Overcoming today's challenges for tomorrow's security

A proactive approach to designing a future defence force

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The PwC Global Defence Advisory Board

The depth of our global network gives PwC a remarkable capacity to bring best practice and insight to everything we do with and for our clients. This is highlighted in our deep and enduring connection with military and strategic leaders, which is a pillar of our Defence practice.

PwC's **Global Government Defence Network** (GGDN) spans 32 countries, connecting defence industry teams across the PwC network of firms. The GGDN has established a **Global Defence Advisory Board** to bring the knowledge and experience of recognised defence industry leaders to clients, helping them solve their most important problems. The advisory board includes:

Terry Weber coordinates PwC's Global Government Defence Network, and in that role, he established the Global Defence Advisory Board. He is the previous leader for the PwC Defence practice in Australia. As an adviser to the Australian Defence Force for the past 20 years, Weber has been involved in strategic reform programmes and transformation.

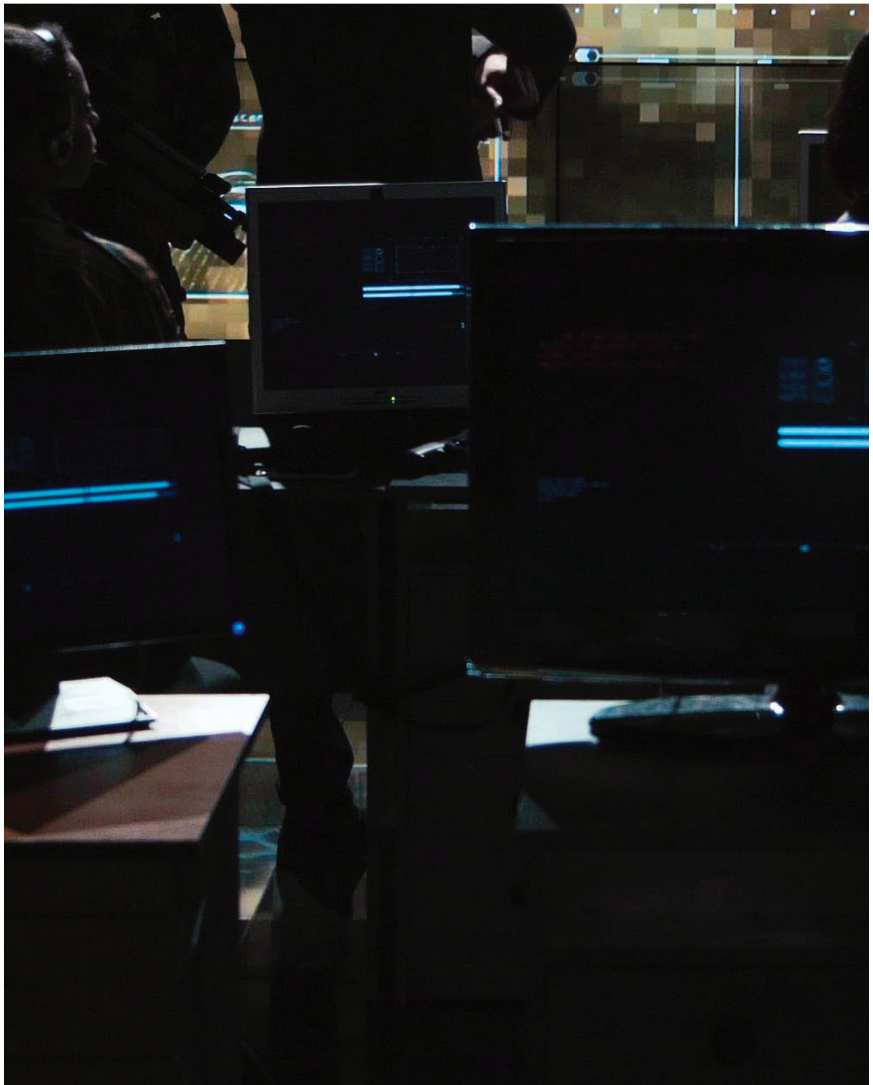
Peter van Uhm, a retired general, was appointed commander of the Royal Netherlands Army in September 2005. Between 2008 and 2012, General van Uhm was the chief of defence of the Netherlands.

Hans-Lothar Domröse, a retired general, was the German military representative to the North Atlantic Treaty Organisation Military Committee (NATO MC) and the European Union Military Committee (EUMC). He was the commander of the Allied Joint Force Command Brunssum between 2012 and 2016.

Tony Raper has 15 years combined experience at the most senior levels of defence, including four years as a member of the UK Army Board and more than ten years in strategic consulting in aerospace, defence and security, primarily in the UK, North America, Europe and the Middle East.

Kym Osley has more than four decades of defence experience, including 15 years as a star-ranked officer. He has extensive experience in military force design, combat operations and the introduction of fifth-generation capabilities into the Australian Defence Force.

Executive summary



Traditional defence organisations must adapt in order to keep the nations they serve safe. The world now exists at an economic, strategic and technological inflection point. Global economic power is shifting, bringing strategic challenges and changing relationships, while technological breakthroughs, such as artificial intelligence and robotics, are evolving rapidly. By 2030, the global population is set to rise by more than 1bn. People are living longer and having fewer children. Populations are ageing and urbanising. The need to address climate change and resource scarcity is becoming more urgent.

