than it has been over the past 50. Further, the nature of future conflict, the orientation of the principal world and regional powers and the advantages of naval power for a range of objectives mean that the sea is likely to be at least as important as an avenue for state activity as it has been to date. Armed conflict will continue to be central to international politics, and much of this will continue to be naval conflict.

### **The challenge of new technology**

The principal reason why some would disagree with this argument would be the impact of technology – specifically emerging weapons systems that are interpreted as challenging naval power. According to this argument, the increasing range, accuracy and striking power of submarines, land-based aircraft and anti-ship missiles pose an ever greater challenge to the major surface warships that are at the heart of the naval capabilities of the great powers. As a result, the argument continues, the ability of these fleets to act against significant opposition is ever more curtailed and their value greatly reduced; the sea might well be used for military purposes but surface warships will have less of a role.

There are many weapons that threaten large surface warships. As a result of the globalisation of the international arms trade, advanced weapons are widely available. This supply side of the equation is matched by a strong demand: the reliance of the major Western powers on large warships for influence and intervention is evident, giving those states hostile to such activities

ample incentive to seek ways to prevent them or at least to raise their cost and complexity. While relatively few states possess nuclear-powered submarines, developments in their more widely available diesel-electric cousins have made them quieter and faster, and improved their range; they can also deploy sophisticated torpedoes or even anti-ship missiles. Similarly, ever more states possess land-based aircraft which again can carry sophisticated anti-ship weapons while also being equipped or upgraded with advanced targeting or electronic warfare systems. Land-based anti-ship missiles, whether cruise or ballistic, are ever more widely available; the former are becoming faster, stealthier and harder to counter, while the latter would be extremely difficult to defend against and could potentially threaten warships well out to sea. Further ahead, hypersonic weapons (those travelling at over five times the speed of sound) offer the potential of rapid and responsive strikes, though the technical problems that remain to be solved are considerable.<sup>4</sup> The effectiveness of these offensive capabilities is increased by longer range (notably over-the-horizon) or space-based surveillance and targeting systems, electronic and cyber warfare capabilities and, for the most sophisticated opponents, anti-satellite weapons. It is easy to overlook the more basic sea denial weapons in the form of the naval mine, which is more affordable than most of the alternatives and is steadily advancing in sophistication; at the very least it can cause complications for and impose delays on any intervening navy. Any assessment of threats to naval forces must also take into account weapons that do not target the warships themselves, but rather the aircraft on which they depend for so much of their potential in power projection. Modern air defence systems pose a considerable threat to non-stealthy aircraft (and stealth could become less of an advantage as intensive efforts to counter it begin to pay off) and even to land-attack missiles.

Even assuming only linear development of such weapons systems (that is, not factoring in any sudden leap forward in capability or a dramatic new invention), it is easy to understand the view that the threats to intervening navies are becoming ever more lethal, perhaps even reaching a level that makes these fleets unusable against any but the smallest powers. So, is the onwards march of technology inevitably bringing about the eclipse of naval power?

### *The dynamics of technological change*

There is something in such arguments but perhaps less than meets the eye, or so previous experience of attempts to discern the impact of technological change would suggest. There are plenty of famous cases where new technologies have been initially underestimated, with their actual impact only becoming clear after painful and costly lessons on the battlefield. However, the list of technological innovations and new weapons systems that have been *exaggerated*, with equally damaging results, is just as great, though oddly less well known. For every thinker who dismissed the impact of air power, for example, there was one (or actually rather more) who greatly overstated its impact<sup>5</sup> – with the latter group, of course, still existing. This tendency has been particularly prevalent concerning naval power; a whole series of developments have led to the demise of the surface warship being prematurely hailed. In the late nineteenth century, torpedo boats were going to make capital ships obsolete; in the early twentieth century it was the submarine, then land-based aircraft, nuclear weapons, anti-ship missiles, swarm tactics, asymmetric attacks and cyber warfare. All too often, the argument has begun with the observation that a novel weapon poses a threat to large warships ... and then leapt directly to the conclusion that the latter are therefore obsolete.

The flaws in these claims are interesting to note, not least because of the number of times that they have been – and continue to be – repeated.<sup>6</sup> First, they exaggerate the vulnerability of warships due to a focus on the final stages of an engagement (for example, a bomb

or a missile hitting a ship) without considering what is required to make that engagement occur successfully. The ship has to be located (which, for example, proved remarkably difficult for land-based aircraft throughout the Second World War), a weapon-carrying aircraft or vessel has to get within attacking range, it has to launch a successful attack and the attack has to cause significant damage to the target. Each of these steps is more difficult to accomplish than its usual portrayal suggests, because of the second flaw in the argument: it understates the ability of warships and navies to adapt and to counter the threats that face them. This adaptation might be technological (such as giving battleships quick-firing guns capable of engaging small, fast torpedo boats), or tactical (such as accompanying capital ships with 'torpedo-boat destroyers', or later, anti-submarine escorts), or operational (relating to the ways in which task forces and fleets deploy and fight) – or, more likely, all three. Third, such claims overlook the ways in which new technologies do not only threaten navies but can also be adopted by them, incorporated and used either to counter various threats, to conduct existing roles more effectively or to add new roles to what navies can do. Weapons systems that can be used in sea denial can also be used by intervening navies, for a tactical defensive in one area, or as part of their overall operational design. Other innovations, such as Directed Energy Weapons, would be well suited to deployment on warships, potentially greatly increasing their capacity to engage aircraft, missiles or small attacking craft. Fourth, at the wider strategic level, such arguments neglect the fact that while sea denial may be all that some states require or the most to which they can aspire, many states need not merely prevent others from using the sea but also to use it positively themselves. They have therefore invested in countering the various threats to surface warships.

