Defending Europe: scenario-based capability requirements for NATO's European members

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Contents

Executive summary

The IISS has conducted an independent open-source high-level assessment of how the defence of Europe, and of European interests, would look if the United States had left NATO and did not contribute militarily.

The study applies scenario analysis – with scenarios set in the early 2020s – to generate force requirements, and assesses the ability of NATO's European member states to meet these requirements based on data from the IISS Military Balance Plus online database. The cost of closing the identified capability shortfalls through equipment acquisition has been estimated.

The objective of the study is to enable informed policy dialogue both in Europe and in a transatlantic setting. The study explicitly does not intend to predict future conflicts nor the intentions of any of the actors involved. Neither does it wish to prescribe a certain path of action to be pursued by European NATO governments.

The first scenario examined deals with the protection of the global sea lines of communication (SLOCs). In this scenario, the United States has withdrawn from NATO and has also abandoned its role of providing global maritime presence and protection, not just for its own national interest but also as an international public good. It thus falls to European countries to achieve and sustain a stable maritime-security environment in European waters and beyond, to enable the free flow of international maritime trade, and to protect global maritime infrastructure. The IISS assesses that European NATO members would have to invest between US$94 billion and US$110bn to fill the capability gaps generated by this scenario.

The second scenario deals with the defence of European NATO territory against a state-level military attack. In this scenario, tensions between Russia and NATO members Lithuania and Poland escalate into war after the US has left NATO. This war results in the Russian occupation of Lithuania and some Polish territory seized by Russia. Invoking Article V, the European members of NATO direct the Supreme Allied Commander Europe (SACEUR) to plan *Operation Eastern Shield* to reassure Estonia, Latvia and Poland, and other front-line NATO member states, by deterring further Russian aggression. European NATO also prepares and assembles forces for *Operation Eastern Storm*, a military operation to restore Polish and Lithuanian government control over their territories. The IISS assesses that European NATO members would have to invest between between US$288bn and US$357bn to fill the capability gaps generated by this scenario. These investments would establish a NATO Europe force level that would likely allow it to prevail in a limited regional war in Europe against a peer adversary. The assessment does not cover a full-scale continental war in Europe.

Beyond identifying capability shortfalls, the study underlines the centrality of the NATO Command Structure. Without it, it does not seem feasible at this point for Europeans to attempt to run demanding operations of the kind considered in this paper. Another implication of this research is the enduring importance of the US in military terms for the defence of Europe.

This study provides a reality check for the ongoing debate on European strategic autonomy. Its findings underline that it would be helpful for this debate to focus on the capabilities to tackle threats to European security, rather than on institutional engineering.

If the funding to meet shortfalls were available, the IISS assesses that the recapitalisation across the military domains would take up to 20 years, with some significant progress around the ten- and 15-year marks. The reasons for this are limited production capacity; the time it takes to decide on and then produce equipment and weapons; recruitment and training demands; and the time it takes for new units to reach an operational capability.

1. European defence by Europeans

On the eve of NATO's 70th anniversary in April 2019, Europe's security debate was focused on visions for a European army and exchanges about possible paths to achieving some degree of European strategic autonomy. These developments were fuelled by a deteriorating security environment in Europe's periphery and further afield, and the rhetoric of a United States administration that has suggested its commitment to European security is conditional on increased European capability. While there was no desire to adjust legal frameworks or to change the fact that even the European Union treaties assign the task of collective defence to NATO, several governments in the EU and NATO had begun to ask how the defence of Europe, and of European interests, would look if the US was not involved.

The IISS has conducted an independent, open-source assessment of this question. In doing so, a team of researchers from the IISS Defence and Military Analysis Programme has combined scenario analysis with data from the IISS Military Balance Plus online database on international military capabilities.[1] The team examined two contingencies:

- The protection of the global sea lines of communication (SLOCs);
- The defence of European NATO territory against a state-level military attack.

For each of these contingencies a scenario was developed in order to produce credible operational assumptions, that would then be the basis for an estimate of the forces required to implement these plans. The team then assessed whether the European NATO member states would be able to generate the required forces for each scenario and identified the shortfalls that would occur.[2] The IISS team modelled a potential solution of possible acquisitions that would cover the shortfalls and estimated the costs of doing so. Recent real-world procurement contracts were used to develop estimates on unit costs.

1.1 Assumptions and approach

When designing and implementing the study, the research team had to make a number of assumptions. By making them transparent, readers will be able to form their own judgements and adjust the takeaways for themselves; for example, whether they feel either optimistic or pessimistic about the ability of European NATO member states to meet a certain force requirement.

One of those judgements relates to the issue of how to account for the different quantities and qualities of the military inventory of NATO's European members. NATO's European members between them possess some 100 armoured or mechanised brigades. However, around three-quarters of these are currently equipped with ageing or obsolescent tank, infantry-fighting-vehicle or armoured-personnel-carrier designs. Those units and their equipment would be of questionable value in a collective-defence scenario involving a state-level opponent that is able to draw, in part, on modern equipment. For the purposes of this study, those brigades have not been counted in the overall assets available for the operation, leading to a significant deficiency in heavy-armoured formations for NATO. This in turn has implications for the ways in which capability shortfalls can be addressed: some shortfalls will require new formations to be stood up and equipped whereas others can be met through re-equipping existing units. This logic applies to many capability areas.

Furthermore, the research team made assumptions about the availability of equipment and units at certain readiness levels. Where these are relevant for the assessment, those assumptions will be explicitly mentioned in the text. Most European NATO members would struggle to make more than 30–50% of their land forces available for deployment without significant lead times of 180 days or more. Thus, assuming a 50% availability rate, a force requirement for ten armoured brigades would only be considered fulfilled if 20 armoured brigades were in existence in European

force structures under the assumptions of this study. Similar (obsolescence) judgements are applied to the air and maritime domains.

None of the scenarios considered in this report involve the use of nuclear weapons. These were considered to be outside the scope of this study, which explicitly tries to illuminate the conventional military shortfalls of NATO's European member states – the shortfalls on which most European members have the ability to act.

Command and control (C2) arrangements prove challenging as well. For the purposes of this study, the assumption was made by the IISS that the NATO Command Structure would continue to exist even without the US involved, and that NATO's remaining members would between them be able to fill the slots currently occupied by US personnel. How this might look could be the subject of a study in itself. However, it is a necessary assumption for this paper, as the IISS assesses that only the NATO Command Structure is currently able to cope with the complexity of the operations required under the scenarios employed.

1.2 US withdrawal from NATO

The setting for this study assumes that the US would not contribute militarily to any of the scenarios under consideration because it has withdrawn from NATO. Again, how such a withdrawal might come about in the next 24 months or so can be the subject of much debate and creative scenario writing. The purpose of this paper is not to dwell on this point but rather to accept this as the starting point of this particular analytical exercise. Factors that can lead to a significant increase in transatlantic friction include disagreements over Afghanistan, China, Iran, Russia, Syria, burden-sharing and international terrorism. It is plausible to assume that any of these could reach a level of mutual distrust leading either a re-elected President Donald Trump or another US president to give notice under the North Atlantic Treaty and leave the Alliance. This paper assumes that the US is no longer a NATO member at the end of 2021.

Rather than exploring how this might come about, it is important to explore what NATO's inheritance would be. It seems logical that once a decision to withdraw has been made, the US defence secretary would direct all US forces and their families; Department of Defense staff; and military units and equipment to leave Europe for rebasing in the US, Gulf or Asia-Pacific. The only exception would most likely be the US Marine Corps security details at US embassies.

Former US bases in Europe might be sold to the host nation or to a commercial bidder. Perhaps any surplus ammunition or spare parts would be offered for sale to European armed forces. US European Command's (EUCOM) main effort would be to manage the withdrawal in all its aspects. US personnel would withdraw from NATO appointments, but existing contracts with US defence manufacturers would be honoured and it seems likely that both NATO as an organisation and its European members would continue to be encouraged to purchase US military equipment. The IISS assumes a number of actions would follow a US withdrawal to ensure NATO would be able to continue to act:

- The United Kingdom and France declare that their national nuclear capabilities would continue to be available to the Alliance *in extremis*.
- The Very High Readiness Joint Task Force (VJTF) and the NATO Response Force (NRF) continue to exist. Gaps left by the withdrawal of US units are to be filled by European NATO states.
- France agrees to replace the US as the lead nation for the Enhanced Forward Presence (EFP) battalion in Poland.
- All US staff officers in NATO leave their posts. These posts are filled by other NATO member nations.
- France and the UK might argue that their nuclear and conventional capabilities, operational experience and UK access to Five Eyes intelligence mean that they should alternate between filling the Supreme Allied Commander Europe (SACEUR) and the Deputy SACEUR (DSACEUR) posts.
- Allied Command Transformation moves to Europe and is likely to be reduced in size to provide staff to fill the gaps at NATO HQ and Allied Command Europe.
- HQ Joint Force Command Norfolk might move from the US to Canada, for example to the Royal Canadian Navy base in Halifax, Nova Scotia.

- Most European NATO members decide to review the scale and extent of their participation in non-NATO overseas operations.

1.3 Objective of the study

This study is based on scenarios set in the early 2020s.[3] The study does not aim to predict future conflicts nor the intentions of any of the actors involved. Neither does it wish to prescribe a certain path of action to be pursued by European NATO governments. Rather, the objective of the study is to use plausible and coherent scenarios in order to provide an open-source assessment that will enable informed policy dialogue both in Europe and in a transatlantic setting.

2. Protecting the global sea lines of communication

This chapter outlines a scenario and the force requirements needed to protect the global sea lines of communication (SLOCs) in a maritime-security context short of general conflict. The background is that the United States has withdrawn from NATO and has also abandoned its traditional role in modern times of providing global maritime presence and protection, not just for its own national interest but also as an international public good (i.e., it has 'abandoned the global commons').

2.1 US withdrawal from Europe

In line with the US administration's intention to withdraw from NATO, US Navy Europe (NAVEUR) begins drawdown preparations. These include the closure of the NAVEUR and US 6th Fleet headquarters in Naples, Italy, as well as the departure of associated task-force HQ staff; the withdrawal of the 6th Fleet command ship USS *Mount Whitney*, based at Gaeta in Italy; and the withdrawal of eight *Arleigh Burke*-class destroyers with their ballistic-missile-defence (BMD) and *Tomahawk* land-attack cruise-missile (LACM) capabilities from Rota, Spain and Portsmouth, United Kingdom (the latter added in late 2019 in response to growing concerns about the Russian threat). The US facilities at Rota and at Souda Bay, Greece, are also prepared for closure. Rotational deployments of P-8A *Poseidon* maritime-patrol aircraft to Sigonella, Italy and Keflavik, Iceland are also brought to an end.

The US four-star admiral in charge of Allied Joint Force Command Naples (JFC Naples) prepares to hand over their responsibilities and US staff prepare to withdraw. US commanders and personnel embedded in NATO Allied Maritime Command (MARCOM), including the Commander Submarines NATO, also withdraw. Forward US rotation of nuclear-powered attack and cruise-missile-armed submarines (SSNs and SSGNs) for NATO operations and exercises ceases, as does US Navy participation in Standing NATO Maritime Groups (SNMGs).

Resetting the US Navy's global posture

The US decision to withdraw from NATO hastens a significant resetting of the US Navy's global posture. This has been under way for some time, in part owing to increasing concern about the continuing development of the Chinese People's Liberation Army Navy (PLAN), both in terms of its sea-denial capabilities within the 'first island chain' and its growing blue-water capabilities beyond. In addition, due to further budget constraints and industrial-base issues, there have been growing doubts about the US Navy's ability to build up its fleet numbers as planned, particularly in the short term.

As a result, there is a further rebalancing of US Navy forces from the Atlantic and the Middle East towards the Pacific. Moreover, during heightened tensions with the PLAN, there is a collision between a US and Chinese destroyer in the South China Sea. Although both ships are damaged, they appear able to continue to their home ports under their own power. However, owing to what an investigation would later conclude was bad maintenance and poor damage control resulting from inadequate training, a fire leads to a devastating explosion on the US vessel, killing 27 sailors and nearly sinking the ship.

Shortly afterwards, another US destroyer going to the aid of a Dutch bulk carrier in the Indian Ocean with a severely ill sailor on-board is also nearly sunk. Two more US sailors lose their lives in a collision between the two vessels due to poor communications and seamanship on both vessels; a marine inquiry judges that the merchant ship was 75% to blame. This leads to public anger in the United States, but also to renewed alarm that the US Navy is dangerously overstretched.

Finally, the US, under growing pressure at sea, calls on the European Union to take over a plan that Washington has been formulating. The plan is to blockade Iranian shipping, which is suspected of being involved in illicit-weapons proliferation and breaking US-imposed sanctions. The EU, as widely expected in

diplomatic circles, declines amid speculation that the White House has deliberately engineered the rift.

This theory gains added weight when, two weeks after his 2021 State of the Union address, the US president visits Pearl Harbor. From the deck of the preserved Second World War battleship USS *Missouri*, and citing the series of recent incidents, they announce that in future the US will take a much narrower view of its maritime interests. For too long, the president declares, the US has been paying to police the world's oceans.

The president reaffirms that the US will not ratify the UN Convention on the Law of the Sea (UNCLOS). They announce that the US policy on Freedom of Navigation Operations (FONOPs) will be rewritten and actual FONOPs will be significantly curtailed. There will be a reduction in routine presence operations, partnership exercises and capacity-building missions. The US Navy will remain the most powerful in the world, according to the president, but it will be a 'navy for the United States', not for the rest of the world.

Subsequently, US spokespeople brief that, of course, if there are actual attacks on world shipping or SLOCs that directly affect US trade and economic interests, the US Navy will respond. However, maritime issues that are confined to specific regions are for the regional states to deal with.

One further consequence is that the operations of the US Navy's 2nd or Atlantic Fleet are focused on the western Atlantic and protecting the US eastern seaboard.

2.2 'Choppy waters': the scenario – October 2021

As a further backdrop, from about 2018, there has been an increase in concern over stability in the maritime space, both in and around Europe; in the Indo-Pacific region centred on growing frictions over the South and East China seas; and more broadly in the global maritime commons.[4]

During 2018, the US Navy revived its 2nd Fleet, with a focus on the Atlantic, and increased the frequency and duration of deployments into the European theatre of aircraft-carrier strike groups and submarines. This was in response to increased Russian naval – particularly submarine – activity, especially in the northeastern Atlantic.

A further development took place in summer 2018, when the Russian Navy surged a force of more than a dozen vessels into the eastern Mediterranean. At the time, it was the biggest such deployment since the end of the Cold War, and it included at least eight platforms, of which two were improved *Kilo*-class conventionally powered attack submarines (SSKs), armed with the *Kalibr* family of land-attack and anti-ship cruise missiles.

As Russian naval deployments continued to grow more confident, the US announced in autumn 2019, two months before the NATO leaders' meeting in London, that it was doubling the number of *Arleigh Burke*-class destroyers forward-deployed to Europe. They were now to be based in Portsmouth as opposed to Rota. At this time, despite the amplified burden-sharing complaints from the White House, the US was actually continuing on a path of bolstering its force posture in Europe.

A new normal

Nevertheless, with transatlantic political fissures and frictions becoming more pronounced, apparently disruptive Russian behaviour began to increase. This spilled over into the maritime domain.

The gathering of Russian Navy forces in the eastern Mediterranean became an established pattern. Smaller groups of Russian Navy ships also began to concentrate more in the western Mediterranean.

Moscow's assertive seizure of control in the Sea of Azov, also a feature of the change at sea in 2018, remained a constant.

There were further overt displays of Russian naval activity in the Baltic Sea, including an increasingly sharp war of words between Russia and Sweden over the island of Gotland. There were reports of harassment of Baltic shipping, and of GPS jamming.

NATO and EU member states in and around the Baltic and Black seas and in the Mediterranean increased their calls for an enhanced maritime presence. US and NATO anti-submarine warfare (ASW) assets and other sub-surface assets and sensors detected a further increase in Russian submarine activity in the northeastern Atlantic, including through the Greenland–Iceland–UK (GIUK) gap.

Against this backdrop, NATO maritime commanders increased their requests for NATO member states to

support fully the SNMGs, which had not operated with their notional full complement of warships for years. There were also calls to add at least one further such group to improve the flexibility of NATO's maritime force posture.

At the same time that such activities in and around Europe were unfolding and preoccupying NATO and European maritime commanders, there were growing concerns about a resurgence of piracy and a general deterioration in maritime security off the Horn of Africa, in the Somali Basin and the Gulf of Aden, and through the Bab el-Mandeb Strait into the Red Sea. As an added factor, Russia's raised profile and presence in the eastern Mediterranean produced an increasingly close alignment between Russia and Egypt, as well as several other northeast African states, helped by a temporary retrenchment of Chinese activity in the region. This added further concerns about freedom of navigation in the Red Sea and through the Bab el-Mandeb Strait. The continuing war in Yemen also presented a latent threat at sea.