These major global changes, often called 'megatrends,' are reshaping society.[1] In particular, they will have a significant impact on the way defence organisations around the world design, develop and build their forces. Making concrete decisions today to mitigate risks in an uncertain tomorrow is more important than ever. The magnitude of these trends and their intersection with one another mark an inflection point for those at the helm of armed forces and defence departments to make significant changes to ensure future capabilities.

The organisations equipped to plan, acquire and sustain the best military forces to carry out their strategies in this period of change will be those that seek and harness the most effective ideas and partners from across their respective defence ecosystems. As PwC's recent paper, *Achieving safety and security in an age of disruption and distrust,* points out, the risks and threats to citizens now transcend physical and virtual borders and require a collaborative approach to ensuring that future generations are protected.[2]

1 For more, see PwC, *Five megatrends and their implications for global defense and security*: https://www.pwc.com/gx/en/archive/archive-government-public-services/publications/five-megatrends.html.

2 PwC, *Achieving safety and security in an age of disruption and distrust,* 2019: https://www.pwc.com/gx/en/industries/government-public-services/public-sector-research-centre/achieving-safety-security.html.

The first step to navigating this period of change is for organisations to assess whether they are equipped to make the best choices and build the necessary relationships. They will need to do this by exploring both their structure and culture to ensure that the organisation is sufficiently agile, adaptable and reflective. Many of these journeys will be difficult, requiring organisational and behavioural changes. However, these changes will enable further vital reforms, such as increased agility of procurement procedures.[3]

Flexibility inside departments is essential to building flexible relationships with the defence industry that are mature and mutually beneficial. By working more strategically with industry, buyers of defence capability will be able to draw more effectively from outside thinking — which may prove a key advantage in planning defence forces.

Finally, defence organisations must function within the wider national and international context. For example, they will need to work across government and education sectors to encourage the availability of key future skills, and should build relationships internationally for design and acquisition of military-enabling assets.

In strategic partnership with industry and other key stakeholders in the defence ecosystem, and through broader national and international partnerships, defence forces will be able to keep their people, property and interests safe. This will be possible only through the building of mature, effective and fit-for-purpose organisations.

3 For more, see PwC, *Agile defense: Sustainable cost reduction on the path to greater agility:* https://www.pwc.com/ee/et/publications/pub/pwc-agile-defense.pdf.

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Key challenges

The reemergence of great power competition

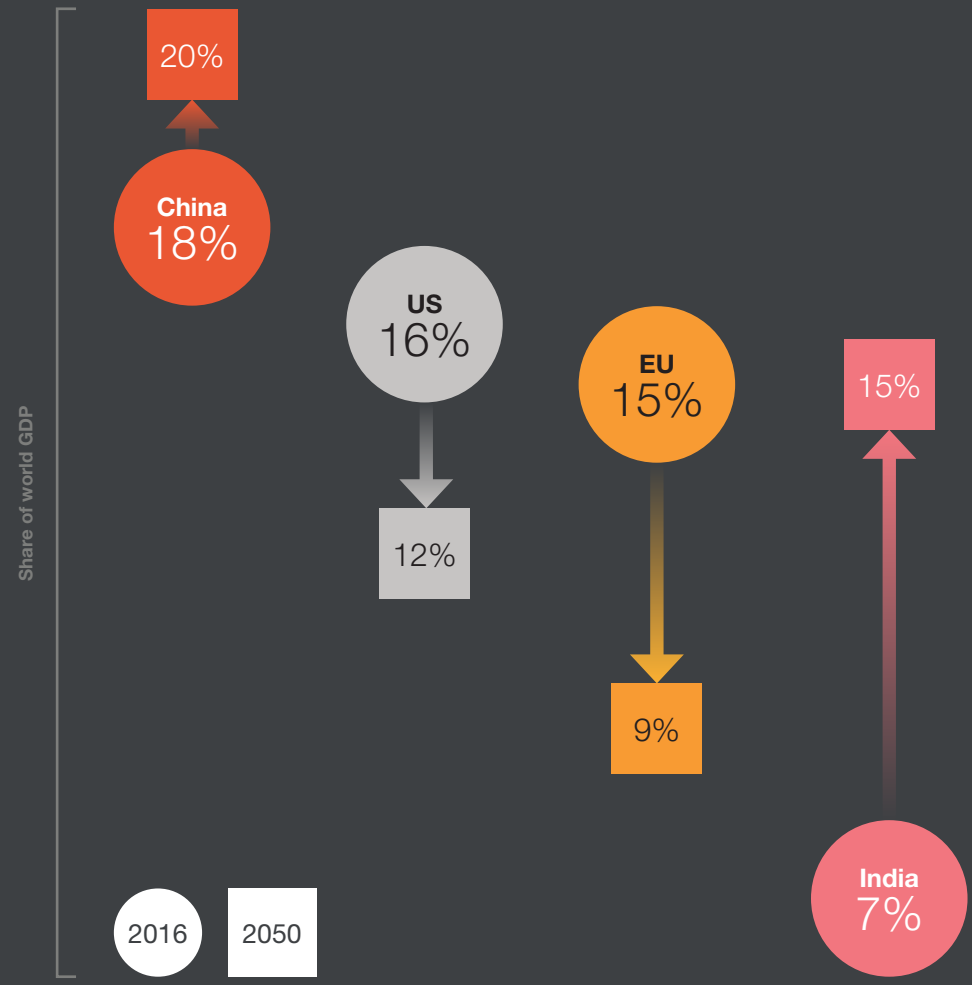
The key strategic trend that will influence defence planning over the coming decades is a series of significant shifts in the global geopolitical dynamic. China steadily continues to build its power in the Western Pacific, bringing its interest into direct competition with the United States' recent primacy in the region. Russia has adopted a more robust posture on the global stage, refocussing Europe on the importance of self-defence. The US is showing signs of a structural shift towards a more isolationist role than the global community is accustomed to.

