ASPI
AUSTRALIAN STRATEGIC POLICY INSTITUTE

The Cost of Defence

ASPI Defence Budget Brief 2022–2023

$133,191,780.82 $133,191,780.82 $133,191,780.82 $133,191,780.82 $133,191,780.82 $133,191,780.82 $133,191,780.82 $133,191,780.82

One hundred & thirty-three million, one hundred & ninety-one thousand, seven hundred & eighty dollars & eighty-two cents per day.

The cost of Defence

ASPI defence budget brief 2022–2023

One hundred & thirty-three million, one hundred & ninety-one thousand, seven hundred & eighty dollars & eighty-two cents per day.

Prepared by:
Dr Marcus Hellyer
Senior Analyst
Defence Economics and Capability

With contributions from:
Dr Ben Stevens
ASPI Research Intern

Cover graphic drawn by Matt Golding.
Reproduced courtesy of the artist.

About ASPI

The Australian Strategic Policy Institute was formed in 2001 as an independent, non-partisan think tank. Its core aim is to provide the Australian Government with fresh ideas on Australia's defence, security and strategic policy choices. ASPI is responsible for informing the public on a range of strategic issues, generating new thinking for government and harnessing strategic thinking internationally. ASPI's sources of funding are identified in our Annual Report, online at www.aspi.org.au and in the acknowledgements section of individual publications. ASPI remains independent in the content of the research and in all editorial judgements. It is incorporated as a company, and is governed by a Council with broad membership. ASPI's core values are collegiality, originality & innovation, quality & excellence and independence.

ASPI's publications—including this paper—are not intended in any way to express or reflect the views of the Australian Government. The opinions and recommendations in this paper are published by ASPI to promote public debate and understanding of strategic and defence issues. They reflect the personal views of the author(s) and should not be seen as representing the formal position of ASPI on any particular issue.

Acknowledgement

This report is in part funded by Saab Australia.

First published June 2022

Published in Australia by:
Australian Strategic Policy Institute (ASPI)
Level 2, 40 Macquarie Street
Barton ACT 2600
Australia

Tel: + 61 (2) 6270 5100
Email: enquiries@aspi.org.au
Web: https://www.aspi.org.au/
Blog: https://www.aspistrategist.org.au/

Note on title: The figure of $133,191,780.82 represents the daily average of the 2022–23 defence funding line (including the Australian Signals Directorate) of $48,615.0 million presented in the 2022–23 Defence Portfolio Budget Statements.

Contents

Executive Director's foreword

This is the 21st edition of *The cost of Defence* and the first during my tenure as ASPI's executive director. As I've been an avid consumer of ASPI's work in my previous roles in Australia's strategic policy community, it's a great pleasure to now be part of the team that produces ASPI's evidence-based, policy-relevant analysis.

We find ourselves in testing times. In the past year, we've experienced the continuing disruptions of the Covid-19 pandemic, witnessed the brutality of Russia's illegal and unjustified invasion of Ukraine, and seen growing demonstrations of the Chinese Communist Party's ambitions in the South Pacific. While all are current events, they all have an impact on Australia's long-term security and prosperity, so it's vital to focus on the capabilities that will protect and advance the national interest for the generations to come. Also during this time, Australia has entered the AUKUS partnership, which offers the prospect of significant advances in technology and military capability if we can seize the opportunity.

More than ever, Australia needs imaginative strategic policies that are informed by new ideas. Those solutions, however, need to be based on robust analysis. *The cost of Defence* has always sought to develop a deeper understanding of the defence budget. Without that understanding, it's difficult to make informed decisions about how best to invest those funds to address our strategic circumstances. This edition continues the long tradition of demystifying the defence budget for readers both inside and outside government.

We've recently had an election that has resulted in a new government. This year, *The cost of Defence* outlines the key defence funding and spending choices it will face. They are discussed in Chapter 5.

One of ASPI's most important functions is to develop the next generation of strategic thinkers. We do this in part through our research internship program. This year, ASPI research intern Dr Ben Stevens provided research support and drafted Chapter 6 on the cost of the war in Ukraine, under the guidance of lead author Dr Marcus Hellyer.

The challenges, threats and opportunities presented by our strategic environment mean that Australia needs to continue investing in defence capability and demonstrate that the research and analysis provided in *The cost of Defence* are as important as ever.

The development of this report was largely funded by ASPI's annual block grant from the Department of Defence, which is currently $4 million (or $10,958.90 per day).

Justin Bassi

Executive Director

Executive summary

Shortly before the recent election, the previous government released a defence budget that continued its record of delivering the funding it promised in the 2016 Defence White Paper (DWP) and subsequent 2020 Defence Strategic Update (DSU).

This year, the consolidated defence funding line (including both the Department of Defence and the Australian Signals Directorate) is $48.6 billion, which is 2.11% of GDP based on the Budget papers' estimates of GDP. That funding represents a very substantial nominal growth of 7.4%. It's the 10th straight year of real growth, but with inflation running hot, it's hard to determine a precise percentage; we've estimated it at 3.8% based on the Budget papers, but, if inflation stays around 5%, the real growth figure will be less. That will hurt Defence. Just as inflation eats into Australian families' budgets, it's eroding Defence's buying power.

Defence funding, 2022–23

Consolidated defence funding (including Australian Signals Directorate), 2022–23

Funding:	$48.6 billion
Share of GDP:	2.11%
Real growth on prior year:	3.8%

Department of Defence government funding, 2022–23

Funding:	$47.0 billion

Key cost categories, 2022–23[a]

Acquisition:	$16.3 billion (33.9%)
Defence workforce:	$14.2 billion (29.5%)
Operating (incl. sustainment):	$17.6 billion (36.6%)

a *The key cost categories sum to $48.0 billion, which doesn't match the Department of Defence's funding appropriation of $47.0 billion because the key cost categories also include funding from other sources.*

Despite disruptions to supply chains, Defence and its industry partners have achieved significant increases in acquisition spending. While Defence may have fallen short of its acquisition spending target in 2021–22, it still achieved a $2.1 billion increase on the previous year, which was itself a $1.5 billion increase. That's translating into growing local spending, both in absolute terms and in relative terms compared to overseas spending. We've written previously that the Australian defence industry will need to eat a very large elephant as Defence's acquisition and sustainment budgets grow. So far, it's demonstrating that it has the appetite to do that.

Capability continues to be delivered across all domains. There's no doubt that the ADF is getting better. But we're seeing the realisation of risks inherent in an acquisition program built around megaprojects. Such projects take years or decades to design and deliver, while spending huge sums for little benefit in the short term. When they encounter problems, those problems are big. The Attack-class submarine program has cost over $4 billion and delivered nothing. The Hunter frigate program continues to experience delays and won't get a vessel into service for over a decade. The Boxer combat reconnaissance vehicle project has spent close to $2 billion, but only 25 training vehicles have been delivered. While the nuclear-powered attack submarine (SSN) program has the potential to deliver a huge step-up in undersea warfare capability, it's the mother of all megaprojects and has a risk profile to match. As the megaprojects ramp up (with over $20 billion in infantry fighting vehicles potentially added to the list of committed funds), their cash flow requirement will increase, tying the government's hands at a time of rapidly growing strategic uncertainty and evaporating warning time.

The new government will have some significant issues to address. Perhaps the biggest one is the size of the defence budget. The incoming government has said that it supports the current level of funding. While that continues to grow in real terms, it was originally developed in 2015 and hasn't changed since then, despite the significant worsening of our strategic circumstances. Russia's illegal and unjustifiable invasion of Ukraine has reminded us that war has not gone away and remains a tool of authoritarian states. China's influence in our near region is growing and could result in a permanent Chinese military presence. The US is looking to its allies and partners to do more, as they must.

As always, the government will need to adjudicate between competing priorities for funding. At a time when Australians are dealing with the rising cost of living, spikes in energy prices and the grinding pressure of housing affordability, it may be tempting to reduce defence spending in the face of competing budget priorities. However, the government should be aware of the results of doing so. The budget is already full, with no pots of unallocated cash. Any short-term windfall delivered by the cancellation of the Attack-class submarine is already gone—as the cancellation of the SkyGuardian armed uncrewed air vehicle to help deliver a $9.9 billion offset for the REDSPICE cyber program reveals. So even holding the defence budget strictly at 2% of GDP will result in substantial, multibillion-dollar reductions to the DSU funding line, inevitably leading to cuts in capability.

Furthermore, it's not clear that the DSU funding line is even sufficient to deliver the current investment plan. That program includes platforms far larger or more numerous than those they're replacing as well as entirely new capabilities, all requiring a much larger workforce. Many capabilities have ended up costing more than was originally budgeted for in Defence's investment plan. The SSN program will cost significantly more than the Attack class; it's anybody's guess how much more. So the first order of business should be for the government to understand the affordability of the current plan.

Then it will need to assure itself that the planned force structure is aligned with what the government thinks the ADF should be doing. It's easy to make a case for the tactical utility of any capability, but how does it fit in the overall strategy? The government will need to make decisions about which sovereign capabilities it needs to hold and where it can rely on allies and partners. And the nub of our current security challenge is that the former are growing while the latter are shrinking.

A further challenge that the government will need to consider is Defence's people problem. The number of contractors in Defence's external workforce continues to grow at significant cost, but Defence can't deliver its ambitious capability program without them. Is that growth the best option available to Defence or simply the only one? Moreover, the investment program will require 20,000 more uniformed personnel to operate the capabilities it's acquiring. With the ADF averaging net annual growth of only 300, is that target attainable? And, if it's not, is the future force structure viable?

In these testing times, the government needs to seize every opportunity available to it to increase capability rapidly, even if that means overruling Defence's long-term vision for the future force. That means doing more with what we're already getting, such as increasing the lethality of the offshore patrol vessels that are soon to enter service.

There are encouraging signs that Defence is engaging more actively with 'the small, the smart and the many'; that is, cheaper, disposable, highly autonomous systems that can be produced rapidly by Australian industry. Investing more heavily in such systems is a crucial hedging strategy against the risk inherent in the megaprojects; plus, such systems will figure heavily in future warfare, whatever may become of the megaprojects.

Similarly, the new AUKUS partnership's advanced technologies programs and the sovereign guided weapons enterprise offer the prospect of delivering meaningful capability soon. Yet we're two years into the guided weapons enterprise and still have heard nothing about which weapons will be produced and how it will be done. We can't apply the kinds of timelines and processes inherent in the megaprojects to these lines of effort.

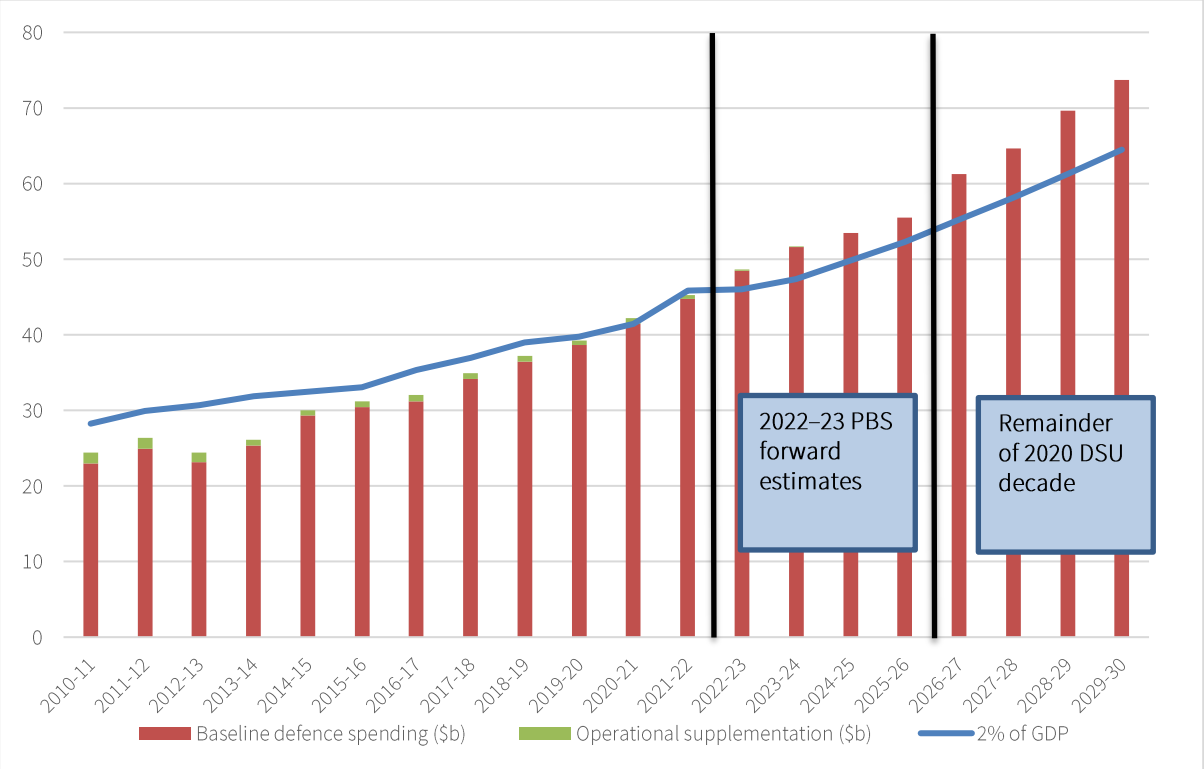
Overall, the government has its work cut out for it. Whatever path it chooses, it will need to bring the Australian public along on the journey. To do that, the government will need to reset the conversation about the defence budget and how it's spent. That will require a commitment to transparency, accountability and sharing information. That means accepting the risk that bad news will get out along with the good, but an informed public is fundamental to democracy.

Defence in 10 tables

The tables presented here are discussed further in later chapters, so we won't provide detailed analysis here, but we have noted where the material illustrated in the tables is discussed in more detail in this brief.

Defence spending

Figure A.1: The Australian defence budget, 2010–11 to 2029–30 (nominal $ billion) (see Chapter 2)

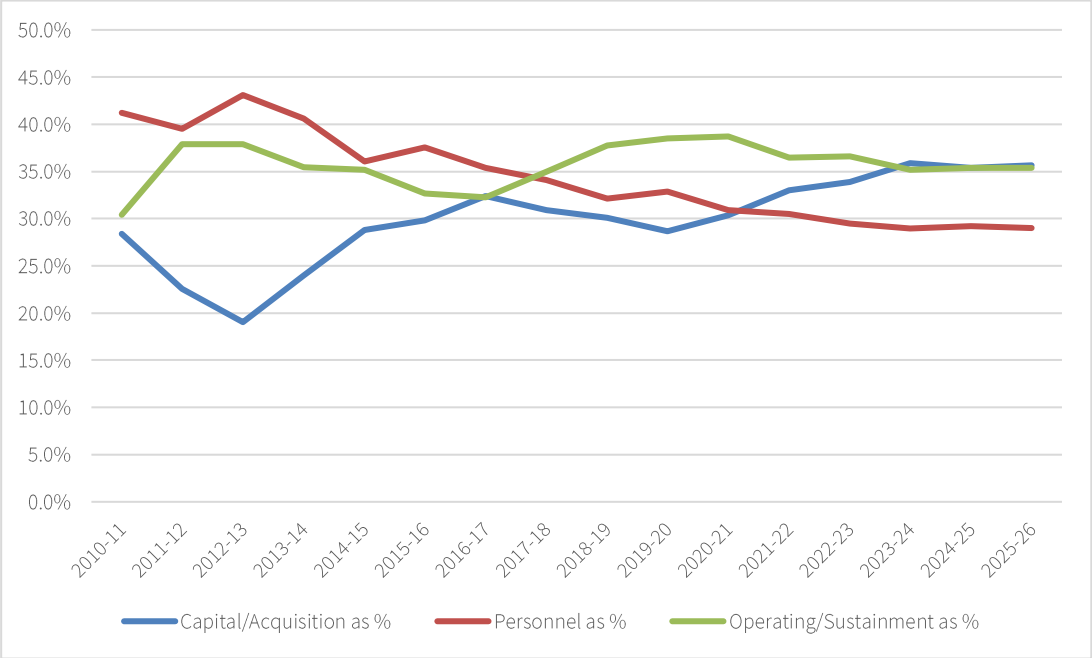


Sources:

Defence funding line: Historical defence spending is taken from ASPI's Cost of Defence database, derived from the PBS. Funding for the forward estimates is taken from the 2022–23 PBS. Funding after 2025–26 is taken from the 2020 Defence Strategic Update (DSU).

2% of GDP line: Historical data on GDP is taken from the Australian Bureau of Statistics. Estimates for GDP over the forward estimates are taken from 2022–23 Budget paper no. 1. We have generated estimates for GDP beyond the forward estimates by projecting 5.3% nominal GDP growth.

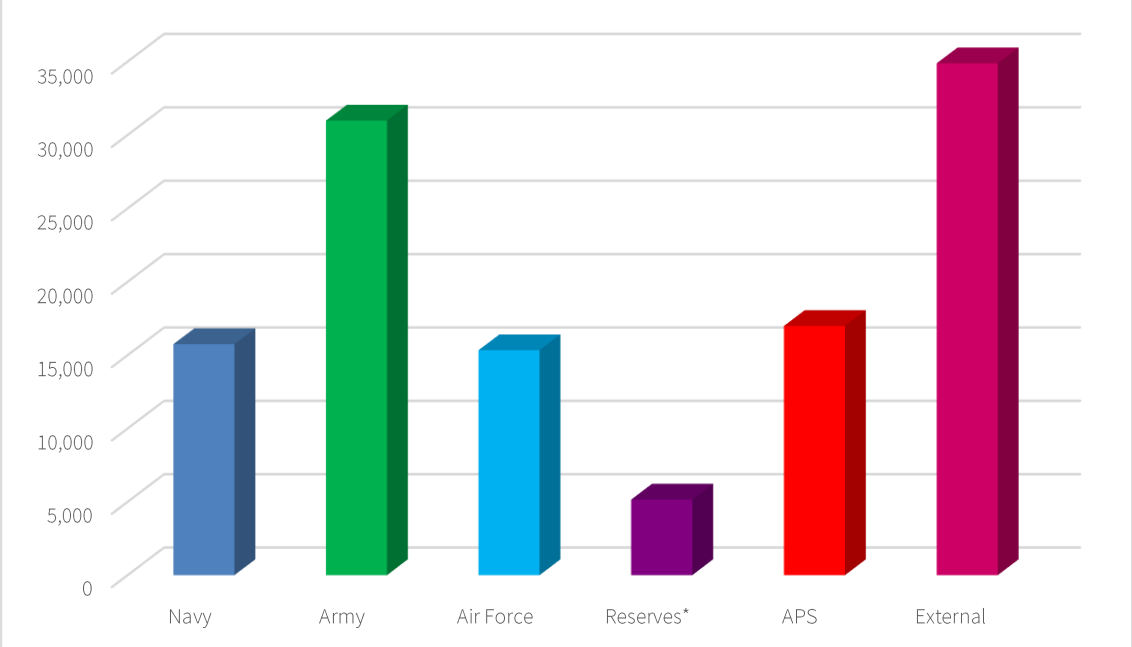
Figure A.2: The Big 3—the balance of the defence budget, 2010–11 to 2025–26 (%) (see chapters 2 and 3)



Source: PBS.

Defence workforce

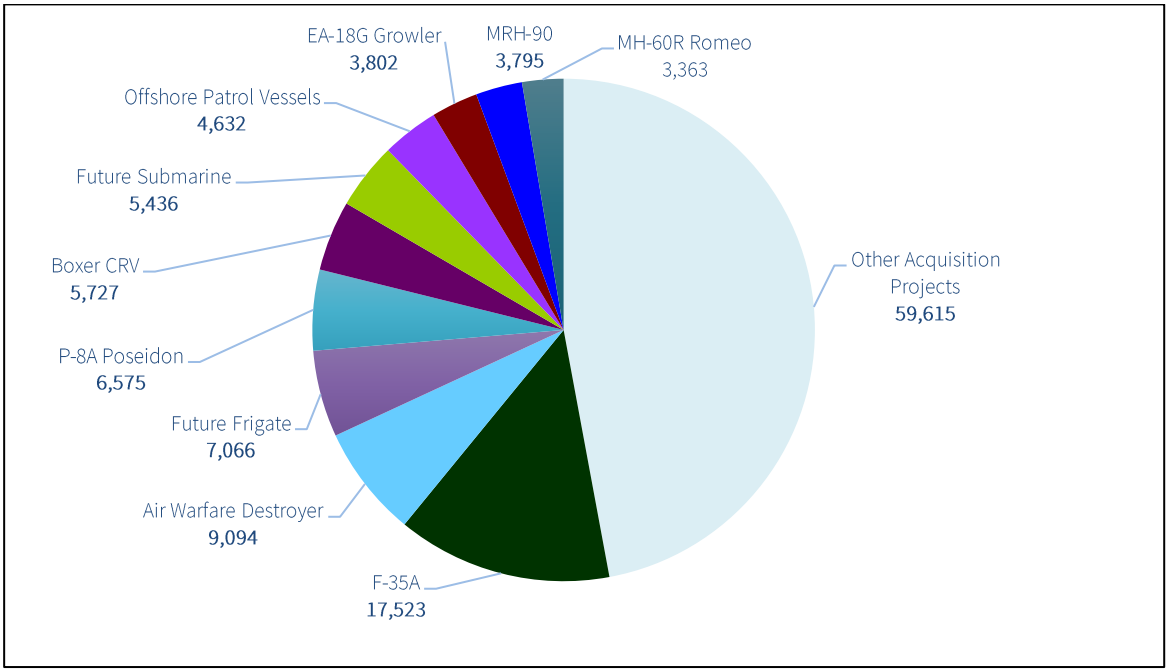
Figure A.3: 2022–23 Defence personnel, by full-time equivalent (see chapters 2 and 3)



Sources: ADF and APS numbers are from 2022–23 PBS allocation. External workforce is from March 2022 Defence external workforce census supplied by Defence.
** Reserve FTE calculated by ASPI by dividing PBS allocated workforce days by 220.*

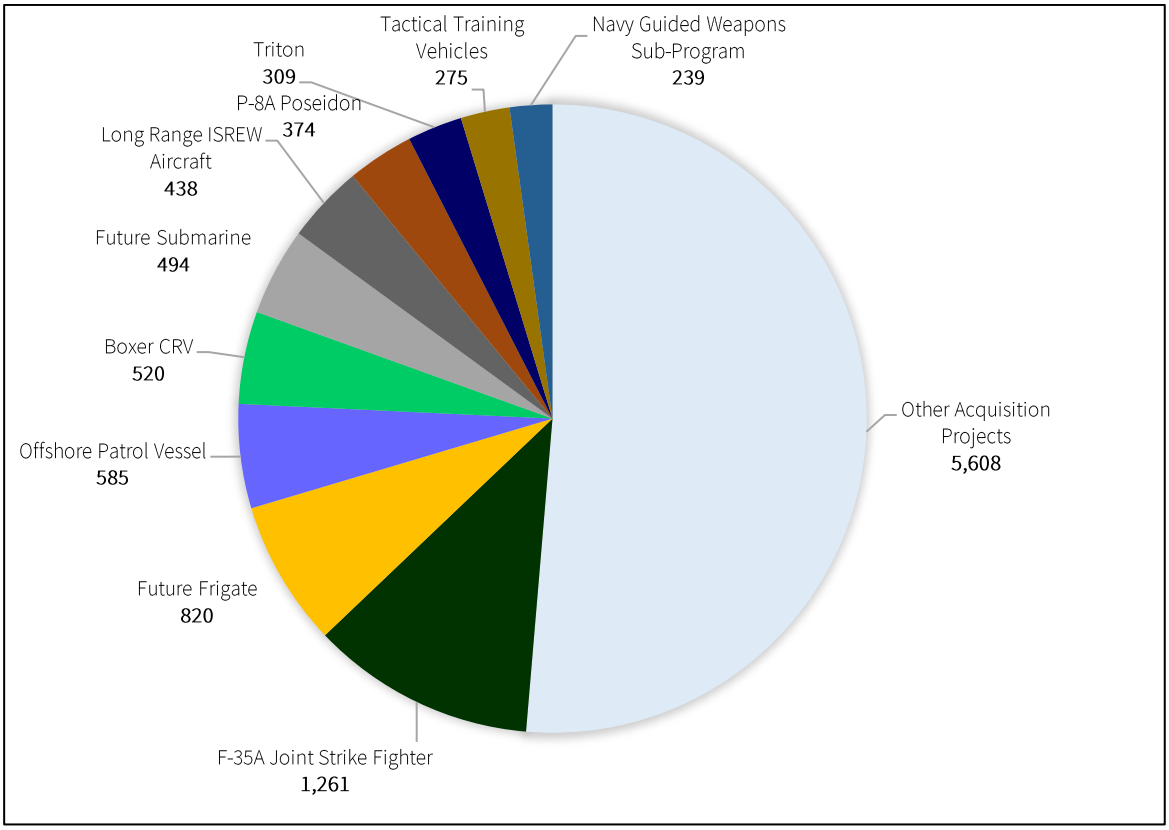
Defence capability

Figure A.4: Top 10 acquisition projects by total approved project budget ($ million) (see chapters 3 and 4)



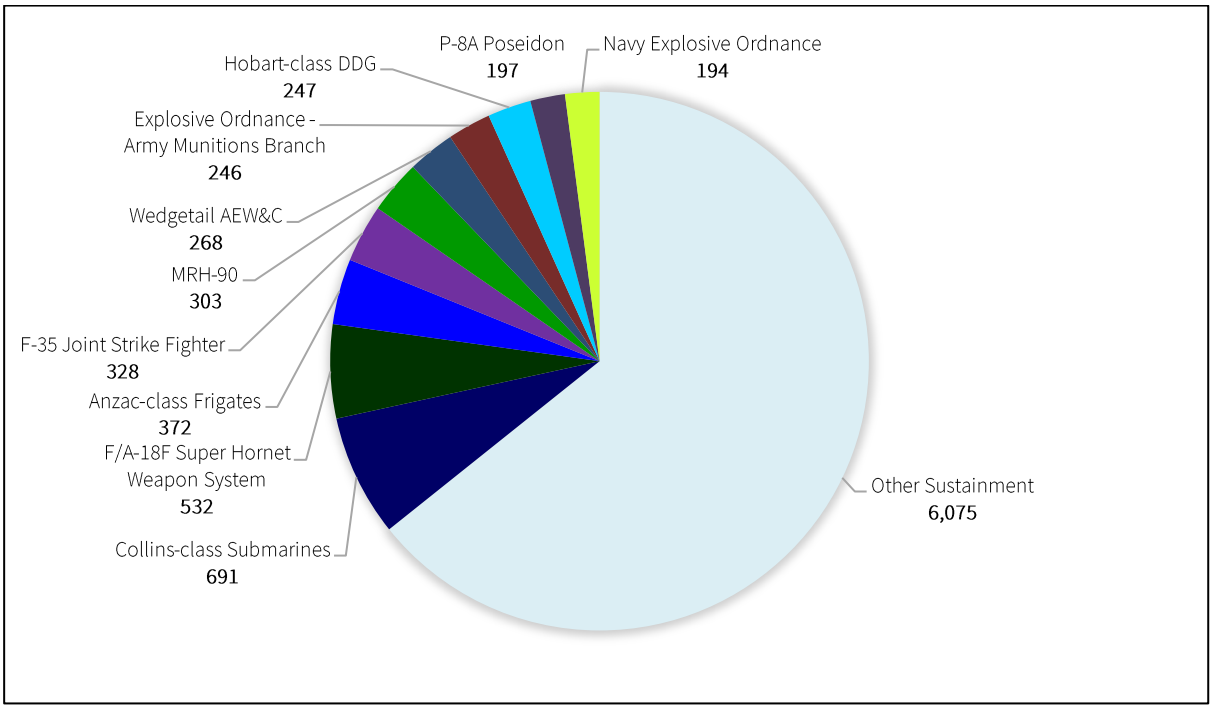
Source: PBS 2022–23, Table 54. Figures include both military equipment and other project inputs to capability.