This argument should not be misconstrued. Of course warships can be sunk. Yet so too can infantry be killed, tanks destroyed, aircraft shot down and their bases destroyed. The central issue is whether the level of risk prevents them from conducting their assigned roles, or whether the cost of adapting them becomes prohibitive for a particular state. The effect of technological advance is not simply to make particular weapons systems obsolete through vulnerability. The battleship, for example, did not disappear from modern fleets because it was vulnerable – with its armour, it was clearly less vulnerable than the aircraft carrier that replaced it as the centrepiece of the modern fleet; further, battleships had long been vulnerable to the guns of other battleships, as well as to more recent threats such as torpedoes. The reason for the demise of the battleship was rather that other platforms and systems (notably nuclear-powered submarines, anti-ship missiles and naval aircraft) could more effectively perform its roles while offering other capabilities besides.

The impact on navies of changing technology has been enormous in fostering adaptation and change in the appearance of warships, the systems they carry, the balance of task forces and fleets, their tactics and strategies. However, it has not removed the fundamental need of the majority of states to use the sea, including for military purposes. It has increased the range of options available for asymmetric approaches of sea denial (of which more below) and it has raised the cost of the highest-end naval capabilities above the level that many states are prepared to pay. That this impact is fundamental and far-reaching is undeniable; yet this is not the outcome that has been predicted by many thinkers who exaggerate and misunderstand the process of technological change.

### ***Developing technology and modern navies***

This argument is important because it has considerable relevance for future naval conflict – not least in suggesting that there are grounds for scepticism about some of the claims made on

behalf of new weapons systems. Throughout the twentieth century, a succession of new technologies were interpreted as spelling the end for major surface warships. Yet in the middle of the second decade of the twenty-first century, the navies of the major powers continue to be centred on large warships, notably aircraft carriers and large amphibious ships. Far from being in decline, ever more states are acquiring both categories of warships, including China, India, Japan and Russia as well as the more traditional users of these capabilities such as the US and Britain. These ships will be in service for many decades, so it is already clear that naval conflict will be dominated by major surface warships until at least the middle of the twenty-first century.

A number of caveats need to be added to this statement. First, these classes of warships have long been one part of a wider force structure that integrates a range of different ships, aircraft and other systems; this tendency is likely to continue and to widen to include a greater range of assets and capabilities. Second, the ever wider availability of weapons systems such as those referred to above will not render large surface warships obsolete but will rather push them to adapt further and will alter, and to some degree constrain, the way in which they operate.

A good example here is the increasing use of unmanned air systems (UAS).<sup>7</sup> These are sometimes portrayed as being a threat to the longevity of manned aircraft, given their greater survivability and the greater willingness to risk their loss. Why risk an expensive aircraft with its expensively trained aircrew when a cheaper UAS can do the job instead? One response to this question, of course, is that sometimes the UAS *cannot* do the job; despite the steep curve of their improving capability, there are still some roles of manned aircraft that UAS cannot perform, not least those requiring the judgement of someone on the spot. There is, of course, the further concern that the use of UAS depends on a high degree of mastery of the electromagnetic spectrum, which might not always be enjoyed against a sophisticated opponent, potentially leaving valuable capabilities open to interference. Once again, it is worth turning to history for guidance. When surface-to-air missiles (SAMs) were first introduced, some thinkers and decision-makers predicted that they would make both manned fighters and anti-aircraft guns obsolete. What actually emerged was a mixed system, involving a combination of manned fighters, SAMs and guns. Similarly, long-range missiles suitable for attacking targets on the ground have not replaced strike aircraft but have rather been added to the inventory to be used alongside them and, indeed, to be delivered by aircraft. So far, UAS have been used in addition to manned aircraft rather than instead of them, and while their use is likely to expand in the future, this basic pattern will remain the same. Much like manned aircraft before them, UAS are well suited to use from warships, whose capabilities they greatly enhance. They increase the effective range of warships, allowing them to gather information, counter threats and strike targets at greater range. Moreover, while some UAS are small, the more capable models offering long range, long endurance and heavy payload, tend to need a large deck from which to operate, such as that of an aircraft carrier or a large amphibious ship. As with other innovations before, UAS will be added to the increasingly diverse naval force, helping it to counter other threats and improving its ability to conduct its assigned roles. (The role of unmanned surface and sub-surface systems is also likely to increase greatly, though like their aerial counterparts, the effect is likely to be to join existing platforms – even to be deployed from them – rather than to replace them.)

The long-running process that has seen naval task forces become broader and more diverse is accelerating. They already include surface warships, organic naval aircraft (including helicopters as well as fixed-wing aircraft, and now UAS too), submarines and land-based aircraft. These naval task forces, moreover, operate in a context that is increasingly combined (i.e. with allies) and joint (i.e. with other services) – the latter in particular altering how navies operate. Their activities are now often closely integrated with land-based aircraft or with land forces, and also, crucially, with national ‘enablers’ such as strategic intelligence support, and various systems in

the new domains of space and cyber, which have been added to the familiar sea, air and land. It is perhaps becoming ever more misleading to refer to 'naval conflict' given this increasing level of integration with other services and capabilities. In some ways, this is nothing new; Julian Corbett, the great naval theorist, frequently emphasised the crucial importance of conceiving of naval strategy and operations within their proper, broader context.<sup>8</sup> It has, however, become ever wider and more closely inter-twined with other capabilities to a degree undreamt of in Corbett's time.

### ***Dilemma: quality or quantity?***

The onwards march of technology and the emergence of new capabilities present dilemmas for the leading military powers. One hardy perennial debate mainly affects the hard-pressed medium military powers, though also having some relevance to the larger powers; that is, the balance between quality and quantity. Put simply, high-end warfighting demands increasingly sophisticated and therefore expensive capabilities; yet designing a fleet around these tends to result in fewer and fewer platforms, raising questions about the capacity of the navy concerned to fulfil all the roles that national policy might require of it (let alone its ability to withstand losses in a conflict, raising the concern that its highly capable warships become too precious to risk). Peacetime and low-level conflict roles tend to require larger numbers of platforms, which need not necessarily possess the highest level of warfighting capability. Yet focusing too much on these lower-cost, lower-capability platforms runs the risk of reducing flexibility and having ships on station that would not be capable of participating in the more demanding missions should this become necessary.