Piracy and maritime security in and off West Africa, and particularly around the Gulf of Guinea, also continued to attract attention. In terms of further maritime horizons, a debate continued on a possible coordinated European approach to confronting challenges to the rules-based order at sea in the Indo-Pacific region, based on an idea originally proposed by France's then-defence minister, Jean-Yves Le Drian, at the 2016 IISS Shangri-La Dialogue.

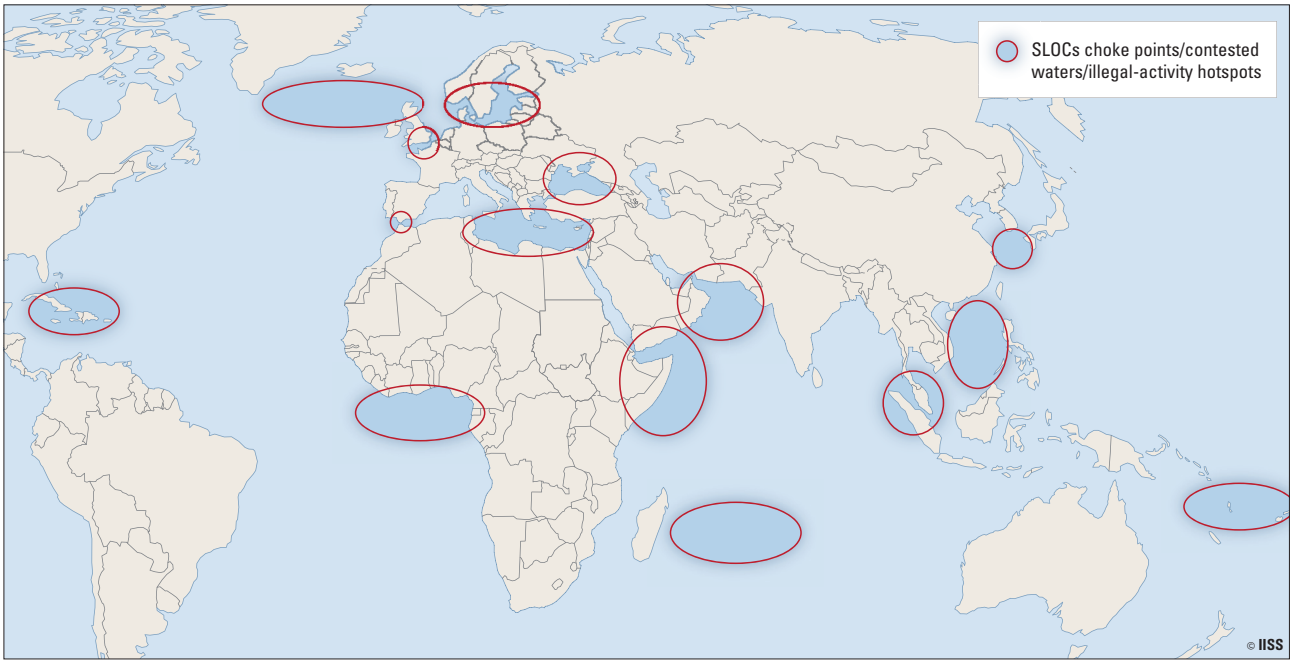
All these issues were coalescing just as the US announcements of a withdrawal from NATO and of a dramatically more restrictive approach to freedom of the seas were revealed. They are brought to a head further by a series of events at sea in October 2021.

The October surprises

The naval posture in and around Europe in the early months of 2021 is relatively relaxed. One unlocated *Oscar* II SSGN on average is believed to be at sea in the North Atlantic. A number of Russian units are in port in Tartus in Syria, and a couple of ships at sea in the eastern Mediterranean. Four SNMG units are at sea in the central and eastern Mediterranean. However, from September, Russian Navy units begin to deploy across the European area, and in this region and beyond the following events unfold:

- Two *Kalibr*-equipped units are detected at sea in the western Mediterranean, a *Grigorovich*-class frigate (FFGHM) and an improved *Kilo*-class SSK in the Adriatic, and three *Kalibr*-equipped units put to sea in the eastern Mediterranean. There are pro-Russian protests in Montenegro. The Russian Black Sea Fleet is placed on high readiness. NATO and EU member states around the Black Sea express concern and call for a heightened NATO or EU naval presence.
- An unidentified sub-surface vehicle or vessel is spotted in Swedish waters in the Baltic, sparking a significant Swedish Navy ASW hunt. At the same time, there are reports of GPS jamming affecting the navigation systems of vessels in the North Sea and the Baltic. Apparently as a result of this jamming, an oil tanker transiting the North Sea runs aground, causing an oil spill. There are also reports of Russian Navy harassment of merchant vessels near undersea pipelines and energy cables connecting the Baltic states and Germany. Moscow announces that Russian divers have found previously undetected, unexploded Second World War ordnance on the seabed near some of these cables and declares a temporary exclusion in the area. The Russian Baltic Fleet is placed at high readiness.
- Four *Kalibr*-equipped units are deployed to the eastern Atlantic from the Russian Northern Fleet, including a *Yasen*-class SSGN. At the same time, Moscow announces plans for a high-seas naval parade involving units from the Northern Fleet, but without specifying a date for the event.
- A *Slava*-class cruiser (CGHM) from the Russian Black Sea Fleet transits the Suez Canal to conduct an exercise with units of the Egyptian Navy in the Red Sea. At the same time – following a withdrawal of both US Navy and PLAN units from counter-piracy and maritime-security operations in the region in the light of their mutual tensions and with renewed US concern over security on the Korean Peninsula – there are two successful

Map 2.1: **Global SLOCs hotspots**



pirate attacks in the region, one off the Somali coast and one off the coast of Yemen. There are also three successful attacks in the Gulf of Guinea in West Africa.

- International alarms are raised by reports of clashes between rival fishing fleets, including very significant Chinese contingents, in what have become over-exploited fishing zones off the coast of Argentina and in the South Pacific.

In light of these events, NATO MARCOM mobilises its operations centre. The MARCOM commander reports to the new French Supreme Allied Commander Europe (SACEUR) their assessment that recent activity by Russia is an effort to apply hybrid pressure on the new NATO following the US departure, in an attempt to deter it. SACEUR briefs the North Atlantic Council (NAC). At the same time, the EU's Political and Security Committee (PSC) meets to consider the situation.

Both the NAC and the PSC direct their organisations' respective military staff to plan for an augmented maritime posture in and around European waters and beyond, following the new situation at sea, and to liaise with each other in the preparation of their plans. The planning process is to be entitled *NATO/EU Maritime Objective*, or *NEMO*.

Outline of operational concept

Objective

To achieve and sustain a stable maritime-security environment in European waters and beyond, to enable the free flow of international maritime trade, and to protect global maritime infrastructure.

Concept

A maritime-security operation in circumstances short of armed conflict. In such a context, without a general war at sea, deep- and open-ocean threats to the SLOCs will be limited, and therefore deep-ocean and long-distance convoying of shipping is unlikely to be a requirement. Nevertheless, planners need to be mindful that, particularly in the maritime arena, there is a significant blurring between peace and war. Therefore, while the specific requirement is for maritime-security operations, consideration needs to be given to the requirement to provide deterrence and the ability to manage escalation, and therefore of the requirement for high-readiness forces or a 'fleet in being' to support presence and policing operations.

Approach

- To leverage the existing competences and capabilities of the NATO command-and-control

infrastructure; NATO MARCOM; JFC Naples and the SNMGs; as well as the EU Naval Force (EUNAVFOR) and its Mediterranean arm, EUNAVFOR MED, and their operations *Atalanta* and *Sophia*.

- There will be a requirement to bolster forces in the eastern Atlantic and the Mediterranean Sea, and the Baltic and Black seas, but additionally to provide for a presence in the northwest Indian Ocean, West Africa and the Western Pacific. Consideration should also be given to the potential requirement for transitory deployments in other sea areas.

Anticipated operational and force requirements to consider

- Command-and-control requirements beyond those currently in place for both NATO and the EU, including the requirement for operational/forward headquarters.
- Enhanced group-deployment capabilities beyond those of the current SNMGs and EUNAVFOR/EUNAVFOR MED deployed forces (*Operation Atalanta* currently has just one ship deployed).
- Establishing and sustaining additional forward presence in the Indian Ocean, Western Pacific and West Africa, as well as potentially the South Atlantic and the South Pacific. The requirement will place particular emphasis on principal surface combatant numbers and the requirement for host-nation support/basing or the requirement for significant additional afloat support. How this requirement fits in with UK and French national forward-deployment plans should also be considered.
- The need for additional units to provide for the high-readiness groups to support forward-presence missions.
- An air component to provide maritime patrol and intelligence, surveillance and reconnaissance (ISR) more generally; principally for the eastern Atlantic, Mediterranean, Indian Ocean and Western Pacific.
- A significant land component is unlikely to be required, except possibly for port/base protection.

2.3 *NEMO*: the plan

Assumptions

- This is a short-of-war/maritime-security scenario. Therefore, the assumption is that European navies will continue to fulfil their national tasking, and existing NATO and other international standing commitments, and that these will not diminish due to continuing concern over Russia. Equally, it is assumed that they will not increase. There are also the demands of deep maintenance to consider.
- National practice and priorities differ, and national tasking can be changed and indeed would be likely to change, although only over time. It is assumed that this scenario requires provision to be made for an additional set of standing tasks and rapid-response requirements. Despite the difficulties in assessing potential changed national priorities, with the assumptions and provisos already set out, it is postulated that 75% of total European inventories are taken up by or already committed to existing national tasking, international commitments and deep maintenance. However, there is a 25% 'discretionary element' to account for the ability to adjust national and NATO tasking and switch to the additional commitments. Therefore, the readiness or availability factor for the additional tasking in this scenario is 25% of total relevant European naval inventories.
- The force requirements are calculated on the basis of a continuing commitment necessitating a rotation of forces. Depending on the distance from European waters, the rotational requirement for a sustained forward presence is likely to be between 1:3 and 1:4. For the sake of this scenario, the assumed ratio will be 1:3 (one unit on task, one in training or on passage to deployment, one returning or in essential maintenance).
- For maritime-air requirements, the assumption will be the need to generate one sortie a day from each forward location.
- In a European context, it is assumed that Turkey will remain a member of NATO and will continue to uphold the terms of the Montreux Convention.
- There will be a beneficial level of local host-nation

support particularly for forward-deployed land-based airborne maritime assets, but the main sustainment for forward-deployed naval assets will be with afloat support.
- It is assumed that a limited number of new units have been added to the inventory in recent years, and a number of obsolete platforms removed.
- Legacy SSKs are assumed to be retained for national and local territorial operations.
- Legacy FFGHMs are retained and deployed for scenario tasking, but due to their age they are confined to missions in European waters.

Command and control

- NATO will have primary responsibility in the Euro-Atlantic area of operations, and NATO MARCOM will be the operational headquarters.
- NATO and the EU will delineate areas of prime responsibility beyond the Euro-Atlantic area of operations. EUNAVFOR will be the EU operational headquarters.
- Suitable mechanisms will enable UK involvement in/co-ordination with EUNAVFOR activities in a post-Brexit scenario.
- The operational concept includes high-readiness forces to respond to requirements for sea control, amphibious operations and mine countermeasures. This is to provide a 'fleet in being' for deterrence, strategic reserve and war-fighting capability to support presence and policing operations.
- A number of 'tailored squadrons' will provide a minimum credible level of forward presence.
- To minimise fixed infrastructure costs and reliance on local host-nation support, local command and control for forward-deployed formations will be afloat, requiring the deployment of platforms capable of operating as flag/command ships (most likely amphibious ships).

Mission priorities

- The protection of the sea basins adjoining Europe (but also including European overseas territories) including areas of trafficking (the Caribbean and Indian Ocean) and vital choke points.
- Safeguarding the flow of energy and strategic commodities, especially in the Mediterranean, Indian Ocean and Gulf of Guinea.
- General security of economic activity at sea, especially in the Indian Ocean, southeast Asia, the Gulf of Guinea, the Mediterranean, and the North and South Atlantic (including the High North).
- Upholding and protecting the provisions of UNCLOS, protecting against environmental threats in the maritime domain, and providing humanitarian assistance and disaster relief.
- Maintaining maritime situational awareness and surveillance throughout the priority areas in order to protect, promote stability and deter.

Area of operations: Euro-Atlantic

Threat perception

The withdrawal of the US from NATO and from the global maritime commons, and the consequent withdrawal of US Navy forces from European and surrounding waters, has led to a general increase in concern about stability and challenges in the maritime domain. Added to this has been an associated increase in Russian assertiveness exemplified by the so-called October surprises (see above).

Particular concerns are the eastern Atlantic and Mediterranean; the Skagerrak and Kattegat entrance to the Baltic Sea and the Baltic Sea itself (particularly the harassment of shipping and security of ports, pipelines, cables and offshore facilities); and the Black Sea. Intelligence also suggests a heightened risk to stability and security at the western end of the Mediterranean owing to pirates, international criminal organisations and insurgents operating from North Africa, and potential challenges to transit of the Strait of Gibraltar (the UK–Spain dispute over Gibraltar is a complicating factor). The Caribbean and the Gulf of Guinea/South Atlantic also represent areas of concern, particularly for certain European states.

Estimated force requirements: tailored squadrons

EUROPEAN WATERS

(in addition to NATO SNMGs/EUNAVFOR)

- 1×DDGHM (air defence)
- 1×DDGHM (ASW/general purpose)
- 3×legacy FFGHM
- 3×modern SSK
- Surveillance assets: provided by NATO-committed ASW aircraft

CARIBBEAN

- 1×LPD/LSD
- 2×FF/FS/PSO/H
- 1×AOR/H/AFS/H
- Surveillance assets: ASW aircraft

SOUTH ATLANTIC/GULF OF GUINEA

- 2×DDGHM (ASW/general purpose)
- 2×FF/FS/PSO/H
- 1×SSN
- 1×AOR/H/AFS/H (acting as command ship)
- Surveillance assets: ASW aircraft

Area of operations: Indo-Pacific

Threat perception

The revival and evolution of the piracy threat off the Horn of Africa is particularly concerning. Added to this is the continuing instability and strategic realignments under way at the bottom of the Red Sea and around the Bab el-Mandeb Strait. A perceived threat owing to missiles, unmanned surface vessels, mines, or improvised waterborne-explosives has led to heightened force-posture requirements. Likewise, uncertainty over the US presence in the Gulf and Strait of Hormuz has raised the potential force requirement there. In both cases, the potential threat level suggests force requirements above corvette or ocean-patrol vessel level. As well as general concerns about the threat to the rules-based order at sea, there are concerns about activities such as illegal fishing in the Indian Ocean region, Southeast Asia and particularly in the South Pacific.

Estimated force requirements: tailored squadrons

HORN OF AFRICA/NORTHERN INDIAN OCEAN

(enhanced EUNAVFOR)

- 2×DDGHM (air defence)
- 2×modern FFGHM
- 2×FF/FS/PSO/H
- 2×modern SSK
- 1×AOR/H/AFS/H
- Surveillance assets: ASW aircraft

SOUTHERN INDIAN OCEAN

- 1×FF/FS/PSO/H
- Surveillance assets: ASW aircraft

WESTERN PACIFIC

- 1×LPD/LSD
- 2×DDGHM (ASW/general purpose)
- 2×FF/FS/PSO/H
- 1×SSN
- 1×AOR/H/AFS/H
- Surveillance assets: ASW aircraft

SOUTH PACIFIC

- 4×FF/FS/PSO/H
- Surveillance assets: ASW aircraft

High-readiness forces

AIRCRAFT CARRIER GROUP

- 1×CV/CVN/CVS
- 2×DDGHM (air defence)
- 2×DDGHM (ASW/general purpose)
- 2×modern FFGHM
- 1×SSN
- 2×AOR/H/AFS/H

AMPHIBIOUS GROUP

- 1×LHD/LHA/LPH
- 1×LPD/LSD
- 1×DDGHM (air defence)
- 2×modern FFGHM
- 1×modern SSK
- 1×AOR/H/AFS/H

MINE COUNTERMEASURES GROUP

- 1×LPD/LSD (as command ship/mother ship)
- 10×MCMV

Table 2.1: **Maritime requirements for *Operation NEMO***

Equipment type	Assessed NATO Europe, EU and Canada inventory	Assessed 25% availability/readiness for scenario tasking	Estimated force requirement (aggregate with 1:3 rotational requirement)	Assessed deficit[5]
CV/CVN/CVS	4[6]	2[7]	3	1[8]
SSN	10	2.5	9	6.5
SSK (modern/high capability)	40[9]	10	18	8
DDGHM (air defence)	32	8	18	10
DDGHM (ASW/general purpose)	20	5	21	16
FFGHM (modern/high capability)	45[10]	11.25	18	6.75
FFGHM (legacy)	43	10.75	9	0
FF/FS/PSO/H	80[11]	20	39	19
LHD/LHA/LPH	8[12]	2	3	1
LPD/LSD	9 [13]	2.25	12	9.75
Large AOR/H or AFS/H	23[14]	5.75	21	15.25
MCMV	111[15]	27.75	30	2.25

Maritime-air requirement

It is estimated that European members of NATO would at any given point have 26 maritime-patrol aircraft available. It is assessed that these will be required for European NATO missions. To support the force requirement generated by the SLOCs scenario with six out-of-area operations and to guarantee the availability of one aircraft for each of them, three ASW aircraft are required to be stationed at each location with at least three full crews. This would warrant 18 ASW aircraft. Furthermore, one squadron (12 aircraft) of F-35B *Lightning* fighter ground-attack aircraft would be required for the additional carrier in a limited sea-control role.