Figure A.5: Top 10 acquisition projects, by planned 2022–23 spend ($ million) (see chapters 3 and 4)



Source: PBS 2022–23, Table 54. Figures include both military equipment and other project inputs to capability.

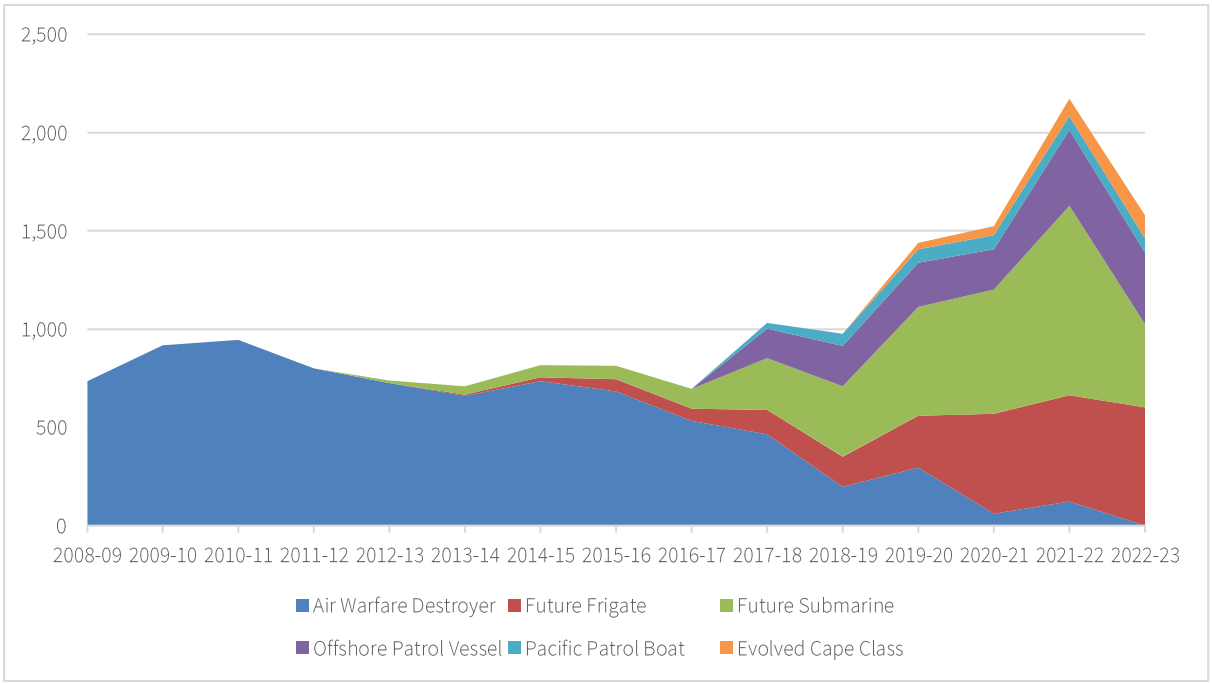
Figure A.6: Top 10 sustainment products, by planned 2021–22 spend ($ million) (see chapters 3 and 4)



Source: PBS 2022–23, Table 55.

The cost of shipbuilding

Figure A.7: Domestic naval shipbuilding cash flow, 2008–09 to 2022–23 (nominal $ million) (see Chapter 4)

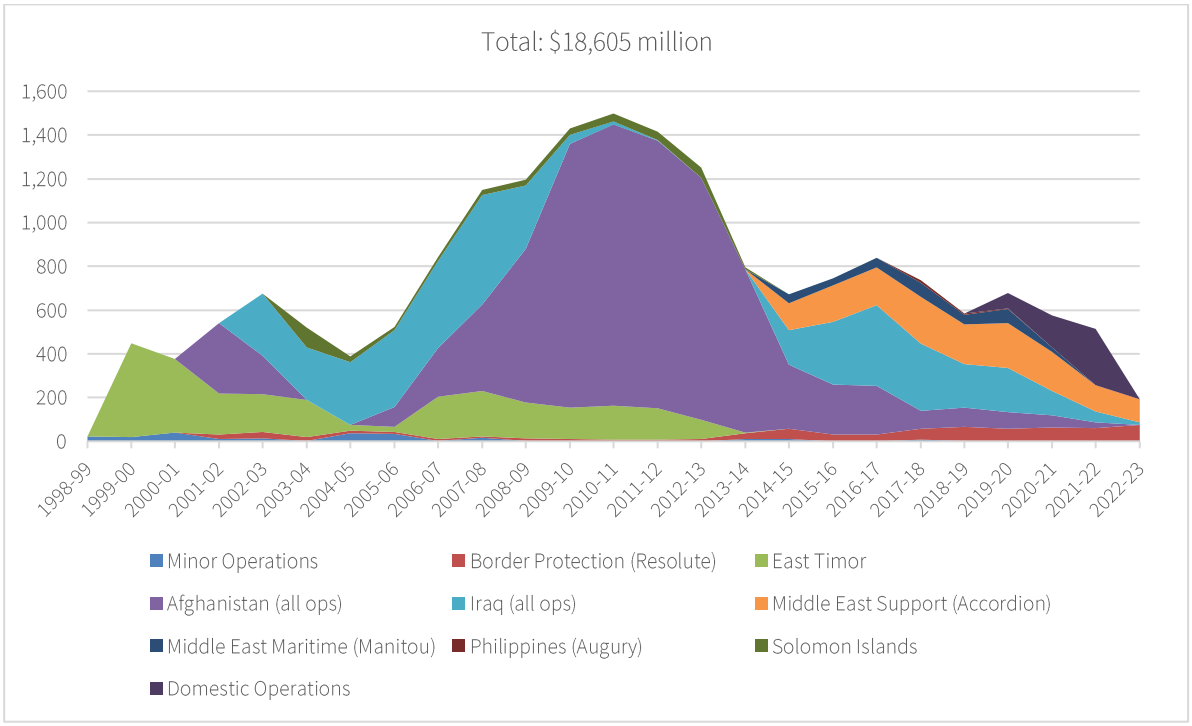


Notes: To ensure consistency with years before 2021–22, this table does not include spending on other project inputs to capability. The Pacific Patrol Boat Project is no longer in the PBS Top 30 acquisition table, so we assume the same cash flow for 2022–23 as 2020–21 ($85 million).

Sources: Defence annual reports, PBS.

Operations

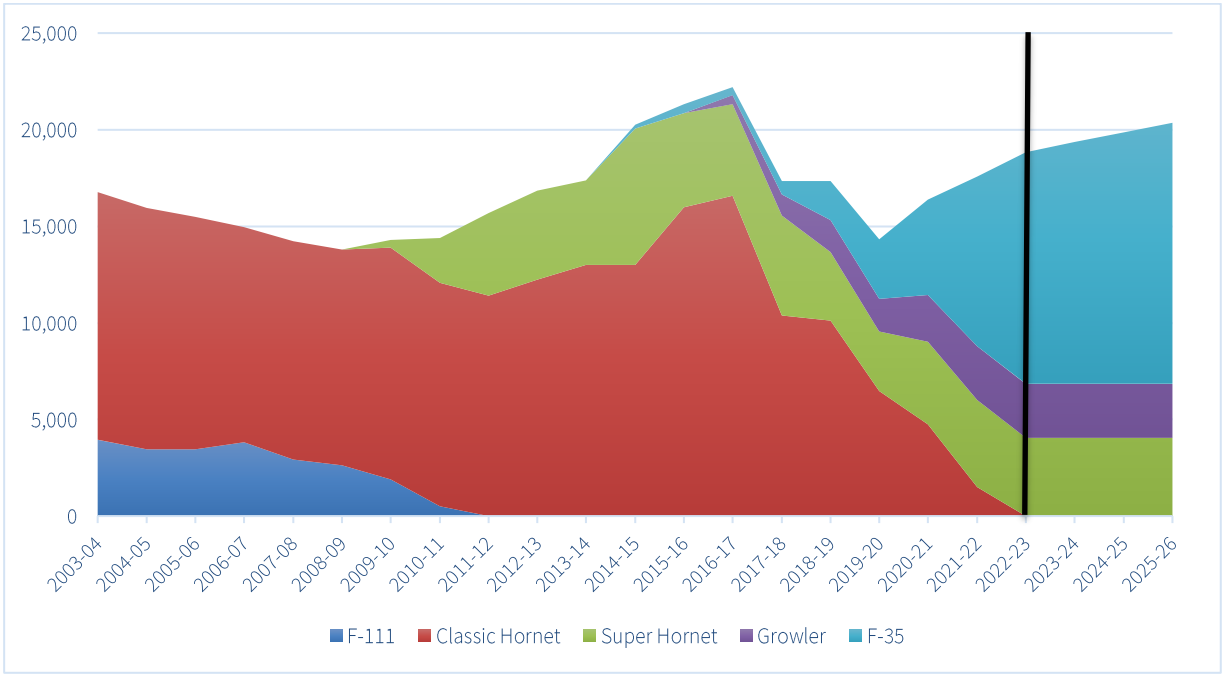
Figure A.8: Operational supplementation, 1998–99 to the present (nominal $ million) (see Chapter 3)



Sources: Defence annual reports, PBS.

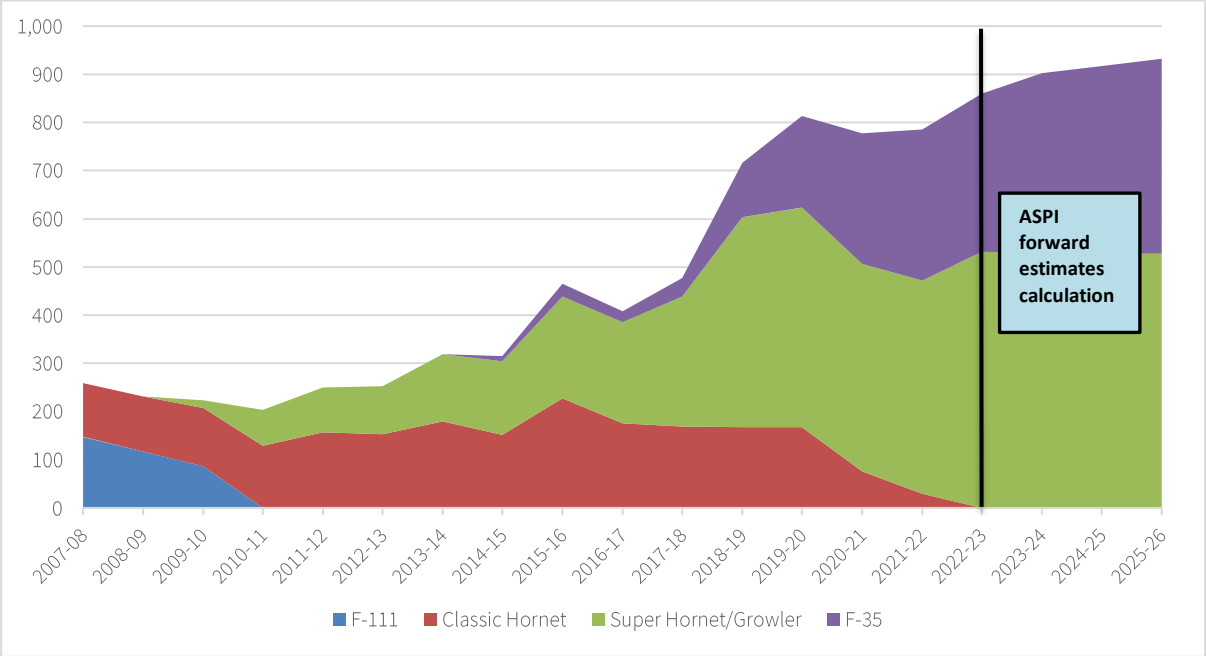
Delivery of capability

Figure A9: Air combat transition: flying hours, 2003–04 to 2022–23 (see Chapter 4)



Sources: Defence annual reports, PBS.

Figure A.10: Air combat transition: sustainment costs, 2003–04 to 2022–23 ($ million) (see Chapter 4)



Sources: Defence annual reports, PBS.

Note: Forward estimates figures generated by multiplying PBS figures for flying hours by average hourly flying cost of Super Hornet/Growler over the past five years and $30,000/hour for F-35A.

Chapter 1: The context

Key points

- The war in Ukraine has shown that war is still a reality and that authoritarian states will use it to achieve their ends. Western democracies are rearming after years of neglecting defence capability.
- China continues to use its power coercively. Its influence in our near region is also growing, and we can expect to see a more frequent, perhaps standing, People's Liberation Army presence in our near region.
- The lessons we learned about supply-chain vulnerability during the Covid-19 pandemic have been reinforced by the ripple effect of economic disruption radiating out from the Ukraine war.
- While the Australian Government's budget deficits continue over the decade, they are manageable by historical standards—unless the effects of the Ukraine war derail Australia's and the world's economic recovery.
- While Australians are concerned about China's use of coercion, defence still rates low on their list of concerns. The government will have to lead the conversation about the need for robust defence spending

As the (supposedly) Chinese curse goes, may you live in interesting times.[1] And we are certainly living in interesting times. Much has happened in our region and the wider world since the last edition of *The cost of Defence*. Plus, we've just had an election that resulted in a change of government. We'll start with a quick review as context for our discussion of the defence budget in later chapters.

1.1 Our strategic situation

The Russian invasion of Ukraine

Perhaps the most significant recent event is the completely illegal and unjustified Russian invasion of Ukraine. Many, particularly in Western Europe, had thought that war was a thing of the past. It was the violence with which that fantasy was dispelled that perhaps explains the robustness of Europe's response.

There are many lessons to be learned, and many of the lessons will be contested. The war is not yet over, so early lessons could change.[2] Some will find that events on the ground confirm their existing views, such as on the obsolescence or continuing utility of tanks in an age of precision-guided weapons. But here are some observations that have salience for Australia.

War is a thing again. Those who thought that war couldn't happen, either because it would cause too much disruption to modern, interwoven economies, or because we have just become too civilised, or because authoritarian rulers such as Vladimir Putin don't really mean what they say when they deny other countries the right to exist, have been proven wrong.

And that's the next lesson. Once again we've fallen into the rationality trap. Just because Western democracies thought that war in Europe was unthinkable and there was no rational reason for Putin starting one, it doesn't mean that Putin considered that war was unthinkable or an irrational way to

achieve his quasi-theological, ethno-nationalist ends and shore up his hold on power. We continue to suffer a failure of imagination, of being able to see the world as others do.

A key lesson for Australia's defence is that the Ukrainians have shown that it's possible to transform military forces in time frames considerably shorter than those set out in our strategic documents, such as the 2016 Defence White Paper (DWP), the 2017 Naval Shipbuilding Plan or the 2020 Defence Strategic Update (DSU). It took Ukraine eight years to develop a defence force that's been able to fight the Russian military to a standstill. And they've been able to do that on a shoestring, compared to Australia's defence budget. One wonders what the Ukrainians would think of multibillion-dollar defence projects that don't deliver anything for well over a decade.

The response to the Ukrainians' determined and effective resistance has made something else clear: friends and partners will help those who help themselves. The contrast to Afghanistan couldn't be clearer: there, the US lost the will to back the Afghan Government. An overstretched US is looking to its allies and partners to do more to help themselves to benefit all. Ultimately, that's what AUKUS is about.

Whatever Putin was thinking he would achieve, he probably wasn't thinking the invasion would result in NATO solidifying, Western Europe rearming, and Finland and Sweden applying to join the alliance.[3] Nevertheless, the invasion also confirmed that the advantage lies with the first mover. That recognition was behind China's *de facto* annexation and militarisation of the South China Sea. Once established, the facts on the ground have an undeniable reality. The situation in Ukraine is the same. The war has shattered the myth of Putin's genius and the competence of the Russian military. Nevertheless, Russia occupies much more of Ukraine than it did before 24 February. That's a fact on the ground that can't be ignored in any attempt to end the war. We can continue to expect revanchist powers to act first and negotiate only later.

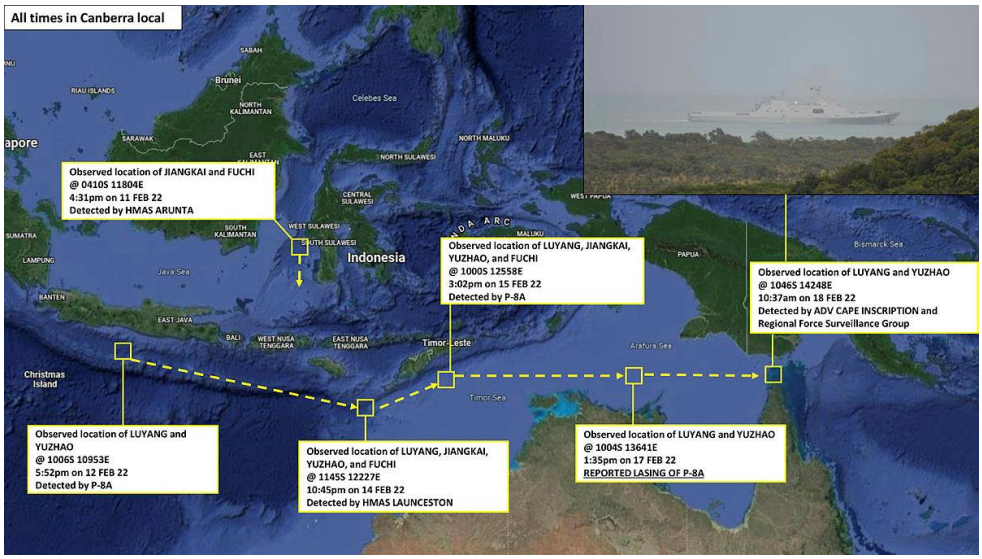
China's growing power

Paul Kelly has referred to China's 'alarming strategic assertion'.[4] I'd agree with his assessment but rename it 'alarming strategic *coercion*'. Australia has been watching it play out in the South China Sea, Xinjiang and Hong Kong and been feeling it in the form of undeclared trade sanctions imposed on Australian goods.[5] Ultimately, the Chinese Communist Party (CCP) is continuing its campaign to alter the facts on the ground across the Indo-Pacific.

There have been further demonstrations of Chinese influence in our region in the past year. The first is the signing of a security agreement between China and Solomon Islands, which seems primarily designed to provide Prime Minister Manasseh Sogavare with enough CCP muscle to squelch any domestic opposition to his ambitions.

The second is the increased presence of People's Liberation Army (PLA) assets in our near region, including a PLA Navy taskforce transiting through the Arafura Sea and Torres Strait (Figure 1.1) and a signals intelligence collection vessel operating off our west coast. Unlike the rather sad charade of the Russian Navy taskforce that made a show of force off Queensland during the 2014 G20, the vessels in which were so antiquated they needed to bring a tugboat just in case they couldn't make it home under their own steam, the PLA Navy taskforce comprised state-of-the-art warships. There's nothing illegal about what those ships were doing; it was just meant to be a reminder that the PLA Navy is now the largest fleet in the world and can reach anywhere in the Indo-Pacific.[6] For good measure, the transit also included the gratuitous lasering of an RAAF patrol aircraft.

Figure 1.1: A Department of Defence storyboard depicting the movements of a PLA Navy taskforce, including its passage into the Arafura Sea and through the Torres Strait into the Coral Sea



Source: Defence image library, online.

In a more positive development, 10 Pacific island nations declined to sign a regional security pact with China during Chinese Foreign Minister Wang Yi's tour of the Pacific in May–June 2022. Some did sign bilateral agreements with China.[7]

The United States

The Biden administration has re-emphasised what the US has traditionally regarded as a key strategic advantage: its robust network of allies and partners.[8] This isn't just a conscious decision to differentiate itself from the previous administration, whose 'America first' foreign policy and transactional approach to international relations created great uncertainty in the minds of Indo-Pacific countries about the strength of the US's commitment. It's also an acceptance of reality. Unilateral US power is no longer sufficient to preserve peace and stability in either the region or the world.

The US still has awesome hard power in its military. No country can match the support it has provided to Ukraine, for example. But the relative balance with China continues to shift. Moreover, the US defence budget is tapped out. After the glitch of Covid-19, when the US federal deficit burgeoned to $3 trillion, the deficit is returning to a more traditional $1 trillion per year. However, there's no credible plan to reduce that figure. Already, around two-thirds of the federal budget consists of protected social programs. Defence is already around half of the remaining discretionary third,[9] so there's virtually nowhere to draw more defence funds from other than tax increases, which is politically toxic. The Biden administration has broadly maintained the previous administration's level of defence spending, but there's virtually no constituency that wants to increase it. Americans of all political persuasions are tired of spending 3.5% of GDP to preserve the security of others who are spending less than 2% on their own defence, and in some cases as little as 1%. They have a case. It would seem reasonable for a country that expected the US to save it to at least be spending something comparable.

With the US defence budget stagnant and the cost of traditional crewed platforms spiralling upwards exponentially, the longstanding undercapitalisation of all US services' equipment fleets continues. The US Navy, for example, still does not have a credible plan to grow its fleet to the force that it believes is required. The previous administration's force structure plans were unaffordable fantasies. The Biden administration's plan is less ambitious but still unachievable with current levels of funding, and in the shorter term it adopts a 'divest to reinvest' strategy that retires significant numbers of ships. That's somehow meant to free up funds for new ships that will inevitably cost more. The fact that some of the

ships being retired are littoral combat ships that are only a few years old demonstrates the aggregate failure of the US Navy's force structure and shipbuilding strategies.[10] The bottom line is that the US Navy is shrinking and has no coherent plan to grow, while the PLA Navy is growing in the numbers and size of its ships as well as the numbers of its missiles at sea.[11]

AUKUS

The result is that US can't do everything everywhere. That's why it's looking for allies and partners to do more. That's the underpinning motivation for AUKUS. The world has changed so much that what was unobtainable has now been offered: nuclear-powered attack submarines (SSNs). But it's not just about making what exists already available; it's about generating new capabilities.

Much ink has been spilled on AUKUS, much of it frankly quite wrong. ASPI's Michael Shoebridge has explained what AUKUS is. It's 'a trilateral technology accelerator between the governments of the three nations with a ruthless focus on increasing the military power of each of our militaries by accelerating the development and application of key technologies into the hands of our service men and women'.[12] None of that will happen by itself, and the plan to deliver on the potential offered by AUKUS has yet to be set out. Since the initial announcement, the number of areas being pursued other than SSNs has grown from four to eight. Working groups have started looking at them, but there's been little public information about what concrete measures will be pursued beyond the SSNs.[13]

1.2 The economy

Supply chains and energy

The onset of the Covid-19 pandemic made us aware of the fragility of modern supply chains. Everything from toilet paper to ventilators was in short supply. That initial crisis made us question our faith in neoliberal globalisation and all that entails, including 'just in time' supply chains.