Economically, the global balance of power is shifting away from Europe and North America and towards emerging economies, which will increasingly hold the top spots in world economic rankings over the next decade (see Exhibit 1). By 2050, the five largest economies by purchasing power parity, in order, will be China, India, the US, Indonesia and Brazil.[4] This global shift in wealth, in and of itself, means a redistribution of military and strategic power, causing current national military strategies to become obsolete and outdated. If and as nations adopt new strategies, they will need redesigned force structures to achieve them.

4 PwC, *The world in 2050: The long view — how will the global economic order change by 2050?*, 2017: https://www.pwc.com/gx/en/issues/economy/the-world-in-2050.html.

Exhibit 1: Predicted changes in the share of world GDP (purchasing power parity) between 2016 and 2050

Shifts in projected economic growth are part of a forecast change in the global balance of power.



Note: EU calculations do not include the UK.
Sources: IMF for 2016 estimates, PwC analysis for projections to 2050

These changes are overlaid on the persistent security challenges with which the world has grappled in recent decades. The instability caused by weak and failing governments will continue to threaten the global community. Terrorism, humanitarian disasters and myriad other demands will call on military resources and engagement along the spectrum of conflict below major war. These continued challenges will place enduring pressure on governments to be able to respond.

Revolutionary technologies are both a threat and opportunity

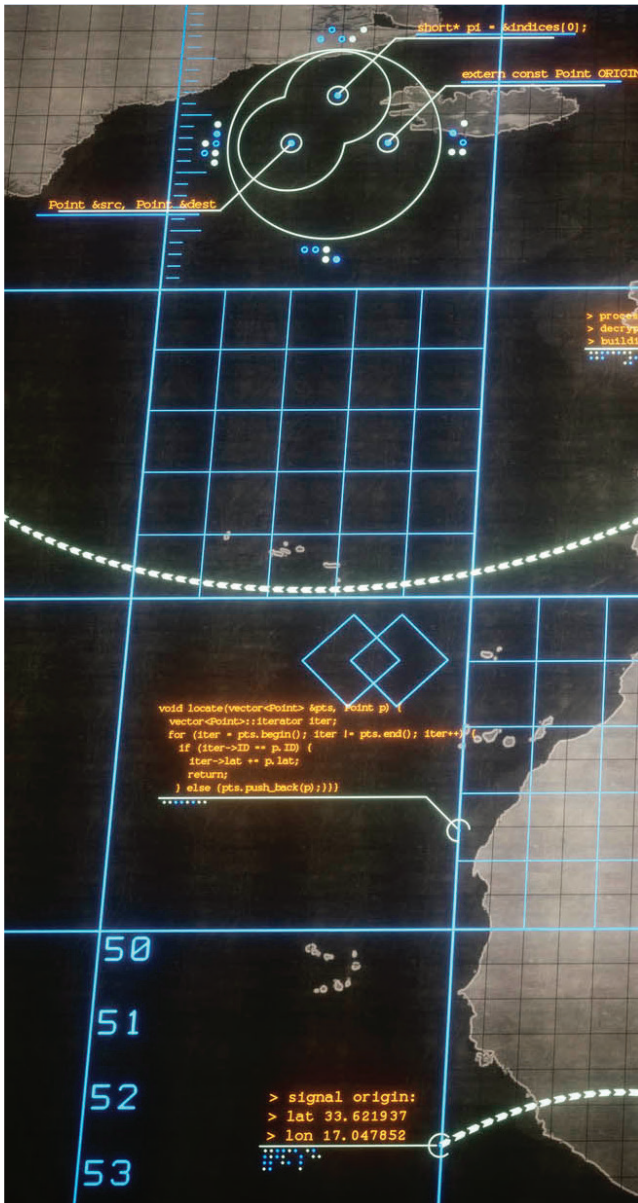
Rapid advances in military technology have occurred throughout history, but the key consideration for decision makers remains the same. It's not whether they are doing 'enough,' but whether they are extracting a competitive advantage over their strategic rivals from the available technology.

Technologies such as artificial intelligence (AI), automation (including of military systems), quantum computing, and the continued rapid development of cyber and space capabilities will change how we defend ourselves. Making the best use of these advances will require more agile and flexible ways of bringing new developments into operations and doing so faster. But crucially, states will also need to decide where to place their bets. Investing equally in all technologies risks ceding advantage to competitors who have advanced in a more presciently chosen area.