Key takeaways

- A proliferation of modern weapons requires a greater high-end capability to be deployed even for maritime-security operations.
- Deployment at range on a rotational basis is extremely demanding in terms of platform numbers.
- SSNs are of considerable operational value in view of their ability to deploy rapidly at range and remain on station, and NATO Europe has a considerable deficit in capability.
- European NATO members and the EU have a considerable deficit in high-capability surface combatant platforms.
- European NATO members and the EU have a significant deficit in terms of light frigates, corvettes and ocean-patrol vessels.
- European NATO members and the EU have a considerable deficit in certain types of amphibious shipping.
- European NATO members and the EU have a significant deficit in afloat support, although this could be mitigated by greater assurance of host-nation support.
- The personnel requirement would increase significantly to sustain the assessed additional capabilities and tasking requirements.

3. Baltic flashpoint: a state-level attack

This chapter outlines a scenario and the force requirements that describe a limited war in Europe, led by a state-level adversary. Following United States withdrawal from NATO, Russia becomes involved in a conflict with Lithuania and Poland, resulting in Russian occupation of the former and part of the latter's territory. NATO activates Article V and starts to plan for operations to regain Lithuanian and Polish territory, as well as safeguarding other NATO states from Russian military activities. The scenario does not cover an all-out war on a continental scale. A limited war in the Baltic region is one of several possibilities for military confrontation in Europe. It was chosen by the IISS for this study because such a scenario has received considerable attention in policy and academic discourse.[16]

3.1 Rising tensions in 2021

Throughout 2021, there are a growing number of incidents between Russia's naval and air forces and Poland and Lithuania in and over the Baltic. The heightened sense of threat contributes to the election of governments that run on anti-Russian platforms and involve radical fringes of the political spectrum in both Poland and Lithuania. Both governments state that they see the Russian possession of Kaliningrad as a historic anomaly and a clear and present danger to themselves. Both Poland and Lithuania mount an increasingly ambitious programme of combined military exercises, many featuring offensive air operations and attacks by armoured forces. Tensions rise on Polish and Lithuanian borders with Russia. All three nations' border guards exchange fire with 'intruders'.

Russia declares that these exercises are unacceptable provocations that pose a direct threat to Russia. The Russian government says that 'the exercises are clear evidence of a Polish and Lithuanian conspiracy to attack Kaliningrad and divide the territory between them'. It releases a recording of a telephone conversation between the Polish and Lithuanian defence ministers where they seemingly discuss military plans to do so. Both governments complain that this is a Russian 'deep fake'.

Russia demands that NATO de-escalates. NATO replies that these are national territorial-defence exercises and not a matter for the Alliance. Russia responds that if Polish and Lithuanian war games were defensive their forces would be practising defence. Instead, Russia says that all of their manoeuvres are rehearsals of offensive operations and that this is clear evidence of hostile intent. Russia reinforces the Kaliningrad exclave by air and sea with additional air- and maritime-defence systems, ground troops and an airborne division. Poland and Lithuania increase their exercise programme further. Tensions continue to rise. Lithuania suspends the 1993 Vilnius Agreement that provides for Russian road transport to travel through Lithuania to and from Kaliningrad. Rail travel from Belarus to Kaliningrad is blocked and Polish and Lithuanian airspace is closed to all Russian civilian and military aircraft. Russia states that this represents a threat to its security and demands that the agreement is reinstated. It is not. Moscow invokes the Conventional Forces in Europe Treaty, demanding that it be allowed to conduct inspections of forces in Lithuania and Poland. Both countries refuse to grant access to Russian inspection teams.

The October war: Russia versus Lithuania and Poland

1 October 2021: Russia attacks Lithuania

On 1 October, coordinated cyber and electronic-warfare attacks take place against Polish and Lithuanian government, media and military networks. The presence of soldiers is registered across Lithuania. They are rapidly joined by air-assault troops landing from helicopters, a motor-rifle division attacking west from Belarus and an airborne division with supporting armour moving east from Kaliningrad. In a bold move, Kaunas Airport in Lithuania is seized by Russian special forces (Spetsnaz) disembarking from civilian airliners, rapidly followed by paratroopers landing in military airlifters. Russian

reinforcements move from the Western Military District through Belarus into Lithuania. As well as forces in Kaliningrad, Russia commits an additional motor-rifle division to the campaign and rapidly surges air power over Lithuania.

By 14 October, most Lithuanian forces have been destroyed, as has the NATO air-policing contingent and the Enhanced Forward Presence (EFP) battlegroup. Most of the soldiers from Belgium, Croatia, the Czech Republic, Germany, Luxembourg, the Netherlands and Norway are killed or captured. Many prisoners are wounded; some are missing. The NATO Baltic Air Policing mission joins the battle. Italian, Spanish and United Kingdom fighters are shot down, with most pilots killed or captured. A small proportion of surviving Lithuanian forces and a few troops from the NATO EFP battalion successfully withdraw to Latvia.

During the Russian attack on Lithuania, the Russian Baltic Fleet makes limited deployments of fast-attack craft to blockade the Lithuanian coastline. There is no Lithuanian naval activity.

The war spills over into Poland

The Polish government is surprised by the intensity of the fighting. Russia mounts a diplomatic and information operation to deter Polish intervention, but this has no effect. Polish civilian volunteers rush to fight in Lithuania. Some are killed and captured by Russian forces. Polish citizens captured fighting in civilian clothes are rapidly tried for war crimes and executed. Warsaw commits Special Operations Forces (SOF) and an armoured division to counter-attack from the south across the Suwalki Gap, and mounts artillery, air and rocket strikes on Russian units and bases in Kaliningrad. Initially, Russia mounts defensive operations against these threats and launches intense artillery, air and missile strikes against Polish targets, including the naval base in Gdynia. Once the Lithuanian forces have been overwhelmed, Russia proclaims the establishment of a 30 kilometre-deep security zone along the border between Kaliningrad and Poland. It attacks Poland to achieve this. There is intense fighting with heavy casualties on both sides, but Polish forces eventually withdraw to the south of the security zone. Russia then declares a unilateral ceasefire. Several thousand Polish civilian casualties occur in the fighting, particularly in the security zone, in Gdansk and Gdynia and around Polish Air Force bases.

There is intense air combat between the Russian and Polish air forces. This not only includes air-to-air combat, but also heavy attacks by Russian cruise missiles and conventionally armed tactical ballistic missiles on Polish air bases. The Polish Air Force is now at about 20% of its pre-war strength and its air bases are incapacitated. Polish land forces are now at 50% of their pre-war capability. The same is true of the NATO EFP battalion, with many French, Romanian and UK troops killed, wounded or captured.

Units of the Russian Baltic Fleet surface force sortie from Kaliningrad to disperse and reinforce the Northern Fleet. These include two *Sovremenny*-class destroyers (DDGHMs) and two *Steregushchiy*-class frigates (FFGHMs). A number of patrol craft and amphibious units are destroyed in Polish attacks on Kaliningrad. A *Nanuchka* III corvette (FSGM) is destroyed by Polish coastal and ship-based anti-ship missiles. The Baltic Fleet's two *Kilo*-class coventionally powered attack submarines (SSKs) and several units – including two *Neustrashimy* and four *Steregushchiy*-class FFGHMs – and a number of *Kalibr*-equipped *Buyan*-M FSGMs and *Karakurt*-class corvettes remain at sea or in port in the Baltic Sea.

NATO response

On 2 October 2021, NATO invokes Article V. It also authorises deployment of the Very High Readiness Joint Task Force (VJTF) and the NATO Response Force (NRF). NATO subsequently gives Russia an ultimatum to withdraw its forces from Lithuania by 1 December 2021. Failure to comply will result in NATO using all necessary means to remove Russian forces from Lithuania. On 15 October, NATO issues an Activation Order (ACTORD) for *Operation Eastern Shield*, which entails deployment of NATO forces to Poland and the Baltic to deter further Russian aggression and reassure NATO states in the region. The UN Security Council is unable to agree a position. NATO nations apply near-total economic sanctions against Russia and a severe ban on travel for Russian citizens, while also putting diplomatic energy into seeking assistance in these

measures from other countries. The US offers to sell ammunition, weapons and military supplies to NATO countries for cash.

An uneasy ceasefire

Poland reluctantly accepts the Russian ceasefire offer. The US president demands that Russia withdraw from Lithuania, announcing: 'I will personally lead negotiations with Russia, because if anyone can put together a deal, I can'.

The Belgrade agreement

The Serbian government offers to act as a peace broker. The Russian and US presidents meet in Serbia. Under some pressure from its allies, Poland reluctantly agrees to a ceasefire along the de facto line of control, which is approximately aligned with the southern boundary of the Russian-declared security zone. The Organization for Security and Co-operation in Europe (OSCE) agrees to monitor the ceasefire.

Russian occupation of Lithuania

A Lithuanian government in exile is established in Warsaw. Russia declares itself to be an 'occupying power' in accordance with the Geneva Conventions. It forms a new Lithuanian provisional administration, composed of Lithuanians of Russian ethnicity, announcing that it intends to hand over to this government within a year. It will rebuild the Lithuanian defence and security forces, but in the meantime, Russia will support the Lithuanian provisional administration by leading security operations against irreconcilable 'die hard' members of the Lithuanian forces, rejectionist civilians, war profiteers and any NATO intelligence personnel or SOF that illegally enter the country.

Russia secures Lithuania's skies and its exclusive economic zone (EEZ) in the Baltic. It takes control of the cyber, electromagnetic and media environments of Lithuania. All independent media are replaced by Russia- or puppet government-controlled media. These portray the country as a twenty-first-century Potemkin village, with Lithuanians expressing boundless gratitude for their liberation and Russian humanitarian and reconstruction efforts taking place. However, determined Lithuanian patriots are still able to smuggle information out of the country. This portrays a very harsh occupation regime, with extensive use of curfews, arbitrary detention and severe punishments. Protests against the occupation are quickly suppressed. Civilian satellite imagery reveals the construction of many detention camps. The Russian government encourages the Polish minority in Lithuania to leave the country. This is monitored by the International Committee of the Red Cross (ICRC), which also requests and obtains access to prisoners of war held by Russia and Poland. The ICRC arranges the repatriation of seriously wounded prisoners and of combatants' bodies.

Russia mounts a major diplomatic and information campaign

Key Russian messages:

- The war was a result of irresponsible Polish and Lithuanian provocations, which were part of a plan for both nations to attack Kaliningrad. It releases a dossier of declassified intelligence, which it states proves that Poland and Lithuania were secretly conspiring to mount a surprise attack on Kaliningrad to evict Russian forces and divide the territory between them.
- The new Lithuanian government will be neutral and a good neighbour to the region. Russia will begin withdrawing after a year, provided that the threat from Poland and NATO reduces.
- Should NATO be foolish enough to attack Russia, those nations whose forces fight Russia can expect to receive a punishing Russian response 'that will greatly disrupt their governments, economies, societies and armed forces beyond their strategic depth'. NATO nations that do not take part in any war can expect to retain cordial political and economic relations with Russia.
- The rapid defeat of Lithuanian and Polish forces is just a foretaste of the combat capability that Russia's modern and battle-hardened armed forces would use against any aggression.
- Russia is repatriating wounded prisoners of war, with the assistance of the ICRC. The return of other prisoners of war will depend on Poland and NATO ceasing provocative actions and NATO states' recognition of the new Lithuanian government.

These demands are reinforced by domestic information operations that portray the Russian position as legitimate, justified and reasonable.

Russian mobilisation

Russia announces that it is conducting a precautionary mobilisation. Snap exercises greatly increase. Most activity takes place in the Western Military District; mobilisation appears to be the main effort. Ammunition is sent out from depots. Reservists are recalled. Military railway traffic increases.

However, substantial Russian forces have been kept in the Southern Military District. It appears that Russia seeks to retain an ability to intervene in Ukraine *in extremis*. Russian air and maritime incursions around the perimeter of NATO increase, as do cyber-reconnaissance probes of NATO members' government, media, military and economic networks.

Belarus puts its armed forces on alert, its military and air-defence command and control (C2) structures are integrated into Russian networks, and there is a limited mobilisation of reserves. Russian logistic, air-defence and C2 units deploy to Belarus, as does the full 1st Guards Tank Army and an air-assault brigade.

Public and political attitudes in NATO

Throughout NATO nations there is shock at the war and the resulting civilian and military casualties; strong public and political opposition to the Russian occupation of Lithuania; and considerable concern that Estonia, Latvia and Poland are vulnerable to another Russian attack. There is also concern about the status of prisoners of war held by Russia. The European Union offers strong support to NATO, including by facilitating the movement of NATO forces across EU nations' national boundaries.

US attitudes

In a TV address from the Oval Office, the president announces that

> this is an avoidable, unnecessary and foolish war. I was right to withdraw our brave men and women in uniform from a continent that was not paying its dues and did not assist us in Asia. I will use my strong relationship with the Russian president to see if a deal that ends the conflict can be negotiated.

Opinion polling in the US shows strong popular support for US abstention from the conflict. This is reflected in congressional attitudes. The Middle East, Afghanistan, the South China Sea and the Korean Peninsula are higher strategic priorities for the US.

Extracts from 1 November 2021 NATO intelligence assessment

Russia is already conducting extensive intelligence gathering and preparation of the battlespace. As well as satellite, air and maritime reconnaissance, this includes infiltration by Federal Security Service (FSB) and SOF operators and cyber reconnaissance activities.

Russia probably believes that NATO is unlikely to attack. It thinks that likely inaction will provoke a NATO crisis of confidence that would fatally weaken the Alliance, allowing Lithuania to become a Russian protectorate and enabling the Finlandisation of Estonia and Latvia. Russia will seek to use a combination of information operations, diplomacy and military deployments to deter NATO from mounting any attack. It is actively attempting to discourage NATO states from contributing forces to any NATO combat operation against Russia.

Should NATO attack, Russia would seek to quickly overrun Estonia and Latvia, presenting NATO with a fait accompli, while causing NATO casualties to weaken political support for the war. Ground combat would probably be confined to the Baltic states and Poland. Attacks on Poland originating in Belarus are possible. Russia would seek to exploit its asymmetric advantages in air defence, surface-to-surface missiles and rocket and gun artillery to impose casualties and delay. Air, missile, maritime, Spetsnaz and cyber attacks would be made against NATO headquarters, NATO C2 and belligerent NATO states.

Russia will probably continue to reinforce Belarus, Lithuania and Kaliningrad, concurrent with building up forces around the Baltic states, to hold them at risk. Russia is conducting a strategic mobilisation, including activating its strategic reserves. It has put its defence industry on a war footing, and can be expected to

quickly produce munitions to replace those expended in October.

One can expect Russian forces based around Murmansk to pose a credible threat to Norway. Should Norway join the war, attacks would be made to fix Norwegian forces in place. Sweden and Finland will probably remain neutral during the early stages of any war, but their forces will actively challenge any Russian incursions. Russian attacks on reinforcements and military material crossing the Atlantic from Canada are likely.

The forces in Russia's Southern Military District, the Mediterranean and Syria will seek to pose credible threats to southern and eastern NATO states. Ships, aircraft and bases of countries that fight Russia can expect to be attacked. This could include UK bases and signals intelligence (SIGINT) sites in Cyprus. Some SOF attacks can be expected, but land attacks on the eastern Balkan states or Turkey are highly unlikely.

For nations that contribute forces to fight Russia, or allow bases, airspace and territorial waters to be used for attacks on Russia, unrestrained cyber attacks against military, economic and media networks are highly likely. Some limited air, missile, maritime and Spetsnaz attacks against these countries and vessels in their waters are to be expected. The risk of air, missile, rocket and artillery attack will increase as forces move closer to Lithuania.

Russia is unlikely to use chemical weapons. This is to avoid providing the US with an excuse for intervention. It is unlikely to use nuclear weapons, unless the Kremlin perceives an existential threat to its regime.

Russian ground forces

The latest report of 2019 suggests that the Russian Ground Forces, Naval Infantry and Airborne Troops are able to generate 136 battalion tactical groups (BTGs); they have increased this number by approximately ten BTGs every year since 2016 despite plateauing contract personnel numbers. Assuming this trend continues – and taking into consideration inflated official Russian figures and the high personnel demands of the BTGs – they would have around 150 to call upon by the time of the scenario, well within their ultimate ambition to generate two BTGs for every manoeuvre brigade or regiment in the ground and airborne forces.