The 2020 DSU was, in a sense, a defence supply-chain White Paper. In retrospect, its announcement that the government was going to investigate the feasibility of a domestic guided weapons manufacturing capability looks inspired, considering the rate of consumption of missiles in the war in Ukraine. Unfortunately, two years later, there have still not been any announcements about which weapons we will manufacture here, or how that will be done.

Since 2020, we've had further reminders of the risks inherent in global supply chains. The Ukraine conflict has not just made us realise that guided weapons will be in high demand and short supply in future warfare, but that local events can have global ramifications. Chapter 6 follows the outwards ripple effects of the war. Already, the war is causing food stress in many countries, which could have implications for political stability. Moreover, even Australia, one of the world's largest energy exporters, is facing a 'perfect storm' of energy price spikes.

Economists have long referred to the 'Dutch disease' facing resource-exporting countries. Resource exports drive up the value of their currencies, making the price of their manufactured goods internationally uncompetitive. As reliance on resources grows, manufacturing declines. Australia is now suffering from 'double Dutch disease'. In addition to the original variant, the unfettered pursuit of export profits has exposed Australian customers to shortages and price spikes in gas (whether as feedstock or energy) and coal that are driven by global demand.[14]

Those shocks are forcing countries around the world to consider adjustments in the form of protectionist measures—a term that was a dirty word during the heyday of globalism. And that might not be a bad thing. What's the point of investing billions to develop a domestic defence industry if we allow price spikes in the gas and coal industry to wipe out Australian manufacturing?[15] There will be

increasing demand that a share of Australian gas and coal production be reserved for Australian customers—particularly when the price spikes benefit only producers, many of whom are foreign owned and pay no tax in Australia.[16] The gas industry's social licence is wearing thin. The challenge for governments will be to navigate between the Scylla of unfettered liberalism and the Charybdis of populist protectionism.

The invasion of Ukraine is pushing Europe even faster down the path of renewable energy than it was already travelling. Here, perhaps the biggest thing Australia can do to increase its strategic resilience is to electrify everything and accelerate the take-up of electric vehicles across as many sectors of the economy as possible. It's strange that governments regard reliance on overseas defence industry as a strategic deficit and sovereign risk and yet are complacent about the fact that we import $37 billion in liquid fuels every year, even though we have unrivalled potential to become energy self-sufficient through renewables.[17] We have little control over the supply of those fuels and no control over their price. We might not control when the sun shines and the wind blows, but no hostile power can shut them off.

The lessons aren't as black and white as 'globalisation is dead'. No country can survive and thrive on its own, but the risks of unfettered globalisation driven solely by market factors are too great to ignore. Every country needs reliable partners, and what makes a partner reliable isn't just its ability to deliver an acceptable product at a reasonable cost, but to keep doing so in times of crisis.[18]

The deficit and debt situation

Before the invasion of Ukraine, the global economy had weathered the Covid-19 storm, more or less. The Australian economy had done well compared to most others. That had come at a cost of huge deficit spending. Table 1.1 below from the 2022–23 Budget papers shows that those deficits extend well into the future.

However, the deficits aren't panning out to be as severe as once predicted. The massive $213.7 billion initially predicted for 2020–21 in that year's Budget has come in at $134.2 billion, for example. The size of the deficit over the forward estimates progressively decreases. In part that's because GDP has recovered faster than expected. The 2022–23 Budget papers' estimate for GDP is $2,300 billion. That's 9.6% more than the prediction for 2022–23 two years ago, of $2,098 billion. Incidentally, if we get the deficit down to $40–45 billion by the end of the forward estimates, that's back to where we were in 2013–14. But back then it was over 3% of GDP; by the end of the forward estimates it will be around only 1.5%. And our debt is low compared to OECD nations. Of course, servicing that debt will hurt more as interest rates rise.

Table 1.1: Forecast versus actual underlying cash surplus/deficit, 2017–18 to 2025–26 federal budgets ($ billion, nominal)

		2017–18	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25	2025–26
2018–19	**$b cash** **% GDP**	**–18.2** –1.0	**–14.5** –0.8	**2.2** 0.1	**11.0** 0.5	**16.6** 0.8				
2019–20	**$b cash** **% GDP**	**–10.1** –0.5	**–4.2** –0.2	**7.1** 0.4	**11.0** 0.5	**17.8** 0.8	**9.2** 0.4			
2020–21	**$b cash** **% GDP**			**–85.3** –4.3	**–213.7** –11.0	**–112.0** –5.6	**–87.9** –4.2	**–66.9** –3.0		
2021–22	**$b cash** **% GDP**			**—85.3** –4.3	**–161.0** –7.8	**–106.6** –5.0	**–99.3** –4.6	**–79.5** –3.5	**–57.0** –2.4	
2022–23	**$b cash** **% GDP**				**–134.2** –6.5	**–79.8** –3.5	**–78.0** –3.4	**–56.5** –2.4	**–47.1** –1.9	**–43.1** –1.6

Actual achievement	Budget year estimate	Forward estimates

Source: Department of Treasury, Budget paper no. 1.

The invasion and the economy

So there are grounds for optimism, but the invasion has thrown a spanner into the works. How badly the spanner has damaged the machinery isn't quite clear. Significant uncertainty reigns, and second- and third-order effects are hard to predict. The Ukraine war shows the butterfly effect that localised conflict can have on an interconnected world. The Russian and Ukrainian economies account for less than 3 per cent of global GDP and less than 2.5% of global trade.[19] Nevertheless, the effects are being felt across the world, particularly in the form of food and energy insecurity.

The Budget papers state that the Russian invasion 'is expected to generate around ¾ of a percentage point drag on global growth in 2022 and increase global inflation by around 1½ percentage points, primarily through higher oil, gas and wheat prices.'[20] Nevertheless, the Budget papers assess that 'a smaller set of net commodity-exporting countries, like Australia and Canada, will be somewhat protected from the inflation impact of higher energy prices, and will potentially benefit from a positive terms of trade shock as export prices rise.'[21] However, we would suggest that, even though Australia as a whole may be insulated, the pain could be felt very strongly by some industries and consumers if energy costs aren't constrained.

The Budget papers also note that 'the potential for an extended or escalated conflict to generate more significant disruptions is a key downside risk for the global economy.' The conflict had only been going for 34 days when those words were published (and fewer when they were written). It's now been going for over 100. With food and energy insecurity continuing and no end in sight, the potential for 'downside risk' is being realised.

Budget pressures

Regardless of the economic impact of the war in Ukraine, the new government will face deficits and many competing priorities for resources. The Australian electorate has come to expect 'magic pudding' economics: more services and financial assistance on the one side, and regular tax cuts on the other. That would be fine if people didn't also think that budget surpluses are the key indicator of good economic management.

Both sides of politics have been burned by trying to reduce expenditure to align with income. Labor's cuts to the defence budget in 2012–13 in a vain attempt to get the budget back into surplus and the Abbott government's cutting of expenditure in its first budget come to mind. Neither exercise won them any favour.

But there are clear signs that the public is now more comfortable with budget deficits. Large-scale deficit spending during the pandemic kept the economy and individuals afloat, and the world didn't end. There seem to be few voices calling for a rapid return to budget surpluses.

But that doesn't mean an open cheque book for Defence; the case for defence spending always needs to be set out clearly. Of course, the opportunity cost of not investing in defence needs to be understood—the invasion of Ukraine shows that the cost of war is many times greater than the cost of defence. Later in this report, we discuss the reasons to increase defence spending, as well as the impact of reducing it.

The inflation situation

Inflation is increasing globally. This was already occurring as a result of Covid-19; more money made available by stimulus measures was chasing a reduced amount of goods, since idle productive capacity hadn't returned to full production. In March 2022, the US registered an 8.5% inflation rate. The situation in Australia isn't quite as bad, but inflation has already hit levels that we haven't seen for decades. The war in Ukraine will exacerbate this as commodity prices increase, even if particular sections of Australia benefit. This adds more uncertainty to the prospects of recovery, as well as increasing hardship for Australians; one of the elements of the perfect storm was the already rising cost of living.

Inflation also puts additional pressure on the defence budget by eating into the planned increases in the funding line and reducing buying power, which we discuss in Chapter 2. Of course, it will affect others' militaries, particularly the US's. 'Shrinkflation' is likely to take effect as the military pays the same to get less capability.[22]

1.3 Public opinion

The previous Australian Government sought to give a khaki shade to the recent federal election. Labor refused to play along, avoiding any attempt to wedge it on national security. It supported AUKUS and its SSNs as well as the DSU funding line, even referring to the planned $270 billion capability investment, which was one of the previous government's favourite lines. Whether the public saw no real difference between the major parties, or simply didn't care whether there was one, the attempt to make the election about national security credentials doesn't seem to have resonated with the electorate.[23]

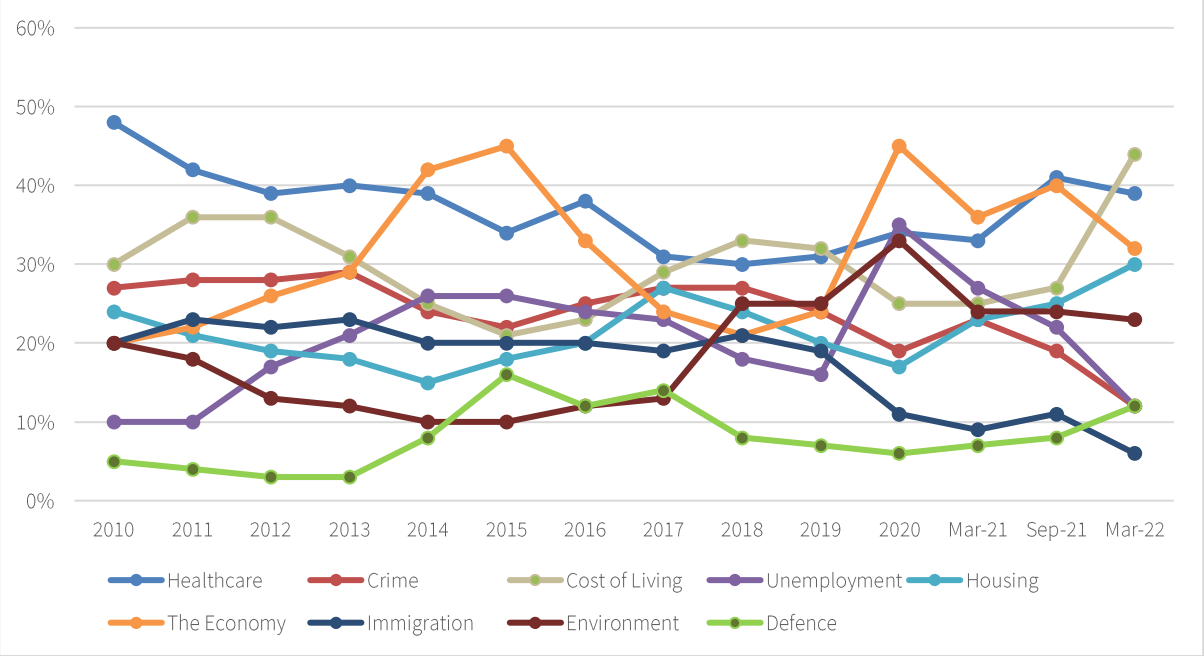
That's not surprising. National security is hardly ever one of the electorate's major concerns. One of the enduring features of public opinion polling is that Australians can have strong views when asked specifically about security issues, but defence always falls well down voters' lists when they're asked to prioritise their concerns.

To illustrate this, we can refer to the Lowy Institute's polling, which has mapped a dramatic change in Australians' attitudes to China. As recently as 2018, 82% saw China as more of an economic partner to Australia, and only 12% saw it as more of a security threat. By 2021, those numbers had changed dramatically to 34% and 63%, respectively. It's quite remarkable that a clear majority of Australians polled saw China as a security threat.[24] But that's a separate issue from being willing to go to war with

China; also in 2021, a majority of Australians (57%) felt that Australia should remain neutral in the event of a conflict between China and the US.[25]

But, while Australians may see China (or perhaps, better said, the CCP) as a security threat, it doesn't seem to have been something that kept them up at night. While Australians' views of China and the CCP have changed, what hasn't changed is their assessment of where national defence sits among the big issues that they're concerned about. Figure 1.2 doesn't show all issues (as that would make it illegible), so defence's ranking is in fact worse than it looks. Even though the punters get to pick three issues, defence has never been higher than ninth. At times, it's been as low as 18th, and it averaged around 14th over the past 12 years. Interestingly, in the past six months it's climbed up to ninth. The last survey pre-dates the news of the Solomon Islands – China security agreement and the start of the khaki election, so it's not clear what's driving that, but it could align with Lowy's data on changing views of China. However, it's still well behind perennial leading issues such as the economy, the cost of living, housing and the environment.

Figure 1.2: The big issues for Australians, 2010 to 2022



Source: Ipsos Issues Monitor, online.

That means the government has to lead and not follow when it comes to making the case for defence spending. Australians might not want to spend more on defence, particularly when they're facing cost-of-living pressures, spikes in energy prices and the constant grinding challenge of housing affordability (and even basic availability), but they do want a government that's competent at preserving their security. Ultimately, they may accept the need for greater spending on national security, but they'll need to be persuaded in an honest, open conversation rooted in principles of accountability and transparency that assures them that their tax dollars are being spent well on military capability that is needed.

Chapter 2: How much money is it?

Key points

- The planned consolidated defence funding (that is, for the Department of Defence and the Australian Signals Directorate) in the 2022–23 budget is $48,615.0 million, representing growth of 7.4% in nominal terms and 3.8% in real terms.
- That delivers the funding that the previous government set out in the 2016 DWP and 2020 DSU for 2022–23—no more, no less.
- Based on the previous government's economic predictions, that translates into 2.11% of GDP, which would be the highest percentage since 1992–93. Defence funding would remain between 2.1% and 2.2% over the forward estimates.
- Estimated defence funding will be $45,251.6 million in 2021–22. That would be slightly lower than 2.0% of GDP due to Australia's strong economic recovery.

This chapter provides a high-level analysis of the defence budget released by the previous government on 29 March 2022.[26] Since then, there's been a change of government. It is of course open to the new Albanese Labor government to adjust defence spending. However, when in opposition, the ALP supported the coalition government's level of defence spending, including its $270 billion commitment to capability. It certainly didn't promise reductions to defence spending during the campaign. So it's still worthwhile to analyse the coalition government's 2022–23 budget. During the campaign, the incoming government stated that it would present a second budget in October 2022. We will publish another edition of *The cost of Defence* examining the defence funding presented in that budget.

Since the Defence PBS is available online on Defence's website, we avoid reproducing PBS tables here as much as possible.[27] When we're referring to a PBS table (as opposed to one in this brief), we flag that with the prefix 'PBS'. If we state 'this year' or don't specify a year, we're referring to 2022–23.

On 1 July 2018, the Australian Signals Directorate (ASD) became a statutory agency within the Defence portfolio. Its funding is now treated separately within the Defence portfolio PBS. Because the government's 2016 DWP and 2020 DSU funding lines included ASD, our analysis of total defence funding still includes ASD. We refer to this as 'consolidated' defence funding. The top-level consolidated funding line is presented in PBS Table 4a. Most of our detailed analysis, however, focuses specifically on the Department of Defence, as it takes around 96.6% of the consolidated budget.

2.1 The top-level numbers

How did defence funding end up in 2021–22?

The PBS provides 'estimated actuals' for 2021–22, but we should bear in mind that those numbers could still change. To make room for the May election, the coalition government released the budget particularly early this year, in late March as opposed to the customary early May. With a quarter of the financial year still to run, the final numbers for 2021–22 could still change a lot.

In the 2021–22 PBS, the consolidated defence budget for that year was $44,618.6 million. With the pandemic still affecting the economy and depressing GDP, that translated into 2.09% of GDP based on the government's predictions in its budget documents.

In the mid-year update to the Budget (the 2021–22 PAES), defence funding increased to $45,161.9 million, due mainly to a $463.1 million foreign exchange adjustment to compensate for the declining value of the Australian dollar (thereby maintaining Defence's buying power constant in real terms) and $91.8 million in additional funding to cover Defence's contribution to Operation Covid Assist. There were several other adjustments, which are discussed below.

According to the most recent estimates in the 2022–23 PBS, defence funding in 2021–22 will reach $45,251.6 (Table 2.1). Further adjustments for 2021–22 include $126.4 million for Operation Flood Assist, $70 million for assistance to Ukraine and a $122 million foreign exchange reduction as the Australian dollar recovered somewhat. Overall, that's $633.0 million more than in the original 2021–22 Budget, which is mostly accounted for by additional funding for domestic support operations and exchange rate compensation.

In short, the coalition government delivered the funding set out in the 2021–22 PBS, plus a little more. However, because GDP has recovered strongly (by nearly $160 billion more than the government predicted a year ago), defence spending actually dropped a whisker below 2% of GDP, at 1.98%. As we've argued many times before, we shouldn't obsess too much about minor fluctuations in funding as a percentage of GDP, particularly when it's GDP estimates that are fluctuating, not defence funding. It's why the previous government made the conscious decision in the 2016 DWP not to link defence funding to GDP.

What's the total defence appropriation for 2022–23?

The consolidated defence appropriation for 2022–23 is $48,615.0 million (Table 2.1). Defence ministers used to include that top-level number in their Budget night media releases, but for some reason have not done so for the past several years. Nevertheless, the number can be easily found in PBS Table 4a. That's the number that corresponds with the funding profiles set out in the 2016 DWP (page 180) and 2020 DSU (page 54).

Table 2.1: Consolidated defence funding from government, 2021–22 and 2022–23 ($ million)

Year	Department of Defence	Australian Signals Directorate	Consolidated total
2021–22 Budget estimate	43,560.7	1,057.9	44,618.6
2021–22 estimated actual	44,086.4	1,165.2	45,251.6
2022–23 Budget estimate	46,951.0	1,664.0	48,615.0

Source: PBS 2021–22 and 2022–23, Table 4a.

Based on the Budget papers' prediction for GDP, that amount would be 2.11% of GDP. That's somewhat less as a percentage of GDP than last year's prediction for this year (2.21%) because of the significant increase in the government's estimates for GDP rather than a decrease in defence funding.

Is this funding consistent with the government's commitment?

We can't make a direct comparison between the funding commitment in the 2016 DWP and 2020 DSU and what's in the PBS until we take into account a range of budget measures or variations, of which

adjustments to foreign exchange and operational supplementation are generally the most significant. ASPI tracks those measures over time as they accumulate.

According to our analysis, once those measures are taken into account, the PBS's estimated actual number for 2021–22 is around $175 million short of the DSU figure, which is less than half of 1%. For 2022–23, Defence's funding is around $39 million over the DSU funding line, but again that's a difference of less than 0.1%. Some of the differences between our analysis and the PBS are likely to be accounted for by the fact that the PBS doesn't show the value of all variations; some are simply listed as 'not for publication', so we can't include them in our analysis.[28]

Since the DSU funding line was the same as the 2016 DWP's funding line for 2021–22 and 2022–23 (once variations are taken into account), this means that the coalition government delivered on the funding commitments it made in 2016. But it didn't increase its planned defence funding in the six years since the DWP was developed despite the marked changes in Australia's strategic environment, which the 2020 DSU noted have occurred faster than was expected in 2016.

How much has defence funding increased since last year?

The consolidated defence funding for 2022–23 is a very large increase in nominal terms of $3,363 million from 2021–22, or 7.4%. Despite relatively high inflation, that's still a very healthy increase of 3.8% in real terms (Table 2.2).[29]

Table 2.2: Consolidated defence funding increases, 2018–19 to 2025–26 ($ million)

	Nominal funding	Nominal increase	Nominal increase %	Real funding (2022–23 baseline)	Real increase	Real increase %	% of GDP
2018–19	37,239	2,313	6.6%	41,170	1,921	4.9%	1.91%
2019–20	39,246	2,007	5.4%	42,816	1,646	4.0%	1.98%
2020–21	42,216	2,970	7.6%	45,322	2,506	5.9%	2.04%
2021–22	45,252	3,035	7.2%	46,855	1,533	3.4%	1.98%
2022–23	48,615	3,363	7.4%	48,615	1,760	3.8%	2.11%
2023–24	51,605	2,990	6.2%	50,179	1,564	3.2%	2.18%
2024–25	53,459	1,854	3.6%	50,590	411	0.8%	2.15%
2025–26	55,526	2,067	3.9%	51,219	628	1.2%	2.12%

Source: PBS.

Actual achievement	Budget year estimate	Forward estimates

2.2 Budget measures and adjustments

Budget measures and adjustments are changes to previous budgets' plans. They're published in the PBS and updated mid-year in the PAES. In the 2022–23 PBS, they're listed in PBS Table 2. The PBS doesn't explain what they are; for that, you need to go to Budget paper no. 2, which briefly explains all budget measures across government.[30] Defence's start on page 70 this year, although some measures affecting Defence are listed under other portfolios that have the lead in implementing them.

Because most of Defence's long-term commitments are set out in white papers (or the DSU), it generally has relatively few major Budget measures, other than foreign exchange adjustments and operations funding. And for those that it does have, the PBS often doesn't state how much funding is involved and simply lists the figures as 'not for publication'.[31]

Measures in the 2021–22 Portfolio Additional Estimates Statements

The PAES provides a mid-year budget update (PAES 2021–22 Table 6). Since it fell between editions of *The cost of Defence*, we have not yet listed its budget measures:[32]

- an increase of $463.1 million as a foreign exchange adjustment
- a transfer of $91.4 million to ASD
- supplementation of $91.8 million for Operation Covid-19 Assist
- adjustments to supplementation for overseas operations netting out a reduction of $16.0 million
- a transfer from Defence of a further $56.5 million to the Office of the Special Investigator for 2022–23 (however, this was subsequently reversed).[33]

Measures in the 2022–23 Portfolio Budget Statements

The 2022–23 PBS had to tidy up a couple of things that occurred in 2021–22 after the PAES was issued:

- $126.4 million for Operation Flood Assist in 2021–22
- $156.5 million for 'initial assistance' to Ukraine in 2021–22. According to the PBS, this included '$91.0 million in lethal and non-lethal military assistance to support the defence of Ukraine, including missiles, weapons and medical supplies.'[34] Defence is being supplemented for $70 million of this and is absorbing the remaining $21 million.[35] The PBS contains no information on funding to support Ukraine in 2022–23 and beyond.

The budget measures in this year's PBS are a little unusual, as the main adjustment is a very large movement within the portfolio from the Department of Defence to ASD to cover most of the cost of the REDSPICE cyber program (discussed below). Aside from REDSPICE, the main adjustments are:

- a foreign exchange reduction of $230.0 million
- supplementation of $68.2 million for Operation Accordion (Middle East) and $74.7 million for Operation Resolute (border protection)
- $151.6 million over five years to be funded with Defence's existing resources to continue industry support programs
- Defence is also contributing to 'Support for the Australian space industry'. The total program is $1.3 billion, but Defence's contribution is not for publication due to 'commercial sensitivities'.

For those hoping to see additional funding to deal with Australia's increasingly uncertain strategic circumstances, there's little to see beyond the $558.7 million in partial supplementation for REDSPICE over the forward estimates.

ASD's funding—the impact of REDSPICE

The new $9.9 billion Resilience, Effects, Defence, Space, Intelligence, Cyber and Enablers (REDSPICE) package included in the Budget will provide a massive enhancement to ASD. The Budget papers state that REDSPICE will 'double ASD's size, creating 1,900 jobs over the next decade … [It] will triple ASD's offensive cyber capabilities and double its cyber hunt and response activities …'

Compared to last year's estimates, ASD's funding will grow rapidly over the next few years (Table 2.3 below). The funding impact will be almost immediate, with a 57.3% increase in 2022–23. By 2023–24, it will have more than doubled. It will be interesting to see how ASD achieves that spend; you need people both to spend that money and to spend it on. Getting that number of people through the security vetting process will take time. It's good to be ambitious, but the Department of Defence's efforts to increase its workforce have achieved less than 1% average annual growth over the past six years. So, if ASD can find a way to do it, it should bottle it and give some to the department.

Table 2.3: ASD funding, 2020–21 to 2025–26 ($ million)

ASD funding	2020–21	2021–22	2022–23	2023–24	2024–25	2025–26
PBS 2021–22	1,010.5	1,057.9	974.2	1,027.7	1,017.7	
PBS 2022–23		1,165.2	1,664.0	2,277.5	2,284.7	2,061.9
% increase over PBS 2021-22 plan			70.8%	121.6%	124.5%	

Actual achievement	Budget year estimate	Forward estimates

Source: PBS.