To give a concrete example, the Royal Navy has built a class of six highly sophisticated air defence destroyers, the Type 45.<sup>9</sup> The rationale for such capable warships is that they are required for the most demanding warfighting tasks in a national or, more likely, a coalition operation, which remains a fundamental driver for British policy. Critics, however, suggest that the high cost of these ships reduces the number of platforms available too far, with the result that there are fewer available for maritime security operations, or for routine presence around the world. They argue that it is inefficient to have such an expensive warship conducting anti-piracy patrols in the Indian Ocean; the Naval Staff would respond that the Type 45 can do this and then at short notice move a couple of hundred miles north and take part in high-intensity warfighting operations, which a cheaper patrol corvette would be unable to do. This case is merely the latest example of a long debate over how to achieve a balance between numbers and capability. During the Cold War, there were enough warships to do both; the US Navy referred to the 'high-tech/low-tech mix', while the Royal Navy (using one of those cricketing terms that foreigners so appreciate) referred to the 'first eleven and second eleven'. The principle was that older ships would provide the lower-capability end – you do not build less capable ships. At times proposals were aired suggesting that, say, rather than build two expensive vessels, it would be preferable to build three cheaper ones to provide more hulls. Such ideas tended to founder on the concern that financial considerations would distort the decision-making process, with any suggestion that less capable warships were acceptable likely to be seized on by the money men, with the end result being not three but rather only two of the less capable ships.

This dilemma existed during the Cold War but has become sharper more recently with emerging technologies. On the one hand, these raise the cost of warships capable of the highest-end operations; yet on the other hand, they could also present some possible solutions. One of the big debates around the turn of the century concerned the existence and implications of a 'revolution in military affairs'.<sup>10</sup> The most relevant concept for naval conflict to emerge from



this debate was that of ‘network-centric warfare’, that is, where the elements of a military force operate not as individuals but as distributed parts of a connected whole, also referred to as a ‘system of systems’. This concept first emerged in the naval sphere, with the ‘cooperative engagement capability’ devised by the US Navy to counter the high-end threat from the USSR. Indeed, naval warfare has long featured a fluid balance between dispersion and concentration; one of the best descriptions of network-centric warfare can be found when Corbett writes that concentration should not be understood as ‘huddled together like a drove of sheep, but distributed with regard to a common purpose, and linked together by the effectual energy of a single will’.<sup>11</sup> The further development of the capabilities associated with this concept has presented some interesting ideas for the future structure of navies – not least in reigniting the issue of the balance within the fleet and raising the question of whether the increased diversification and dispersion of naval forces has reached a threshold that effectively means a shift to a new model.

One such idea was laid out in a 2012 doctrine note from the UK Development, Concepts and Doctrine Centre advocating the ‘Black Swan sloop’ concept.<sup>12</sup> This paper (conceived as a contribution to the debate over the future shape and balance of the fleet) suggested a new approach to the issue of quality versus quantity. It acknowledged the need for greater numbers of platforms but rejected the argument that large surface warships represent ‘quality’:

There is no doubt that the current and future surface combatants will be capable of conducting a wide range of tasks across the full spectrum of maritime operations. However, these large combatants will be too few, too costly, too mission essential and most importantly too vulnerable to be risked in a contested littoral.<sup>13</sup>

The envisaged warship, given the historically resonant label of ‘sloop of war’, would act in groups, as the core of an integrated network of manned and unmanned platforms. Its own fit of sensors, weapons and unmanned systems would be modular and would vary depending on the tasks to which the ship was committed, giving a degree of flexibility. The ‘Black Swan’ vessels would focus on the roles of securing sea control (including maritime security and global presence, though also having a role in warfighting operations) and would therefore complement the larger, more sophisticated vessels designed for force projection. This concept is a relatively ambitious one: although it does not envisage the end of aircraft carriers or large amphibious vessels, it does advocate a major change to the familiar model of destroyers and frigates. It is not simply a suggestion of large numbers of cheap corvettes but rather a radically different approach that acknowledges emerging threats and seeks to counter them, while also meeting Britain’s needs at sea, by the use of emerging technologies and novel concepts. Such ideas are bound to become more prevalent in future debates over force structures.

### **Asymmetric approaches**

Naval forces, especially the larger surface platforms, are expensive and technologically demanding to acquire and to operate. There are heavy penalties in attempting to play the conventional naval game with inferior forces, as losses occur disproportionately. It is therefore not surprising that many actors that perceive a need either to use the sea or to disrupt or prevent another’s use of it have adopted an asymmetric approach. This term means fighting an opponent with forces, tactics or strategies that are dissimilar to his, with the aim of exploiting an advantage of one’s own or a weakness of the opponent.<sup>14</sup>

Some actors that confront states are inherently asymmetric. Much attention has been devoted to the role in international affairs of non-state actors, such as terrorist or insurgent groups. Some

such groups do use force and some of them have sought to use the sea, either for transportation, for strikes against shipping (merchant ships or even warships) or to launch attacks against the shore.<sup>15</sup> Some of the capabilities used are fairly rudimentary, there have been few successful attacks and many more that have been frustrated or defeated. Nevertheless, some insurgent groups, particularly those acting as clients of states, have been able to acquire advanced weapons, and the high value and visibility of merchant shipping and, in particular, warships (whose prestige value is high) makes them tempting targets. Countering non-state asymmetric actors will be a major role for many navies, and a minor though still significant role for the leading ones.