Russia has worked hard on improving its levels of readiness for short-notice operations over the last decade and has had more time to prepare for this particular action. It is assessed that Russia therefore has roughly half of its total deployable ground formations available for use in theatre, allowing for the need to backfill conscript posts and to retain contingency forces on the Chinese, Georgian, Norwegian and Ukrainian borders. This gives them around 75 battalion tactical groups, and the artillery, engineer and other enabler assets from five or six armies mainly drawn from the Western, Southern and Central military districts.

Initial ground operations against Lithuania are believed to have been conducted by the 144th Motor Rifle Division moving through Belarus, and the 98th Airborne Division which had been airlifted into Kaliningrad and reinforced with the 11th Tank Regiment already deployed there. Second-echelon forces were provided by the remaining units of the 20th Guards Army and the 1st Guards Tank Army, reinforced to establishment strength by contract-personnel BTGs drawn from central and southern Russia.

These latter units were then responsible for the rapid defeat of the Polish 18th Mechanised Division's counter-attack in the Suwalki Gap, and then the destruction of a large part of NATO's Multinational Division Northeast (MND-NE) while taking control of the security zone south of Kaliningrad.

The 20th Guards Army is now deployed in Kaliningrad, southern Lithuania and the Polish security zone. Identified formations assigned to the 20th Guards Army comprise two motor-rifle divisions, two artillery brigades, one multiple rocket launcher (MRL) brigade, an engineer regiment and two medium-range surface-to-air missile brigades with *Buk*-M3 systems. In addition, the 11th Corps in Kaliningrad controls one independent motor-rifle brigade, one independent tank regiment and one short-range missile brigade. Including naval infantry, these forces are estimated to deploy approximately 27 BTGs.

Behind these forces, the 1st Guards Tank Army controls a second echelon deployed in Lithuania and Belarus. Formations thought to be assigned to the 1st Guards Tank Army include one tank division, one

motor-rifle division, one independent tank brigade, one air assault brigade, three artillery brigades, two MRL brigades, three short-range missile brigades, two engineer brigades/regiments, two medium-range surface-to-air missile brigades and one long-range surface-to-air missile brigade with S-300V4 systems. These forces are assessed as deploying approximately 24 BTGs. There are also three division equivalents of National Guard troops in Belarus and Lithuania on internal-security and line-of-communications duties.

The 76th Air Assault Division appears to have been retained in Pskov *oblast*, along with additional artillery, missile and surface-to-air missile brigades from the 6th Army, presumably in case contingency operations in Estonia and Latvia are deemed necessary. Reinforced by elements of local motor-rifle brigades, the 76th could generate an additional nine BTGs for operations.

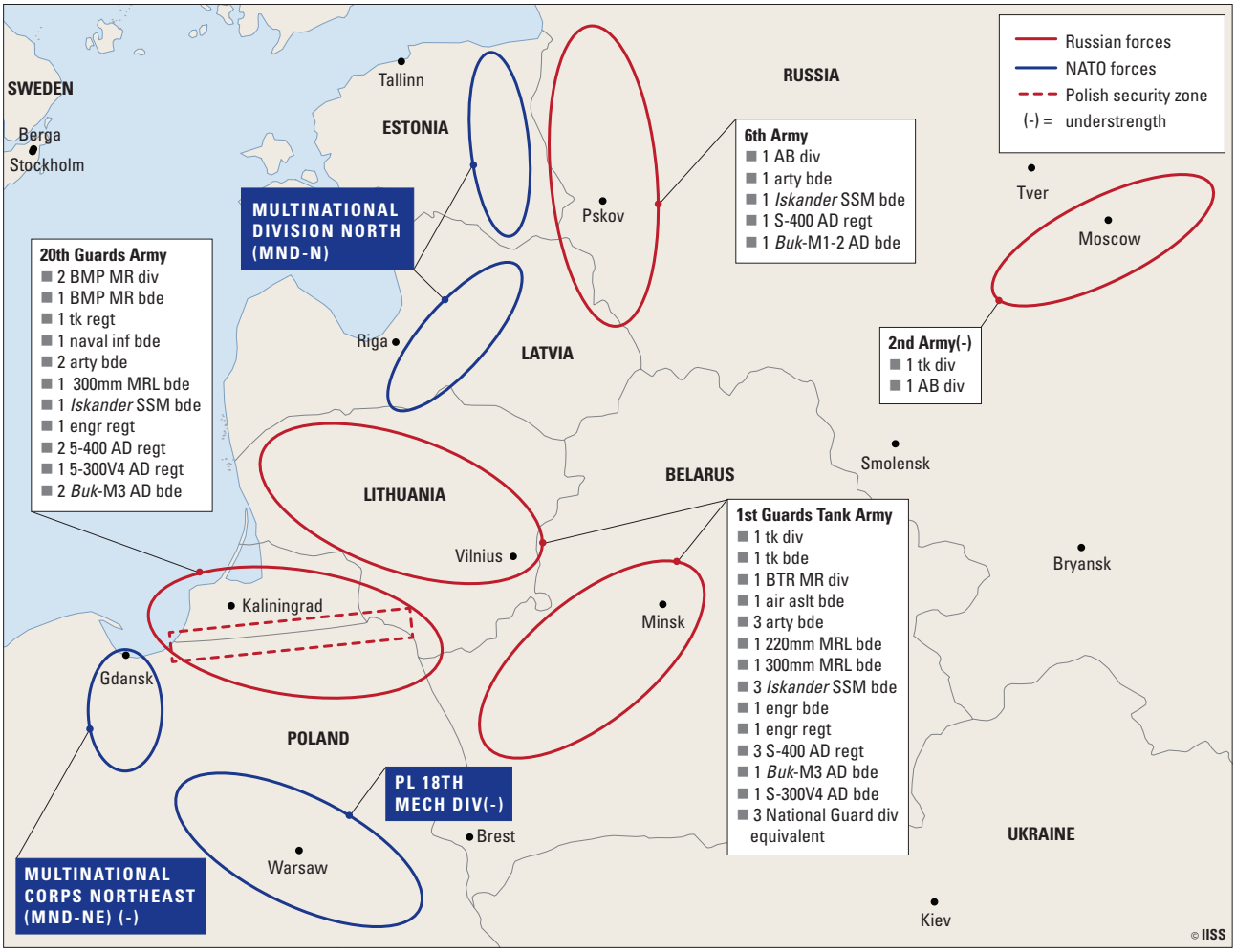
The 98th Airborne Division has been withdrawn to the Moscow region; the 90th Tank Division from central Russia and the 112th Missile Brigade also join it there. These formations appear to be positioned as a form of strategic reserve, totalling approximately 15 BTGs, under the control of the 2nd Army's headquarters.

In equipment terms, these forces have approximately 1,000 T-72B3 and T-90A/M main battle tanks, and around the same number of BMP-2 and BTR-82 infantry fighting vehicles. Primary artillery types are upgraded versions of the *Msta*-S 152mm howitzer (2S19M1/M2) and *Tornado*-G and *Tornado*-S MRLs. All missile brigades operate the *Iskander*-M short-range ballistic- and cruise-missile system (SS-26/SSC-7) and two or three brigades also have an attached battalion equipped with the longer range SSC-8 system.

Russian Navy

At the outset of the crisis, the dispositions of the Russian Navy, including the composition of the various fleets

Map 3.1: **Scenario ground-forces laydown**



and the base ports of their units, remain much as they have been in recent years. There have been a small number of new unit additions – including submarines, *Admiral Gorshkov*-class DDGHMs and *Karakurt*-class corvettes – to the inventories.

A number of units of the Russian Navy's premier formation, the Northern Fleet, have been worked hard in recent years. Others are stalled by long-term refits and modernisation. Nevertheless, significant efforts have been undertaken to sustain prestige units, like the *Kirov*-class nuclear-powered cruiser (CGHMN) *Pyotr Velikiy*. Sister ship *Admiral Nakhimov* still has not emerged from its very long modernisation. The *Slava*-class CGHM *Marshal Ustinov* has undergone a recent refit and is in good condition. Despite the variable condition of many of the Russian Navy's vessels, its main formations are assessed as being at approximately 50% readiness – the same as NATO – with the likelihood that Russian commanders would be ready to deploy more ships if required.

As NATO begins to mobilise forces, the Russian Navy is deploying major elements of its reinforced Northern Fleet surface and sub-surface forces, and naval aviation, to defend the approaches to the Russian homeland and to protect Russian ballistic-missile-submarine bastions. Units are also deploying into the North Atlantic, potentially to interdict NATO reinforcements and supplies. Dispositions include one *Kirov*-class CGHMN, one *Slava*-class cruiser, a number of *Admiral Gorshkov*-, *Sovremenny*- and *Udaloy*-class destroyers, and other surface combatants, as well as the deployment of one *Borey*-A and one *Delta* IV nuclear-powered ballistic-missile submarine (SSBN); the nuclear-powered guided-missile submarine (SSGN) *Severodvinsk* and two *Oscar* II SSGNs (one of which, according to intelligence reporting, may be headed for the Mediterranean); and at least three *Akula* I/*Akula* II nuclear-powered attack submarines (SSNs) and two *Sierra* I/*Sierra* II SSNs. These submarines remain undetected.

In the south, the Russian Black Sea Fleet is placed on high readiness and a number of vessels sortie into the eastern Mediterranean, several deploying to Tartus in Syria. The deployed vessels include eight *Kalibr* shooters, of which three are improved *Kilo*-class SSKs deployed to Tartus, three *Admiral Grigorovich*-class FFGHMs and two *Buyan*-M FSGMs. It is suspected that there is also an *Oscar* II SSGN deployed from the Northern Fleet.

Overall, we assess that Russia's Northern and Baltic fleets could surge approximately 9–11 SSGN/SSNs, six SSKs and approximately 15 large and small surface combatants armed with significant offensive stand-off capabilities. Likewise, the Black Sea Fleet including detached formations in the Mediterranean could surge and poise at least 3–4 SSKs and ten large and small surface combatants.

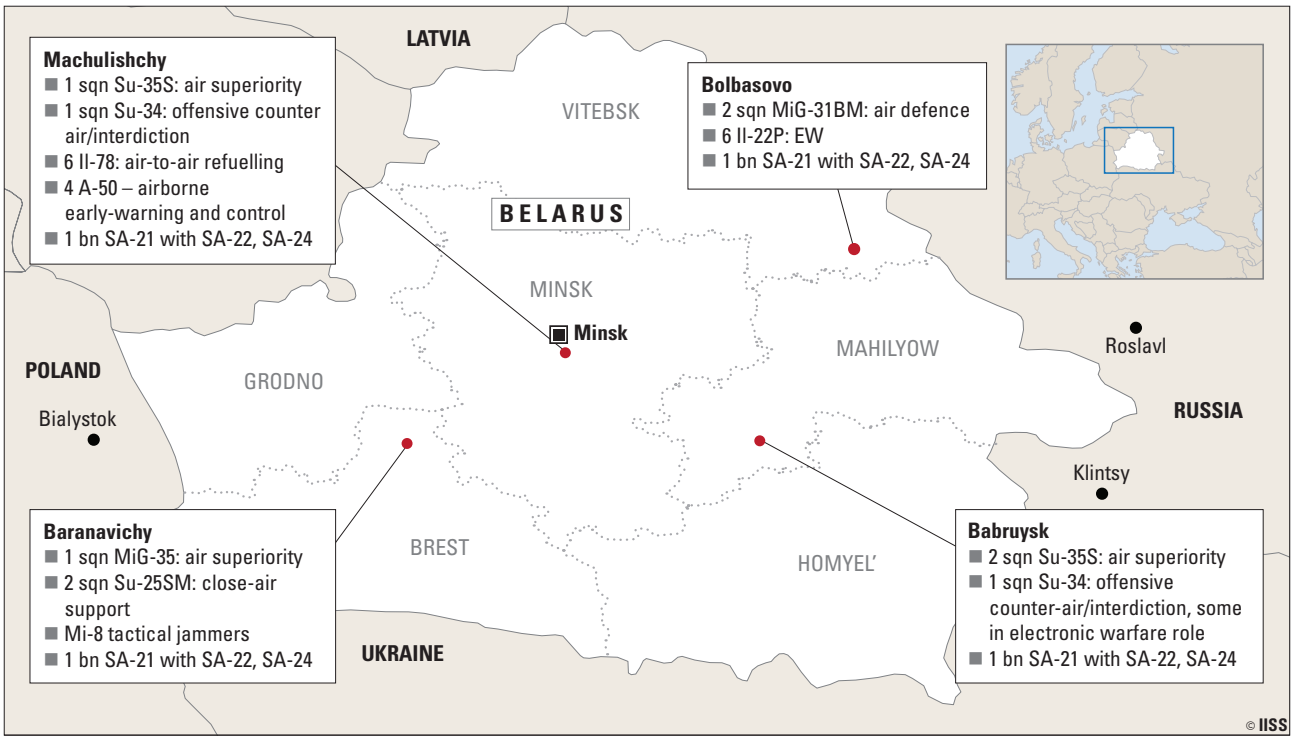
Russian Aerospace Forces

Any Russian campaign would include long-range air and cruise-missile attacks against operational and strategic targets in belligerent NATO countries. Anti-air and missile-defence units are forward deployed into Lithuania and Belarus to reduce effectiveness of NATO offensive air capabilities. The deployed Russian units are deemed to be at a high state of availability, as a result of Moscow's preparation for the military action. Operational tempo for the first seven days generates two sorties per day, dropping to one sortie per day beyond this. This is based on Soviet operational tempo models from the 1980s, and also draws on Russia's ability to sustain a credible tempo of operations in Syria.

We assess that Russia will employ more than 250 tactical aircraft in the theatre. This will be a mixture of Cold War-era platforms and more modern aircraft. A particular threat will be the most modern Russian air-to-air missiles such as AA-12B *Adder*, AA-13 *Axehead* and AA-11C *Archer*. Tactical aircraft would be employed in coordination with the layered air-defence umbrella created over Russian bases and force concentrations, using long-range SA-21 *Growler,* as well as SA-23 *Gladiator/Giant* and SA-17 *Grizzly* missiles. A wide range of unmanned aircraft would be employed for surveillance and targeting, and the extensive use of electronic warfare is likely.

Map 3.2: **Russian maritime forces laydown**

Map 3.3: **Scenario deployment of Russian Aerospace Forces (VKS) in Belarus**



3.2 NATO *Operation Eastern Shield/ Eastern Storm*

Initial response

The North Atlantic Council (NAC) invokes Article V, requiring all NATO nations to contribute to NATO's initial defensive response. It directs the Supreme Allied Commander Europe (SACEUR) to plan *Operation Eastern Shield* to reassure Poland, Estonia, Latvia and other front-line NATO member states by deterring further Russian aggression. In the event of current political negotiations failing, SACEUR is to plan for and assemble forces for *Operation Eastern Storm*, a military operation to restore Polish and Lithuanian government control over their territories. The required forces for *Operation Eastern Shield* are to be ready to conduct offensive operations by 15 January 2022.

NATO military committee direction to SACEUR for *Operation Eastern Shield/Eastern Storm*

Political strategy

The NATO strategic narrative is that Russia's recent attacks on Lithuania and Poland were an illegal aggression. Lithuania is now under an illegal, illegitimate and brutal occupation. While NATO is making every effort toward diplomacy, the clock is ticking. Russia must understand that if it does not withdraw from Lithuania by the end of the year, NATO stands ready to use force and is now mobilising and deploying its troops, ships and aircraft to do so.

***Operation Eastern Shield*:** The VJTF and NRF are deploying to bases and assembly areas outside Poland. NATO will continue to build up forces and develop plans for the execution of *Operation Eastern Storm*. Should the current ceasefire break down, you should be prepared to use whatever forces are in the area of operations (AO) to defend NATO territory, with a view to passing onto the counter-offensive as soon as practicable.

Operation Eastern Storm: The mission is to restore Polish and Lithuanian government control over their territories, whilst securing other NATO territory, territorial waters and airspace against other Russian threats. It will be a strategic offensive operation by land, sea and air to remove Russian forces from Lithuania, its airspace and its EEZ.

Initial planning direction to Allied Command Operations and Joint Force Commands

Threat

The following assumptions apply:

- Russia's main strategic effort is to retain control of Lithuania. If NATO attacks, it will seek to impose enough casualties that – in conjunction with its diplomatic, propaganda and grey-zone activities – a combination of popular opposition and internal friction within NATO will cause the Alliance to abandon the operation.
- Those countries that participate in *Operation Eastern Storm* can expect limited air, missile and maritime attacks. These would not be at the expense of the main effort, but would aim to degrade C2 bases and the flow of reinforcements, as well as undermine popular support for the war.
- Attacks against Estonia and Latvia are highly likely. A limited attack against Norway is possible. Land attacks in southern and eastern Europe are very unlikely. An attack on Ukraine is unlikely, unless Ukraine escalates fighting in the east of the country. Air and missile attacks or SOF may come through Ukraine.
- Turkey will apply the provisions of the Montreux Convention to warship movement through the Bosporus. The route will be closed to Russian vessels from the outset of *Operation Eastern Storm*.
- The UK and France will continue to use appropriate conventional forces to safeguard their national nuclear deterrents.
- NATO nations will withdraw necessary forces from NATO, UN and international military operations outside Europe.