The other issue is where the money is coming from. The previous government stated that the total is $9.9 billion over the decade. The Budget papers only present the forward estimates to 2025–26 (Table 2.4 below). From that we can see that ASD gets an additional $4,217.3 million over the forward estimates. The Budget papers say that 'the cost of this measure will be partially offset from Defence's Integrated Investment Program.' It would be more accurate to say that it is being *almost entirely* offset from the IIP. Only $588.7 million (14%) is new funding from government; the other $3,628.6 million is being moved over from the Department of Defence.[36]

Beyond the forward estimates, ASD will need a further $5.7 billion or so to reach $9.9 billion. If the plan is for there to be a similar split beyond the forward estimates between new money and transfers from Defence, that will be a very expensive exercise for the department; it will need to find a further $4.9 billion for a total of around $8.5 billion over the decade. Since every dollar in the defence budget is already spoken for, it can only do that by taking funding away from other priorities. It's not surprising that Defence has had to cancel projects such as the SkyGuardian uncrewed aerial vehicle.

Table 2. 4: Sources of REDSPICE funding ($ million)

ASD funding	2022–23	2023–24	2024–25	2025–26	Total
From Defence	-688.7	-983.6	-981.4	-974.9	-3,628.6
To ASD	680.0	1,243.6	1,260.6	1,033.1	4,217.3
New funding	-8.7	260.0	279.2	58.2	588.7

Source: 2022–23 Budget paper no. 2, online.

'Large Vessel Infrastructure and Submarine Basing'

The measures in the PBS also include 'Large Vessel Infrastructure and Submarine Basing'. The large-vessel dry berth was first announced by the government on 15 March 2022.[37] Budget paper no. 2 states that 'The Government will invest up to $4.3 billion to deliver Western Australia's first large-vessel dry berth, which will support the construction and sustainment of naval vessels in Australia and support a stronger commercial shipbuilding and sustainment industry in Western Australia.' Senate estimates testimony from Australian Naval Infrastructure Pty Ltd (ANI), which will manage the construction and operation of the facility, indicates that it will have capacity 'in the order of 40,000t.' That would be more than sufficient for the Navy's largest ships—the LHDs and replenishment vessels.

While Budget paper no. 2 says that this funding is provisioned within the Defence integrated investment program, the PBS says 'the Defence components of this measure are being absorbed by Defence and will be managed within the Defence Integrated Investment Program.' That language suggests that it's a new measure that Defence has to find the money for, not one that was already programmed for in the IIP. Indeed, there was no line in the 2020 FSP for a large-vessel dry berth. It seems unlikely that $4.3 billion in funding was there but somehow not visible, but anything is possible.

ANI is owned by the Department of Finance, and ANI's other works, such as the construction of submarine and surface shipyards in Adelaide, were funded by equity injections from the Australian Government. However, the source of those funds has always been opaque, and it was never clear from Budget documentation how much of those works was funded by Defence and how much by the Department of Finance. In short, it's quite possible that the $4.3 billion is another new impost on the Defence Department's budget. The Budget documents don't provide an annual breakdown of the $4.3 billion, but the Minister for Defence has stated that work will start in 2023 and that initial operations will commence in 2028.

The measure also includes the east coast submarine base announced by the government on 7 March 2022. Again, there's no funding set out in the PBS or Budget paper no. 2 for this, but, in contrast to the large-vessel dry berth, there's already a $6.8–10.2 billion line in the 2020 FSP for 'Undersea warfare support facilities and infrastructure'.[38] The government has stated that this funding line is intended to be used to develop the east coast base. In short, this is not a new measure that Defence will have to absorb. Whether that amount will be sufficient to establish a new SSN base is no doubt something that the Nuclear-Powered Submarine Taskforce will be examining most closely.

2.3 How is defence funding looking over the longer term?

Since 2000–01, the nominal defence budget has grown from $12,319 million to $48,615 million, or by 294%. In real terms, which take inflation into account, that's a more modest but still very healthy growth of 130%.

Spending grew substantially under the coalition government. In its first year in office in 2013–14, Defence spending was $26.1 billion. In the recent 2022–23 Budget it's $48.6 billion. That's nominal growth of 86%. In real terms it's still a very hefty 55%.

This year is the tenth straight year of real growth (see Figure A1 in 'Defence in 10 tables'). Since the 2020 DSU confirmed the 2016 DWP funding model and extended it for a further four years out to the end of the decade in 2029–30, that growth continues in the DSU. As noted, this year the budget has grown by 7.4% in nominal terms and 3.8% in real terms. Over the next three years, the growth moderates but continues at 6.2%, 3.6% and 3.9%, according to the PBS's numbers. In real terms, that's 3.2%, 0.8% and 1.2% (based on the Budget papers' CPI predictions, which are, of course, only predictions).

I discussed the longer term defence funding model in Chapter 2 of Part 1 of 2020–21's *The cost of Defence,*[39] but its key features can be summarised as follows:

- $575 billion total funding over the decade from 2020–21 to 2029–30
- $270 billion in capability investment, which includes acquisition and 'future sustainment'[40]
- 88% nominal growth over the decade compared to a 2019–20 baseline.
- Will it be enough? We consider the hard funding choices the government will need to make, including whether to change the funding line set out in the DSU, in Chapter 5, but here is some context to consider.

The difference between 2% of GDP and planned funding

As we've noted, in opposition the ALP supported the government's defence funding. It has not stated any intent to reduce funding. However, structural deficits are built into the Australian Government's budget at least for the forward estimates and probably for some years beyond that. In simple terms, every year the government is running at a deficit. There will be increasing competition for resources, whether to fund other government programs, provide tax cuts or reduce the annual deficit more quickly. All governments certainly have the option of decreasing defence spending in favour of other priorities, but it's important to understand the potential impact.

As we've seen over the past few years, predicting GDP is difficult, but, according to the previous government's own GDP estimates in the 2022–23 Budget papers, defence funding will sit between 2.1% and 2.2% of GDP over the next few years. That means that, in dollar terms, defence funding will exceed 2% of GDP by around $3–4 billion per year very soon (Table 2.5).

Table 2.5: Difference between the PBS 2022–23 funding and 2% of GDP ($ billion)

	2021–22	2022–23	2023–24	2024–25	2025–26
2022–23 PBS funding	45.3	48.6	51.6	53.5	55.5
Funding as % of GDP	1.98%	2.11%	2.18%	2.15%	2.12%
2% of GDP	45.8	46.0	47.4	49.8	52.3
Difference	0.5	–2.6	–4.2	–3.7	–3.2

Sources: PBS 2022–23, 2022–23 Budget paper no.1.

Since Defence's planning is based on spending every dollar the government gives it (and then some, due to its overprogramming practices), should any government decide to limit spending to, say, 2% of GDP, Defence will need to adjust its spending plans downwards by around $3–4 billion per year—there simply aren't that many 'hollow logs' in the budget.

To give a sense of the scale of reprioritisation that would require, the estimated cost of sustaining Defence's 10 most expensive capabilities this year is $3.4 billion; a $3–4 billion cut would have real, unavoidable impact on capability. That's also well over twice as much as this year's entire predicted spend on the Naval Shipbuilding Program ($1.6 billion).

Should the economic recovery falter and GDP grow more slowly than anticipated in the budget, 2% of GDP will of course be lower, and the difference between the DSU funding line and 2% of GDP will be even greater. To illustrate this: a year and a half ago when the GDP outlook was decidedly less rosy than now, the annual difference was in the order of $7–9 billion.[41] This is a key reason why linking defence spending directly to a particular percentage of GDP is a bad idea; what constitutes 2% of Australia's GDP for a particular year has fluctuated by over $4–5 billion just in the space of the last two budgets. It would cause planning chaos if Defence's actual budget moved around that much each year.

The corrosive effect of inflation

A key challenge for the defence budget is inflation, which eats into not just the average Aussie family's buying power, but also the government's. The higher the rate of inflation, the more Defence's buying power will be eroded in real terms. Analysts in the US, where inflation is running at around 8%, have expressed concern about its impact on the nation's defence budget.[42] But Australia's Department of Defence won't be immune from inflation's debilitating effects either.

Over the past two decades, Australia has had relatively low rates of inflation, with 2.25%–2.50% being the norm (using the CPI). We can assume that the 10-year funding lines included in the 2016 DWP and 2020 DSU were developed using something like that rate of inflation.

The Covid-19 pandemic has changed that stable picture. First, we had a year of moderate deflation in 2019–20, but since then inflation has increased beyond the norms of recent history. It hit 3.5% in 2020–21. The previous government predicted 1.75% for 2021–22 but had to revise that up to 4.25% in the 2022–23 Budget (see Table 2.6 below). That may need further revision; on 27 April the Australian Bureau of Statistics reported that inflation had risen by 5.1% over the 12 months to the March 2022 quarter, and the governor of the Reserve Bank of Australia has suggested that it will hit 6% before it moderates.[43]

Table 2.6: Inflation, predicted and actual, 2019–20 to 2025–26 (%)

	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25	2025–26
2019–20 Budget	2.25	2.5	2.5	2.5			
2020–21 Budget	–0.3	1.75	1.15	1.75	2.0		
2021–22 Budget	–0.3	3.5	1.75	2.25	2.5	2.5	
2022–23 Budget		3.8	4.25	3.0	2.75	2.75	2.5

Actual achievement	Budget year estimate	Forward estimates

Source: Budget paper no. 1.

In fairness, accuracy hasn't been a feature of anybody's economic predictions in the age of Covid. At the moment, a lot of money (in part coming from various Covid relief measures) has been seeking a reduced amount of goods and services (caused by supply-chain disruptions, lack of workers, sanctions in the energy sector and so on), driving inflation. The previous government assumed that those disruptions would end and inflation would decrease to 3.0% in 2022–23 and eventually drop back to a more 'normal' 2.5% by the end of the forward estimates.

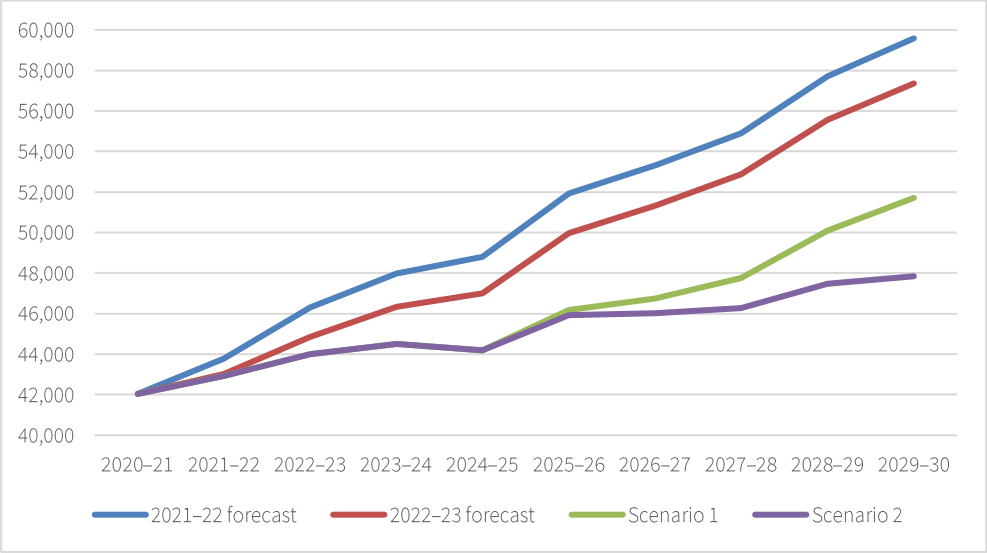
I'm not going to argue for any particular number but, when we're thinking about risks, it can be helpful to consider scenarios. Let's start with the government's own numbers. Already, the rise in inflation in 2021–22 from the government's prediction at the start of that financial year of 1.75% to its current estimate of 4.25% for the year has had the effect of eroding over $700 million from the defence budget in real terms. Using the inflation predictions in the 2022–23 Budget papers results in a further loss of $1,400 million in 2022-23. By the end of the forward estimates in 2025–26, the defence budget will be 3.7% less in real terms. That might not sound like much, but it represents a cumulative loss of buying power of around $6.8 billion over the forward estimates and $15.2 billion over the decade.

Compare that to our figures above for the top 30 sustainment products and the shipbuilding program to get a sense of scale. Nearly as much as the value of the shipbuilding program has evaporated in 2022-23 alone, even before the shortfalls compound over time.

That's if we use the Budget papers' 'official' inflation predictions, but we can generate more worrying scenarios. One in which inflation hits 5% but returns to 'normal' more slowly, not getting there until late this decade, produces a cumulative reduction in real terms of $16 billion over the forward estimates and $45 billion over the decade (scenario 1 in Figure 2.1 below). A scenario in which inflation of 5% becomes the new normal results in a 20% reduction in real terms by the end of the decade and a cumulative reduction of $54 billion (scenario 2). A reduction in real buying power of that scale will have a huge impact on Defence.

We should also bear in mind that around two-thirds of Defence's equipment acquisition budget goes overseas, largely to the US, where inflation is running at around 8%. While Defence's funding is automatically adjusted for exchange-rate fluctuations, it isn't for overseas inflation.[44] So, even if inflation moderates here, Defence's buying power can still be eroded by cost increases overseas.

Figure 2.1: Effects of inflation on the defence budget (2021–22 real $ million)



Source: ASPI modelling.

In sum, if inflation remains above historical levels, it will quickly eat into Defence's buying power even if the government adheres to the 2020 DSU funding line. To manage that, the government will need to accept reductions in capability or increase the defence budget just to acquire and support the same capability.

2.4 The Big 3

The PBS provides a breakdown of the Defence Department's top-level spending into key cost categories: workforce, operations, capability acquisition program, capability sustainment program, and operating (PBS Table 4b). We'll combine operations, capability sustainment program and operating costs into one gripped up operating number to create our 'Big 3' of workforce, operating and acquisition.[45] Note that these are spending categories that include funding from government and Defence's own-source revenue, so they sum to serial 15 in PBS Table 1, not serial 5.

The balance between the Big 3 is shown in Figure A2 in 'Defence in 10 tables' at the front of this brief. This year, the balance is forecast to be 29.5% workforce, 33.9% acquisition and 36.6% operating. We provide some high-level observations below and discuss each category in more detail in Chapter 3

Workforce

The 2021–22 PBS planned on spending $13,856.4 million on personnel. The latest estimate is for $13,779.2 million, which is pretty close.

Defence's workforce in 2022–23 is budgeted at $14,160.0 million. That's an increase of 2.8% in nominal terms, but a slight decrease in real terms of –0.8%.

Table 2.7 shows Defence's workforce costs and numbers. Despite the previous government's recent announcement of a further 12,500 Defence personnel over the coming decade and a further 6,000 in the subsequent decade, we don't see a significant ramp up in personnel spending over the forward estimates in real terms. That's because the increase in new people also ramps up slowly, plus Defence has to make up the existing gap between where it actually is and where it's supposed to be before it can even start on the additional 12,500. Broadly speaking, real increases in spending on personnel broadly match the planned increases in Defence's personnel numbers, so the alignment of people and dollars is probably about right over the next few years. However, further into the decade

we should expect to see larger increases in personnel spending if Defence is achieving its personnel targets.

Spending on workforce for 2022–23 will be 29.5% of the total budget. Overall, Defence's workforce spending hasn't grown as fast as its overall budget. That means that workforce spending has fallen as a share of the total budget. However, it isn't falling as fast as planned in the 2016 DWP or 2020 DSU. The broad trajectory set out in those documents saw acquisition growing to 39% or even 40% of the total, while personnel spending was to fall to 26%. That would be a substantial change from a decade ago, when personnel spending was over 40% of the total defence budget.

We have questioned whether this plan was viable; you need people to acquire, operate and sustain the equipment being acquired. It's not surprising then that in the 2022–23 PBS the fall in personnel costs plateaus out at 29.0% over the forward estimates rather than continuing to fall to 26%.

Table 2.7: Defence workforce costs—annual increases

	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024--25	2025–26
Personnel costs ($m)	11,922.0	12,877.9	13,046.2	13,779.2	14,160.0	14,550.9	15,219.9	15,793.8
Nominal increase %	–0.5%	8.0%	1.3%	5.6%	2.8%	2.8%	4.6%	3.8%
Real increase %	–2.1%	6.6%	–0.3%	1.9%	–0.8%	0.3%	2.0%	1.2%
Personnel[a]	74,305	75,238	76,784	75,863	79,054	79,201	80,332	81,478
Personnel increase %	–2.1%	1.3%	2.1%	–1.2%	4.2%	0.2%	1.4%	1.4%
% of total defence budget	32.1%	32.9%	30.9%	30.5%	29.5%	29.0%	29.2%	29.0%

Actual achievement	Budget year estimate	Forward estimates

[a] *Personnel numbers are actual for previous years, but are Defence's approved allocation for 2022–23 and future years (that is. an aspiration). Defence is currently below its allocation; hence the apparent big jump of around 3,200 personnel from 2021–22 to 2022–23, which would get it from where it actually is to where it should be. It isn't going to happen.*

Sources: PBS for budget year and forward estimates; Defence annual report for actual achievement.

The workforce costs presented here include only Defence's own workforce and don't include its external workforce (contractors, consultants and service providers), whose cost is generally covered by acquisition and sustainment programs. We have examined those costs in previous editions of *The cost of Defence*. While it's very difficult to generate precise numbers for them, it's important to note that the way Defence treats its external workforce can be regarded as under-reporting workforce costs and misrepresents the breakdown in the Big 3. That could be another reason why the fall in personnel spending as a percentage of the total is plateauing out—personnel costs are being shifted to the acquisition and sustainment programs.

Capability Acquisition Program

Defence's capital budget is essentially its Capability Acquisition Program, which is presented in PBS Table 5.[46] Historical data is provided in ASPI's online database.[47] The increase in defence spending over the decade is focused on the acquisition program, which aims at a very ambitious ramp up in spending over the decade.

The 2020–21 Budget planned a massive $3 billion (27.4%) increase in acquisition spending for the year; to go from $11,212.1 million in 2019–20 to $14,281.2 million. That was always going to be a major challenge, even without the added obstacle of Covid-19 disrupting global supply chains. In the end, Defence spent $12,817.7 million. That's nearly $1.5 billion short of the ambitious target, but $1.5 billion more than the previous year. Overall, it was a step up of 14.3%. Not bad work in the middle of a pandemic.

Then Defence and its industry partners had to repeat that growth in 2021–22. The PBS planned a further $3.1 billion increase in acquisition spending (24.5%) to get to $15,766.0 million. As with the previous year, that was always going to be difficult. Based on the latest estimates, it will repeat its 2020–21 performance; that is, it will fall short of the target but still achieve a very solid increase of nearly $2.1 billion. In short, Defence has now delivered a year of 14.3% growth followed by a year of 16.3% growth. That appears to be showing that supply can grow to meet demand if industry is provided with consistent funding. We look at how successfully that spending is being turned into capability in Chapter 4.

Recent performance would suggest that 2022–23's target of 9.1% growth to $16,263.5 million is achievable. That's a mere step up of $1,359.1 billion. The annual increases in acquisition spending are to continue over the forward estimates (Table 2.8) with increases of 10.9%, 2.2% and 5.3% in nominal terms (although 2.2% nominal growth could be a decrease in real terms).

Table 2.8: Defence capital program—annual increases

	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25	2025–26
Capital program (nominal $m)	10,944.4	11,212.1	12,816.7	14,904.4	16,263.5	18,028.5	18,424.0	19,401.5
Nominal increase ($m)	154.2	267.7	1,604.6	2,087.7	1,359.1	1,765.0	395.5	977.5
Nominal increase %	1.4%	2.4%	14.3%	16.3%	9.1%	10.9%	2.2%	5.3%
Capital program (real $m)	12,099.6	12,232.1	13,759.6	15,432.6	16,263.5	17,588.8	17,536.2	18,016.2
Real increase ($m)	–26.1	132.5	1,527.5	1,673.0	830.9	1,325.3	–52.6	480.0
Real increase %	–0.2%	1.1%	12.5%	12.2%	5.4%	8.1%	–0.3%	2.7%

Actual achievement	Budget year estimate	Forward estimates

Sources: PBS.

Despite the strong growth in acquisition spending, it seems to be plateauing as a percentage of the Big 3. Just as personnel spending was to fall to 26% but is flattening out at 29%, acquisition spending looks like stabilising before it reaches the DWP and DSU target of 40%. It will reach nearly 34% this year (should Defence hit its PBS target) but then sit at 35%–36% for the remainder of the forward estimates. We've suggested previously that there may be 'natural' limits on how much you can spend on equipment if you still want to be able to operate and sustain it, and this year's Budget seems to confirm that.

Operating costs and the Capability Sustainment Program

The PBS now includes a breakdown of expenditure by key cost categories, including operations, capability sustainment and operating (PBS Table 4b), which ASPI rolls up in a single 'operating' figure.

In 2021–22, the target was $14,945.5 million, which would have been virtually no increase over the previous year. This sounded a little implausible in the light of the ongoing pace of ADF activity—if you're using the force, you have to pay for it. It's not surprising then that, according to the most recent estimates, 2021–22 will come in at $16,454.2 million, or $1,508.7 million (10.1%) more than planned. All three elements of operations, sustainment and operating spent more than planned.

The combined estimate for all three for 2022–23 is $17,555.8 million, which is 36.6% of the defence budget. That will be a substantial increase of over $1,101.6 million (6.7%) over 2021–22's estimated achievement.

The biggest of the three elements by a long way is the Capability Sustainment Program, which is presented in PBS Table 6. Sustainment covers the cost of operating, maintaining and repairing Defence's capabilities. It doesn't include the cost of Defence personnel doing those activities, but it does include the cost of outside service providers. While the Capability Acquisition Program isn't broken down by service or group in PBS Table 5, the Capability Sustainment Program is broken down in PBS Table 6, so we can see what services and groups are spending.[48] ASPI publishes historical sustainment data online.[49]

This year, the estimate for sustainment is $12,952 million, which would be a very substantial 9.9% nominal increase on 2021–22 (Table 2.9). That's a lot, but not unachievable considering the precedent of 9.4% growth in 2020–21. The growth continues over the forward estimates.

Table 2.9: Sustainment spending, 2018–19 to 2025–26

	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25	2025–26
Capability Sustainment Program ($m)	11,579.2	12,095.6	13,228.2	13,628.5	14,975.6	15,310.3	16,241.4	17,072.7
Annual nominal increase	4.7%	4.5%	9.4%	3.0%	9.9%	2.2%	6.1%	5.1%

Actual achievement	Budget year estimate	Forward estimates

Sources: PBS.

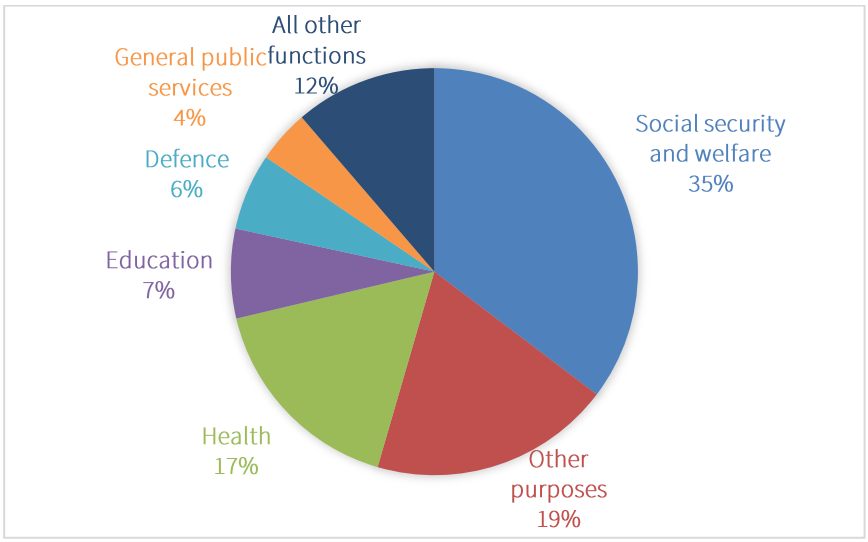
2.4 Defence and other federal government spending

Defence as a percentage of federal government spending

Despite its large numbers, defence spending is not one of the bigger elements in the Australian Government's spending (Figure 2.2). Before Covid-19, it sat between 6.0%–6.6% of Australian Government expenses. In 2020–21, defence spending grew as a percentage of GDP but fell as a percentage of expenses due to the government's massive Covid-19-related social and stimulus spending. As a result, defence spending fell to 5.1%. In 2021–22, the opposite occurred; as GDP recovered and less social and stimulus spending was required, defence spending fell as a percentage of GDP but rose as a percentage of government expenses to 5.6% (Figure 2.3).

According to the 2022–23 Budget papers, defence spending will grow again as a percentage of government expenses to 6.1%.