It would be misleading to assume that 'asymmetric' is synonymous with 'non-state'. There is a long history of states adopting asymmetric approaches, arguably even more at sea than on land. Even in the sailing era, for example, France and then the young United States did not seek to contest command of the seas with the Royal Navy but rather to inflict economic losses by raiding commerce. From the mid-nineteenth century onwards the industrial revolution began to provide further options for those who wished to avoid taking on the leading naval powers at their own game. In the late nineteenth century, for example, there arose in France the 'jeune école', which argued that rather than build a battlefleet to counter that of the Royal Navy, a better approach would be to focus on large numbers of small, agile torpedo boats which would overwhelm the powerful but ponderous British battleships.<sup>16</sup> This idea never took hold in official policy partly because of the process outlined above, which saw successful adaptation, but also because France needed to use the sea herself and could not simply rely on sea denial. Other states made effective use of new weapons that provided an asymmetric advantage, not least Japan which opened the 1904–5 war against Russia with a torpedo boat attack against the latter's fleet in harbour, much as it would do again in 1941 with a carrier strike against the US fleet in Pearl Harbor. Germany in the First World War initially sought a traditional, Mahanian fleet-against-fleet struggle for supremacy against the Royal Navy. Yet when this strategy was defeated, an asymmetric approach ensued of using submarines not against warships, as had been widely anticipated, but against merchant shipping; while ultimately unsuccessful, this campaign forced Britain and its allies to expend disproportionate resources compared to those invested in the U-boat fleet.

Throughout the post-1945 period, the evident difficulty of countering the fleets of the major powers in a symmetric fashion made asymmetric weapons and approaches (notably the use of submarines, land-based aircraft, anti-ship missiles and mines) highly attractive. It is a useful corrective to the occasional tendency to overrate the success of asymmetric warfare to note that these were largely unsuccessful, at best imposing minor delays on operations. Countering these strategies and tactics was possible but, as explained above, increasingly expensive. As weapons technology continues to advance and proliferate, however, a modern asymmetric approach could raise the risk and cost above what many would-be intervening navies would be willing to pay.

A modern example of an asymmetric approach is Iran, which has made extensive preparations for a campaign in and around the Strait of Hormuz, aiming to disrupt shipping and complicate the activities of a US naval force. Iran's objective is to deter the US from launching offensive action and also to coerce Washington's regional allies to deny access to bases. This strategy is a broad one, taking in many elements; it includes naval and maritime options such as the relatively familiar submarines, mines, fast attack craft, land-based aircraft and anti-ship missiles. It also extends to more asymmetric means such as use of swarms of small craft in suicide attacks, threats of ballistic missile attack against US facilities in the region and the threat of proxies such as Hezbollah launching terror attacks against the interests of the US and its allies. Further off, the apparent goal of acquiring a nuclear capability also fits into an asymmetric approach to preventing US military action.

Such an approach for Iran is far more promising than seeking to build larger surface warships, a lesson painfully learned during the 'tanker wars' phase of the Iran–Iraq conflict, when the surface forces of the Iranian Navy were rapidly defeated. The attention devoted to the capability of Iran to 'close the straits', disrupt international shipping or even inflict potentially prohibitive losses on an intervening US force suggests that the threat is taken seriously. However, it is not guaranteed to succeed, given the resources and capabilities of the US and its allies. One problem for those who exaggerate the effectiveness of asymmetric approaches is that, to paraphrase the famous expression, 'it takes two to be asymmetric'; those who convince themselves that asymmetric means offer a low-cost option against a great power risk a severe shock when their opponent escalates, retaliating in a devastating, albeit conventional, fashion against their military or governmental infrastructure. Iran, for example, has a range of potential vulnerabilities not least its own fuel exports. Asymmetric warfare conducted by non-state actors or, even more, by states is undoubtedly a major nuisance to the leading powers, and can cause significant damage; it is not necessarily a game changer. However, this conclusion might need to be revised should an emerging superpower make effective use of an approach which might broadly be seen as asymmetric.

### **'A2/AD' versus 'air-sea battle'**

One of the most important relationships for the twenty-first century is that between the US and China. This pivotal relationship has particular significance for future naval conflict because the possibility – however slight – of an armed clash between the two defines the high end of future conventional warfare. Further, the two leading powers of the twenty-first century have devoted considerable thought to how a future conflict between them might unfold.

China stepped up its precautions against US naval power projection as a result of a chastening experience in 1996. Clumsy Chinese military pressure against Taiwan, intended to influence the elections there, resulted in the US reacting with the deployment of two carrier groups to the Taiwan Straits as a very visible show of support. Opinion in the West was divided over whether this had a deterrent effect on China, but the latter's subsequent policy suggests that the potential influence of the US carriers was taken very seriously indeed. There is an evident aim in Chinese strategy to develop force structures and doctrine to induce the US Navy to pull back from the areas that China considers as most central to its vital interests at sea.

The panoply of modern military capabilities opposing navies have been given the label of 'Anti-Access and Area Denial', or 'A2/AD'. This approach – exemplified but by no means confined to China – aims to complicate an opponent's entry into a particular region and then to hinder its movement and operations within it. It thereby aims to frustrate the access and mobility that are the great advantages provided to intervening powers by the use of the sea, for example compelling the US to operate from bases at greater distances from the theatre of operations (thus reducing the effectiveness of its forces) and at higher levels of risk.<sup>17</sup> While the main focus in discussions of A2/AD is China, which represents the most developed and powerful form of the approach, it is also one that others could well seek to emulate.

In the case of China the strategy involves a range of systems both naval, such as a rapidly expanding submarine force and surface warships, and land-based, including aircraft and, in particular, large numbers of increasingly sophisticated cruise and ballistic missiles. (The best publicised anti-carrier system is the DF-21, a conversion of a ballistic missile originally designed to carry a nuclear weapon but now with a conventional warhead; its speed of approach would greatly complicate any attempt to engage it with defensive weapons.)<sup>18</sup> These military

capabilities are backed by a huge supporting infrastructure of land-, air-, sea- and space-based intelligence-gathering systems, long-range surveillance and targeting systems, as well as by electronic warfare, operations against the space systems on which the American way of war is so dependent and cyber warfare. This network would be used to threaten and attack deployed US naval forces as well as their bases and supporting infrastructure. The threat to US warships, particularly the aircraft carriers, is designed to hold them at a distance from the areas of concern to China, while the threat to bases aims to erode the willingness of host states to place themselves at risk by granting such facilities to the US as well as to make them less effective for support in time of war.