Command structure

The operation will be commanded through HQ Allied Command Operations. Planning and conducting operations will require three theatre HQs, in the form of Joint Force Commands (JFCs). The JFCs may form Combined Joint Task Forces (CJTFs) as required. The JFCs are:

- **Allied JFC Brunssum:** This is the main effort and supported command. Its AO comprises the UK and its EEZ, the English Channel, the North Sea, the Norwegian Sea, the Baltic Sea and the following countries: Belarus, Belgium, the Czech Republic, Denmark, Estonia, France, Germany, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland and Slovakia, and Russia's Western Military District.
- **JFC Naples:** This comprises all other NATO nations, UK sovereign bases in Cyprus, Syria and Russia's Southern Military District.
- **JFC Halifax:** Its AO comprises Canada, Iceland and the North Atlantic, less the UK EEZ and the Norwegian Sea.

Missions for Operation Eastern Shield

- **JFC Brunssum – main effort:** In *Operation Eastern Shield*, it is to deploy assigned forces to deter and, if necessary, defeat further Russian aggression in its AO. It will be responsible for planning and, if necessary, conducting *Operation Eastern Storm* to eject Russian forces from Lithuania and defending against Russian attacks elsewhere in its AO.
- **JFC Brunssum – further responsibilities:** To form and deploy a CJTF – CJTF *Unity* – to conduct *Operation Eastern Shield* and, if required, *Eastern Storm*. The AO for this CJTF is the Baltic Sea, Belarus, Estonia, Kaliningrad, Latvia, Lithuania, Poland, and Russia's Western Military District. It will be called AO *Unity*. This CJTF will also deter and, if necessary, defeat Russian attacks elsewhere in its AO.
- **JFC Naples:** Deter and, if necessary, defeat Russian attacks in its AO.
- **JFC Halifax:** Deter and, if necessary, defeat Russian attacks in its AO. Protect the movement through the Atlantic of Canadian forces and merchant shipping carrying military materiel from the US.
- **Joint Support and Enabling Command Ulm:** Responsible for the reception, staging, onward movement and integration of forces throughout Europe, apart from AO *Unity*, where it will be the responsibility of CJTF *Unity*.

All three JFCs are responsible for defending AOs against air, missile and maritime attack. It is assumed that countering SOF attacks and hostile intelligence services will be the responsibility of host nations' security forces.

The main effort – AO Unity

The CJTF *Unity* C2 structure will be as follows:

- One CJTF HQ.
- Land component; rostered National Rapid Deployable Corps HQ as Land Multi Corps HQ. To be known as HQ Eastern Army.
- Maritime component.
- Air component.
- SOF component.

The MND-NE has already mobilised and assumed control of land forces in Estonia, Latvia and Poland. It will develop plans to rapidly assist Polish forces in defeating any further Russian attacks. However, to avoid miscalculation and escalation, NATO forces deployed as reinforcements will remain at least 50 km from the line of actual control between Russia, while preparing for combat operations.

As NATO forces arrive in the operational theatre, they will be increasingly capable of conducting tactical and operational counter-offensives. By 15 January 2022, NATO needs to be capable of mounting a strategic counter-offensive to evict Russian forces from Lithuania. Planning will immediately commence for *Operation Eastern Storm* in order to achieve this. It is to be assumed that the main effort will be a land attack from Poland.

Estonia and Latvia

It is necessary to deter Russian spoiling attacks on these countries, but not to commit forces to the detriment of the main effort. Both countries have mobilised their armed forces. Once *Operation Eastern Storm* begins, both nations may be platforms for projecting air power and SOF into the AO. HQ Multinational Division North (MND-N) is to assume command over land forces in Estonia and Latvia.

Lithuanian resistance

A fledgling national resistance network is emerging, reporting to the Lithuanian government in exile. It is already contributing to NATO intelligence, surveillance and reconnaissance (ISR). Once *Operation Eastern Storm* begins, NATO air, maritime and SOF components may be required to assist.

Operation Eastern Storm

The CJTF *Unity* operational concept and scheme of manoeuvre is being developed. Initial planning suggests the following missions and tasks for all components:

CJTF LAND COMPONENT

- Deter Russian attacks on Poland, Estonia and Latvia and defend these if they are attacked.
- On order, to conduct offensive operations to eject Russian forces from Lithuania. This may involve manoeuvre through Belarus.

CJTF MARITIME COMPONENT

- Deter and, if necessary, defeat any Russian incursions into the Baltic.
- On order, to support the land operation to regain Lithuania.

CJTF AIR COMPONENT

- Build up enough combat power to deny Russian efforts to gain air superiority over Kaliningrad, Romania and Poland, and to deter any further Russian attacks.
- On order, to support the land operation to regain Lithuania and counter Russian air and missile attacks on AO *Unity*.

Combined Joint Special Operations Task Force (CJSOTF)

- On order, to support the land operation to regain Lithuania. This is the main effort.
- To be prepared to support the defence of Estonia and Latvia, and support the Lithuanian national resistance.

Land-component requirement presented by the Deputy SACEUR to NATO military representatives

Land component formation and unit requirements

HQ Eastern Army. Land Component HQ achieved by upgrading assigned NATO Multinational (MN) Corps HQ.

Army troops:

- Signal brigade: Of at least three battalions to provide C2 from Army HQ to corps HQs. To be based on existing corps signals brigade.
- Military bridging brigade: Capable of creating up to three crossings of the Vistula river.
- Air- and missile-defence brigade.

Three or four corps HQs required. These are generated by:

- Employing the in-situ HQ MN Corps Northeast.
- The MN Corps HQ nominated for the NRF.
- One or two other MN Corps HQ at high readiness for war-fighting corps HQ role.

Manoeuvre formation requirements for the three MN corps:

- Each of the MN corps are to comprise three armoured/mechanised divisions.

Requirements for divisions: Each division requires a minimum of three armoured/mechanised brigades. Permanently constituted multinational brigades are acceptable. Ad hoc multinational brigades are not. Divisional combat support requirements:

- Artillery: Capability equivalent to three armoured howitzer battalions and one rocket-launcher battalion.
- Air defence: At least one short-range battalion equivalent per brigade and one long-range battalion at divisional level.
- Engineers: The equivalent of an engineer brigade to provide close- and general-support combat engineers.

Corps-level combat support:

- Signals: An organic corps signals brigade of at least three battalions.
- Artillery brigade of at least three depth-fire units.
- Engineers: A general support engineer brigade, of at least three battalions, including a military bridging battalion. An explosive ordnance disposal (EOD) and counter-capability unit of at least battalion strength.
- Chemical, biological, radiological, nuclear, explosive (CBRN): A CBRN warning, monitoring and defence capability, of at least battalion size.
- ISR: A brigade of at least a manned ground reconnaissance unit, a medium-range uninhabited aerial vehicle (UAV) battalion and a SIGINT/electronic-warfare (EW) battalion.
- Aviation: An aviation brigade of at least three battalions of attack helicopters and at least one transport-helicopter battalion.

Land component equipment capability minimum requirements:

- Armoured vehicles: Tanks equivalent in capability to M1 *Abrams* or *Leopard* 2. Armoured infantry fighting vehicles equivalent in capability to M2 *Bradley* or CV90.
- Artillery: All armoured/mechanised division gun artillery to be self-propelled, of at least 152mm calibre, equivalent to *Paladin* or CAESAR. Rocket artillery to be equivalent to Multiple Launch Rocket System (MLRS) or High Mobility Artillery Rocket System (HIMARS).
- Anti-tank missiles: To be equivalent in capability to *Spike*, *Javelin* or TOW-2.
- Attack helicopters: To be equivalent to *Apache* or *Tiger*.

- Air and missile defence: Corps and theatre air- and missile-defence systems to be equivalent in capability to *Patriot*.
- Cyber: All assigned units and formations to apply cyber hardening with immediate effect.

Special operations component

CJSOTF: Comprising HQ, five SOF battalions with organic SOF aviation. Battalions to be assigned potential roles in Belarus, Estonia, Latvia, Lithuania and the Western Military District. Requires enough organic rotary- and fixed-wing aircraft to independently deploy through enemy battlespace.

3.3 The land campaign

The land component represents the main effort of NATO's campaign, intended to close with and defeat Russian forces in Lithuania and occupied Poland in order to eject them and liberate the territory of NATO member states. Simultaneously, in order to ensure the timely flow of logistical support to the front-line, it must devote resources to securing rear areas against Russian sabotage and air and missile attacks.

Russia has developed a formidable arsenal of long-range missile and rocket artillery in the past decade, as well as modernising its armour and artillery platforms and recruiting large numbers of contract personnel. All of this has served to effectively close the qualitative gap between Russian ground forces and their European equivalents. Russia has also modernised a substantial array of electronic-warfare systems, and NATO forces can expect to face a substantial contest across the electromagnetic spectrum.

Given the size of the Russian force established in Eastern Europe, and the time it has had to entrench its positions before NATO can commence combat operations, the land component is required to be a formation equivalent in size to a Major Joint Operation Plus (MJO+), comprising multiple manoeuvre corps, all with sufficient combat support and combat service-support assets. A three-corps-sized land component would only suffice to produce a 1.5:1 ratio of quantities in favour of NATO – a reasonable degree of confidence in a favourable outcome of operations for NATO in this scenario would require four corps, to achieve a 2:1 quantitative ratio.

Currently, the NRF is sized to produce a land-combat division, while the NATO Readiness Initiative agreed at the 2018 Brussels summit (the Four 30s plan) would produce a roughly corps-sized force in battalion terms. Neither of these structures would therefore prove sufficient to generate the force size required in this scenario. In addition, the bulk of the NATO force would need to be composed of armoured or heavy mechanised brigades equipped with modern main battle tanks and infantry fighting vehicles in order to meet the Russians on a relatively even playing field.

Without the US, and with the more modern Polish formations having taken heavy casualties, the remaining European members of NATO and Canada currently only have around 20 brigades that would meet these criteria. About one-third of this total comprises formations primarily equipped with lighter, wheeled, armoured vehicles. Assuming that, on average, 50% of these formations would be able to deploy within the 90 days given, the overall force available to NATO would be equivalent only to a single corps. In a similar vein, there are currently insufficient numbers of modern artillery, particularly long-range systems. A significant increase in the size of both capabilities would therefore be necessary to adequately address the requirement, through some combination of greater overall force pools, improving the equipment level of existing European heavy brigades, and a substantial increase in readiness levels.[17]

The Russian ability to comfortably engage targets in Poland with its long-range missile capabilities, and the challenges posed to NATO air forces by Russia's improved air force and integrated air-defence capabilities, mean that the land component also has a sizeable requirement for air and missile defence, both mobile short-range and long-range area coverage. Although some member states are planning to rebuild capability

in this area, there is currently little or no modern mobile short-range air defence available. The limited amount of available longer-range air and missile defence would be just sufficient to cover the necessary front-line air bases for NATO, but there would be no excess to protect the land component itself or to protect critical military infrastructure sites such as rear-area headquarters and logistics. Given the overall shortage of assets in this critical area, a substantial increase in overall force size would be essential.

NATO needs to address shortfalls in niche land-combat enabler areas, particularly combat bridging and medium UAVs for ISR missions, as well as the need for formation headquarters to control such capabilities. In general, other combat support and aviation assets are available in sufficient quantities for a three-corps-sized force. However, in order to generate a four-corps-sized force, a slight uplift in the overall numbers of combat engineers and modern attack helicopters would be required.

Finally, reserve stocks of ammunition and spares would need to be substantially increased. Even successful high-intensity operations could potentially last for weeks and consume ammunition stocks for direct- and indirect-fire weapons very quickly. With Cold War stocks run down, war-reserve stocks in many European countries may only be sufficient for a few days of operations at best, and could take months to replenish.

NATO and Russian land assumptions

- The availability of most formations and units is at 50% of the total within the 90-day timeframe.
- The qualitative differences between armoured vehicles, artillery systems and personnel training is insufficient to allow either side meaningful overmatch.
- The overall scaling of the NATO force therefore needs to achieve significant quantitative overmatch against deployed Russian forces to make a favourable outcome likely.
- Large-scale Russian missile, rocket and artillery capabilities generate sizeable force-protection requirements for NATO.
- Force assembly will have to take place outside Poland, and forces transiting Poland on their way to the battle area will require air- and missile-defence capabilities.
- Combat, once initiated, will be of high intensity, potentially multiple days or weeks in duration, and require expenditure of significant amounts of ammunition on both sides.

Table 3.1: **Land-capability assessment**

Formation type	Assessed inventory	Assessed 50% readiness	Estimated force requirement (three corps)	Assessed deficit (three corps)	Estimated force requirement (four corps)	Assessed deficit (four corps)
Armoured/heavy mechanised brigade	14	7	24	17	33	26
Medium mechanised brigade	8	4	3	0	3	0
155mm self-propelled artillery battalions	32	16	27	11	36	20
MRL battalion	7	3.5	9	5.5	12	8.5
Short-range air-defence battalions	0	0	27	27	36	36
Long-range air/missile defence battalions (force protection)	0	0	12	12	15	15
Long-range air/missile defence battalions (critical military infrastructure)	0	0	10	10	10	10
Bridging battalions	7	3.5	12	8.5	15	11.5
Tactical ISR UAV battalions	4	2	3	1	4	2
Attack helicopters	11	9[18]	9	0	12	3

3.4 The air campaign

The air element of the campaign is tasked with gaining air superiority when required, air defence to protect land assets, air support, offensive counter-air actions, close air support and ISR. Airborne early warning (AEW) and air-to-air refuelling (AAR) are critical enabling roles.

Air bases in Poland were hit in the initial Russian attack, with considerable damage to infrastructure. These sites also fall within the range of the SS-26 *Stone*/SSC-7 short-range ballistic and ground-launched cruise missiles deployed along Belarus's eastern border and now in the occupied Polish Corridor. These sites also remain particularly vulnerable to airstrikes, and therefore the bases in these sites cannot be used. Instead, bases in the Czech Republic, Denmark, Germany and Slovakia are used by the allies to build up the required air component, and to reduce transit times to the area of operation. Bases in northern Norway are reinforced to counter potential Russian activity in this region.

National air-defence requirements partially determine the availability for the air element. The Russian Aerospace Forces (VKS) have increased long-range aviation training exercises, including with Tu-160M *Blackjack*, Tu-95MS *Bear* and Tu-22M3 *Backfire*. The *Blackjack* and *Bear* aircraft have been regularly intercepted while skirting UK airspace, while *Backfire* and Su-34 *Fullback* aircraft have been deployed to Crimea and Syria and exercised along the Mediterranean. The threat of air-launched land-attack cruise missiles (LACMs), combined with Russia's increased ability to use sea-launched LACMs, requires significant national air defence among the allies. This is compounded by some countries retaining comparatively few primary air bases, some of which have acquired near-strategic targeting value. (For instance, the UK is reliant upon Royal Air Force Brize Norton as its air-transport hub.)

Given these demands, the force that NATO member states' air forces are now capable of generating, with the US contribution removed, was deemed highly unlikely to be able to deliver a generally favourable outcome when involved in offensive operations to retake territory in support of Article V. All other things being near equal, platform numbers around parity favour the defender strongly. A force structure 50% larger than that assessed to be currently deployable would offer an uncertain outcome, while a deployed force double the size of the current estimate would provide a generally favourable outcome, at least in the air domain.

Areas of shortfall include the latest generations of fighter ground-attack aircraft, and associated types of weapons that are deemed just as important – both in terms of class and with regard to depth or arsenals. Air-launched weapons inventories among NATO nations – excepting the US – are woefully inadequate to conduct a high-intensity peer-on-peer campaign. Again barring the US, those NATO states involved in the 2011 air operation in Libya depleted their air-to-surface weapon stocks. In a peer-on-peer war in Europe the rate of weapon utilisation would be far higher. It is conceivable that some of today's holdings could be exhausted within the first 48 hours.

Given the importance of degrading Russian ground-based air defences, there is a lack of dedicated suppression of enemy air defence/destruction of enemy air defence (SEAD/DEAD) aircraft and weapons in the inventory. There are also shortfalls in AAR and anti-submarine warfare (ASW) aircraft.

Survivable ISR also presents a challenge. The small number of mid-size and large ISR UAVs in the inventory were not designed to operate in contested airspace. The use of such systems would, in all probability, result in unacceptably high attrition rates, even at far greater inventory levels. Instead, a low-observable UAV (notionally in the class of the RQ-180 or the *Avenger*) would provide the required capability.