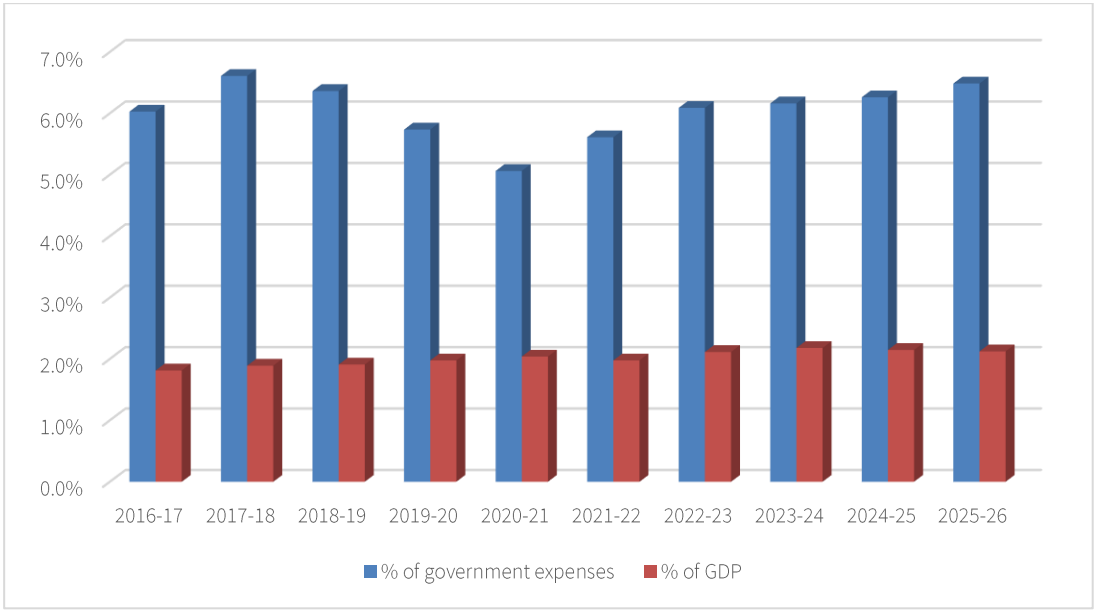
Figure 2.2: Australian Government expenses, by function, 2022–23



Source: Budget paper no. 1.

According to the Budget papers' estimates of government spending, defence funding will reach 6.5% of government expenses by the end of the forward estimates, but that's still less than where it was in 2017–18, at 6.6% (Figure 2.3). So, while the defence budget is showing strong growth, it's not by any means taking over the Australian Government's budget.

Figure 2.3: Defence spending as a percentage of government expenses and GDP, 2016–17 to 2025–26



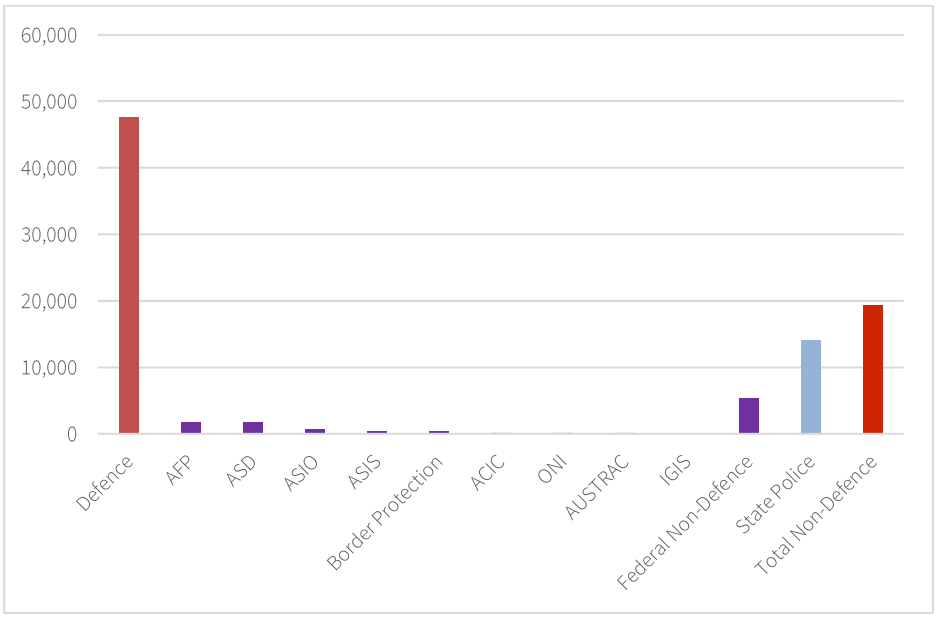
Sources: Budget papers; PBS.

Defence has only two 'programs' in the Australian Government's top 20 programs in 2022–23 listed in Budget paper no. 1: the Army at 18 and the Air Force at 19, both up one spot from 2021–22. The Navy is very close behind but hasn't yet cracked the Top 20. Even the Army is only one-tenth the size of the largest program, which is revenue assistance to the states and territories (that is, where your GST goes).

National security spending

The cost of Defence first compared defence spending with other areas of national security spending in 2018–19. We've revisited the numbers this year (Figure 2.4). Little has changed in the broad outlines. Defence is still the gorilla on the block. Even the more prominent agencies, such as the Australian Federal Police, the Australian Security Intelligence Organisation and the Australian Secret Intelligence Service, barely show up as blips next to the Department of Defence. All agencies combined (including ASD) are around $5.2 billion compared to the Department of Defence's $47.7 billion for 2022–23. The state police forces add a further $14 billion (noting that most of what they do is not directly related to national security). All non-Defence agencies together are around $19.3 billion, equivalent to around 40% of Defence's budget.

Figure 2.4: National security spending, 2022–23 ($ million)



Source: Budget Paper No. 4 2022–23 and the most recent state Budget papers. The Border Protection figure is for Department of Home Affairs Outcome 1.

Chapter 3: Where does the money go?

Key points

- In 2022–23, the Department of Defence plans to spend:[50]
    - $14,160 million to employ its allocation of 62,063 full-time uniformed and 16,991 public service personnel
    - $16,264 million on capital acquisitions, including $11,673 million on military equipment and $3,338 million on infrastructure
    - $17,556 million to operate, including $14,976 million on the sustainment of its equipment and facilities and $193 million to conduct operations.
- With Middle East operations continuing to wind down, spending on operations will be at its lowest level since before the INTERFET peacekeeping operation in East Timor in 1999. In 2021–22, the ADF's domestic operations cost more than overseas ones for the first time.
- ASD's spending will increase substantially, growing by 42.8% to $1,664 million in 2022–23.

This chapter looks at what the average Australian taxpayer gets for their $1,878.55 per year (or $5.15 per day).[51] Again, we assume readers have access to the PBS online, so we avoid duplicating its tables as much as possible.

3.1 How is the money divided up among groups and services?

Spending, by program

There are a number of ways to look at how the money is divided up. The first is among Defence's programs. In public service jargon, Defence's groups and services are 'programs'.

Section 2 of the PBS (page 23) presents the outcomes and programs that the government expects from Defence in return for the funding that it's providing. There are two outcomes. Outcome 1 can be understood as the conduct of operations, while Outcome 2 is about ensuring that Defence has the ability to conduct them.

Outcome 1 comprises three programs, which essentially cover operations in different parts of the world. Outcome 2 comprises 18 programs, which are organisations. We won't look at programs 15–18, as they're 'administered' programs that aren't part of the Department of Defence. They deal with such things as military superannuation and housing assistance and therefore aren't directly related to military capability. They also aren't funded by the $48,615.0 million that Defence receives from the government. For each program the PBS provides a statement of objectives, key activities and performance measures. All are at very high level. You aren't going to see a list of things that each program is going to do over the year.[52]

Defence's groups frequently undergo restructuring. Since the 2021–22 PBS, three changes have occurred (reported in the PAES 2021–22, page 11):

- A three-star managed Nuclear-Powered Submarine Taskforce was established to identify the optimal pathway to deliver a nuclear-powered submarine capability for the Royal Australian Navy.53

- Leadership of the Defence COVID-19 Taskforce has been downgraded from a three-star to a two-star level. You gain a three-star, you lose a three-star.
- The Defence Security and Vetting Services Division moved to the Estate and Infrastructure Group, which was renamed the Security and Estate Group. Security vetting has bounced around a bit as Defence has sought to find a natural home for it. For some reason, it's with the facilities people for now.

Table 3.1 shows how Defence's budget is distributed among outcomes and programs. It also shows the changes between 2021–22 and 2022–23, as well as each program as a percentage of the total.[54]

Table 3.1: Resourcing, by departmental outcomes and programs, 2021–22 and 2022–23

Outcome/program	2021–22 estimated actual ($'000)	2022–23 budget estimate ($'000)	% increase 2021–22 to 2022–23	% of total 2022–23
Outcome 1				
Program 1.1: Operations Contributing to the Safety of the Immediate Neighbourhood	35	36	2.9%	0.0%
Program 1.2: Operations Supporting Wider Interests	199,184	118,446	-40.5%	0.2%
Program 1.3: Defence Contribution to National Support Tasks in Australia	317,112	74,754	-76.4%	0.2%
Outcome 1: Total department outputs	**516,331**	**193,236**	**-62.6%**	**0.4%**
Outcome 2				
Program 2.1: Strategy, Policy and Industry	761,316	739,855	-2.8%	1.5%
Program 2.2. Defence Executive Support	639,256	758,344	18.6%	1.6%
Program 2.3: Defence Finance	184,185	164,527	-10.7%	0.3%
Program 2.4: Joint Capabilities	2,218,604	2,728,619	23.0%	5.7%
Program 2.5: Navy Capabilities	9,258,944	9,288,328	0.3%	19.4%
Program 2.6: Army Capabilities	9,905,318	11,102,394	12.1%	23.1%
Program 2.7: Air Force Capabilities	9,742,250	10,701,736	9.8%	22.3%
Program 2.8: Australian Defence Force Headquarters	276,749	397,165	43.5%	0.8%
Program 2.9: Capability Acquisition and Sustainment	974,814	1,068,034	9.6%	2.2%
Program 2.10: Security and Estate	6,519,257	7,065,222	8.4%	14.7%
Program 2.11: Chief Information Officer	1,635,234	1,821,095	11.4%	3.8%
Program 2.12: Defence People	585,252	623,793	6.6%	1.3%
Program 2.13: Defence Science and Technology	680,179	632,860	-7.0%	1.3%
Program 2.14: Defence Intelligence	1,240,031	693,920	-44.0%	1.4%
Outcome 2: Total department outputs	**44,621,389**	**47,785,892**	**7.1%**	**99.6%**
Total department outputs	**45,137,720**	**47,979,128**	**6.3%**	**100.0%**

Note: This table contains own-source revenue in addition to funding from government. There are also a number of costs that are managed centrally in Defence and aren't ascribed to any individual program. This accounts for the slight discrepancy between the total cost of the programs ($47,979.128 million) and the total Defence funding line in PBS Table 1, serial 15 or PBS Table 4b, serial 6 ($47,979.286 million).

Source: PBS.

The cost of operations is now only a small part of Defence's budget, as the three programs in Outcome 1 make up less than half of 1% of the total.

Not surprisingly, the three services are the biggest programs. In 2021–22, Defence aimed to reach 'balanced force' perfection, with the three service's shares all within 0.2% of each other. But the Navy lagged and this year will fall even further behind, planning to spend around $1.8 billion less than the Army and $1.4 billion less than the Air Force. We'll unpack that below.

The next biggest is Estate and Infrastructure Group at 14.7% ($7,065.2 million). This is in part due to its very large acquisition budget, but also to its role in providing base services to the rest of Defence. Similarly, as Chief Information Officer Group provides ICT services to the rest of Defence, it has a large budget. It's only 3.8% of the total, but small percentages of large numbers can still be large numbers: $1,821.1 billion in this case. Defence ICT is big business.

With the establishment of Chief Joint Capability as a capability manager in his own right, Joint Capabilities Group's budget has emerged as one of the biggest in Defence and is continuing to grow. It's planned to hit $2,728.6 this year (5.7%), up 23% from last year.

The budget for Capability Acquisition and Sustainment Group (CASG) always looks like it's much too low, at only 2.2% of the total, even though it manages enormous acquisition and sustainment programs. Security and Estate Group's budget is much larger. But the cost of acquiring and sustaining military equipment is ascribed to the capability managers, not CASG, whereas the cost of building and maintaining facilities and providing garrison services is ascribed to Security and Estate Group.

Capital spending, by program

The 'net cost' presentation introduced into the PBS in 2020–21 now allows us to distinguish programs' capital expenditure from their personnel and operating expenses.[55] It's a big step forward for transparency and also allows us to do some analysis. We've listed the programs' capital budgets in Table 3.2.[56]

Table 3.2: Capital budgets, by departmental outcome and program, 2021–22 and 2022–23 ($'000)

Outcome/program	Estimated actual, 2021–22 ($'000)	2022–23 budget estimate ($'000)	% increase 2021–22 to 2022–23	% of total, 2022–23
Outcome 1				
Program 1.1: Operations Contributing to the Safety of the Immediate Neighbourhood	0	0	0	0.0%
Program 1.2: Operations Supporting Wider Interests	5,433	3,305	-39.2%	0.0%
Program 1.3: Defence Contribution to National Support Tasks in Australia	4,264	31,197	631.6%	0.2%
Outcome 1: Total capital expenditure	**9,697**	**34,502**	**255.8%**	**0.2%**
Outcome 2				
Program 2.1: Strategy, Policy and Industry	248,059	278,730	12.4%	1.7%
Program 2.2. Defence Executive Support	257,378	319,337	24.1%	1.9%
Program 2.3: Defence Finance	67	67	0.0%	0.0%
Program 2.4: Joint Capabilities	469,490	725,515	54.5%	4.3%
Program 2.5: Navy Capabilities	3,471,554	3,416,721	-1.6%	20.3%
Program 2.6: Army Capabilities	3,443,596	4,264,567	23.8%	25.4%
Program 2.7: Air Force Capabilities	4,506,689	4,666,539	3.5%	27.8%
Program 2.8: Australian Defence Force Headquarters	94,690	148,139	56.4%	0.9%
Program 2.9: Capability Acquisition and Sustainment	9,396	12	-99.9%	0.0%
Program 2.10: Security and Estate	1,970,682	2,315,063	17.5%	13.8%
Program 2.11: Chief Information Officer	96,006	311,211	224.2%	1.9%
Program 2.12: Defence People	11,840	24,476	106.7%	0.1%
Program 2.13: Defence Science and Technology	98,643	70,173	-28.9%	0.4%
Program 2.14: Defence Intelligence	618,451	217,445	-64.8%	1.3%
Outcome 2: Total capital expenditure	**15,296,541**	**16,757,995**	**9.6%**	**99.8%**
Total department capital expenditure	**15,306,238**	**16,792,497**	**9.7%**	**100.0%**

Note: The lines in this table are funded by appropriation and own-source revenue. They do not sum exactly to Defence's Capability Acquisition Program ($16,263.5 million), as they also include items that are treated as capital under accounting guidelines but are not part of the Capability Acquisition Program.

Source: PBS.

The three services together make up 73.5% of the total capital budget. Estate and Infrastructure has a very large capital budget, mainly because it delivers the Enterprise Estate and Infrastructure Program. As with total program funding, while CASG manages huge acquisition programs, the cost of those programs is ascribed to the capability managers, so its own capital budget is very small.

Shipbuilding disarray means missed spending targets

Because of the way each program's budget is now presented in the PBS, we can directly compare their capital spending. Previously, we only had visibility of the department's total capability acquisition program or the individual projects in the Top 30. In the case of the latter, the PBS showed only their planned spends for the budget year, not for the forward estimates. In short, we couldn't see how spending in each capability manager's acquisition program was going. Now we have some data back to 2019–20 as well as through the forward estimates.

We can see why the Navy is falling behind the two other services in total program funding—it's being driven by the disruption and delays in its acquisition program. It's clear from the data that the Navy's acquisition spending is falling far short of the plan envisaged in 2020–21. That's to be expected due to the delays to the Attack-class submarine and Hunter-class frigate and then the cancellation of the Attack class. But without having visibility of how those projects (and other Navy projects) were supposed to ramp up over the forward estimates, there was no way to assess the extent of the shortfall.

As Table 3.3 makes clear, the shortfall is stark. Actual spending is growing, but at nowhere near the rate that was planned. The Navy's capital expenditure over the forward estimates from 2020–21 was planned to be $20 billion. According to the most recent estimates, it will fall $5.3 billion short (26.5%). The shortfall will be nearly $2 billion in 2022–23 alone.

Table 3.3: The Navy's capital spending, planned and actual, 2019–20 to 2025–26 ($ million)

	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25	2025–26
PBS 2020–21	2,644.2	3,811.3	4,849.7	5,384.6	5,987.1		
PBS 2021–22		3,183.9	4,369.6	4,916.9	5,481.9	5,552.0	
PBS 2022–23			3,471.6	3,416.7	4,477.3	5,101.9	5,712.0
Shortfall between 2020–21 plan and latest estimate		–444.4	–1,378.1	–1,967.9	–1,509.8	–450.1	

Actual achievement	Budget year allocation	Forward estimates allocation

Sources: PBS, PAES.

If you're not spending the money, you're not getting the capability, but you also have to spend it on things that deliver. If we also consider that the nearly $9.5 billion that the Navy's capital program has spent over the past three years includes over $2.1 billion spent on the Attack-class submarine that has delivered no capability whatsoever, the scale of the shortfall becomes even more stark. We'll look at the individual projects that make up this program more closely in Chapter 4.

To give a complete picture: over the same period (based on the latest PBS estimates), the Air Force will miss its $18 billion target by $845.0 million (4.7%). The Army will miss its $16 billion capital spending target by only $83 million (0.5%). Or put another way, as shipbuilding ramped up, the Navy was to spend the most of the three services. Due to the disruptions to shipbuilding, it will spend the least. That isn't to say that all of the Army's and the Air Force's programs have been delivering exactly as planned, only that they have found a way to spend nearly all the money coming their way.

Outcome 1

Outcome 1 is 'Defend Australia and its national interests through the conduct of operations and provision of support for the Australian community and civilian authorities in accordance with government direction.' The three programs that make up Outcome 1 are:

- Program 1.1: Operations Contributing to the Safety of the Immediate Neighbourhood.

- Program 1.2: Operations Supporting Wider Interests
- Program 1.3: Defence Contribution to National Support Tasks in Australia.

Funding for Outcome 1 is $193.2 million (PBS Table 12). As noted above, conducting operations is now only a very small part of Defence's budget—about 0.4%. It's the lowest since the start of the Timor intervention in 1999 (Figure A.7 in 'Defence in 10 tables' shows spending on operations over the past two decades).

The resources for Outcome 1 don't exactly match the net additional cost of operations in PBS Table 3 ($190.9 million) because not all operations are listed in PBS Table 3, only the ones that Defence receives supplementation funding for. Defence receives supplementation on a no win / no loss basis for large operations.[57] Defence has to pay for the smaller ones out of its own pocket, which will be only a couple of million this year.

Plans can of course change. The PBS 2021–22 said that Defence would receive no further supplementation that year for Operation Covid Assist. As it turned out, due to the scale of later outbreaks, Defence will receive $131.5 million in 2021–22 for the operation. If the government directs Defence to conduct operations in 2022–23, it's highly likely that Defence will receive supplementation to conduct them.

The PBS lists current operations on pages 25–26 with a high-level description but without costs or numbers of deployed personnel. Some information on deployed personnel numbers can be found on Defence's website.[58] The 2020–21 annual report also provides a list of operations and numbers of personnel deployed under its reporting against programs 1.1, 1.2 and 1.3 (pages 24–27).[59]

Middle East operations

Middle East operations haven't completely ended, but, at $116.2 million this year, they're well down from their peak of $1,298.7 million. Including 2022–23, Australia will have spent $14,430.6 million on operations in the Middle East since the initial intervention in Afghanistan in 2001 (Table 3.4).

Table 3.4: Cost of Middle East operations, 2001–02 to 2022–23 ($ million)

Operation	Peak year	2021–22 estimated actual	2022–23 estimate	Total
All Iraq operations[a]	501.5 (2007–08)	48.3	11.5	4,104.5
All Afghanistan operations[b]	1,284.9 (2010–11)	28.3	0.5	8,547.5
Operation Accordion (support for Middle East operations)	215.2 (2017–18)	119.5	104.2	1,470.7
Operation Manitou (maritime security operations)	64.1 (2019–20)	0	0	306.6
All Middle East operations	1,298.7 (2010–11)	196.1	116.2	14,430.6

a Includes the second Gulf War, Operation Kruger and Operation Okra.

b Includes Operation Slipper, Afghanistan force protection and Operation Highroad.

Sources: Defence annual reports, PBS.

Domestic operations

While spending on operations overseas has been ramping down, spending on domestic operations has grown significantly, driven by bushfires, Covid-19 and flooding. In fact, for the first time in the 23 years that ASPI has tracked spending on operations, in 2021–22 supplementation for domestic operations exceeded that for overseas operations ($257.9 million to $255.3 million) (Table 3.5). If we include the $59.2 million spent on the ADF's contribution to border protection (Operation Resolute) in the domestic column, the balance swings even further ($317.1 million to $196.1 million).

No funding is provided for domestic operations in 2022–23. There's no way to know exactly what natural disasters are going to happen; if a large ADF deployment is required, the government will fund it. The PBS states that the Covid-19 response will no longer be funded under no win / no loss arrangements, but that's what it said this time last year, and Defence ended up getting $131.5 million.

Table 3.5: Supplementation for domestic operations, 2019–20 to 2022–23 ($ million)

Operation	2019–20	2020–21	2021–22	2022–23	Total
Bushfire Assist 2019–20	68.4				68.4
Covid-19 response		147.2	131.5		278.7
Flood Assist			126.4		126.4
Total domestic operations	**68.4**	**147.2**	**257.9**	**0.0**	**473.5**
Operation Resolute	57.0	61.9	59.2	74.7	252.8

Sources: PBS, Defence annual reports.

Outcome 2

Outcome 2 is 'Protect and advance Australia's strategic interests through the provision of strategic policy, the development, delivery and sustainment of military, intelligence and enabling capabilities, and the promotion of regional and global security and stability as directed by Government.'

Outcome 2 contains the 14 programs that make up Defence's groups and services (not including the four administered programs). The total resourcing for the 14 programs is $47,979.1 million. PBS Table 16 gives a high-level summary of the budget for each program. Pages 44–76 outline each program, giving its objectives, performance criteria and targets. Each also has a cost summary.

Each of the three service programs also provides estimated deliverables for its platforms for the previous and the budget year. The annual report details actual achievement. Those deliverables are presented in flying hours for aircraft fleets and unit availability days for ships (no deliverables are provided for vehicle fleets). While flying hours are broken down by aircraft type, naval assets are aggregated, so it isn't possible to distinguish between different classes of frigates and destroyers, or indeed between ships and submarines.

ASPI publishes historical data on ADF aircraft fleets' flying hours and sustainment costs in its Cost of Defence online database.[60]

The Australian Signals Directorate

ASD is a statutory agency with the Defence portfolio, not one of the Department of Defence's programs. Its budget statements start at page 147 of the Defence PBS. In 2022–23, it will receive $1,664.0 million, or about 3.4%, of the government's consolidated defence funding (PBS Table 4a). A small amount of external revenue plus a rather mysterious $30 million line called 'Departmental Capital Budget' (PBS ASD Table 1) bring its total funding up to $1,697.6 million (PBS ASD Table 3).

ASD has only one outcome: 'Defend Australia from global threats and advance our national interests through the provision of foreign signals intelligence, cyber security and offensive cyber operations, as directed by Government.' That outcome is delivered by one program—Program 1.1: Foreign Signals Intelligence, Cyber Security and Offensive Cyber Operations.

We discuss the rapid ramp-up of ASD's funding resulting from the REDSPICE program in Chapter 2 in our section on budget measures. That increase can be seen already in 2022–23's budget, with ASD's budget increasing dramatically by $498.8 million (42.8%). ASD's capital expenditure for this year is $538.5 million (31.7% of the total). That's a big jump from $273.3 million in 2021–22 (82.5%), so a lot of the REDSPICE money is going into things as well as people.

ASD's staffing allocation is classified, but the government has said that the 1,900 additional people being funded by REDSPICE will double its staffing… In 2022–23, employee expenses are estimated at $382.3 million—an increase of 23.4% over 2021–22 and making up 22.5% of its total budget. That's a very small percentage for a business that is very people intensive.

If we add employees and capital together, we get to 54.2% of ASD's budget, indicating that around 45% of its budget is going on operating costs. That suggests a lot of money is going on contractors. It's hard to see ASD spending all the extra money without them.

3.2 Workforce

Another way to describe how the money is divided up is among the Big 3: the workforce–investment–operating triumvirate. We outline the top-level balance between the Big 3 in Chapter 2 but go into more detail here. We'll start with workforce.

Defence will spend an estimated $13,799.2 million on its workforce in 2021–22, with its total permanent workforce reaching 75,863. In 2020–21, the full-time uniformed workforce reached 60,330—that was first time it cracked 60,000 since 1993–94, when ADF strength was shrinking as part of the post–Cold War peace dividend. Unfortunately, it looks like it will fall back down to 59,862 in 2021–22—a sign of how hard it is to consistently grow the ADF.

The personnel budget for 2022–23 is $14,160.0 million (from PBS Table 4b). That funding doesn't cover Defence's external workforce, which is mostly included in the cost of acquisition projects or sustainment activities. Defence's full-time workforce allocation shown in Table 3.6 (a more complete table including the forward estimates is PBS Table 8), including 62,063 full-time ADF personnel. It will not achieve that number. To understand why, we need to look at Defence's workforce narrative.

Table 3.6: Defence planned full-time workforce allocation, 2022–23

Navy	Army	Air Force	ADF total	APS	Defence total
15,748	30,977	15,338	62,063	16,991	79,054

Source: 2022–23 PBS, Table 8.