Advancements to existing military systems, such as increasingly accurate long-range weapons, more effective sensors, hypersonic weapons, and autonomous and highly networked forms of warfare have not yet been used in full-scale state conflict. As militaries around the world begin to recapitalise their forces with fifth-generation (comprehensively networked) assets, there are real challenges in anticipating the most effective way to use these new forces — particularly in high-intensity operations — and in building, integrating and effectively sustaining complex new networks of capabilities. Similarly, there is a challenge in understanding the vulnerabilities of forces to new capabilities and building the ability to adapt and respond when they become apparent. Non-state actors will increasingly have access to low-cost technologies able to generate asymmetric threats that are difficult and costly for conventional military forces to counter.

An important problem posed by this change is how to optimise the use of traditional major systems in future force design. In some cases, the manned aircraft, ships, tanks and other pieces of frontline, traditional military equipment are, or soon will be, rendered too vulnerable to warrant further concentration of resources. In those instances, future capability may be delivered more effectively through autonomous and networked forces made up of larger numbers of smaller systems. However, the impulse to reform will need to be considered in the context of maintaining forces capable of prevailing in high-intensity conflict.

On one hand, these changes will mean defence organisations must put significant effort into understanding whether, or how, networked forces of smaller, less vulnerable platforms can prevail in the type of high-end conflict that has usually been the preserve of major systems. However, even the modest movement that is already underway towards more highly networked forces poses serious challenges for governments in effective



design, acquisition and integration. As militaries begin to field a greater number and variety of fifth-generation assets, behavioural and organisational shifts will be required to plan, sustain and operate them effectively.

Planning effectively amid rapidly changing horizons

The future is more opaque for today's defence planners than ever. For example, a change in the course of European political cooperation or a breakthrough in AI could drive policymakers to seek major changes to force structure and military plans. Today's major military platforms take longer to design, build, buy, integrate and deploy than has ever been the case. The surface ships, fighter aircraft and submarines that nations bring into service now will also be serving decades into the foggy future. And as military technology becomes increasingly software-enabled, the capacity to update major systems rapidly — altering the way they deliver military effect and interact with friendly forces in the battlespace — is also increasing.

Shifting horizons place a huge burden on defence planners to understand the opportunity costs of their decisions. They must confidently place bets on elements of capability that are structurally essential to delivering national military strategy, and to seeking the maximum freedom of action, in order to meet future force challenges. Of course, to some extent these goals are contradictory; preserving flexibility comes at a cost. More than ever, defence capability planners and strategic planners must be aligned and deliberate in making their mutually dependent multi-decade decisions.

Those defence organisations that have responded well to today's challenges will find their international policies supported by the capacity to pursue their interests. Those that haven't will suffer when attempting to preserve them.

The cost of inaction

If defence planners fail to capture advantage today, it won't be fully apparent unless or until there is a conflict. Inadequacies will then be thrown into sharp relief, and nations will face grave risk. But even absent outright hostility, the changing balance of military power will become evident as the consequences of decisions made today materialise in the decades ahead. Those defence organisations that have responded well to today's challenges will find their international policies supported by the capacity to pursue their interests. Those that haven't will suffer when attempting to preserve them.

To avoid the ash heap of history then, defence organisations must be innovative, agile and creative enough to understand their own strengths and weaknesses at a time of profound change. They must build the capacity to plan effectively for future conflicts, making the best use of emerging technology — and not commit the familiar error of planning for past conflicts. In doing so, they will build more effective and efficient forces to enable them to prosecute their defence strategies and make their people and countries safer.

Key opportunities

To meet the challenges outlined above, defence and military planners must build and maintain maturity through three mutually reinforcing lenses: the organisation, capability planning and partnerships. Each of these lenses will work in support of the others to ensure that, in an increasingly zero-sum world, governments are best placed to engage with business and other public-sector partners to provide security for their people, property and interests (see Exhibit 2).

Mature organisations

Building agile, adaptable and reflective defence organisations

Defence forces are big, complex organisations with unique challenges. Competing interests and multiple stakeholders make meeting today's challenges a delicate and difficult task. Decisions must be made about investing in present-day military capabilities while planning for the future, and capability trade-offs need to occur across the war-fighting domains of air, sea, land, space and cyberspace.

Those that cannot change as circumstances require or cannot move quickly enough will struggle to safeguard the interests of the countries they are tasked with protecting. An ability to reflect on whether critical needs are being met and to focus on the right things will ensure that the right decisions, processes and people are solving the right issues.

Exhibit 2: Mature defence organisations focus their actions through three mutually reinforcing lenses

To achieve maturity, defence organisations should plan their efforts according to the lenses represented in the inner ring, taking the steps shown in the outer circles.

Source: PwC Global Government Defence Network

There is a great opportunity for defence organisations to create the structures, processes and cultures to be agile, adaptable and reflective. In practice, that means undertaking necessary reform and change programmes.

These changes will allow military organisations to be flexible with plans and approaches — including at the strategic level — to make technical changes in support of alterations to capability plans, and to adapt to changing technological or strategic circumstances. The ability to reflect will enable continual improvement and allow defence forces to make the best decisions for an uncertain and complex future. This will be evident in a well-defined and routinely practiced process of setting and reviewing the broad design for military forces 20 years hence.

It will also be essential for defence departments to build and sustain the right culture. In many countries, periods of fiscal austerity have created environments of excessive risk-aversion. Conservative and protective decision making is often a barrier to effectively deploying investment in defence portfolios, resulting in a tendency to maintain funding for the status quo.