Some accounts of Chinese anti-access capabilities run ahead of reality. There are formidable technical problems associated with attempting to strike a moving target such as an aircraft carrier with a ballistic missile, not least the difficulties of identifying and acquiring the target and also terminal guidance at enormously high speeds. They would be a greater threat against fixed facilities.<sup>19</sup> Even if their use against carriers were technically feasible, there would be political constraints on their use. A successful attack against a US carrier would itself be highly escalatory in any situation short of full-scale war and the US has ample means of retaliation. Similar problems apply to the use of other Chinese capabilities such as anti-satellite weapons or cyber warfare. While it is always important to guard against complacency or underestimating a potential opponent, there is also the danger of exaggerating its capabilities – not least of conflating current capabilities with future aspirations.<sup>20</sup> Moreover, while China's military capabilities will no doubt improve, so too will those of the US, particularly when directed specifically against A2/AD networks.

Regardless of the reality of the Chinese threat, the US has clearly taken it seriously, both in terms of grand strategy – in the form of the 'pivot' (or 'rebalance') towards Asia – and also in terms of defence planning. Inevitably, the spectre of A2/AD has driven a response in the US, in the form of 'Air–Sea Battle' (ASB).<sup>21</sup> This concept is driven by cooperation between the US Navy and the US Air Force (a cynic might suggest that getting these two notoriously uneasy bedfellows to work together is quite an achievement by China) but also envisages an important role for land forces. It involves US forces continuing to move beyond mere deconfliction and cooperation to integration, including maritime, air, land, space and cyber forces. It envisages drawing on the whole breadth of existing and planned capabilities, including cyber attack, information operations and electronic warfare, as well as manned and unmanned platforms on and under the sea, in the air and in space, with the aim of 'Networked, Integrated Attack-in-Depth'.<sup>22</sup> Some assets such as aircraft carriers would initially be held at distance, while submarines, small surface warships (such as destroyers and littoral combat ships) and unmanned systems operate inside the enemy's core areas, with land-based aircraft operating from more distant air bases, to unravel and defeat the enemy defensive system. This initiative is at a very early stage and the individual programmes that comprise it are vulnerable to reductions in the defence budget. Nevertheless, the Air–Sea Battle concept provides an indication of the form that high-end naval conflict might take. As noted above, the initiative is not solely directed against China and would have utility against any other state that seeks to disrupt or deter US intervention at or from the sea, including the asymmetric approaches of a potential challenger such as Iran.

In some ways, of course, it is stretching the term 'asymmetric' to apply it to China's strategy for naval conflict. The capabilities envisaged are by any standards highly sophisticated and enormously expensive, albeit sharply different from those of the US. Further, China shows increasingly clear signs of becoming a conventional naval power itself. During the Cold War, depictions of the USSR as solely a continental power were increasingly confounded as its navy steadily developed in capabilities, in the roles it undertook and the regions to which it was

deployed. This process was in part the result of reflection on the Western use of naval power in limited war, crisis and unstable peace, as set out by the long-time commander-in-chief of the Soviet Navy, Admiral Sergei Gorshkov.<sup>23</sup> While some analysts inside China as well as outside have portrayed the country as overwhelmingly continental in orientation, it should not be a surprise that as its economy has developed and its power increased, it has looked increasingly to naval power. In economic terms, China is enormously dependent on the sea to import raw materials and to export industrial goods. For China, an approach confined to sea denial alone is not an option. It is therefore to be expected that the Chinese Navy will become an increasingly familiar presence at steadily growing distances from home. Moreover, China's own dependence on the sea and on the globalised international economy more broadly provides not only a strong reason to avoid armed conflict with the US, but also incentives to look to cooperation at sea. The Chinese deployment for anti-piracy patrols off East Africa is significant in this respect.

There are signs that China is developing the types of capabilities that would give it a more traditional fleet for operations further from home – in addition to rather than instead of an A2/AD approach to a confrontation with the US. Interestingly, there is an awareness in Chinese writing about anti-ship ballistic missiles that they cannot replace traditional naval assets such as aircraft carriers and submarines, and that they cannot provide sea control.<sup>24</sup> China has accelerated work on a former Soviet aircraft carrier, with the apparent intention to use it to ascend the formidable learning curve involved in operating fixed-wing aircraft from carriers. It is also building up other capabilities that would permit force projection at greater range, building larger amphibious ships including LPDs ('Landing Platform Dock', or amphibious assault ships capable of landing forces by helicopter as well as by using traditional landing craft) with plans for larger and more capable LHDs (helicopter assault ships).<sup>25</sup>

### **The future of the aircraft carrier**

Perhaps the principal debate relating to naval capabilities, certainly the longest in duration, concerns the continuing centrality of the aircraft carrier. No other naval asset, no other military platform has been the subject of more premature obituaries. It is easy to understand institutional antipathy carriers. For air forces, they represent the heresy of air power outside their control (which, embarrassingly, has repeatedly proved its value and versatility relative to land-based aircraft as recently as in operations against Islamic State in Iraq and Syria). For armies and for politicians, they are capital-intensive assets which mean less to spend on other defence or non-defence priorities.