Air operations would also use electronic attack and elements of cyber warfare to degrade Russian forces. It is assessed, however, that any campaign would have a large kinematic element with the inevitable considerable losses among those forces engaged.

European space-based ISR and communications satellite infrastructure is deemed adequate. This however assumes no hard-kill anti-satellite (ASAT) activity on the part of Russia. Were Moscow to degrade this capability, then some rapid-access launch system combined with a constellation of small, ready-to-launch ISR satellites would be required. Alternatively, spare satellites – extraneous to the present systems – could be built up, though these would remain more vulnerable to attack when placed in orbit.

NATO and Russian air assumptions

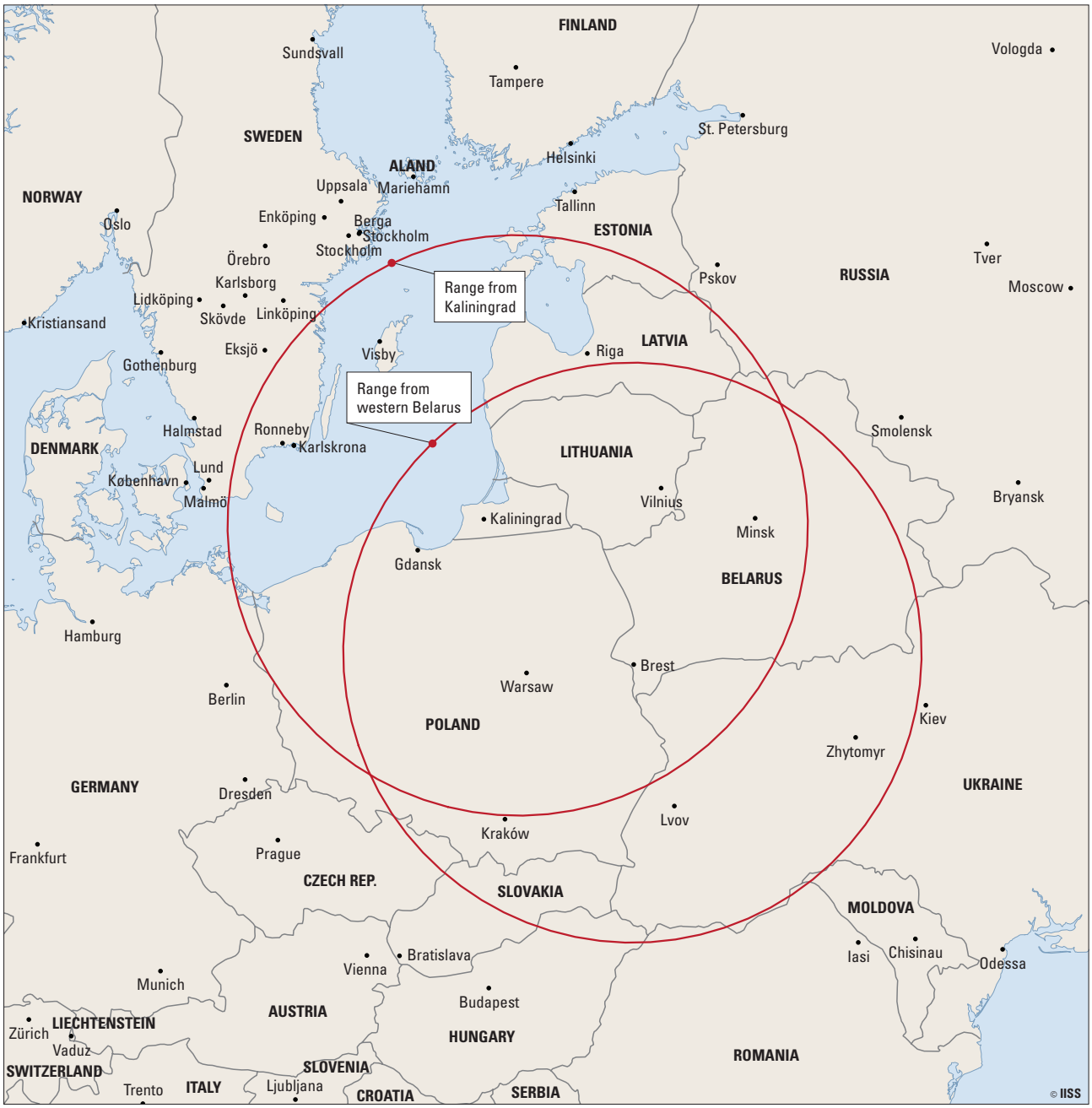
- National requirements, including Quick Reaction Alert (QRA), considerably reduce NATO air tactical fleet size available for offensive operations.
- While for defensive air operations parity may be acceptable, for offensive operations numerical superiority is required to increase the likelihood of a favourable outcome.
- 75% deployed aircraft availability on day one.
- Two sorties a day on days 1–7 and then one per day.
- NATO and Russian training is on an equal footing.
- F-35A/B low-observable advantage over Russian air.
- Eurofighter *Typhoon*, *Rafale*, Su-35S combat 'parity'.
- F-16A/B/C/D disadvantage over Su-35S, Su-30SM.
- NATO and Russian air-launched weapon stocks inadequate for an extended campaign.
- Air-to-air missiles (AAM): NATO air advantage with *Meteor* and imaging infrared (IIR) AAMs.
- Russian air advantage: very-long-range LACMs.
- NATO's air tasking does not require permanent air superiority throughout the area of operations, but only windows of temporary and geographically limited air superiority in order to be successful.
- Degrading Russian integrated air defence system (IADS) and air bases in Belarus a priority.
- No forward air deployment in Poland – deemed too vulnerable to Russian offensive action (air attack and surface-to-surface missiles) prior to day one.

Table 3.2: **Selected NATO air-domain requirements**[19]

Equipment type	Russian Aerospace Forces deployed in theatre	NATO allied air forces available	Assessed NATO deficit
FGA aircraft	156	316[20]	264
Interceptors	60	0	0
Attack	48	48	FGA increases also address this need
Anti-surface	8	0	0
Bomber	24	0	0
AEW and control	10	24	12
AAR	8	32	16
Crewed EW/ELINT/ISR	7	9	5
SEAD	All FGA SEAD ARM capable	36 dedicated; some FGA have SEAD ARM capability	FGA increases with additional ARM war stock address this need
Medium-altitude long-endurance/ high-altitude long-endurance (MALE/HALE) UAV	0	17	51 survivable combat ISR UAV; also has EW/ELINT/SIGINT roles
ASW	0	39	27

Map 3.4: **Engagement ranges of Russian air and naval LACMs**

Map 3.5: **SS-26 tactical ballistic-missile range**



3.5 The maritime campaign

The maritime domain presents a particular challenge in terms of operating in the narrowly defined main area of operations. An additional challenge is due to the anticipated Russian naval activity to interdict and 'fix' NATO forces in the broader arena, particularly in the northeast Atlantic and the Mediterranean and Black seas. On the assumption of no US support, trans-atlantic resupply and convoying requirements would not be on the scale assumed by previous, and particularly Cold War, contingency planning. Nevertheless, some resupply from the US and Canada would be necessary. Likewise, the prospective NATO Europe force posture is unlikely to assume the level of offensive action or 'holding Russian strategic assets at risk' strategy as in a classic 'NATO with US' context. Yet the threats to, or vulnerability of, key maritime infrastructure and trade routes in and around northwestern Europe and the Mediterranean and Black seas, as well as the potential interdiction of forces, mean that offensive action at a certain level in the maritime arena is likely to be required at some stage in order to bring operations to a conclusion.

The deployment on the scale anticipated of submarine and surface units from the Russian Northern and Black Sea fleets would represent a significant challenge to NATO Europe maritime forces, because of both their stand-off anti-ship capabilities and their potential precision land-attack capabilities. These include 3M45 *Granit* (SS-N-19 *Shipwreck*), 3M54K (SS-N-27 *Sizzler*), 3M24 (SS-N-25 *Switchblade*) and 3M14 (SS-N-30). Threats within the Baltic Sea itself also include the *Bastion*-P (SSC-5 *Stooge*) large coastal anti-ship missile. Maritime forces further face a significant potential threat from Russian long-range missile-armed aviation.

Estimated command-and-control requirements

- NATO Allied Maritime Command (MARCOM) supplemented by UK national maritime-command elements at Northwood to provide maritime component command in AO *Unity* for *Operation Eastern Shield/Eastern Storm*.
- JFC Naples to provide command for maritime force elements in the Mediterranean and Black seas.
- Two-star afloat command required for NATO maritime strike force, one-star afloat command required for amphibious task group.

Estimated formation/unit requirements

The assumption is a requirement in the northern area of operations for:

- A surface-action group, submarine force and mine countermeasure vessel (MCMV) capability directly for the Baltic.
- A littoral manoeuvre/amphibious group with a large screening escort force to support operations in the Baltic and Norway.
- A carrier-centred sea-control and ASW screening force for the North Atlantic for defensive surface and ASW screening to counter Russian interdiction threat, as well as some support for NATO land-based tactical aviation.
- An Atlantic/English Channel ASW force.
- A screening submarine force for the Atlantic.

In addition, for the southern area of operations, a deterrent force for the western and eastern Mediterranean and the Black Sea:

- One combined carrier-centred (CVS) sea control/littoral manoeuvre group.
- One surface-action group for the Black Sea.
- Submarine screening and general MCMV forces.

The below data and assessed naval-platform shortfalls, and the associated mission requirements, suggest also significant major weapons system shortfalls, most notably:

- Two squadrons (12 aircraft each) of F-35B *Lightning* FGAs or equivalent to equip assessed carrier deficit.
- 500–1,000 local area air-defence missiles (*Aster* 15/*Aster* 30, SM-3, ESSM equivalent).
- 500–750 anti-ship missiles (*Exocet/Harpoon* equivalent).
- 250 heavyweight torpedoes.

NATO and Russian maritime assumptions

- Requirement to provide direct support to land component to regain Lithuania and parts of Poland and to provide direct support to Norway, including force elements for an amphibious brigade and an aircraft-carrier-based maritime strike force.
- Requirement to deter and, if necessary, defeat Russian maritime forces in the Baltic.
- Requirement to protect sea lines of communication (SLOCs) in the northeast Atlantic to protect maritime supply routes and defend general maritime trade to northwest European ports.
- Bulk of Canadian maritime force based in the Atlantic retained for national tasking to defend northwest Atlantic sea area.
- The UK and France retain a number of units on national tasking to support their national SSBN forces.
- Requirement to deter and, if necessary, defeat Russian maritime forces in the Black Sea.
- Requirement to protect SLOCs and, if necessary, deter and defeat Russian maritime forces in the Mediterranean.
- Requirement for NATO task-group formations and operations in the face of Russian maritime and counter-maritime capabilities in and around the Baltic Sea, the northern Atlantic, and potentially the Black Sea and Mediterranean, will require surface combatants that are more modern with significant area-defence and self-defence capabilities or significant ASW capability, as well as high-end submarine capabilities (SSNs/modern SSKs).
- Some legacy ASW surface combatants available to supplement larger formations. Most such legacy platforms retained for national ASW/local sea-control tasking.
- Most legacy SSKs retained for national ASW/local sea-denial tasking.
- A readiness availability of 50%.
- A small number of new units have entered service and several other obsolete units have been deleted.

Table 3.3: **Maritime-capability assessment**

Equipment type	Assessed NATO Europe and Canada inventory	Assessed 50% readiness	Estimated force requirement	Assessed deficit[21]
CV/CVN	2[22]	1	2	1
CVS	1	0.5	1	0.5
SSN	10[23]	5	8	3
SSK (modern/high capability)	31[24]	15.5	20	4.5
SSK (legacy)	21	10.5	0	0
DDGHM (air defence)	32	16	32	16
DDGHM (ASW/general purpose)	19[25]	9.5	16	6.5
FFGHM (modern/high capability)	25[26]	12.5	12	0
FFGHM (legacy)	14[27]	21.5	4	0
LHD/LHA/LPH	8[28]	3.5	5	1.5
LPD/LSD	9	4.5	8	3.5
Large AOR/H or AFS/H	22	11	16	5
MCMV	22[29]	11	24	13

4. Cost implications of the scenarios

This chapter provides an estimate of the investment that would be necessary to fill the capability gaps encountered in the sea lines of communication (SLOCs) and the Article V scenarios. Various sources were utilised to determine weapon-systems costings. These costings were based on illustrative platform types for each weapons category. For example:

Table 4.1: Examples of platform types

Platform type	Example
Long-range SAM	*Patriot*; SAMP/T
MBT	*Leopard* 2A6/*Leopard* 2A7; M1 *Abrams*
DDGHM	UK Type-45; France/Italy *Horizon*
Fighter ground-attack aircraft	*Typhoon*; *Rafale*

From there, a range of primary and secondary sources was used to estimate procurement costs for each platform. Key government sources included the Defense Security Cooperation Agency (DSCA) for the United States Department of Defense (DoD) notifications of major arms sales; selected US DoD acquisition reports and programme-acquisition costs; United Kingdom National Audit Office (NAO) reports on the Ministry of Defence's equipment plans; French Senate reports on annual defence budgeting; and US Government Accountability Office (GAO) reports. Company sources were also used to determine contract values. Where no primary sources were available, reports from specialised defence media outlets were used to support IISS analysts' independent assessments.

The cost estimates are provided with low–high figures. There are three main reasons for the variation between low and high figures:

- Domain specialists estimated low or high ranges of capability shortfalls – e.g., between 2,500 and 3,750 main battle tanks – which were taken into account.
- The estimate was generated based on different examples of weapon platforms that have different price points. For instance, to cost the requirements of guided-missile destroyers, the Franco-Italian FREMM was estimated to cost US$1.22 billion per unit but the UK's Type-26 was priced at US$1.92bn.
- When three or more figures were available, the middle-range value was typically used. For example, for infantry fighting vehicles (IFVs), which could be fulfilled by CV90, *Puma* or VBCI, the price of the VBCI was used as it was in between the other two estimates.

While for some of the most recent programmes the costs include development expenses, the total figures do not include maintenance costs or the financial outlays required to recruit, train and pay additional requisite personnel. The exception to this is for the additional fighter ground-attack aircraft (F-35, Eurofighter *Typhoon*, *Rafale*) where the tables include estimates for additional pilots and the running costs of squadrons.

The contract data used to build cost estimates covers a number of years. To convert European currencies to US$, the exchange rate for the given year was used, based on data from the IMF's World Economic Outlook database.[30] Then, to adjust for inflation, the Consumer Price Index (CPI) inflation calculator from the US Bureau of Labor Statistics was used (from January to January in given years).[31] In all tables in this chapter, the totals may not add up precisely owing to rounding.

4.1 Sea lines of communication: cost implications

The value of equipment required to match capability shortfalls in a SLOCs scenario ranges between US$94.4bn and US$110.4bn in current (2019) terms. Table 4.2 below shows the distribution of costs per domain: logically, maritime-warfare capabilities represent the bulk of the requirements (up to 95%).

Table 4.2: **Cost overview by domain**		
Domain	**US$bn low**	**US$bn high**
Maritime	88.4	104.4
Aerospace	6.0	6.0
Total	**94.4**	**110.4**

In this scenario, the most expensive capability shortfalls would be high-end general-purpose frigates. For 16 such ships, the estimates range between US$19.5bn and US$30.7bn. The variation is due to higher estimates for Type-26 unit costs compared to the FREMM. Procuring these vessels would represent about one-quarter of total recapitalisation costs under this scenario. The second most expensive capability shortfalls are the ten air-defence destroyers, ranging between US$19.4bn and US$20.8bn. Here again the variation is caused by the difference of programme costs between the UK Type-45 and the Franco-Italian *Horizon* class. This requirement represents almost one-fifth of total costs.

Figure 4.1: **Higher estimates – breakdown per domain**

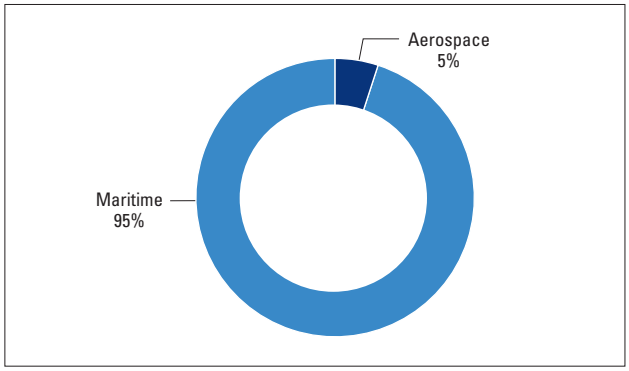


Table 4.3: **Top ten most expensive equipment shortfalls**					
Platform type	**Example**	**Requirement**	**US$m 2019, low**	**US$m 2019, high**	**% of total (high)**
DDGHM (ASW/general purpose)	France/Italy FREMM; UK Type-26	16	19,532	30,745	27.9
DDGHM (air defence)	UK Type-45; France/Italy *Horizon*	10	19,350	20,755	18.8
SSN	UK Astute; France *Barracuda*	7	14,266	15,477	14.0
Large AOR/H or AFS/H	UK *Tide*; Germany *Berlin*; France/Italy *Vulcano*	16	7,436	7,958	7.2
FFGHM (modern/high capability)	France *Frégates de Taille Intermédiaire*	7	6,227	6,227	5.6
ASW aircraft	P-8 class	18	5,994	5,994	5.4
LPD/LSD	UK *Albion*; Netherlands *Johan de Witt*	10	5,728	5,728	5.2
SSK (modern/high capability)	Germany Type-212/Type-214; Sweden A26	8	3,882	5,496	5.0
CV/CVN	UK Queen *Elizabeth*; France *Charles de Gaulle*	1	4,240	4,240	3.8
FF/FS/PSO	UK Batch 2 river class	19	3,474	3,474	3.1

Totals in this table may not add up precisely owing to rounding.