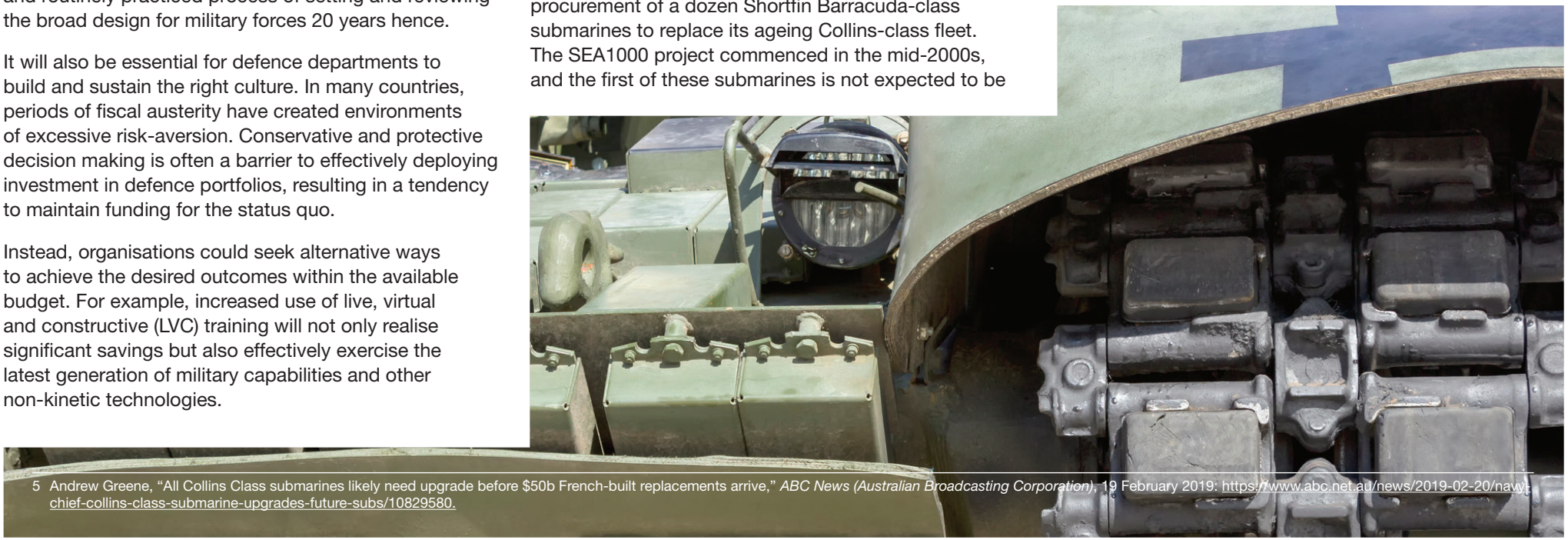
Instead, organisations could seek alternative ways to achieve the desired outcomes within the available budget. For example, increased use of live, virtual and constructive (LVC) training will not only realise significant savings but also effectively exercise the latest generation of military capabilities and other non-kinetic technologies.

Adopting a more agile and efficient approach to procurement

The kinds of improvements in organisational design and process mentioned above are particularly important in driving more agile and efficient procurement.

Procurement times in defence organisations around the world typically are longer than in any other industry, and so the ability to refresh capability quickly is a challenge. When a platform is scoped 30 years before its delivery, changing course mid-development is a unique problem.

For example, take the Australian Government's recent procurement of a dozen Shortfin Barracuda-class submarines to replace its ageing Collins-class fleet. The SEA1000 project commenced in the mid-2000s, and the first of these submarines is not expected to be delivered until the early 2030s.[5] With the accelerating rate of technological change and intensifying geopolitical tensions in the South China Sea, critics question whether this will be too little too late. Will large manned submarines still be the preeminent subsurface platform beyond 2040? Will the emergence of new technologies such as autonomous vehicles and high-speed underwater precision weapons change the game? While we do not yet know the answer to these questions, a reduction in procurement times would facilitate the ability to respond more quickly and efficiently to the changing demands in fighting war over time.



5 Andrew Greene, "All Collins Class submarines likely need upgrade before $50b French-built replacements arrive," *ABC News (Australian Broadcasting Corporation)*, 19 February 2019: https://www.abc.net.au/news/2019-02-20/navy-chief-collins-class-submarine-upgrades-future-subs/10829580.