In view of the criticism directed against them, which ranges from the informed to the merely vitriolic, their survival is rather surprising – and this cannot simply be ascribed to institutional inertia from navies, since they have been opposed by many equally powerful and no less inert institutions. Ever since the Second World War, these vessels have been at the heart of the major fleets. Despite their demise being repeatedly hailed, they have successfully adapted and retained their position in navies, fending off threats both conceptual and military from land-based aircraft and from various weapons systems proclaimed to have made them obsolete. As explained above, this process has involved the adaptation of the task force more widely, taking in a wider range of assets, and has also benefited from improvements in the capabilities of the aircraft operating from the ships. The accusation of vulnerability so repeatedly hurled against them has never quite stuck; partly because all military systems are 'vulnerable' but also because empirical evidence contradicts it: despite being involved in a huge number and variety of conflicts and despite the efforts made by opponents, not a single carrier has been hit by an enemy, let alone sunk, since

the later stages of the Second World War. Moreover, no aircraft has been lost to enemy action, on the deck of a carrier in this period, either. It is salutary to compare these statistics with the number of air bases knocked out or overrun and the number of aircraft destroyed on the ground by a range of threats from missile strikes to insurgent attack.

Indeed, the carrier seems to be enjoying something of a resurgence. The US is continuing to build large-deck carriers, which play a central role in its envisaged response from high-end conventional warfare such as ASB to countering asymmetric approaches.<sup>26</sup> Britain is currently building two carriers, which will be the largest warships ever put into service by the Royal Navy. France, India, Italy, Russia, Spain and Thailand all deploy carriers. The Japanese Maritime Self-Defence Force has commissioned a 'destroyer', which at 19,000 tons displacement and with a full through-flight deck might well have been labelled a carrier in another navy.<sup>27</sup> As noted above, for all the effort devoted to countering the US Navy's carriers, China also realises their immense utility for sea control and force projection beyond the range at which land-based aircraft can support naval operations. As one Chinese admiral wrote:

Aircraft carriers symbolize a country's overall strength. They are also the core of the navy's combined-arms sea operations. Building carriers has all along been a matter of concern for the Chinese people. To modernize our national defense and build a perfect weaponry and equipment system, we have to consider the development of carriers.

The article that cites this quotation explains that the Chinese intention for carriers is not to go toe-to-toe with their US Navy counterparts in a repeat of the Pacific War, but rather to support naval operations (both sea control and power projection) at a greater distance than is currently possible for the Chinese Navy.<sup>28</sup> Far from being in decline, aircraft carriers are being deployed in an increasing number of navies.

The reason for this is their evident utility, demonstrated on many occasions, in naval operations both at and from the sea, at all levels from regional war to limited intervention and naval diplomacy.<sup>29</sup> Given the argument at the outset of the chapter, predicting that conflict at and adjacent to the sea will become increasingly prevalent, it is not surprising that more states are seeking the advantages that the capability offers.

This is not, of course, to argue that carriers will remain unchanged or that their roles and uses will be the same as in previous decades. Several states have commissioned helicopter carriers – particularly for anti-submarine warfare or amphibious operations – either in addition to or instead of conventional fixed-wing carriers on the conventional model (including the US, UK, France, Soviet Union, Brazil, Spain, Italy and Australia). The current intention for the British *Queen Elizabeth*-class carriers is that they should be able to combine the roles of carrier strike and amphibious warfare in an ambitious concept known as 'Carrier Enabled Power Projection'. Carriers will continue to evolve. They will deploy unmanned aircraft alongside their existing complement. They will operate in a closely integrated fashion with other surface, sub-surface, air (both naval and land-based) and space systems. This will include novel platforms, such as smaller, networked surface combatants or warships and submarines optimised for strike against land,<sup>30</sup> and within a context of new capabilities, notably cyber warfare. They will continue to have considerable utility in high-end conventional warfare – albeit being constrained in the very highest-threat environments, perhaps operating at greater distances than hitherto in the early stage of a conflict. They will be more central in the far more likely scenarios at the lower and middle range of conflict intensity.<sup>31</sup> Carriers have been in service for nearly 100 years; they will continue to be a central feature of naval conflict for many decades to come.

### ***Lower-intensity roles***

Much of this chapter has focused on warfighting operations by naval forces, as these tend to receive the most attention. However, much of what navies do on a routine basis, day by day, is quite different, as well as being far less influenced by changing technology. The roles of naval forces in the future will continue to be varied, across a wide spectrum of types and intensities of conflict. This broad range of activities is peculiar to navies, with no exact parallel among land or air forces, and once again finds ample precedents in history:

The function of the fleet, the object for which it was always employed, has been three-fold: firstly, to support or obstruct diplomatic effort; secondly, to protect or destroy commerce; and thirdly, to further or hinder military operations ashore.<sup>32</sup>

As now, more states will tend to focus on the more limited end of the scale than aspire to the most demanding operations – though it is likely that the number of states in the latter category will increase rather than diminish.

At the least ambitious end of the scale lie constabulary and humanitarian operations. These include policing national waters, countering crime at sea (such as smuggling or illegal fishing), or responding to humanitarian emergencies. Every navy, even the smallest, conducts these operations.

Moving up a level lie maritime security operations. These include the protection of shipping against harassment or interference, or operations against more developed threats such as piracy or maritime terrorism. Some of these activities are conducted within a state's own territorial waters; the more capable navies will contribute to such operations in more distant waters – the multinational operations in the Gulf of Aden and the Indian Ocean being a good case in point. Closely linked to this sort of activity is the often overlooked diplomatic role of navies,<sup>33</sup> gathering situational awareness and building relationships, supporting and reassuring friends, deterring potential enemies and providing a presence that permits rapid response in a crisis, ideally to prevent or contain it. While much attention is devoted to power projection, this broader, longer-term activity that might be termed 'influence projection' will continue to be hugely significant in the international system, as the major powers use it to interact with each other and to maintain a military presence in their key regions of interest.

### **Conclusion**

The variety of naval operations and the range of naval conflict will remain as broad as before, ranging from constabulary and presence activities, through maritime security, to limited intervention, regional conflict and up to high-end conventional war. There will still be a combination of operations at sea and operations from the sea. The former will include maritime security operations and counter-terrorism but also protection of shipping and assertion of rights of navigation or disputed waters. The latter will include strikes against shore targets as well as amphibious raids and Special Forces operations, on a scale varying widely from small, brief interventions – which are likely to be particularly prominent and conducted by a wider range of states – to longer campaigns.