Table 4.4: **Maritime requirements costs**

Platform type	Example	Requirement	Unit cost US$m 2019, low	Unit cost US$m 2019, high	Total cost US$m 2019, low	Total cost US$m 2019, high	Remarks
Fighter ground-attack aircraft	F-35B	12	117	117	1,407	1,407	Estimate based on Lockheed Martin report
Pilots		18	7	7	126	126	Cost of additional pilot training and readiness (IISS analysis)
Running costs of squadrons		1	234	234	234	234	Running costs of squadrons (IISS analysis)
CV/CVN	UK *Queen Elizabeth*; France *Charles de Gaulle*	1	4,240	4,240	4,240	4,240	Estimate based on UK defence equipment plan
CVS	Italy *Cavour*; Japan *Izumo*	0	1,674	1,674	0	0	
SSN	UK *Astute*; France *Barracuda*	7	2,038	2,211	14,266	15,477	Range of costs between the UK *Astute* class and the French *Barracuda* class
SSK (modern/ high capability)	Germany Type-212/Type-214; Sweden A26	8	485	687	3,882	5,496	Range of costs between Italian procurement of Type-212 and Swedish A26 programme costs
DDGHM (air defence)	UK Type-45; France/Italy *Horizon*	10	1,935	2076	19,350	20,755	Range of costs between the French *Horizon* and the UK Type-45 acquisitions
DDGHM (ASW/ general purpose)	France/Italy FREMM; UK Type-26	16	1,221	1922	19,532	30,745	Range of costs between the French FREMM and the UK Type-26 acquisitions
FFGHM (modern/ high capability)	France *Frégates de Taille Intermédiaire*	7	890	890	6,227	6,227	Estimate based on secondary source (*Mer et Marine*)
FFGHM (legacy)		0			0	0	
FF/FS/PSO/H	UK Batch 2 river class	19	183	183	3,474	3,474	Estimate based on BAE Systems report
LHD/LHA/LPH	France *Mistral*; Spain *Juan Carlos*; Italy *Trieste*	1	568	617	568	617	Range of costs between Spain's *Juan Carlos* and French *Mistral* (secondary sources)
LPD/LSD	UK *Albion*; Netherlands *Johan de Witt*	10	573	573	5,728	5,728	Original order price
Large AOR/H or AFS/H	UK Tide; Germany *Berlin*; France/Italy *Vulcano*	16	465	497	7,436	7,958	Range of costs between France and Italy *Vulcano* acquisitions
MCMV	Finland *Katanpää* class	3	130	130	390	390	Estimate based on Kongsberg report
Local-area air defence missiles	*Aster* 15/*Aster* 30; SM-6; ESSM	300	4	4	1,254	1,254	Estimates for SM-6 procurement from US Navy reports
Anti-ship missiles	*Exocet; Harpoon*	200	1	1	248	248	Estimate based on average *Harpoon* sales from DSCA announcements
Heavyweight torpedoes	UK *Spearfish*; US Mark 48	0	2	2	0	0	
Total maritime					**88,363**	**104,377**	

Totals in this table may not add up precisely owing to rounding.

Table 4.5: **Aerospace requirements costs**

Platform type	Example	Requirement	Unit cost US$m 2019, low	Unit cost US$m 2019, high	Total cost US$m 2019, low	Total cost US$m 2019, high	Remarks
ASW aircraft	P-8 class	18	5,994	5,994	5,994	5,994	Estimate based on UK defence equipment plan
Total aerospace					**5,994**	**5,994**	

Totals in this table may not add up precisely owing to rounding.

4.2 Collective defence and Article V: cost implications

The total cost for equipment required to match capability shortfalls in an Article V scenario ranges between US$288bn and US$357bn, in current (2019) terms. Table 4.6 shows the distribution per domain; land-warfare capabilities would represent half of the costs.

Table 4.6: Cost overview by domain

Domain	US$bn low	US$bn high
Aerospace	71.2	80.9
Maritime	68.2	79.5
Land	148.6	196.3
Total	**288.0**	**356.7**

The most expensive capability shortfalls are by far air-defence platforms, with costs based on examples of *Patriot*-system acquisitions. Table 4.7 lists the top ten most expensive capability shortfalls in this scenario. Combined, air-defence systems required for the protection of forces and critical military infrastructure account for almost 30% of the total. Recapitalisation in terms of main battle tanks, air-defence destroyers and fighter ground-attack aircraft would be the next most costly procurement: each platform represents 8–10% of total costs.

Figure 4.2: **Higher estimates – breakdown per domain**

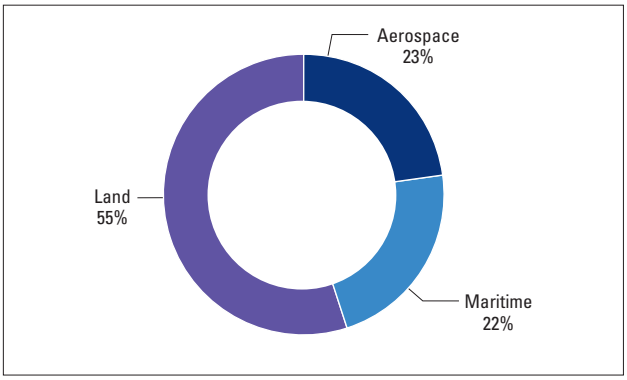


Table 4.7: Top ten most expensive equipment shortfalls

Platform type	Example	Requirement	US$m 2019, low	US$m 2019, high	% of total (high)
Long-range SAM (force protection)	*Patriot*; SAMP/T	72–90 batteries (24–30 battalions)	62,150	77,687	21.8
MBT	*Leopard* 2A6/*Leopard* 2A7; M1 Abrams	2,500–3,750 (100–150 battalions)	25,000	37,500	10.5
DDGHM (air defence)	UK Type-45; France/Italy *Horizon*	16	30,960	33,208	9.3
Fighter ground-attack aircraft	*Typhoon; Rafale*	264	24,716	30,896	8.7
Long-range SAM (critical military infrastructure)	*Patriot*	30 batteries (10 battalions)	25,896	25,896	7.3
IFV	CV90; *Puma*; VBCI	2,500–3,750	12,875	19,313	5.4
SHORAD	CAMM; *Land Ceptor*	162–216 batteries (54–72 battalions)	10,153	13,537	3.8
DDGHM (ASW/general purpose)	France/Italy FREMM; UK Type-26	7	8,545	13,451	3.8
AAM radio frequency	*Meteor* missile	2,112	9,610	9,821	2.8
ASW aircraft	P-8 class	27	8,990	8,990	2.5

Totals in this table may not add up precisely owing to rounding.

Table 4.8: **Aerospace requirements costs**

Platform type	Example	Requirement	Unit cost US$m 2019, low	Unit cost US$m 2019, high	Total cost US$m 2019, low	Total cost US$m 2019, high	Remarks
Fighter ground-attack aircraft	*Typhoon*; *Rafale*	264	94	117	24,716	30,896	Estimate based on range of costings for *Typhoon* and *Rafale*
Pilots		396	7	7	2,781	2,781	Cost of additional pilots training and readiness (IISS analysis)
Running costs of squadrons		22	234	234	5,149	5,149	Running costs of squadrons (IISS analysis)
Air-to-air refuelling aircraft	C-135; KC-135; *Voyager*; KC-767	16	203	203	3,250	3,250	Estimate based on DoD acquisition report
ASW aircraft	P-8 class	27	333	333	8,990	8,990	Estimate based on UK defence equipment plan
ELINT/SIGINT/ ISR/EW	Rivet Joint RC-135 (*Airseeker*)	5	370	370	1,851	1,851	Estimate based on UK NAO report (2012)
AEW and control	Boeing E-7 *Wedgetail*	12	396	396	4,752	4,752	Estimate based on UK Royal Air Force procurement announcement
Survivable ISR	*Predator* C-class system	51	30	82	1,554	4,159	No unit costs available for *Predator* C-class system (in development); range based on unit costs of MQ-9 *Reaper* and UK *Predator*
AAM radio frequency guided	*Meteor* missile	2,112	5	5	9,610	9,821	Range of costs between the *Meteor* missile procurements in UK and France over the years
AAM IIR guided	ASRAAM	1,056	0.45	0.45	475	475	Estimate based on UK NAO report (2000)
Anti-radiation missiles	AGM-88E equivalent	500–1,000 rounds	0.85	0.85	425	851	Price variation owing to range of requirements estimates (500–1,000 rounds)
LACM	*Storm Shadow*; SCALP	1,000	1.45	1.45	1,450	1,450	Estimate based on UK parliamentary report
PGM medium range	SPEAR-3 class weapon	2,000	0.52	0.65	1,039	1,299	Estimate based on IISS analysis
PGM short range	*Brimstone*-2 class weapon	2,000	0.32	0.32	640	640	Estimate based on UK parliamentary report
PGM direct attack	SDB II class	2,000	0.11	0.11	220	220	Estimate based on contract awarded to Raytheon
Precision-guided bombs	*Paveway* IV; AASM-class weapon	30,000	0.13	0.13	3,900	3,900	Estimate based on UK Freedom of Information response
Precision-guided bombs	SDB-1-class weapon	10,000	0.04	0.04	400	400	Estimate based on DoD acquisition report
Total aerospace					**71,201**	**80,882**	

Totals in this table may not add up precisely owing to rounding.

Table 4.9: **Maritime requirements costs**

Platform type	Example	Requirement	Unit cost US$m 2019, low	Unit cost US$m 2019, high	Total cost US$m 2019, low	Total cost US$m 2019, high	Remarks
Fighter ground-attack aircraft	F-35B	24	117	117	2,815	2,815	Estimate based on Lockheed Martin report
Pilots		36	7.0	7.0	253	253	Cost of additional pilots training and readiness (IISS analysis)
Running costs of squadrons		2	234	234	468	468	Running costs of squadrons (IISS analysis)
CV/CVN	UK *Queen Elizabeth*; France *Charles de Gaulle*	1	4,240	4,240	4,240	4,240	Estimate based on UK defence equipment plan
CVS	Italy *Cavour*	1	1,674	1,674	1,674	1,674	Estimate based on Italian MoD report
SSN	UK *Astute*; France *Barracuda*	3	2,038	2,211	6,114	6,633	Range of costs between the UK *Astute* class and the French *Barracuda* class
SSK (modern/ high capability)	Germany Type-212/Type-214; Sweden A26	5	485	687	2,426	3,435	Range of costs between Italian procurement of Type-212 and Swedish A26 programme costs
DDGHM (air defence)	UK Type-45; France/Italy *Horizon*	16	1,935	2,076	30,960	33,208	Range of costs between the French *Horizon* and the UK Type-45 acquisitions
DDGHM (ASW/ general purpose)	France/Italy FREMM; UK Type-26	7	1,221	1,922	8,545	13,451	Range of costs between the French FREMM and the UK Type-26 acquisitions
FFGHM (modern/ high capability)	France *Frégates de Taille Intermédiaire*	0	890	890	0	0	Estimate based on secondary source (*Mer et Marine*)
LHD/LHA/LPH	France *Mistral*; Spain *Juan Carlos*; Italy *Trieste*	2	568	617	1,135	1,233	Range of costs between Spain's *Juan Carlos* and French *Mistral* (secondary sources)
LPD/LSD	UK *Albion*; Netherlands *Johan de Witt*	4	573	573	2,291	2,291	Original order price
Large AOR/H or AFS/H	UK *Tide*; Germany *Berlin*; France/ Italy *Vulcano*	5	465	497	2,324	2,487	Range of costs between France and Italy *Vulcano* acquisitions
MCMV	Finland *Katanpää*-class	13	130	130	1,691	1,691	Estimate based on Kongsberg report
Local area air-defence missiles	*Aster* 15/*Aster* 30; SM-6; ESSM	500–1,000	4.2	4.2	2,090	4,180	Estimates for SM-6 procurement from US Navy reports
Anti-ship missiles	*Exocet*; *Harpoon*	500–750	1.2	1.2	620	930	Estimate based on average *Harpoon* sales from DSCA announcements
Heavyweight torpedoes	UK *Spearfish*; US Mark 48	250	2.0	2.0	508	508	Range of costs between UK *Spearfish* and US Mark 48 acquisitions
Total maritime					**68,154**	**79,497**	

Totals in this table may not add up precisely owing to rounding.

Table 4.10: **Land requirements costs**

Platform type	Example	Gap	Unit cost US$m 2019, high	Unit cost US$m 2019, low	Total cost US$m 2019, low	Total cost US$m 2019, high	Remarks
MBT	*Leopard* 2A6 and 2A7; M1 *Abrams*	2,500–3,750 (50–75 battalions)	10	10	25,000	37,500	Estimate based on *Leopard* 2A6 and M1A1 contracts
IFV	CV90; *Puma*; VBCI	2,500–3,750 (50–75 battalions)	5.2	5.2	12,875	19,313	Estimate based on France VBCI acquisitions
Artillery 155 SP	CAESAR; M109A6/ M109A7; PzH 2000	432–960 (18–40 battalions)	6.0	6.0	2,570	5,712	Estimate based on France CAESAR acquisitions
MRL	High Mobility Artillery Rocket System (HIMARS)	288–480 (12–20 battalions)	6.0	6.0	1,719	2,866	Estimate based on US DoD acquisition reports
SHORAD	CAMM/*Land Ceptor*	162–216 batteries (54–72 battalions)	63	63	10,153	13,537	Estimate based on secondary sources for *Sky Sabre* battery and *Giraffe radar*
Long-range SAM (force protection)	*Patriot;* SAMP/T	72–90 batteries (24–30 battalions)	863	863	62,150	77,687	Estimate based on *Patriot* systems and PAC-3 missile contracts
Long-range SAM (critical military infrastructure)	*Patriot*	30 batteries (ten battalions)	863	863	25,896	25,896	Estimate based on *Patriot* systems and PAC-3 missile contracts
Ammunition	155mm artillery round	720,000–1,440,000	0.0	0.0	1,080	2,160	Estimate based on IISS analysis
Bridging battalions	*Leguan* bridge layers; US Joint Assault Bridge	324–432	4.7	16.2	3,381	4,508	Estimate based on KMW contract reports and US DoD acquisition report
Tactical ISR UAV battalions	*Hermes* 450 UAV	9–18 orbits (four UAVs and one ground-control station/orbit)	28	28	256	512	Estimate based on secondary source for H450 UAS contract
Attack helicopter	AH-64E	0–75	29	29	0	2,171	Estimate based on DoD acquisition report
Army personnel		50,000–62,000	0.07	0.07	3,554	4,443	Estimate based on average military personnel cost in NATO countries (excluding US)
Total land					**148,634**	**196,303**	

Totals in this table may not add up precisely owing to rounding.

5. Implications for Europe's defence debate

This paper set out to provide an open-source assessment of the military-capability challenges that would occur if the European members of NATO had to undertake very demanding military operations without United States support or involvement. Insights into the capability shortfalls that NATO Europe would likely experience were generated by drawing on two hypothetical scenarios: the first covering the protection of global sea lines of communication (SLOCs) and the second covering the defence of European NATO territory against a state-level attack, in which Article V is invoked. Following the scenarios is an assessment of the financial cost of procuring equipment to close those gaps.

The IISS estimates that up to US$110 billion would be required to tackle the SLOCs scenario and up to US$357bn to address the Article V shortfalls.[32] These two estimates should not be added up to a new total, given that the capability requirements for both overlap to a degree: some of the platforms that Europe would buy to address the SLOCs scenario would have utility in an Article V contingency and vice versa.

In general, beyond meeting the force requirements for the scenarios analysed in this study, addressing the identified capability shortfalls provides Europe with a stronger deterrence against a wide range of actors and would enable Europeans to tackle a greater variety of military operations, be that in the context of NATO or the European Union. It is a political decision for governments to employ the military instrument in line with their national interests. This study assumes that the European members of NATO and Canada would be able to maintain a degree of political cohesion following the withdrawal of the US from NATO. Closing the capability gaps provides options, but in itself does not create political will.