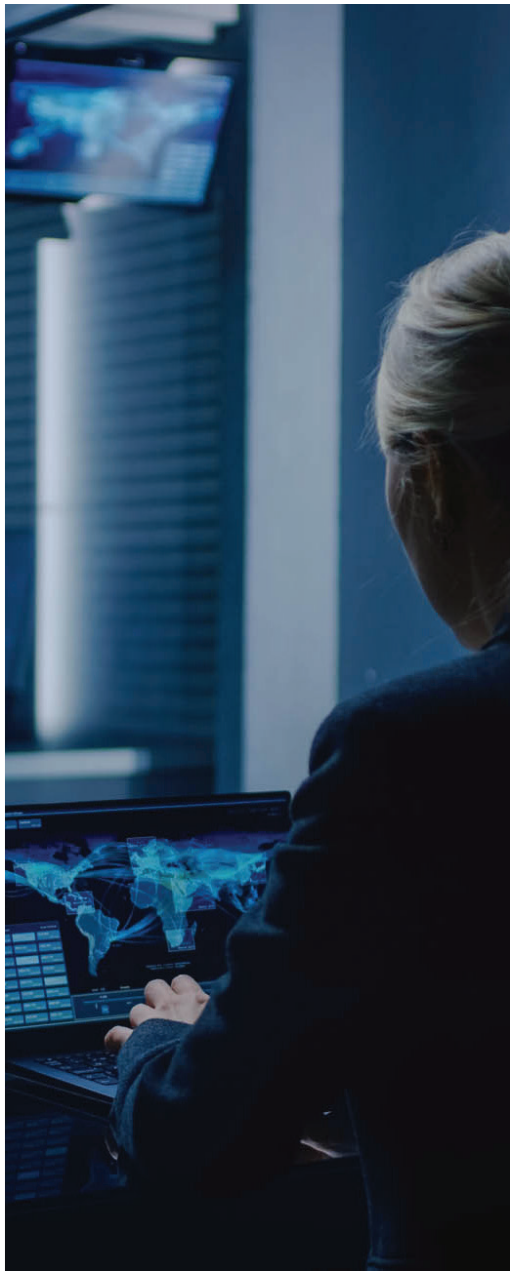
Addressing this problem relies in large part on the ability to adopt a more efficient and effective acquisition process. To do this — in addition to appropriate and lean governance — defence departments will need to build more mature strategic relationships with industry partners.

The constraints around procurement place a high premium on value. However, a sophisticated understanding of value in the current context is markedly different from what it once was. Whereas the complexity of an aeroplane, for example, could once be measured in dollars per kilo, its value now lies in the terabytes of information generated from its use.

Organisations therefore must develop more mature decision-making frameworks, with a focus on attaining a clearer picture of the current drivers of cost and complexity, and understanding precisely how elements of a defence portfolio contribute to operational and strategic objectives.

Other key themes that might be explored to support the goal of greater agility and efficiency in defence procurement include:

- focussing on the value of adapting existing platforms and systems, and including consideration of commercial off-the-shelf technologies over premium or bespoke solutions
- further exploration of the opportunities for partnership and cooperation on procurement, e.g., within NATO
- more effective use of nonmilitary national capacity, e.g., as it relates to fuels or dual-use transport capability or overlapping domestic policing capability.



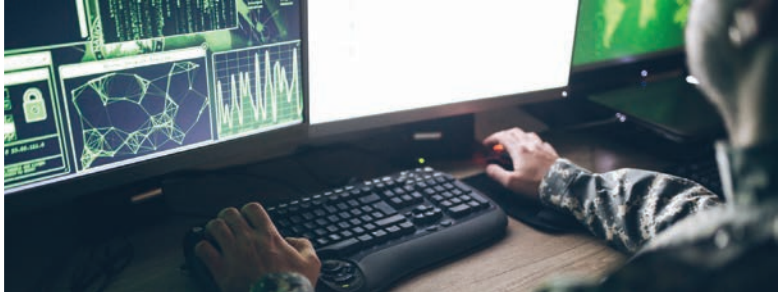
Focussing on strategic workforce planning

The workforce and skills required for defence organisations are changing. Exacerbated by demographic shifts and complicated by the fact that many of the skills required — for example, specialised engineering and cybersecurity — now fall outside traditional defence workforce planning, the military faces a critical pivot point. Organisations must prepare proactively for these changes, rather than seeking to address skills shortages and imbalances once they have become acute.

For example, defence forces in countries where land-based conflict, which typically is more people intensive, is more prevalent than air or sea conflict can no longer take for granted the availability of a supply of serving-age recruits. As the global population ages and population growth in many parts of the world slows, this dilemma will only intensify.

Similarly, a broad set of skills that enable defence organisations to exploit technology — e.g., gaming, visualisation, autonomy and synthetics — will be in high demand, both as the volume of information that defence organisations manage and use increases, and as more military capability rests on software as well as traditional hardware.

Uniquely in militaries, where skill and rank are often entwined, there is additional stress in competing with workforces in the private sector. Where these skills are remunerated competitively in the private sector, defence organisations must implement more innovative ways of attracting highly skilled workers through more flexible wage and rank structures.



In the future, nontraditional pathways through the military will become common, and a person may alternate between military and commercial employment.

Traditionally, defence forces have promoted from within, with limited lateral recruiting and then only from like-minded military forces. In the future, nontraditional pathways through the military will become common, and a person may alternate between military and commercial employment. The Singaporean Defence Force has been an early and effective adopter of this workforce principle,[6] and the Australian Defence Force now has its first chief who spent several years out of uniform in the latter part of his career.[7]

In the future, it is likely that remuneration linked to the unique skills of the individual instead of their rank will become the rule rather than the exception. In many defence forces today, the higher paid staff are more likely to be civilian specialists in fields such as IT, acquisition, health and law rather than the military leaders.

Mature partnerships

Building deep and trusted partnerships with industry

Defence organisations need to foster more mature strategic relationships with suppliers of key services, in particular key military assets and technology. The process of a military issuing its requirements in isolation and industry responding without previous engagement is fundamentally flawed. Without stronger industry partnerships, governments are left to either face unacceptably long development time frames or accept limited control over technological innovation. It is an unappealing choice.