A bigger change might be expected in who is conducting naval operations. The traditional naval powers (notably the US, UK, France, arguably Russia) will continue to be prominent but they will increasingly be joined by the rising powers such as China and India both within and outside their own regions, as well as by a host of medium navies in their own regions. The

advance of technology will increasingly stretch the spectrum of fully capable, to limited global, to local navies. Operations will often be conducted by a multinational force, either drawing on formal alliances or on a more *ad hoc* basis. One interesting possibility is the increasing role of non-state actors in naval conflict, whether in the shape of terrorist groups conducting attacks at or from the sea, or private security companies protecting shipping against pirate attack.

Developing technology has long been a principal driver of changes in naval conflict and this will remain the case. Some new technologies threaten warships and navies, some assist and enhance them, most do both. Any suggestion that large warships are becoming obsolete should be treated with extreme caution, not least because of the previous collapse of so many claims along these lines. While other options can provide some capability in sea denial, for the many states and roles that require the positive use of the sea, surface warships remain essential. They will, however, continue to adapt and will increasingly operate in the context of diverse and integrated force structures that involve land, air, space and cyber systems – and a combination of manned and unmanned platforms – in addition to the traditional naval platforms, surface, subsurface and air. The result of the continuing to-and-fro cycle of technological advance will leave some states by the wayside and will reduce the roles and capabilities to which some other states aspire; but these laggards will be replaced by emerging world and regional powers who are keen to make use of the sea.

The strategic environment and the threats and opportunities presented by emerging technology establish the questions for the future of naval conflict. The key factor in the outcomes of the process, and the main area where answers must be sought, lies in politics. How far will the US reorient its forces towards maritime capabilities as it seeks to balance against China in the context of a diminishing economic and technological lead? To what extent will the UK and other European powers devote the required resources to defence policy in general and to naval forces in particular? As regards Europe, will there be effective cooperation or ‘burden sharing’, or will its navies simply shrink in isolation? Will Russia collapse or revive, and how far will it look to its navy to support its overseas interests? How far will the rising powers continue the trajectory of their naval development by acquiring the capabilities for power projection at distance from their home territory? What regional powers will emerge as key players and what roles will they seek to conduct at sea? It is in these issues that the key developments framing future naval conflict will unfold.

## Notes

- 1 The analysis, opinions and conclusions expressed or implied in this chapter are those of the author and do not necessarily represent the views of the Joint Services Command and Staff College, the UK Ministry of Defence or any other government agency.
- 2 Ministry of Defence, *Strategic Trends Programme: Future Character of Conflict* (Development, Concepts and Doctrine Centre, February 2010), especially pp. 20–5. Available at: [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/33685/FCOCR\\_eadactedFinalWeb.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/33685/FCOCR_eadactedFinalWeb.pdf), accessed 1 February 2015.
- 3 Ministry of Defence, *Joint Doctrine Publication 0–10: British Maritime Doctrine* (Development, Concepts and Doctrine Centre, August 2011), especially section 2–1, which list the attributes of maritime power as access, mobility, lift capacity, sustained reach, versatility, poise and resilience, which combine to provide leverage. Available at: [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/33699/20110816JDP0\\_10\\_BMD.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/33699/20110816JDP0_10_BMD.pdf), accessed 1 February 2015.
- 4 See, for example, ‘Speed Is the New Stealth’, *Economist*, 1 June 2013, which argues that such a weapon system could replace stealth capabilities, which other states will increasingly be able to counter.
- 5 For an entertaining example that blends a little insight with a lot of exaggeration, see Alexander P. de Seversky, *Victory through Air Power* (New York: Simon & Schuster, 1942), or his 1943 Walt Disney film of the same name.