The workforce narrative

We discussed the big picture for Defence's workforce growth in some detail in Part B of 2020–21's *The cost of Defence* (pages 32–35), so we'll focus on recent developments. The development of Defence's workforce numbers is set out in Table 3.7. The table shows planned workforce numbers (scanning left to right) as well as how those plans have changed over time (scanning top to bottom). Actual numbers achieved are in the blue boxes.

Table 3.7: Defence's uniformed workforce, targeted and achieved, 2015–16 to 2025–26

	2015–16	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25	2025–26
2016–17	58,061	59,209	59,681	59,794	60,090						
2017–18		58,680	59,194	59,794	60,090	60,585					
2018–19			58,475	59,794	60,090	60,585	61,027				
2019–20				58,380	60,090	60,585	61,027	61,402			
2020–21					59,109	60,826	61,459	62,054	62,726		
2021–22						60,486	61,468	62,063	62,735	62,905	
2022–23							59,862	62,063	62,735	63,597	64,532

Sources: PBS, Defence annual reports.

Actual achievement	Budget year allocation	Forward estimates allocation

The 2016 DWP planned a steady increase in the ADF's workforce allocation to 62,400 over the decade to 2024–25. That was an increase in its allocation of 2,500 but represented growth of 4,400 from where the ADF was actually starting from.[61] The 2020 DSU added a further 800 ADF positions as an interim measure until the government considered Defence's longer term workforce requirements. The 2021–22 PAES included additional APS positions to help implement AUKUS and the sovereign

guided weapons enterprise. The number appears to be around 190 in 2021–22 and another 300 in 2022–23, although they all seem to terminate at the end of 2022–23.

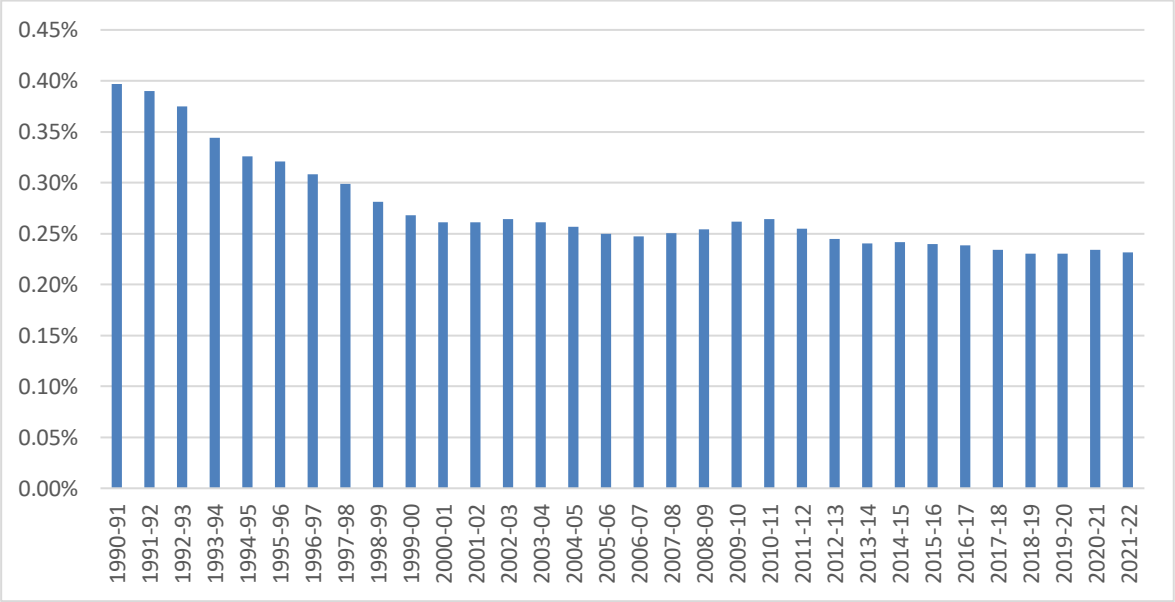
When we assess how the ADF's workforce has grown since the 2016 DWP, it's clear that it has fallen short of the goal. Over six years from the start point in 2015–16 to the latest estimates for 2021–22, Defence's uniformed workforce has grown by 1,801. In raw numbers, that means it's just managed to pass the *starting point* of the 2016 DWP growth. That's growth of 3.1% over six years, with an average of 300 per year, but it hasn't been even, as numbers went backwards in three of those years.

The government's consideration of Defence's long-term workforce needs flagged in the 2020 DSU has now occurred, and the Morrison government announced further growth of 18,500 over the next two decades.[62] It didn't release a detailed breakdown of what the 18,500 will be doing, but it did provide some high-level information to the media. From that, it appears that there'll be two phases of growth. Over the next decade, there will be 12,500 new positions. Those have already been assigned to particular new capabilities. In the second decade, there are 6,000 more positions, which seem to be more of a general pool that will be assigned to roles as Defence's long-term requirements are better understood. Around 2,000 of the first 12,500 are APS positions, with another 2,000 in the following 6,000.

That means there are around 10,500 ADF positions in the first decade and another 4,000 in the second decade. But, since the ADF has only just got to the starting point of the 2016 DWP journey, it still needs to find people for the 2,500 new positions in the DWP and the 800 in the DSU. In short, it needs to find around 13,800 in the first decade. Since that averages out at 1,380 per year and the ADF has managed only 300 on average per year, it will be a huge challenge. And if it can't find those people, a lot of the $270 billion shopping list will sit on the shelf once it's delivered.

Is there any chance of Defence achieving that growth? There are some grounds for optimism. The current force is only 0.23% of Australia's population—less than one-quarter of 1%, or only one in every 400 Australians. While a future full-time ADF strength of 75,000 to 80,000 sounds like a lot, it will still be only a very small percentage of Australia's population. Considering that our population has grown by around 34% over the past 20 years and neither major political party seems to want to fundamentally change our immigration policy, it's reasonable to assume that future population growth will be similar. Put another way, the ADF just has to preserve its current share of the Australian population to achieve the target. That means turning around a trajectory of declining share (Figure 3.1).

Figure 3.1: ADF full-time personnel as a percentage of Australia's population, 1990–91 to 2021–22



Sources: Defence annual reports; Australian Bureau of Statistics, Australian demographic statistics, cat. no. 3101.0.

The key might not be in recruitment, but in retention. According the 2020–21 Defence annual report, the ADF enlisted 6,135 permanent members (page 112)—a number far in excess of the number it's seeking to grow by. The problem is that existing members are leaving at a similar rate. The ADF has averaged a separation rate of 8%–10% over recent years. In 2019–20 it was 9.0%, and in 2020–21 it was 9.5%. In essence, that means it's losing 5,000–6,000 people per year, most of whom are already trained and highly skilled. If it can reduce that by 1,000 per year, it will have basically cracked the problem.

Of course, that's easier said than done. It comes down to giving ADF members a competitive employment offer. Defence is aware of this and working on it. The business case for an east coast submarine base is as much about recruitment and retention as it is about the strategic drivers of a two-ocean navy. And the ADF's total workforce system seeks to provide its members with some of the flexibility that Australian workers now take for granted.

Reserve numbers

Reserve numbers didn't reach the 2021–22 target of 1,094,000 days and 21,350 headcount, achieving 1,068,800 days and 20,741 headcount. The shortfall in days seems a little odd, considering the effort reservists put into domestic operations such as Covid Assist and flood relief. Planned reserve numbers grow to 1,132,000 days and 21,600 headcount in 2022–23. The growth continues over the forward estimates, reaching 1,206,500 and 22,400 by 2025–26.

It's difficult to translate the reserve effort into a full-time equivalent. We use a rather coarse metric of dividing reserve days by 220 to generate a full-time equivalent number. For 2022–23, that would be 5,150.

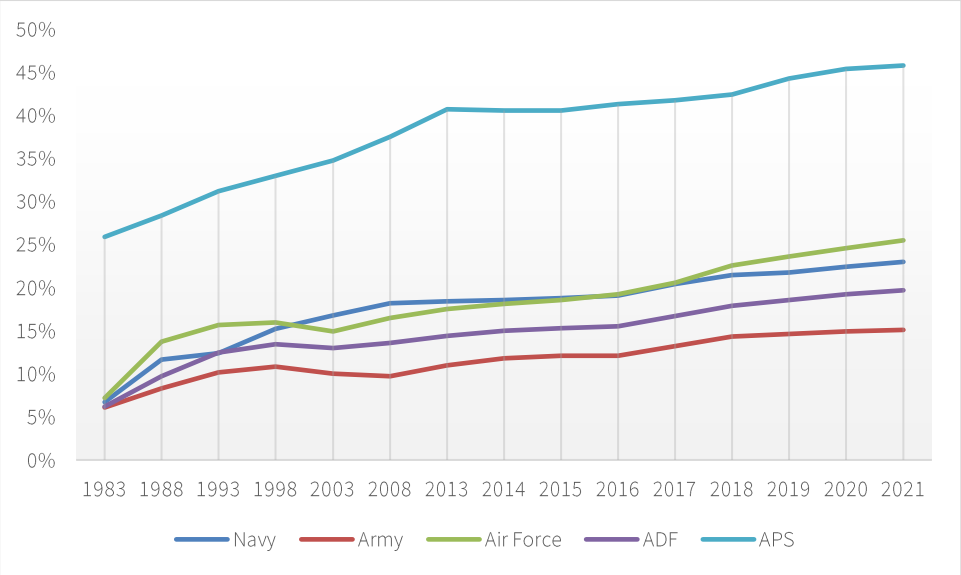
Women in Defence

The percentage of women in Defence continues its gradual rise in all three services and the APS (Figure 3.2). Women now form 19.7% of the ADF. The Air Force has the highest percentage of women of the three services, at 25.5%. The Navy is close behind at 23.0%, while the Army lags at 15.1%.

That's a total of 11,739 permanent ADF members. Progress has been slow, but at least none of the services has gone backwards in any year over the past decade.

The percentage of women in Defence's APS staff is higher, at 45.8%, but that's significantly lower than in the APS in general, where women make up around 60.2%.[63]

Figure 3.2: Percentage of women in Defence, 1983 to 2021

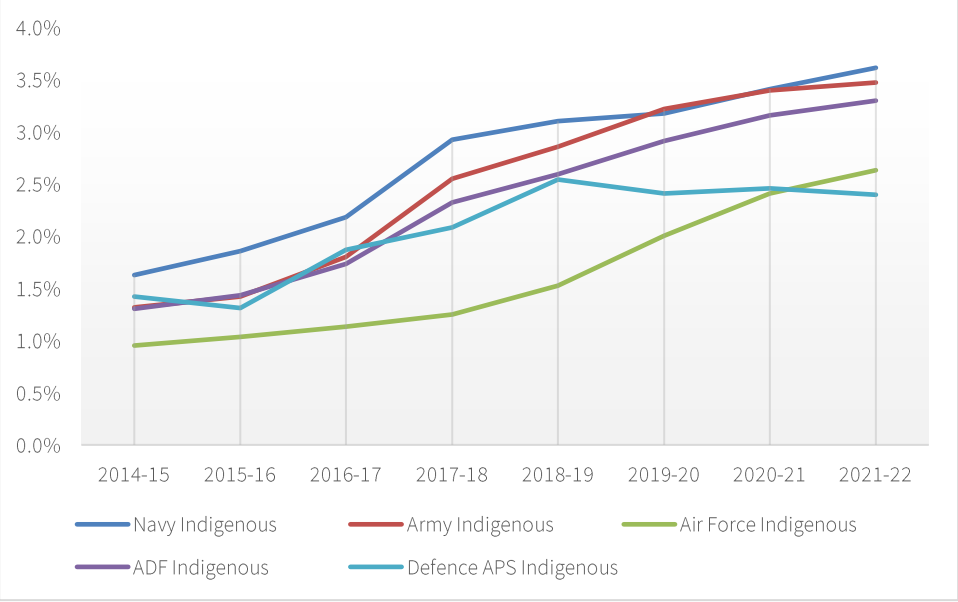


Source: Defence annual reports.

Indigenous participation

For the first time, *The cost of Defence* is including data on Defence's Indigenous workforce. The data goes back to 2014–15, when it was first reported in Defence's annual report. Percentages are presented in Figure 3.3; absolute numbers can be found in the Cost of Defence online database.

Figure 3.3: Indigenous personnel as a percentage of Defence's full-time workforce



Source: Defence annual reports.[64]

Defence also supports Indigenous businesses. As the Secretary of Defence stated in the 2020–21 annual report:

> Defence values the important contribution of our Aboriginal and Torres Strait Islander personnel, and I am proud that Defence has achieved the Government's Indigenous participation target of 3 per cent as an integrated workforce. I am pleased that Defence has awarded $610 million in contract value to Indigenous businesses this year alone, a total of over $2.3 billion since the release of the Indigenous Procurement Policy in July 2015, and was awarded the Government Member of the Year Award from Supply Nation for the third time.[65]

External workforce

In Part 2 of *The cost of Defence 2020–21* (Chapter 4) and in *The cost of Defence 2021–22* (pages 41–42), I explored the cost of Defence's rapidly growing external workforce. According to Defence's March 2021 external workforce census, its external workforce was its largest 'service', at 32,487, exceeding the Army (Table 3.8 and Figure A.3 in 'Defence in 10 tables'). Since then, Defence's external workforce has continued to grow: the March 2022 census indicated a total external workforce of 34,880.

The largest category, outsourced service providers, has grown by 836 to 26,199 (3.3%). Outsourced service providers provide a broad range of services, such a catering and cleaning on bases and maintenance for various fleets. That rate of growth is not remarkable, considering the growth in the ADF's capabilities.

More striking is the continuing rapid growth of contractor numbers. After 20.6% growth between the 2020 and 2021 censuses, there's been further 22.0% growth in the last year to 8,311. By Defence's own definition, contractors are meant to fill roles usually performed by ADF or APS staff on a temporary basis. Based on that data, contractors alone are equal to nearly 50% of Defence's APS workforce, suggesting that there's nothing temporary about this situation.

Defence has released very little data on the cost of contractors compared to the ADF or APS workforce. In *The cost of Defence 2021–22*, we calculated the average cost of a public servant to be $121,000, while a contractor cost $283,000, or a difference of $162,000. Based on that, Defence is paying $1,346.4 million more for using contractors than APS staff.

Of course, that's a very crude analysis. And we're not suggesting that contractors don't provide value. There's no way Defence could have achieved the strong outcomes it has in growing its acquisition and sustainment programs in recent years without using contractors. It simply hasn't had the internal workforce allocation needed to do that, so it's had to rely heavily on outsourced workforce. As Defence's acquisition and sustainment budgets grow, it's hard to see it turning those dollars into capability without using contractors, but the use of contractors also consumes acquisition and sustainment dollars.

Defence has released next to no information or analysis on the cost of its contracted workforce. And, if you don't understand the money you're paying, you can't assess whether you're getting value for money. Currently, Defence seems to be using contractors because it has no choice, not on the basis of an informed, value-for-money decision. An early item of business for the incoming government will be to ensure that Defence understands the value-for-money calculus of its internal and external workforce and allowing it to adjust the balance between internal and external in the most efficient way possible.

Table 3.8: Defence's external workforce, July 2019 to March 2022 (full-time equivalent)

Workforce	July 2019[a]	March 2020[b]	September 2020[b]	March 2021[b]	March 2022
Contractors	4,669	5,361	5,646	6,810	8,311
Consultants	250	255	284	314	370
Outsourced service providers	18,405	23,017	25,710	25,363	26,199
Total	**23,324**	**28,633**	**31,640**	**32,487**	**34,880**

Sources:

a Defence freedom of information log, online.

b Defence external workforce census, March 2021, provided by Defence.

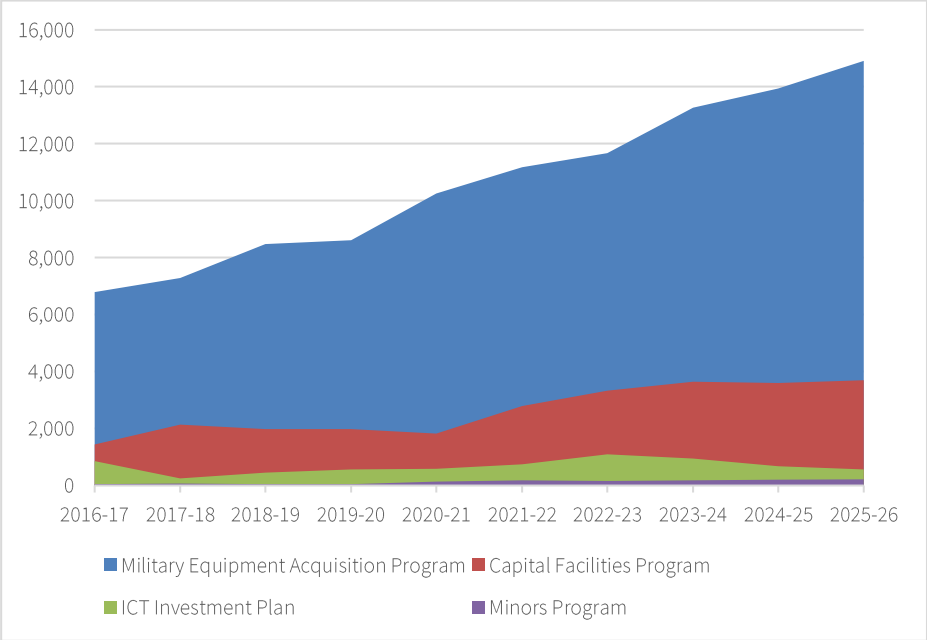
The March 2021 census has different numbers for March 2020 from those released under freedom of information requirements. The revised numbers for March 2020 have the same total, but recategorise around 1,200 contractors as outsourced service providers.

3.3 Capital / acquisition spending

As discussed in Chapter 2, Defence is heading towards a record acquisition spend of $14,904.4 billion in 2021–22, based on the latest estimates. The 2022–23 PBS is planning another substantial increase of 9.1% to $16,263.5 million.

The capital budget is further divided into smaller (but still huge) programs (see PBS Table 5). The breakdown over the forward estimates is illustrated in Figure 3.4.

Figure 3.4: Breakdown of Defence's capital programs, 2016–17 to 2025–26 (nominal $ million)



Sources: PBS, PAES.

Military Equipment Acquisition Program

The Military Equipment Acquisition Program is delivered by CASG on behalf of the capability managers. It's always the largest of the acquisition programs and averages around 70% of the total program. It's been growing significantly.

Before we look at 2021–22 and 2022–23, we need to correct the record for 2020–21, which was a somewhat unusual year. The Budget estimate for 2020–21 was $10,742.4 million (Table 3.9). In the 2020–21 PAES's revised estimate, it looked like Defence was going to fall more than $400 million short at $10,304.1 million. Then the estimated actual in the 2021–22 PBS for 2020–21 plummeted much further to $9,549.7 million, indicating that Defence was heading towards a $1.2 billion underachievement. That's what we reported in last year's *The cost of Defence*. However, once all the final numbers were in, the actual result for 2020–21 reported in the 2021–22 PAES recovered significantly to $10,244.8 million; all up, a shortfall of just under $500 million. That's a big number, but not as big as things looked like a year ago. Moreover, it was still a massive $1.6 billion increase on the previous year and a remarkable achievement in the middle of the pandemic. Defence and its industry partners should take great credit for that outcome.

Table 3.9: 2020–21 Military Equipment Acquisition Program, changes in estimates ($ million)

	2020–21 budget estimate	2020–21 PAES revised estimate	2021–22 PBS estimated actual	2021–22 PAES actual result
2020–21 Military Equipment Acquisition Program	10,742.4	10,304.1	9,549.7	10,244.8
Shortfall against budget estimate	-	438.3	1,192.7	497.6

Sources: PBS, PAES.

2020–21's trajectory is a useful lesson that shows how estimates can change over time, sometimes very significantly. In *The cost of Defence*, we always use the most recent numbers and we update the

online The Cost of Defence database whenever the PBS, PAES and annual report are published. But, as it turns out, the most recent numbers aren't always very good numbers.

To follow up its excellent performance in 2020–21, the capital equipment program was to grow to $11,160.6 million in 2021–22. How much of a step-up that would be depends on your starting point, and our previous discussion shows how that changed. But taking 2020–21's actual result as the start point, it would be another very healthy increase of $915.8 million (8.9%). Based on the estimated actuals in the 2022–23 PBS, it will come in almost exactly on target at $11,174.5 million—another very good achievement by the department and its industry partners.

Looking forward, the growth continues (Figure 3.5). The Budget estimate for 2022–23 is $11,673.4 million—a more moderate increase of $499 million (4.5%), which should be quite achievable based on recent years' performance. Over the subsequent years of the forward estimates, growth continues by 13.6%, 5.2% and 6.9%. One key risk to that growth is of course inflation, which we discuss in Chapter 2. If inflation continues at 5%–6% per year, much of those increases will be eroded in real terms.

Figure 3.5: Military equipment acquisition spending, 2010–11 to 2025–26 ($ million)

Sources: PBS, PAES.

PBS Table 54 lists Defence's top 30 military equipment acquisition projects by 2022–23 forecast expenditure. The table also gives a useful summary of the projects' key goals for the year. Projects below the top 30 aren't covered. Last year, for the first time, the table included the cost of what Defence is terming 'Other project inputs to capability'. It defines those as 'other elements that are not part of the major capability system … this could include facilities, information communications technology and research and development.' This provides greater transparency in giving a more complete view of the total cost of acquiring capability, and the practice has been continued this year. This year, the cut-off for the top 30 is $88 million in military equipment spend, so there's no information in the PBS on projects below that.[66]

Figure A.5 in 'Defence in 10 tables' shows the size of the 10 largest projects by planned 2022–23 spend, illustrating their impact on the overall program. This year, the F-35A Joint Strike Fighter is once again the top spender, with a forecast budget of $1,261 million, but it's ramping down from a peak of over $2.4 billion. The Attack-class submarine would probably have overtaken it, had it not suffered its unhappy fate. Next year, the F-35A could finally be dethroned as it ramps down and the Hunter-class frigate moves towards the start of construction, although the Hunter ramp-up has been significantly slower than planned.

We discuss individual projects in the top 30 in more detail in Chapter 4 on capability.

ASPI publishes historical data on acquisition spending in its Cost of Defence online database.[67]

What happened to the Attack-class submarine money?

The Attack-class submarine program was on an upwards spending trajectory. We can argue whether it was increasing fast enough, but had it not been cancelled it probably would have passed $1 billion in annual spend in 2022–23. With the start of construction in 2024 or 2025, it would have reached at least $1.5 billion in the next few years. Over the forward estimates, its total spend could have been around $5–6 billion. In the longer term, SSNs are going to cost considerably more than the Attack-class. But, in the shorter term, there's no way that early SSN work could come close to using that money. That means that the cancellation of the Attack class freed up a lot of cash for Defence in the short term. What has the department done with it?

Looking from the outside, there's no way to tell exactly, but the sorts of things that could consume those funds are projects that were either not in the IIP or were brought a long way forward. That includes the announcement of the early replacement of the MRH-90 helicopters, which was previously planned for the 2030s, by Black Hawks. The 2020 FSP provisioned the acquisition of a maritime logistics helicopter in the second half of this decade, but that's been brought forward with the acquisition of 12 more Seahawk Romeo helicopters (plus one to replace a helicopter that crashed in the Philippines Sea during exercises).

It doesn't include tanks and combat engineering vehicles, since their acquisition is progressing broadly in line with the FSP (although they may have needed a bit of a funding top-up with submarine cash). Similarly, the replacement of the Tiger armed reconnaissance helicopter by the Apache was announced well before the cancellation of the Attack class, and the schedule of its FSP funding is broadly in line with the announced plan (although it, too, may have required a top-up since its FSP provision was $3.4–5.1 billion and the then Prime Minister recently said it would cost $5.5 billion plus $500 million for facilities).

The government has announced the acquisition of the NSM maritime strike missile and the JASSM-ER long-range strike missile. Both capabilities were already in the FSP, but the government has stated that their acquisition has been advanced by several years, so that, too, probably would have required a top-up in early cash flow.[68]

Whatever the windfall was spent on, there wasn't enough left to completely cover REDSPICE. At Senate estimates at the start of April, Defence officials stated that some of REDSPICE's funding had come from approved and unapproved submarine money over the forward estimates, but Defence had to find more. That's why, when Defence had to find the money to fund REDSPICE, it offered up to the government the cancellation of the SkyGuardian project. The officials didn't state what the value of that project was. They also said that the offsets included 'an ICT project around modernisation and mobility. That was around $236 million over the forward estimates.'[69]

Enterprise Estate and Infrastructure Program

The second biggest capital program delivers infrastructure. It's now called the Enterprise Estate and Infrastructure Program. Its projects are delivered by Defence's Security and Estate Group. We've noted previously that we're in a golden age of defence infrastructure construction. While there have been a few ups and downs, its overall trajectory has been very healthy, and spending has averaged

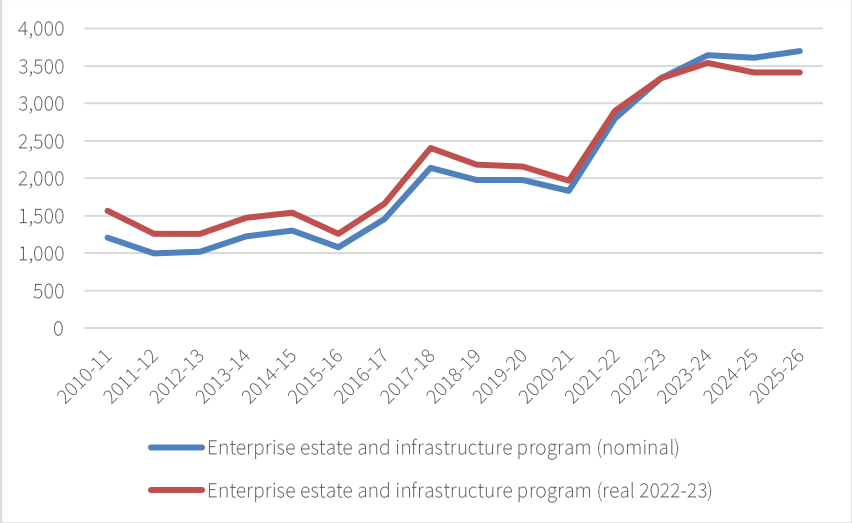
well over $2.1 billion over the past five years, even during Covid-19. It averaged only $1.2 billion in the previous five years.