The study underlines the centrality of the NATO Command Structure. Without it, it does not seem feasible at this point for Europeans to attempt to run demanding operations of the kind considered in this paper. Another implication of this research is the enduring importance of the US in military terms. As a NATO member, the US provides a significant reservoir of capabilities on which US and NATO commanders can and would draw in a crisis. Some of the capabilities provided by US forces, such as logistics and sustainment for land forces, may be relatively straightforward if not cheap to replace. However others are almost unique to the US, and it would be difficult to substitute European capabilities.

This study provides a reality check for the ongoing debate on European strategic autonomy. Its findings underline that it would be more helpful for this debate to focus on the capabilities to tackle threats to European security than it is to focus on institutional engineering. The insights generated by this study are of course driven by the scenarios employed. Additional scenarios could focus more on aspects of hybrid conflict, the cyber domain, or national resilience, which would add additional layers of analysis. The point of this work is not to say that European efforts are hopeless and European governments are structurally unable to defend themselves. In 2018, NATO's European member states spent some US$264bn on defence, according to IISS data, which is certainly a significant sum. Meeting the capability shortfalls identified in this study would of course not fall to one or two countries but to all of them, and it would not be done in a couple of years, but rather over the course of one or two decades. It would not be feasible to do this more quickly, but it also means that the additional spending required would be spread across member states and time. It is notable that, had all European NATO member states in 2018 spent in accordance with the 2% of GDP benchmark, they would have had an additional US$102bn available compared to the US$264bn they did spend.

The timelines for the recapitalisation across the military domains are complex. For example, equipment procurement for the identified land shortfalls, if it were to start immediately in 2019, would likely take some eight to 12 years, owing to the numbers involved and the limited number of available suppliers. Training

units to full operational-capability standards on new equipment would add to this. Closing the identified gaps in the air domain, likewise, will take at least a decade, given aircraft and systems-production capacity; procurement decisions and production times; recruitment and training demands; and the time it takes for new units to reach an operational capability. In the maritime domain, owing to the scale of the overall additional requirement; the complexity of construction of some of the capital ships and submarines; and the limited industrial base in Europe to undertake the work, it is estimated that it would take 15–20 years to fulfil the entire requirement. The other major challenge would be the delivery of a large number of high-end surface combatants that are deemed necessary. Lower-end capabilities (e.g., ocean-patrol vessels) could be delivered over a shorter period of approximately ten years.

Notes

1 Information on the Military Balance Plus database is available here: https://www.iiss.org/publications/the-military-balance-plus.

2 The scenarios assume that Canada remains a NATO member state. For readability, this study refers to NATO's European members rather than NATO's European members plus Canada. However, most of the capability assessments undertaken here include Canada as a contributing nation. Where specific Canadian assets are required to address the scenarios examined in this study, this is indicated in tables and endnotes.

3 The scenarios were set in the early 2020s to be able to make analytical assessments based on current force structures and equipment holdings. Scenarios that would push the timeline out further would require additional assumptions about future capabilities, which in themselves may or may not come to pass.

4 All events referred to before April 2019 in this scenario are factual.

5 Requirements with decimals were rounded up for costing purposes in Chapter Four.

6 Assumes two UK CVs, both able to operate in a sea-control carrier role with limited fixed-wing aircraft complement, although the second UK CV will also be operated in an LPH role on occasions. Also includes French CVN *Charles de Gaulle* and Italian CVS *Cavour*.

7 Assumes UK, France and Italy maintain their capital ships at higher readiness than average (for example, the UK continuous-carrier availability commitment) and agree a higher level of consultation on deployment schedules.

8 Assessed as a requirement for a full-size carrier (CV/CVN).

9 Includes Canada, Sweden SSKs.

10 Includes 12 Canada FFGHMs.

11 Includes Ireland, Sweden PSO.

12 Includes three small Italy *San Giorgio* LHDs, each count as 0.5 normal LHD capacity. Includes one UK CV operating as an LPH.

13 This figure was rounded up for costing purposes in Chapter Four.

14 Includes one Canada AORH.

15 Includes Sweden MCMV.

16 The IISS does not make a judgement on the likelihood of the scenario – this analysis focuses on what would be required to deal with it, should it occur.

17 In this scenario, it is proposed that enough modern tanks and infantry fighting vehicles must be bought to re-equip between 34 and 52 existing NATO brigades, thereby ensuring that at 50% readiness, 17–26 additional brigades could be generated for the land component. This would require equipment for approximately 100–150 battalions, split evenly between main battle tanks and infantry fighting vehicles, with an average of 50 vehicles required per battalion. A similar approach has been taken to meeting the shortfall in self-propelled artillery and multiple rocket launchers. The purchase of 30–60 battalion sets of modern equipment would enable enough existing artillery battalions to be added to NATO's force-generation pool to alleviate the deficiencies in this area.

18 Attack-helicopter availability assessed using a higher rate of readiness as per air-domain assumptions.

19 The capability assessment for the air domain is based on the following assumptions: aircraft availability is estimated to be at 75% for those types from which assets for the operation will be drawn; platforms required for national tasking/contingent needs are excluded from the available force pool; Soviet or Russian types still in service with NATO nations are excluded from the available force pool; and platforms assessed to be obsolete are excluded from the available force pool.

20 Available FGA is based on 75% overall readiness minus those units required to meet national tasking such as quick-reaction alert, air defence and other roles. Types deemed to be unsuitable, whether through age, lack of adequate capability, or Soviet-design heritage are also excluded.

21 Assessed deficits with decimals were rounded up for the cost calculations in Chapter Four.

22 Assumes one UK CV although availability of fixed-wing air group in doubt.

23 Assumes one SSN each for the UK and France tasked with SSBN support.

24 Assumes one Canada SSK based in the Atlantic on national tasking in western Atlantic.

25 Assumes one France DDGHM (ASW) tasked with SSBN support.

26 Assumes two of seven Canada FFGHM based in Atlantic

available, the rest on national tasking in the western Atlantic. Assumes one UK FFGHM tasked with SSBN support.

27 Available for NATO tasking from total inventory of 43, most retained for national ASW/local sea control.

28 Includes three small Italian *San Giorgio* LHDs, each counts as 0.5 normal LHD capacity. Includes one UK CV operating as an LPH.

29 Available for NATO tasking from total inventory of 103, most of which retained for national port/territorial waters MCM missions.

30 IMF, World Economic Outlook database, October 2018, https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/index.aspx.

31 Bureau of Labor Statistics, CPI Inflation Calculator, https://data.bls.gov/cgi-bin/cpicalc.pl.

32 This assessment covers the initial equipment investment only – additional costs for maintenance, personnel and, in general, the support services and structures this new force posture would require are not included in this estimate.

Annex

List of abbreviations for military equipment categories

AAA	anti-aircraft artillery
AAM	air-to-air missile
AAR	search-and-rescue vessel
AAV	amphibious assault vehicle
AB	airborne
ABM	anti-ballistic missile
ABU/H	sea-going buoy tender/with hangar
ABCV	airborne combat vehicle
ac	aircraft
ACV	air-cushion vehicle/armoured combat vehicle
ACS	crane ship
AD	air defence
ADA	air-defence artillery
ADEX	air-defence exercise
adj	adjusted
AE	auxiliary, ammunition carrier
AEM	missile support ship
AEV	armoured engineer vehicle
AEW	airborne early warning
AFD/L	auxiliary floating dry dock/small
AFS/H	logistics ship/with hangar
AFSB	afloat forward staging base
AFV	armoured fighting vehicle
AG	misc auxiliary
AGB/H	icebreaker/with hangar
AGE/H	experimental auxiliary ship/with hangar
AGF/H	command ship/with hangar
AGHS	hydrographic survey vessel
AGI	intelligence collection vessel
AGM	space tracking vessel
AGOR	oceanographic research vessel
AGOS	oceanographic surveillance vessel
AGS/H	survey ship/with hangar
AH	hospital ship
AIP	air-independent propulsion
AK/L	cargo ship/light
aka	also known as
AKEH	dry cargo/ammunition ship
AKR/H	roll-on/roll-off cargo ship/with hangar
AKS/L	stores ship/light
ALCM	air-launched cruise missile
amb	ambulance
amph	amphibious/amphibian
AO/S	oiler/small
AOE	fast combat support ship
AOR/L/H	fleet replenishment oiler with RAS capability/light/with hangar
AOT/L	oiler transport/light
AP	armour-piercing/anti-personnel/ transport ship
APB	barracks ship
APC	armoured personnel carrier
AR/C/D/L	repair ship/cable/dry dock/light
ARG	amphibious ready group
ARH	active radar homing
ARL	airborne reconnaissance low
ARM	anti-radiation missile
armd	armoured
ARS/H	rescue and salvage ship/with hangar
arty	artillery
ARV	armoured recovery vehicle
AS	anti-submarine/submarine tender
ASBM	anti-ship ballistic missile
ASCM	anti-ship cruise missile
AShM	anti-ship missile
aslt	assault
ASM	air-to-surface missile
ASR	submarine rescue craft
ASTT	anti-submarine torpedo tube
ASW	anti-submarine warfare
ASuW	anti-surface warfare
AT	tug/anti-tank
ATBM	anti-tactical ballistic missile
ATF	tug, ocean going
ATGW	anti-tank guided weapon
Atk	attack/ground attack
ATS	tug, salvage and rescue ship

AUV	armoured utility vehicle
AVB	aviation logistic support ship
avn	aviation
AWT	water tanker
AX/L/S	training craft/light/sail
BA	Budget Authority (US)
Bbr	bomber
BCT	brigade combat team
bde	brigade
bdgt	budget
BG	battlegroup
BMD	ballistic-missile defence
BMEWS	ballistic missile early warning system
bn	battalion/billion
bty	battery
C2	command and control
casevac	casualty evacuation
cav	cavalry
cbt	combat
CBRN	chemical, biological, radiological, nuclear, explosive
cdo	commando
C/G/H/M/N	cruiser/with AShM/with hangar/ with SAM/nuclear-powered
CISR	combat ISR
CIMIC	civil–military cooperation
CIWS	close-in weapons system
COIN	counter-insurgency
comd	command
COMINT	communications intelligence
comms	communications
coy	company
CP	command post
CPX	command post exercise
CS	combat support
CSAR	combat search and rescue
CSS	combat service support
CT	counter-terrorism
CV/H/L/N/S	aircraft carrier/helicopter/light/ nuclear powered/VSTOL
CW	chemical warfare/weapons
DD/G/H/M	destroyer/with AShM/with hangar/ with SAM
DDR	disarmament, demobilisation and reintegration
DDS	dry deck shelter
def	defence
det	detachment
div	division
ECM	electronic countermeasures
ELINT	electronic intelligence
elm	element/s
engr	engineer
EOD	explosive ordnance disposal
EPF	expeditionary fast transport vessel
eqpt	equipment
ESB	expeditionary mobile base
ESD	expeditionary transport dock
EW	electronic warfare
excl	excludes/excluding
exp	expenditure
FAC	forward air control
fd	field
FF/G/H/M	frigate/with AShM/with hangar/with SAM
FGA	fighter ground attack
FLD	full-load displacement
flt	flight
FMA	Foreign Military Assistance
FS/G/H/M	corvette/with AShM/with hangar/ with SAM
Ftr	fighter
FTX	field training exercise
FY	fiscal year
GBU	guided bomb unit
gd	guard
GDP	gross domestic product
GLCM	ground-launched cruise missile
GMLS	Guided Missile Launching System
gp	group
HA/DR	humanitarian assistance/disaster relief
hel	helicopter
how	howitzer
HQ	headquarters
HUMINT	human intelligence
HWT	heavyweight torpedo
hy	heavy
IBU	inshore boat unit
ICBM	intercontinental ballistic missile
IFV	infantry fighting vehicle
IIR	imaging infrared

IMINT imagery intelligence
imp improved
indep independent
inf infantry
info ops information operations
INS inertial navigation system
int intelligence
IOC Initial Operating Capability
IR infrared
IRBM intermediate-range ballistic missile
ISD in-service date
ISR intelligence, surveillance and reconnaissance
ISTAR intelligence, surveillance, target acquisition and reconnaissance
JOINTEX joint exercise
LACM land-attack cruise missile
LC/A/AC/H/M/PA/P/L/T/U/VP landing craft/assault/air cushion/heavy/medium/personnel air cushion/personnel/large/tank/utility/vehicles and personnel
LCC amphibious command ship
LGB laser-guided bomb
LHA landing ship assault
LHD amphibious assault ship
LIFT lead-in ftr trainer
LKA amphibious cargo ship
LLI long-lead items
lnchr launcher
LoA letter of acceptance
log logistic
LoI letter of intent
LP/D/H landing platform/dock/helicopter
LRIP low-rate initial production
LS/D/L/LH/M/T landing ship/dock/logistic/logistic helicopter/medium/tank
lt light
LWT lightweight torpedo
maint maintenance
MANPAD man-portable air-defence system
MANPATS man-portable anti-tank system
MAREX maritime exercise
MBT main battle tank
MC/C/CS/D/I/O mine countermeasure coastal/command and support/diving support/inshore/ocean
MCM mine countermeasures
MCMV mine countermeasures vessel
MD military district
MDT mine diving tender
mech mechanised
med medium/medical
medevac medical evacuation
MH/C/D/I/O mine hunter/coastal/drone/inshore/ocean
mil military
MIRV multiple independently targetable re-entry vehicle
mk mark (model number)
ML minelayer
MLU mid-life update
mne marine
mod modified/modification
mor mortar
mot motorised/motor
MoU memorandum of understanding
MP maritime patrol/military police
MR maritime reconnaissance/motor rifle
MRBM medium-range ballistic missile
MRH multi-role helicopter
MRL multiple rocket launcher
MS/A/C/D/I/O/R mine sweeper/auxiliary/coastal/drone/inshore/ocean/river
msl missile
mtn mountain
MW mine warfare
n.a. not applicable
n.k. not known
NBC nuclear, biological, chemical
NCO non-commissioned officer
nm nautical mile
nuc nuclear
O & M operations and maintenance
obs observation/observer
OCU operational conversion unit
OP observation post
op/ops operational/operations

OPFOR opposition training force
org organised/organisation
OPV offshore patrol vessel
para paratroop/parachute
PAX passenger/passenger transport aircraft
PB/C/F/G/I/M/R/T patrol boat/coastal/fast/with AShM/inshore/with SAM/riverine/with torpedo
PC/C/F/G/H/I/M/O/R/T patrol craft/coastal/fast/guided missile/with hangar/inshore/with CIWS missile or SAM/offshore/riverine/with torpedo
pdr pounder
pers personnel
PG/G/GF/H patrol gunboat/guided missile/fast attack craft/hydrofoil
PGM precision-guided munitions
PH/G/M/T patrol hydrofoil/with AShM/with SAM/with torpedo
pl platoon
PKO peacekeeping operations
PoR programme of record
PPP purchasing-power parity
PPV protected patrol vehicle
PRH passive radar-homing
prepo pre-positioned
PSO/H peace support operations or offshore patrol ship/with hangar
PTF semi-submersible vessel
ptn pontoon bridging
quad quadruple
R&D research and development
RCL recoilless launcher
recce reconnaissance
regt regiment
RFI request for information
RFP request for proposals
RIB rigid inflatable boat
RL rocket launcher
ro-ro roll-on, roll-off
RRC/F/U rapid-reaction corps/force/unit
RV re-entry vehicle
rvn riverine
SAM surface-to-air missile
SAR search and rescue
SARH semi-active radar homing
sat satellite
SDV swimmer delivery vehicles
SEAD suppression of enemy air defence
SF special forces
SHORAD short-range air defence
SIGINT signals intelligence
sigs signals
SLBM submarine-launched ballistic missile
SLCM submarine-launched cruise missile
SLEP service-life-extension programme
SP self-propelled
Spec Ops special operations
SPAAGM self-propelled anti-aircraft gun and missile system
spt support
sqn squadron
SRBM short-range ballistic missile
SS submarine
SSA submersible auxiliary support vessel
SSAN submersible auxiliary support vessel (nuclear)
SSBN nuclear-powered ballistic-missile submarine
SSC coastal submarine
SSG guided-missile submarine
SSI inshore submarine
SSGN nuclear-powered guided-missile submarine
SSK attack submarine (hunter-killer)
SSM surface-to-surface missile
SSN nuclear-powered attack submarine
SSR security-sector reform
SSW midget submarine
str strength
surv surveillance
sy security
t tonnes
tac tactical
tch technical
temp temporary
tk tank
tkr tanker
TMD theatre missile defence
torp torpedo

tpt	transport
tr	trillion
trg	training
TRV	torpedo recovery vehicle
TT	torpedo tube
UAV	unmanned/uninhabited aerial vehicle
UCAC	utility craft air cushioned
UCAV	unmanned combat air vehicle
utl	utility
UUV	unmanned/uninhabited underwater vehicle
veh	vehicle
VLB	vehicle launched bridge
VLS	vertical launch system
VSHORAD	very short-range air defence
WFU	withdrawn from use
wg	wing

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