- 6 This argument is developed at greater length in Tim Benbow, 'Navies and the Challenge of Technological Change', *Defence Studies* 8, 2 (June 2008), 207–26.
- 7 They are also referred to as 'unmanned aerial vehicles', or UAVs; when armed, they are referred to as 'unmanned combat aerial vehicles', orUCAVs.
- 8 See in particular, Julian S. Corbett, *Some Principles of Maritime Strategy* (London: Longmans, 1911).
- 9 The original plan was for 12 but this was scaled back due to reductions in the defence budget and expenditure on the prolonged campaigns in Iraq and Afghanistan.
- 10 For a more detailed exposition of my views on this subject, see Tim Benbow, *The Magic Bullet? Understanding the 'Revolution in Military Affairs'* (London: Brassey's, 2004). Essentially, I argue that an RMA comparable with previous cases that were widely recognised as such was indeed underway – but that the implications of an RMA were not what some of its more excitable adherents hoped; its effect are undermined by friction and chance – which will not be eliminated – and by the adaptation of opponents (both symmetric and asymmetric). In particular, it does not offer an easy military solution to complex strategic problems.
- 11 Corbett, *Some Principles of Maritime Strategy*, p. 131. He was paraphrasing approvingly the words of Alfred T. Mahan.
- 12 Joint Concept Note 1/12, *Future 'Black Swan' Class Sloop-of-War: A Group System* (Development, Concepts and Doctrine Centre, May 2012). Available at: [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/33686/20120503JCN112\\_Black\\_SwanU.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/33686/20120503JCN112_Black_SwanU.pdf), accessed 1 February 2015.
- 13 *Future 'Black Swan' Class Sloop-of-War*, pp. 1–13.
- 14 For more on asymmetric warfare, see Benbow, *The Magic Bullet?*, ch. 7; also Tim Benbow, 'Irresistible Force or Immoveable Object? The Revolution in Military Affairs and Asymmetric Warfare', *Defence and Security Analysis* 25, 1 (March 2009), 21–36.
- 15 See Martin Murphy, 'The Blue, Green and Brown: Insurgency and Counter-insurgency on the Water', in Tim Benbow and Rod Thornton (eds), *Dimensions of Counter-insurgency: Applying Experience to Practice* (London: Routledge, 2008), 57–73.
- 16 Theodore Ropp, 'Continental Doctrines of Sea Power' in Edward M. Earle, *Makers of Modern Strategy: Military Thought from Machiavelli to Hitler* (Princeton, NJ: Princeton University Press, 1943), 447–54.
- 17 For an interesting account of anti-access strategies, which shows that they are far from new, see Sam J. Tangredi, *Anti-Access Warfare: Countering A2/AD Strategies* (Annapolis, MD: Naval Institute Press, 2013).
- 18 For considerable detail about how the Chinese armed forces envisage using anti-ship ballistic missiles, see Andrew S. Erickson and David D. Yang, 'Using the Land to Control the Sea? Chinese Analysts Consider the Antiship Ballistic Missile', *Naval War College Review* 62 4 (Autumn 2009), 53–86.
- 19 For an analysis of the threat posed by Chinese ballistic missiles to US carriers and also air bases, as well as the US response, see Marshall Hoyle, 'China's "Antiaccess" Ballistic Missiles and US Active Defense', *Naval War College Review* 63 4 (Autumn 2010), 84–105.
- 20 Robert S. Ross argues that China 'is still unable to challenge US dominance at sea or upend the balance of power in the region'; Robert S. Ross, 'The Problem with the Pivot', *Foreign Affairs* 91, 6 (November–December 2012), p. 73. His analysis suggests that China's recent assertiveness stems not from confidence but rather from a perception of insecurity.
- 21 See Aaron L. Friedberg, *Beyond Air–Sea Battle: The Debate over US Military Strategy in Asia* (London: Routledge/IISS, 2014).
- 22 See Jan Van Tol, Mark Gunzinger, Andrew E. Krepinevich and Jim Thomas, *AirSea Battle: A Point-of-Departure Operational Concept* (Washington, DC: Center for Strategic and Budgetary Assessments, 2010); Air–Sea Battle Office unclassified briefing, 'Air–Sea Battle: Concept and Implementation', 12 October 2102. Also General Norton A. Schwartz, USAF and Admiral Jonathan W. Greenert, USN, 'Air–Sea Battle: Promoting Stability in an Era of Uncertainty', *American Interest*, 20 February 2012. The authors (respectively the Chief of Staff of the USAF and the Chief of Naval Operations) draw the parallel with cooperation between the US Army and US Air Force to defeat Soviet bloc land forces with concepts such as 'Follow-on Forces Attack' and 'AirLand Battle'. Interestingly, they suggest that Air–Sea Battle would be relevant against non-state as well as state opponents.
- 23 See Sergei Gorshkov (Fleet Admiral, Soviet Navy), *The Sea Power of the State* (Oxford: Pergamon, 1979).
- 24 Erickson and Yang, 'Using the Land to Control the Sea?', p. 68. Again, comparison with the writings of Gorshkov – in which he argued that the USSR needed a surface fleet as well as the submarines on which some of his compatriots were content to rely – is instructive.

- 25 Daniel J. Kostecka, 'From the Sea: PLA Doctrine and the Employment of Sea-Based Airpower', *Naval War College Review* 64, 3 (Summer 2011), 11–31. He argues that China sees the amphibious platforms as primarily useful for assaults in the South China Sea but also for wider roles such as counter-piracy, humanitarian relief or non-combatant evacuation.
- 26 For contrasting approaches in the US debate, see Captain Henry J. Hendrix, US Navy, and Lieutenant-Colonel J. Noel Williams, US Marine Corps (Ret), 'Twilight of the \$UPERflous Carrier', *Proceedings of the US Naval Institute* 137, 5/1,299 (May 2011); and Scott C. Truver, 'Now Hear This – 'Semper CVN!', *Proceedings of the US Naval Institute* 139, 9/1,327 (September 2013).
- 27 Vice-Admiral Yoji Koda, 'A New Carrier Race? Strategy, Force Planning and JS *Hyuga*', *Naval War College Review* 64, 3 (Summer 2011), 31–60.
- 28 Kostecka, 'From the Sea'; quotation cited p. 11.
- 29 An account and analysis of the use since 1945 of carriers (and also amphibious ships) by the Royal Navy can be found in Tim Benbow, *British Uses of Aircraft Carriers and Amphibious Ships 1945–2010*, Corbett Paper 9 (Corbett Centre for Maritime Policy Studies, March 2012). Available at: [www.kcl.ac.uk/sspp/departments/dsd/research/researchgroups/corbett/corbettpaper9.pdf](http://www.kcl.ac.uk/sspp/departments/dsd/research/researchgroups/corbett/corbettpaper9.pdf), accessed 1 February 2015.
- 30 The US has for some time operated cruisers, destroyers and nuclear submarines with land-attack missiles in addition to their other weapons systems. It has also deployed dedicated missile battery ships in the form of four 'SSGNs', Ohio-class former ballistic nuclear missile submarines converted to carry as many as 154 Tomahawk land-attack missiles, as well as being able to deploy special forces.
- 31 One analyst sees the roles of the carrier changing and its utility narrowing, with greater emphasis on providing the eyes of the fleet (possibly acting in support of submarines) and less on hit-and-run raids, though acknowledging that they will retain a role in 'scenarios short of high-end missile combat'; Robert C. Rubel, 'The Future of Aircraft Carriers', *Naval War College Review* 64, 4 (Autumn 2011), p. 23.
- 32 Julian Corbett, *England in the Seven Years' War: A Study in Combined Strategy*, vol. 1 (Cambridge: Cambridge University Press, 2010) (reprint of the original Longmans, Green, and Co. 1907 edition), p. 6. I am indebted to Dr James Bosbotinis for this quotation.
- 33 The classic text on this important field of activity is James Cable, *Gunboat Diplomacy 1919–1991: Political Applications of Limited Naval Force* (London: Macmillan/IISS, 1994).

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