2021–22 will record the biggest annual increase in facilities spending, based on the latest estimates in the PBS. It's gone from $1,834.9 million to $2,796.2 million. Granted, that's significantly short of the huge target of $3,444.1 million set in the 2021–22 PBS, but it's still a massive $961 million (52.4%) increase. Essentially, the infrastructure program was the largest driver of growth in the capital program, outstripping even the much larger capital equipment program, which achieved 'only' $930 million in growth.

The reason the infrastructure program has grown so much may have been because of Covid-19 rather than despite it. While Covid-19 has disrupted the international supply chains that equipment acquisition projects rely upon, facilities projects aren't as dependent on them. If you're willing to pay a premium for local construction supplies, Australia can produce most of them. Moreover, facilities projects don't face the same development issues that equipment projects do. Australian industry already knows how to build runways, buildings and sewerage systems. Also, because so much of the infrastructure budget is spent in regional Australia (see the discussion below on where the money is spent), and the government's policy strongly encourages prime contractors to use local small businesses, projects can have a substantial local economic impact. So there's both an incentive and an ability to keep facilities projects moving even in the face of Covid-19.

The planned growth continues this year, with another step-up to $3,337.8 million (19.4%). Based on industry's performance in 2021–22, that should be achievable. The growth moderates over the forward estimates, and the program sits at around $3.6 billion per year from 2023–24 to 2025–26 (Figure 3.6).

Figure 3.6: Enterprise estate and infrastructure program, 2010–11 to 2025–26 ($ million)



Sources: PBS, PAES.

PBS Appendix D covers the Enterprise Estate and Infrastructure Program, outlining at a high level what work each project is conducting and the project's total budget, spend to date and planned spend for 2022–23. PBS Table 56 details this year's planned expenditure on approved major capital facilities projects. The biggest spenders are as follows:

- Hunter-class frigate facilities with a planned spend of $219.9 million out of a total budget of $918.8 million. Considering that the first frigate won't be commissioned until well after 2030, the facilities should be well and truly ready for it.

- Close behind are the facilities for the offshore patrol vessels, with a $218.8 million spend out of a total of $918.5 million. Considering that the first ship is to be delivered this calendar year, getting the facilities ready in time might be a little tighter than with the frigates.

- RAAF Base Tindal Redevelopment Stage 6 and the United States Force Posture Initiative (USFPI) Airfield Works and Associated Infrastructure at Tindal in the Northern Territory was a big spender in 2021–22 and is still in third place with a planned spend of $176.8 million of a total budget of $1,173.9 million. But there's still a long way to go, as that won't even get it to half way.

- The USFPI Northern Territory training areas and ranges upgrades project is aiming to spend $117.1 million of a $747.0 million total. Again, there'll still be a long way to go.

- The facilities project for the AIR 555 Peregrine electronic warfare aircraft is aiming to spend $105.2 million of a total $293.7 million, primarily in Edinburgh.

Large facilities projects that are nearing completion include the following:

- F-35A facilities: $1,436.4 million of $1,485.8 million spent. The F-35A program is working towards standing up 75 Squadron at Tindal in the Northern Territory.

- HMAS Cerberus, the Navy's main training facility: $415.5 million of $465.6 million spent.

- Air traffic control infrastructure (part of the AIR 5431 complex of projects): $393.0 million of $409.9 million spent.

- C-27J battlefield airlifter facilities at RAAF Base Amberley in Queensland: $369.3 million of $370.4 million spent.

- HMAS Stirling redevelopment Stage 3A: $353.0 million of $366.8 million spent.

- The facilities for the Enhanced Land Force, P-8A maritime patrol aircraft, Growler, Garden Island East critical infrastructure recovery, and LAND 121 are also close to completion, based on their spend to date.

During the election campaign, the Prime Minister announced $428 million in airbase upgrades at Amberley, Pearce, Richmond and HMAS Albatross.[70] The upgrades had been flagged in the 2020 FSP, but with no budget or schedule. Subsequently, the Minister for Defence Industry announced a $694.4 million upgrade and expansion to the Headquarters Joint Operations Command, with work to start in 2023 and be completed by 2025.[71] Again, the FSP flagged 'infrastructure upgrades to key headquarters facilities, such as … Joint Operations Command' (page 119) but provided no budget or schedule.

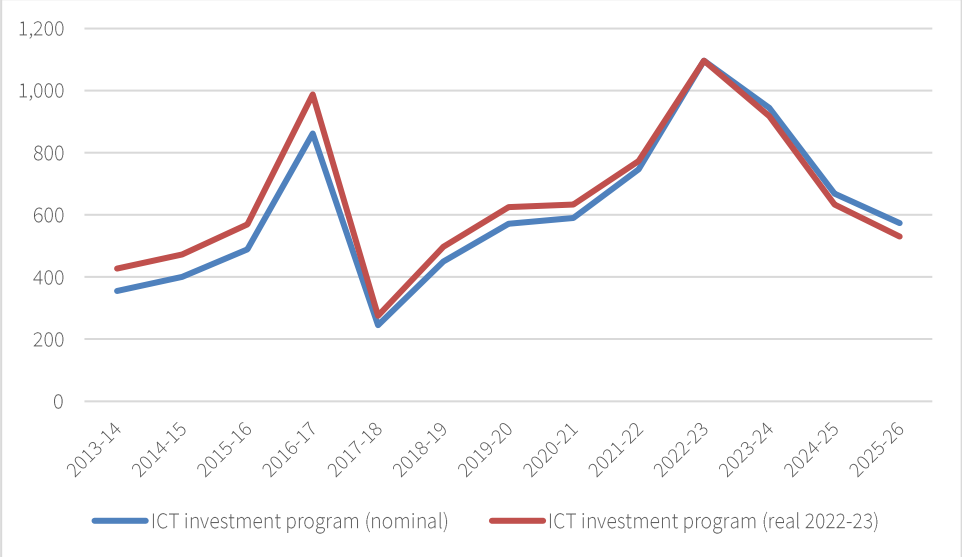
Facilities projects scheduled for government and Parliamentary Works Committee consideration in 2022–23 are listed in PBS Appendix E. In contrast, the PBS gave up on listing planned approvals in the equipment program some years ago—another backwards step in transparency and accountability.

More detail on Defence's infrastructure projects is in the business cases that Defence submits to the Parliamentary Standing Committee on Public Works.[72]

ICT Acquisition Program

The third subprogram is the ICT Acquisition Program. It's much smaller than the first two, at around 6.7% of the total acquisition program. Nevertheless, it's still budgeted at $1,097 million for 2022–23—a big increase of 45.1% on 2021–22's $748 million and the first time it's planned to crack $1 billion (Figure 3.7).

Figure 3.7: ICT investment program, 2013–14 to 2025–26 ($ million)



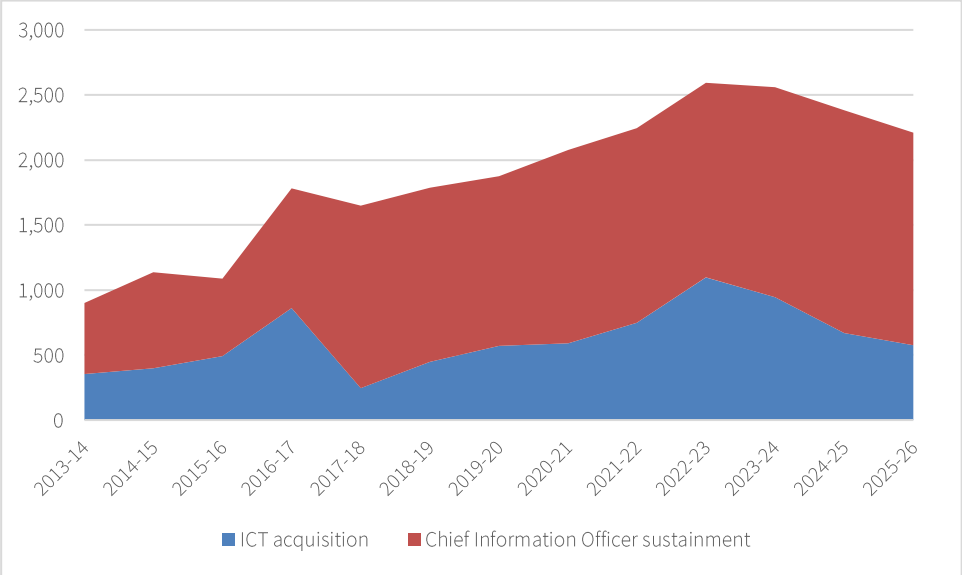
Sources: PBS, PAES.

The trajectory of the ICT Acquisition Program is a little confusing because of some substantial fluctuations that have occurred, such as the precipitous drop to $245 million in 2017–18. But, in an area such as ICT, it can be difficult to distinguish between acquisition and sustainment. A software upgrade might be sustainment, but what if you need new hardware to run the new software? If we 'stack' acquisition and sustainment together, the ups and downs don't appear quite as dramatic, suggesting that the variations in the acquisition program related to definitions of acquisition and sustainment rather than adjustments to overall ICT spending (Figure 3.8).

Nevertheless, there's still a decline in total ICT spending over the forward estimates. That might be because Defence has discovered the Holy Grail of ICT efficiencies and is realising savings. But there have only been two declines in total ICT spending in the past decade, and both were immediately followed by increases, so we're entitled to remain somewhat sceptical that Defence has found the Holy Grail just yet. It may be that Defence doesn't exactly know what its future requirements are.

Stacking acquisition and sustainment spending also confirms what we said earlier about Defence ICT being big business; the two combined are estimated to reach over $2.5 billion this year.[73] Readers with time on their hands might go through Budget paper no. 4 to see how many federal agencies' total budgets are exceeded by Defence's ICT spend. It's 50% more that ASD's funding, even with its huge REDSPICE increase. It's also more than the Australian Federal Police ($1,780.3 million) and the Australian Security Intelligence Organisation ($654.5 million) combined.[74]

Figure 3.8: Combined Defence ICT acquisition and sustainment spending, 2013–14 to 2025–26 ($ million)



Sources: PBS, PAES.

Last year, for the first time, the PBS included information on the five ICT projects with the largest planned spend for the year. That continues this year. The largest is the Defence Enterprise Resource Planning Program with a planned budget for 2022–23 of $112 million of its total $609 million approved budget. According to the accompanying description in the PBS, it 'will modernise, integrate and transform Defence's approach to managing its HR, finance, logistics, supply, engineering and maintenance functions'. That's quite a goal, since it seems to cover all of Defence's back-of-house corporate functions. Since the program is crucial to the success of Defence's transformation strategy, it's good that there's finally a modicum of transparency about it. A further step towards greater transparency would be the inclusion of Defence's biggest ICT projects in the ANAO's *Major projects report*.

The Minors Program

The Minors Program covers small projects. Not only are the projects small, but the total program budget is a small part of the acquisition program. Nevertheless, it achieved massive growth last year, increasing its spend from $43.5 million in 2019–20 to $157.5 million. There's nothing in the PBS that explains how or why that happened, but the program stays around that level over the forward estimates. Hopefully, that's an indication that Defence is finding ways to move small-scale projects more quickly through its capability development process and it's using the Minors Program to turn innovation into actual capability.

3.4 Operating and sustainment costs

The PBS provides a high-level breakdown of the defence budget by key cost categories, which include operations, the Capability Sustainment Program and operating costs. Combined, they add up to $17,555.8 million for 2022–23, or 36.6% of Defence's budget.[75]

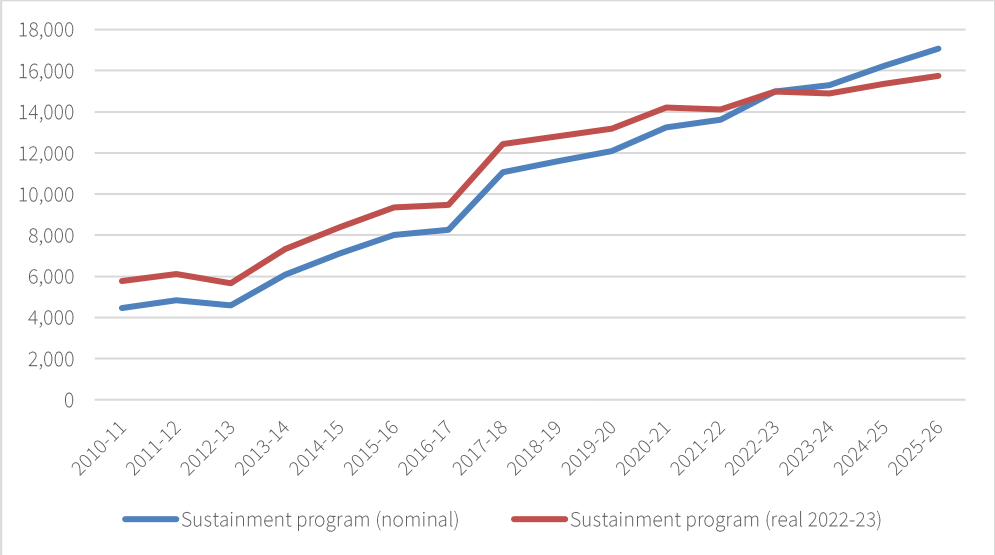
There's no breakdown of the subcategory of operating costs. It's $2,387.0 million in 2022–23. It seems to cover everyday corporate running costs. We've discussed operations already in Chapter 2.

Sustainment

The biggest element of the operating budget is the Capability Sustainment Program. This year, Defence plans to spend $14,975.6 million on sustainment, or 85.3% of its total operating budget.

Like Defence's acquisition program, the sustainment program has enjoyed strong and steady growth over the past decade (Figure 3.9). The jump of 33.6% in 2017–18 appears to have been largely an artefact of reclassifying some operating costs as sustainment costs, and that makes it hard to compare apples with apples over time. Overall, the growth is planned to continue over the forward estimates and, according to the 2020 DSU funding model, over the remainder of the decade to 2029–30. It will need to, as many of the systems coming into service both now and in the future will have substantially higher operating costs than those they're replacing.[76]

Figure 3.9: Capability Sustainment Program, 2010–11 to 2025–26 ($ million)



Sources: PBS, PAES.

The key question is, will that be enough to sustain the fleets being acquired though the very large acquisition program? That depends to a large degree on how good Defence is at estimating its future sustainment costs. We can examine Defence's performance over the past six years since the 2016 DWP (Table 3.10).

The estimates in the DWP (the 2016–17 PBS line in Table 3.10) don't appear to be very accurate. The three years of its forward estimates came in on average over $1.5 billion above the original estimate. The 2017–18 PBS was out by just as much over its forward estimates, but it's hard to know how much of that was poor estimation and how much was due to the reclassification of some operating costs as sustainment costs in 2017–18, pushing up sustainment spending. We can be charitable and suggest that it's the latter, since the gaps between estimates and actuals have shrunk since then. The 2018–19 PBS was out by an average of $484 million per year over its forward estimates—still a lot but much less than previously. The 2019–20 PBS underestimated its forward estimates by only $236 million per year on average (noting that we don't have any actuals for its final year since that's 2022–23).

That might suggest that Defence's ability to estimate sustainment costs is improving. On the other hand, the 2020–21 PBS estimate for that year was $12,588 million and actuals came in at $13,228 million, or $640 million over budget. Similarly, the 2021–22 PBS estimated $12,952 million for that year and the latest figure is $13,626 million, or $674 million over budget. Those are big numbers, but, to put it in perspective, they're only around 5% over. I don't know whether large organisations have a benchmark for what counts as a good outcome when predicting operating costs, but 5%

doesn't sound too bad, particularly since sustainment demands can shift radically as operations and other activities quickly ramp up and down.

In sum, Defence consistently underestimates its sustainment costs, but, based on the most recent years' data, it's not off by too much. However, that assessment is based on its performance over the forward estimates, where it's largely estimating the sustainment cost of things that it already has in service. That's a very different task from developing estimates for the longer term when completely new systems will be entering service—and that's a risk for the long-term affordability of Defence.

Table 3.10: Defence estimated and actual sustainment spending, 2016–17 to 2025–26 ($ million)

	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25	2025–26
2016–17 PBS	8,665.5	9,176.2	10,044.5	10,867.0						
2017–18 PBS	8,276.3	9,474.2	9,931.9	10,743.4	11,508.3					
2018–19 PBS		11,060.4	10,975.0	11,697.4	12,417.3	13,385.3				
2019–20 PBS			11,579.3	12,091.3	12,610.0	13,435.3	15,078.3			
2020–21 PBS				12,095.9	12,588.0	13,217.3	14,876.0	15,637.7		
2021–22 PBS					13,228.2	12,952.2	14,502.3	15,222.3	16,379.0	
2022–23 PBS						13,628.5	14,975.6	15,310.3	16,241.4	17,072.7
Difference between earliest and most recent figures	–389.2	1,884.2	1,534.8	1,228.9	1,719.9	243.2	–102.7	–327.4	–137.6	

Actual achievement	Budget year allocation	Forward estimates allocation

Source: PBS.

The top 30 sustainment 'products' are presented in PBS Table 55 with their planned 2022–23 budget and a short description of priorities for the year. The sustainment program isn't dominated by a small number of projects to quite the same extent as the acquisition program, but nonetheless there are a few standouts. We show the top 10 in Figure A.6 in 'Defence in 10 tables'). As has been the case for many years, the Collins-class submarine is the most expensive sustainment product. This year, the target is $691 million, which is a moderate increase on 2021–22's $673 million. This year, the cut-off for the top 30 is $81 million, so we can't see the sustainment cost of any platform below that. We discuss individual sustainment products in Chapter 4 on capability.

ASPI publishes historical data on sustainment costs in its Cost of Defence online database.[77]

3.5 Where's the money spent?

Another way of looking at how the budget is divided is by looking at where the money is spent.

Defence Cooperation Program

PBS Appendix A (page 98) covers the Defence Cooperation Program (DCP), which is Defence's own regional aid program aimed at developing Defence's relationships with South Pacific and Southeast Asian security forces and enhancing their capacity. It's not necessarily a lot of money by Defence's standards (less than 0.5% of the total budget), but it makes a big difference to regional forces, plus it's gotten a bit of attention as part of the 'Who lost Solomon Islands?' argy-bargy.

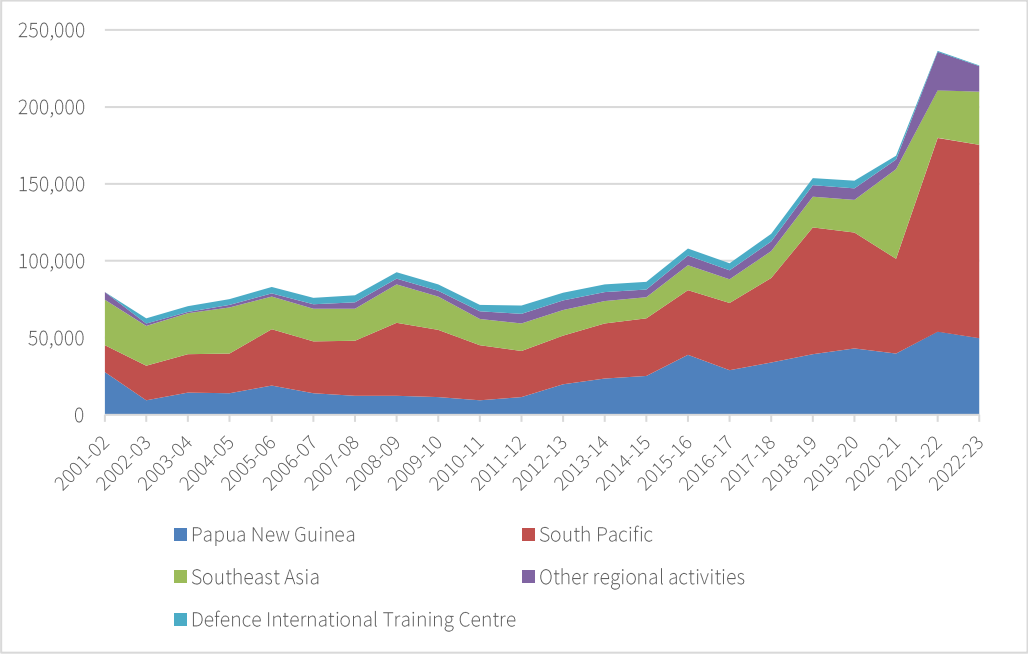
After a long period of being essentially stagnant or declining in real terms, the DCP's budget has been growing rapidly over recent years (Figure 3.10). This has been driven by, among other things, the Pacific Maritime Security Program, the centrepiece of which is the replacement patrol boat program. The 21 Guardian patrol boats for South Pacific nations and Timor-Leste are being constructed by Austal in Henderson in Western Australia (so a lot of the money is actually being spent here in Australia, not in the South Pacific).

Despite some heated discussion at Senate estimates about an estimated $9 million reduction from 2021–22 to 2022–23, it's pretty clear that there's been a dramatic upwards trajectory in the DCP over the past six years. According to Defence officials, the peak in spending in 2021–22 was driven by Covid-19 assistance measures. Also, there was an additional $4 million in support to the Tongan armed forces in response to the volcanic eruption in January 2022.

The cost of the Pacific support vessel, the overseas acquisition of which was revealed in the PBS without any announcement (total budget of $193 million, with $68 million spent in 2021–22 and a further $88 million planned for 2022–23), doesn't appear to be included in the DCP, although the Pacific Patrol Boat and Pacific Maritime Security programs are.

Figure 3.10 shows the breakdown by region. As a region, the South Pacific is the largest recipient overall, but Papua New Guinea is the largest single recipient country (PBS tables 52 and 53 provide a breakdown by country for this year).

Figure 3.10: Defence Cooperation Program, 2001–02 to 2022–23 ($'000 nominal)

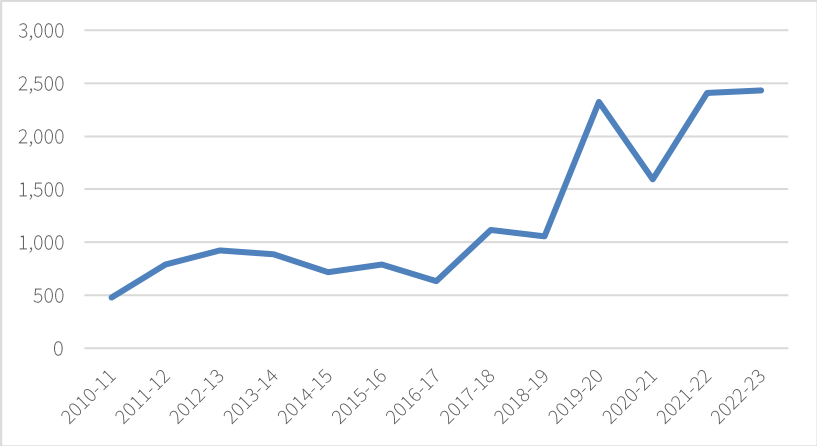


Note: The PBS provides estimates only for the budget year, not for the remainder of the forward estimates.

Source: PBS.

On the issue of Solomon Islands, Figure 3.11 shows DCP assistance to the country over the past decade.

Figure 3.11: Defence Cooperation Program assistance to Solomon Islands, 2010–11 to 2022–23 ($'000)



Sources: PBS, PAES.

The overall trajectory, like the rest of the DCP, is upwards, but even at the peak it's only around $2.5 million. It's a stretch to suggest that small adjustments to that funding line resulted in Solomon Islands' security pact with China. Incidentally, that amount doesn't include the patrol boat and Pacific Maritime Security Programs. Australia provided Solomon Islands with two of the original Pacific-class patrol boats and associated support. They have now been replaced by two Guardian-class patrol boats. So, the total value of Australia's security assistance to Solomon Islands is much greater that the figure above suggests.

In last year's *The cost of Defence*, we attempted rather unsuccessfully to determine the total cost of the Pacific Step-up. The issue is still no clearer.

By state and territory

Defence doesn't publish a holistic overview of where its spend goes by state and territory. Some information accompanied the 2020 DSU in the form of a large number of media releases, which ASPI aggregated and published in Part 1 of 2020–21's *The cost of Defence*.[78] The Defence annual report also provides the number of ADF personnel in each state and territory.