There are many collaborative examples in which like-minded military forces have worked closely with industry, such as the advanced radar system that the Australian military has co-developed with CEA Technologies.[8] This leading-edge capability would have been unlikely to occur if the time frames of a traditional procurement process had been followed.

More mature strategic relationships with industry, in which research and development (R&D) is collaborative from inception, would enable governments to have:

- greater input into shaping the market
- greater access to private industry innovation and intellectual property
- an industrial and supplier base able and incentivised to respond to military and government needs quickly and efficiently
- better sovereign industry outcomes and benefits with less expenditure overseas and more jobs in the defence sector.

These relationships would be characterised by a higher degree of mutual understanding of national strategic and investment priorities. This would enable defence contractors to respond with greater flexibility and speed to governments' need for systems, services and technology. Importantly, new approaches to procurement and contracting will be vital to building these strategic relationships.

A crucial consideration in seizing the opportunity in these relationships is to explore the national levers for building sovereign capability. A robust sovereign export capability that meets the operational needs of allies and partners can be both an economic and strategic boon. But this will require nations to build manufacturing capacity and develop and sustain sufficiently rich R&D, design and integration capabilities.

6 Defence Science & Technology Agency, Singapore Ministry of Defence, *Effecting an integrated workforce*: https://dsta.gov.sg/programme-centres/procurement/effecting-an-integrated-workforce.

7 For more, see the Australia Department of Defence chief of the defence force profile (accessed October 2019): http://www.defence.gov.au/CDF/.

8 Australia Department of Defence Ministers, "Advanced radar research agreement with CEA Technologies," 1 March 2018: https://www.minister.defence.gov.au/minister/christopher-pyne/media-releases/advanced-radar-research-agreement-cea-technologies.

Building international relationships to support future capability

Deepening relationships with industry in development and innovation will go a long way towards enabling the flexibility needed to adapt to changing system requirements. Alongside this, modern military capabilities are increasingly being developed — and sustained — by consortia of nations and organisations rather than by one company, or even one country.

For some countries, this provides a reason to deepen international partnerships around overlapping geographically anchored interests. For example, Australia might deepen its defence partnership with Norway — a country with a shared need to defend water borders — to acquire and sustain assets that form part of a maritime denial capability. Countries that are geographically distanced from their theatres of war would have similar need for systems that give preference to range and reach, while others with conflicts closer to home may put a preference on payload. Nations with these overlapping operational footprints have an opportunity to work together to save on fixed costs of systems, intellectual property and other benefits. Of course, there will be differing sovereign interests and requirements that may mean some duplication of support and sustainment is required to ensure that countries can operate their military forces independently of others.

The ability to identify and manage long-term capability partnerships will be essential — particularly for small and medium-sized militaries — in building capacity in the coming decades.

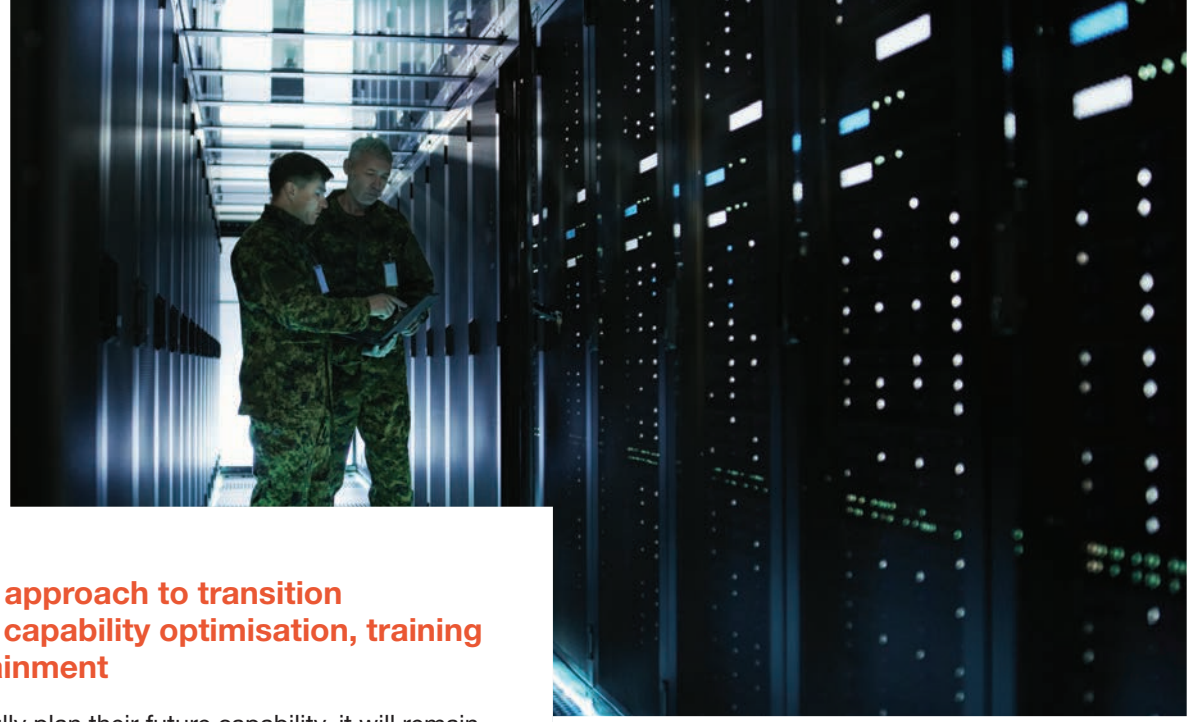
Mature capability planning

Avoiding a platform replacement approach

In designing future forces, planners and decision makers should seriously consider abandoning their overreliance on major platforms. This means scrutinising any plan justified by a new-for-old replacement policy, rather than a demonstrated rationale that supports the selection of one option over others.

Instead of replacing equipment with a newer model, planners should assess the use case for the technology first. What is the underlying need the technology is tasked with addressing? Is there a more efficient or more appropriate way that this could be done? This may involve greater input but could ultimately lead to better outcomes.

In doing this, defence departments must be careful not to erode national capacity by abandoning key capabilities prematurely. There will also need to be a balance between newer, potentially smaller assets and traditional, larger platforms.



Adapting the base footprint to the changing force environment

In designing future forces, planners and decision makers need to take into account the supporting infrastructure that will be required to train servicemen and women for future needs. This means reviewing both the land used for training as well as the facilities that are built upon that land.

Many nations have a base footprint that was developed and adopted during or shortly after World War II, which is not necessarily the optimal layout for the forces of the future.

Planners need to take a holistic view and try to match base requirements to force needs, which in many cases can free up assets that can then be recycled to help build the future-focussed force.

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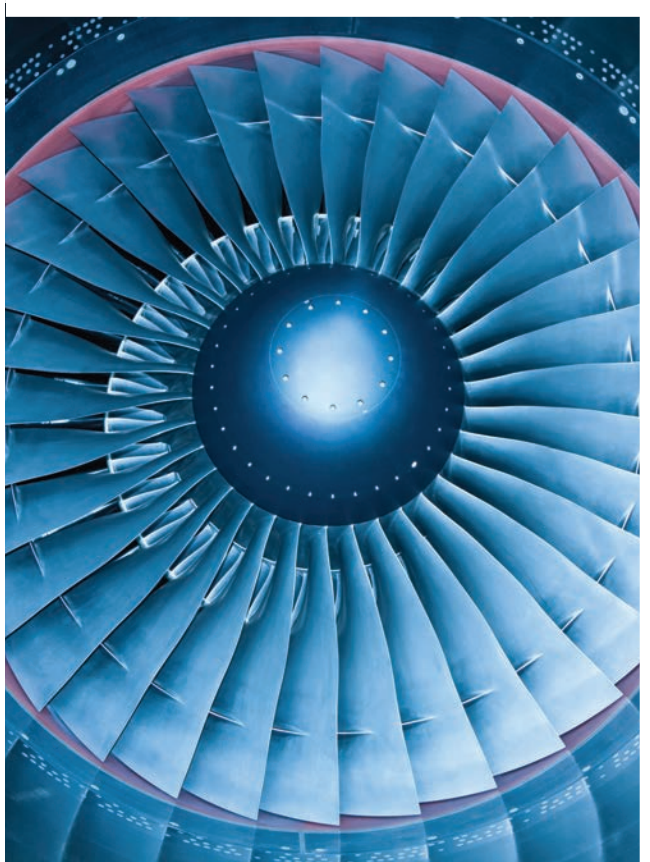
A holistic approach to transition planning, capability optimisation, training and sustainment

To successfully plan their future capability, it will remain essential for militaries to have effective force design and capability management functions. Several areas that national military forces and capability planners traditionally under-emphasise need to be addressed:

- achieving the right balance of investment between capability today — and resulting sustainment costs — and building stronger capability in the future
- ensuring that sufficient organisational energy and resource investment goes into capability optimisation, e.g., fundamental inputs to capability (FIC) and workforce optimisation
- maintaining the desired level of capability even when transitioning between major platforms or components
- accounting for sustainment requirements — such as total cost of ownership, including skills, time and backfill assets — alongside future force design plans within defence portfolios
- fully utilising sophisticated simulated and synthetic training environments to drive effective and efficient management of capability.



The next steps

In meeting today's challenges and seizing the opportunities they present, defence organisations must look impartially and clearly at how they need to change.

Assess

Using the three lenses discussed above, senior leaders should assess their organisation's maturity. They must then socialise these assessments beyond the defence organisation so that civil, military and political leadership can arrive at a shared understanding of the priorities for change.

Engage

There is typically a large and knowledgeable ecosystem beyond the government department primarily responsible for defence. Seeking these outside perspectives can help ensure that the strong intellectual alignment that often exists in military and defence organisations doesn't obscure the most promising avenues for improvement.

Prioritise

Although key opportunities are intrinsically linked, departments will need to prioritise reform agendas. This will help to drive meaningful change early and form a foundation for lasting success.

Change

After rapidly cycling through the assess, engage and prioritise steps, departments must drive the reform. Achieving early wins in the first avenues of opportunity will allow defence organisations to see enormous benefit in continuing until they achieve a high level of maturity across the opportunities.

By taking these actions, defence leaders will give their organisations the best chance of overcoming today's challenges and provide security for their citizens now and in the future.

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