However, the PBS breaks spending by each facilities project down by electorate as well as state and territory (PBS Table 56 this year). Table 3.11 sums the spend over recent years by state and territory. Note that these figures are budget estimates, not actuals. Actual spending can change significantly, for example when spending is accelerated as a form of Covid-19 economic stimulus.

Table 3.11: Planned Defence capital facilities spend, by state or territory, 2019–2020 to 2022–23 ($ million)

	ACT	NSW	NT	Qld	SA	Tas.	Vic.	WA	Total
2019–20	115.3	368.9	331.7	230.6	127.3	0.0	326.5	300.5	1800.8
2020–21	87.3	300.7	324.8	201.4	157.4	0.1	274.4	101.3	1,447.4
2021–22	32.0	186.4	296.0	151.8	122.5	10.4	220.1	176.8	1,196.0
2022–23	23.4	223.6	466.1	245.9	260.2	42.6	158.6	291.4	1,711.8
% of 2022–23 total	1.4%	13.1%	27.2%	14.4%	15.2%	2.5%	9.3%	17.0%	100.0%

Source: PBS 2022–23.

This year's biggest spend is in the Northern Territory for the third year in a row. And that doesn't include work done by the US facilities, such as the East Arm fuel facility in Darwin.[79]

Business cases for Defence's large infrastructure projects are on the Parliamentary Standing Committee on Public Works' web page.[80]

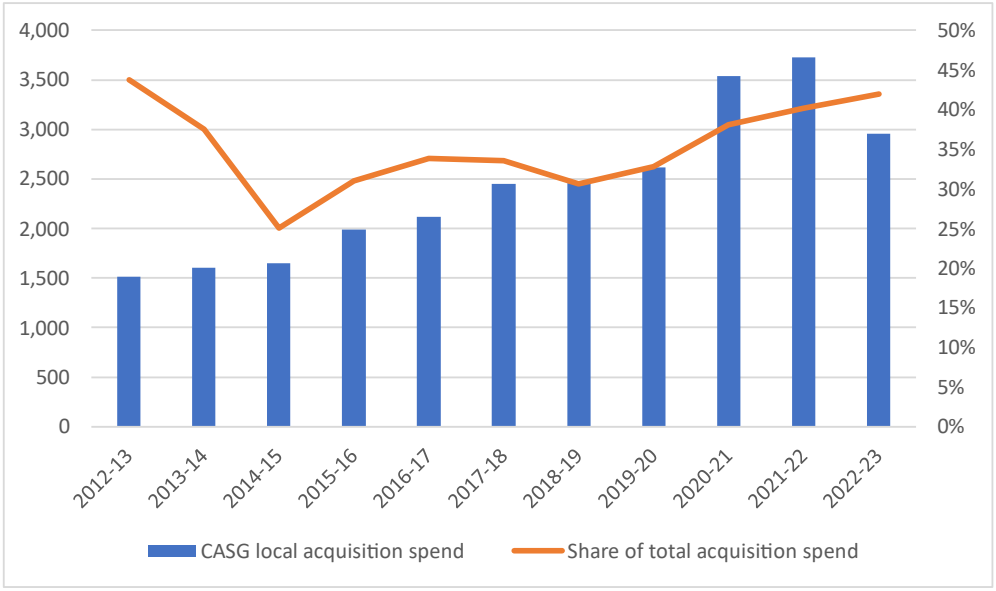
Local versus overseas spending

Defence provides ASPI with a breakdown between local and overseas spending for its military equipment acquisition and sustainment programs (that is, the programs administered by CASG). We've included in Appendix 1 Defence's updated figures for 2021–22 and its estimated numbers for 2022–23. The acquisition data is also presented graphically in Figure 3.12 below.

The good news story for Australian industry continues, again increasing its share of the acquisition spend in both absolute and percentage terms in 2021–22. The performance of the past two years combined with Defence's estimates for 2022–23 suggest that Australian industry can consistently absorb over one-third of the growing acquisition spend, and indeed can go over 40%. Meanwhile, it's preserving a two-third share of the sustainment spend. We probably shouldn't be too concerned about an absolute dip in acquisition spending in 2022–23, since the numbers include only approved projects. Therefore, the dollars for any projects securing second-pass approval after March 2022 won't be

included, so that number is very likely to grow. The 2022–23 acquisition numbers may also have been affected by the cancellation of the Attack-class submarine.

Figure 3.12: Australian industry's share of Defence's equipment acquisition spend, 2012–13 to 2022–23 ($ million)



Source: Defence data.

In previous editions of *The cost of the Defence*, we've looked at the size of the elephant that the Australian defence industry will need to eat in order meet the goals of the DSU. We've argued that if Australian industry can absorb 40% of Defence's military equipment acquisition budget, it will grow to around $11 billion per year by 2029–30, up from less than $2.5 billion in 2018–19. It's a huge task, but, based on the past few years' data, industry is meeting the challenge. The DSU also forecasts that operating spending will increase to around $25 billion by 2029–30. If we assume that sustainment will remain around 80% of that and Australian industry retains its roughly 67% share (as it has achieved on average over the past decade), that will result in a $13.5 billion local spend per year. When we add acquisition and sustainment together, it looks like the Australian defence industry is heading towards being a $24–25 billion per year enterprise.

Chapter 4: How is the delivery of capability going?

Key points

- The Navy's acquisition spending shortfalls confirm what is well known: we're still a long way away from getting new frigates and submarines. The OPV project is broadly on schedule, and the first delivery is coming soon.
- The Army's $30–40 billion recapitalisation of its armoured fleets continues, but its long-range fires program potentially offers greater transformative potential for its future capability.
- Remarkably, the ADF still doesn't have any armed uncrewed or autonomous systems. Nevertheless, Defence is increasingly active in experimenting with autonomous technologies. While the scale of investment is still small compared to 'traditional' capabilities, there are numerous lines of effort underway to explore 'the small, the smart and the many'.
- The Air Force's transformation into a 'fifth-generation' force is progressing well, and its air combat assets are supported by small numbers of advanced enabling assets.
- AUKUS's advanced technology programs and the sovereign guided weapons enterprise offer great potential, but no decisions on actual investments or acquisitions in either have been announced yet.

The previous two chapters looked at how much money the government is spending on capability and noted that Defence's acquisition spending is ramping up significantly. This chapter looks at what it's getting for the money and how delivery is going. We draw on a range of sources, including:

- the *Major projects report* (MPR) published by the Australian National Audit Office (ANAO), but including project management information drawn directly from Defence (the most recent edition is 2020–21)
- the top 30 acquisition projects and sustainment products tables in the PBS and PAES (and actual spends reported in the Defence Department's annual report)[81]
- parliamentary committee hearings, particularly Senate estimates, and Defence's written responses to committee questions
- Defence documents released under freedom of information requests
- media articles in both mainstream publications and specialist defence media
- ASPI's Cost of Defence database, which compiles publicly available data on project spending.

In recent editions of *The cost of Defence*, we've examined the following issues, so we won't repeat that analysis here:

- Do Defence projects consistently go over budget (2020–21 edition, Part B, Chapter 2)?
- Is Defence underspending its acquisition budget (2021–22 edition)?

- The Defence budget and Covid-19 (2021–22 edition)
- How to hedge against the risk in maritime capability (2019–20 edition).

4.1 Maritime capability

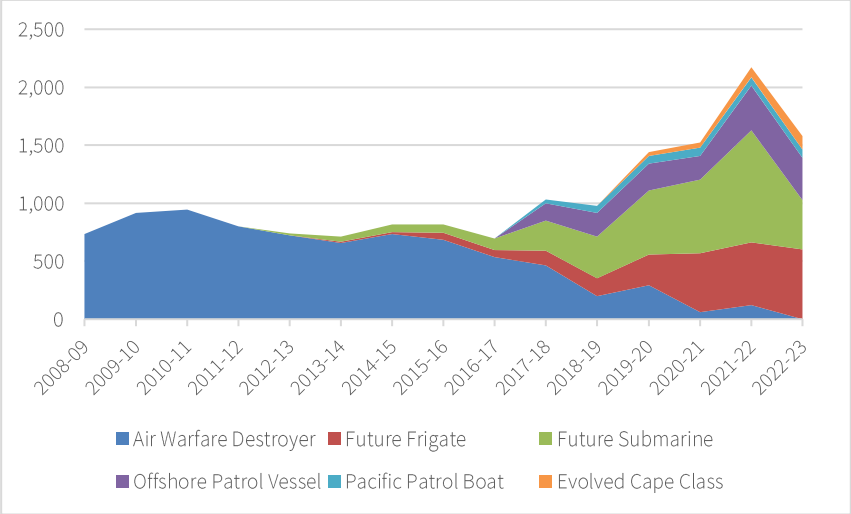
In the previous chapter, we noted that the Navy's acquisition spending is not ramping up as was planned in 2020–21, and the shortfall between planned and actual spending is very significant. But capability is still being developed and delivered. We'll give an overview of the Navy's capability program. This includes some warts, but also some real additions to capabilities.

The Naval Shipbuilding Enterprise

It's reasonable to assume that the shortfalls in the Navy's acquisition spending are primarily the result of the slow ramp-up and then cancellation of the Attack-class submarine and the similarly slow ramp-up of the Hunter-class frigate. The problem we face in trying to quantify how individual projects are performing against their longer term plans is that the PBS doesn't give planned spends for individual projects over the entire forward estimates but only for the Budget year.

Figure 4.1 shows the spending on the shipbuilding enterprise broken down by project. The planned total for 2022–23 is $1,579 million, well below the achieved 2021–22 total of $2,172 million (based on estimated actuals).[82] That dip is, of course, driven by the cancellation of the Attack-class submarine.

Figure 4.1: National Shipbuilding Enterprise, spending by project, 2008–09 to 2022–23 ($ million)



Sources: PBS, Defence annual reports.

We can also see how each year's spending has gone compared to the budget estimate for that year (Figure 4.2). Each of the past five years has fallen well short, and the annual shortfall has averaged $363 million over that period. That's not necessarily poor performance; most Defence projects underspend against their planned target for the year.

What we can't see is how 2021–22's achievement compares to earlier years' plans for that year. So we can't really see how much of the programmatic shortfall discussed earlier is driven by the shipbuilding projects. It's probably reasonable to assume that it's the main contributor.

Figure 4.2: National Shipbuilding Enterprise spending, planned versus achieved, 2009–10 to 2021–22 ($ million)

Sources: PBS, Defence annual reports.

Transparency and shipbuilding

The big shipbuilding programs for future frigates and OPVs are now all in the ANAO's MPR (as was the Attack class briefly before it was cancelled), which is a major step forward for transparency. It will be important to ensure that the SSN program is also included, once the government agrees to an 'optimal pathway' forward to achieve the capability.

There's still no annual report on the shipbuilding program as a whole that covers not just the projects themselves but the enterprise-level elements, such as the development of the workforce, training programs, shipbuilding infrastructure, industrial capability and capacity—in short, all of those elements that make this a national enterprise and not merely a collection of discrete projects.

On a similar note, the first Naval Shipbuilding Plan was released in 2017, and we're now long overdue for an updated one that takes into account major developments since then. Granted, the cancellation of the Attack class would have required some rework to any draft plan, but Defence officials informed Senate committees that a revised plan had been with the Minister for Defence since late last year.

The SSN program

The biggest capability decision of the past year, and potentially since World War II, was the 16 September 2021 announcement that Australia would acquire a nuclear-powered submarine (SSN) capability under the auspices of AUKUS. A taskforce has been established to determine the optimal pathway to establish the capability and is to make its recommendation 18 months from the original announcement (that is, around March 2023).

The government hasn't announced a funding provision for the program. It has stated that the SSNs will cost more than the Attack-class conventional submarine, but until the government agrees to a particular pathway involving a particular submarine and build strategy, it's very difficult for anybody to say exactly how much more.

ASPI has published some cost estimates for the SSN program, but they're heavily caveated because they depend on a large number of assumptions. We would refer readers to that analysis to understand

the range of assumptions, but we'll briefly reproduce the cost band here.[83] As a point of comparison, Defence's final estimate for the Attack class was $46.4 billion in constant dollars (that is, dollars that don't take inflation into account). The corresponding out-turned number (which does take inflation into account) was somewhere between $80 billion and $90 billion, depending on exchange rates and other factors. We should note that all of Defence's unapproved project provisions in the IIP/FSP and approved budget budgets in the PBS are in out-turned dollars, without exception.

ASPI's constant number for the SSN program was around $70 billion for a submarine the size of the Royal Navy's Astute class and $79 billion for a larger submarine, such as the US Navy's Virginia class. What those figures out-turn to depends on the schedule, which in turn is determined by the build strategy and delivery drumbeat (that is, the interval between deliveries of boats). The longer the build, the more time inflation and other forms of price escalation have to compound. The most efficient build approach could result in an out-turned cost of $116–129 billion. A process that's drawn out to ensure a continuous build cycle could increase that to $153–171 billion. But, to reiterate, we're in very assumption-rich territory here.

SSNs aren't yet a project in the PBS's top 30. The taskforce's work seems to be supported by funds originally in the SEA 1000 (the Attack class) provision. Defence informed the Senate that the taskforce is funded at $120 million in 2021-22 and $180 million in 2022-23.[84]

What will the total sunk cost of the Attack-class submarine be?

Attack-class submarine	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	4,896	2,918	877	425
Other project inputs to capability	540	292	182	69

It may seem strange that a project that's been cancelled is still in the PBS's top 30 and forecast to be Defence's fifth-highest spending project for 2022–23, at $425 million, but there are still some rather large loose ends to tidy up. According to Defence officials, the $425 million is what it had been planning to spend on SEA 1000 in 2022–23 before cancellation, but with two elements removed. Those are the 'sovereign talent pool' (a scheme to relocate staff from the Attack-class program into other projects), and the cost of the Nuclear-Powered Submarine Taskforce. What's left is $425 million. That's been left there to cover termination costs to be paid to Naval Group. But that doesn't mean Defence thinks those costs will be $425 million; in fact, officials admitted they didn't have a better number. They also stated that Naval Group had reserved its rights for compensation beyond termination costs.

In short, there has to be some uncertainty about the final number since the officials stated that the strategic partnering agreement (the 'head contract' governing the project) didn't explicitly cover the possibility of the Australian Government cancelling at this point. Despite the uncertainties, officials stated that they were confident that any termination costs could be covered by the $425 million. Since they had already started negotiations with Naval Group about termination costs, it's reasonable to assume that their assessment is correct.[85]

What will the total sunk cost be? Because Senate estimates interactions can be confused and confusing, a $5.4 billion number has made it into media reports. But that's SEA 1000 approved budget ($4,896 million for equipment and $540 million for other elements), once the elements mentioned

above have been removed, not how much has been or will be spent.[86] That approval from government still remains, but that's not what Defence is expecting the total cost to be. That will be the sum of:

- the estimated cumulative expenditure to 30 June 2022 on military equipment of $2,918 million
- the estimated cumulative expenditure to 30 June 2022 on other project inputs to capability of $292 million
- the termination costs, which officials believe would be less than $425 million.

We should also include costs that aren't covered by the SEA 1000 Phase 1B approval but are still directly related to the future submarine capability:

- SEA 1000 expenditure under earlier phases before the Attack class was selected, which is $204.7 million[87]
- $470 million in expenditure on developing the shipyard to build the Attack class, noting that Australian Naval Infrastructure informed Senate estimates that some of those facilities could be reused.[88]

Those figures sum to $4,310 million. But, assuming that the officials are correct and termination costs end up being less than $425 million, and some of the shipyard infrastructure can be reused for SSN construction, the sunk cost will be less than that figure.

What happened to the remaining Attack-class submarine money?

Before its cancellation, the Attack-class submarine program was on an upwards spending trajectory. We can argue whether it was increasing fast enough, but had it not been cancelled it would be likely to have passed $1 billion in annual spend in 2022–23. With the start of construction in 2024 or 2025, it probably would have reached at least $1.5 billion. Over the forward estimates, it could have been around $5–6 billion, but that's now down to, at most, the $425 million termination cost discussed above. So potentially $4.5–5.5 billion was freed up over the next four years. In the longer term, the SSNs are going to cost considerably more than the Attack class. But in the shorter term, there's no way that early SSN work could come close to using that money. So what has Defence done with it?

Looking from the outside, there's no way to tell exactly, but the sorts of things that could consume those funds are projects that were either not in the 2020 FSP, were brought a long way forward or needed a funding top-up. That includes the announcement of the early replacement of the MRH-90 helicopter, which was previously planned for the 2030s, by Black Hawks. The FSP also provisioned the acquisition of a maritime logistics helicopter in the second half of this decade, and that's been brought forward with the acquisition of 12 more Seahawk Romeo helicopters (plus one to replace a helicopter that crashed in the Philippines Sea during exercises).

The replacement of the Tiger armed reconnaissance helicopter by the Apache was announced well before the cancellation of the Attack class, and the schedule of its FSP funding is broadly in line with the announced plan. However, it may have required a top-up since its provision was $3.4–5.1 billion, and the Prime Minister recently said Apache would cost $5.5 billion plus $500 million for facilities. Similarly, tanks and combat engineering vehicles are progressing broadly in line with the FSP, although they may also have needed a bit of a funding top-up.

The government has announced the acquisition of the NSM maritime strike missile and the JASSM-ER long-range strike missile. Both capabilities were already in the FSP (even if those particular solutions to the capability requirement had not been selected), but the government has stated that

their acquisition has been advanced several years, so that, too, probably would have required a top-up in early cash flow.[89]

Whatever the windfall was spent on, there wasn't enough left to cover the REDSPICE cyber program. At Senate estimates at the start of April, Defence officials stated that some of REDSPICE's funding had come from approved and unapproved submarine money over the forward estimates. But there wasn't enough of the windfall left to cover it all. That's why, when Defence had to find the money to fund REDSPICE, it offered up to the government the cancellation of the SkyGuardian project. The officials didn't state what the value of that project was. They also said the offsets included 'an ICT project around modernisation and mobility. That was around $236 million over the forward estimates.'[90]

Collins-class submarines

Collins Class Submarine (CN10)

2020–21 sustainment	2021–22 sustainment	2022–23 sustainment
661	673	691

Collins Submarine Program Life of Type Extension (CN62)

2020–21 sustainment	2021–22 sustainment	2022–23 sustainment
–	–	104

Collins sustainment once again holds the number 1 position in the top 30 sustainment products. But that's not the full cost. I analysed the full cost of Australia's submarine capability in *The Strategist* last year, taking into account acquisition, upgrade, operating and sustainment costs, and concluded that once we include all direct costs, the Collins capability is costing around $1.2 billion per year.[91] It's hard to know for sure, since a lot of the upgrade projects aren't included in the sustainment budget but don't make it into the top 30 acquisition projects. Currently, major upgrades to the Collins's sonar and communications systems are underway, but their budgets and spending aren't visible.

During the election campaign, the Defence Minister announced that optronics masts would be installed on the Collins fleet at a cost of $381 million. These are essentially digital periscopes.[92] Interestingly, they had been proposed as part of the life-of-type extension (LOTE) but seem to have been removed from the initial tranche of improvements, according to Senate estimates testimony. First installation apparently will start in 2024, which is actually before the first LOTE, which is due to start in 2026.[93]

The government had confirmed that all six boats would be put through the LOTE, even before the cancellation of the Attack class in favour of SSNs meant that the Collins would have to stay in service for even longer.[94] The first Collins to go through the LOTE will have a new planned withdrawal date of 2028. Doing all six provided a little bit of schedule float in the transition to the Attack class; that's now gone with a later delivery date for the SSNs likely.

On the day of the AUKUS announcement, the government stated that it had approved the Collins LOTE from 2026 with a budget of up to $6.4 billion.[95] As with all of the government's announcements, it wasn't clear whether this was simply an adjustment to the project provision in the IIP (the 2020 FSP listed it at $3.5–6.0 billion) or an actual second-pass approval. Based on Senate estimates testimony from ASC indicating that design work for the LOTE still had a long way to go, it's more likely to be the

first of those possibilities, particularly when the government was trying to assure South Australian industry that the evaporation of Attack-class work hadn't left it stranded high and dry.

Interestingly, the 2022–23 PBS has for the first time a funding line for the LOTE, which appears in the top 30 sustainment products as a separate entry from the Collins submarine sustainment itself. It's unusual for an upgrade activity as large and as complex as the LOTE to be conducted as a sustainment activity rather than an acquisition project.[96]

Submarine escape and rescue system wash-up

For those wondering what the final wash-up of the cancelled submarine escape, rescue and abandonment system (SEA 1354 Phase 1) was, Defence responded to a question on notice from Senate estimates stating that, at 31 January 2022, the total expenditure was $108 million, although details of the settlement with the main contractor are confidential.[97] Defence also stated that an investigation was conducted into the failure of the project by the departments of Defence and Prime Minister and Cabinet, which 'did not identify evidence of any maladministration, improper or unethical behaviour in the management of the project. However, notwithstanding sound project planning, the investigation identified shortfalls in elements of program execution, routine review, and reporting all underpinned by an overriding focus on schedule.'[98] Defence has refused to release the investigation report even in redacted form due to legal obligations entered into with the former contractor.[99]

SEA 5000: Hunter-class frigate

Hunter-class frigate	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	6,056	1,750	459	600
Other project inputs to capability	1,101	260	150	220

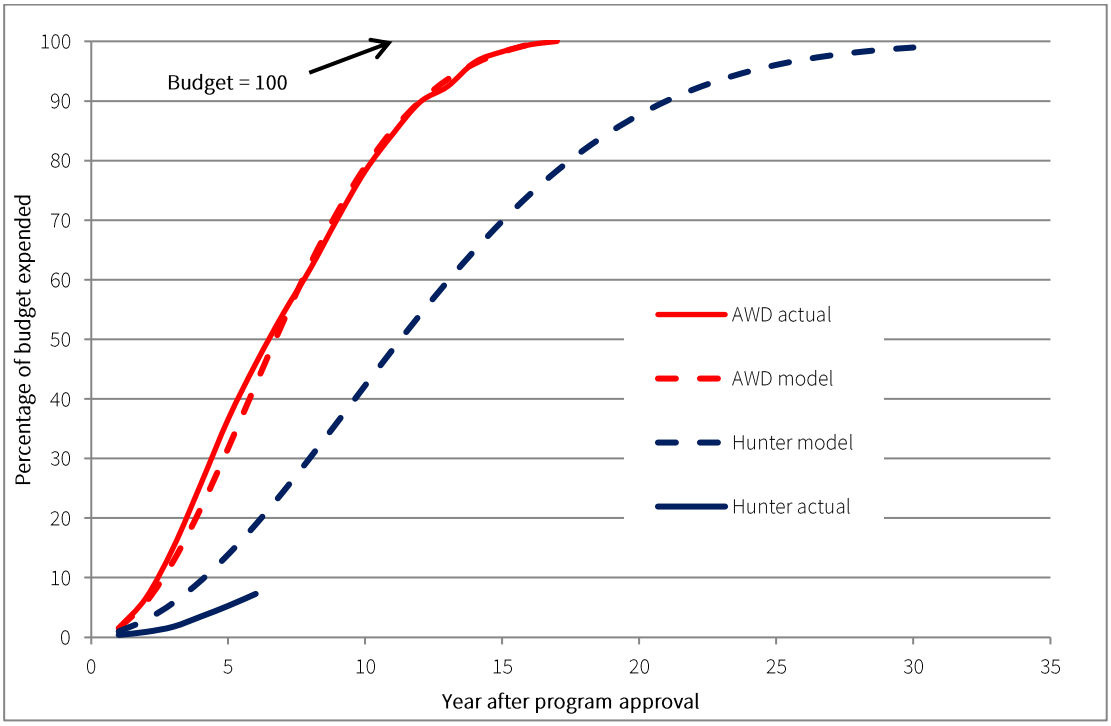
More bad news appeared over the past 12 months. Defence officials reported further delays in SEA 5000, with the start of construction sliding from 2022 to 2024 and initial operating capability (IOC) to around 2033 or 34.[100] A leaked engineering report raised further concerns about the maturity and indeed viability of the design, although officials have testified that the issues identified in the report were well understood and were being remediated.[101]

The schedule delays are borne out by the spending picture. Even though the program has spent $1,750 million, that's significantly short of where it should be relative to key milestones. ASPI senior fellow Dr Andrew Davies has prepared the following chart and text to illustrate that:

> The Rayleigh–Norden model is a useful tool for estimating the proportion of the overall budget of a major industrial development project that will be spent in a given year.[102] The only input parameters are the total cost and the duration of the project. Figure 4.3 below shows the close correspondence of the SEA 4000 Air Warfare Destroyer (AWD) program to the model—it is almost perfectly correlated. Because of the substantial set-up costs, projects of this sort are heavily front-loaded in the spending profile—by the time the first of class, HMAS *Hobart*, was launched in 2015, the AWD program had expended 70% of its budget. For the Hunter class, we have modelled the spend assuming that the budget is $30 billion (2018 constant dollars) and that the last ship will be delivered towards the end of the 2040s. The figure shows that the to-date and forward budgeted spend is well below the predicted curve—the estimated shortfall is around 2.5 years. The situation might actually be worse than that because of the conservative numbers we took for the budget and delivery times—if the budget is higher than

we assumed, or if delivery is planned to be faster, the project is even further behind where it needs to be.

Figure 4.3: The spending profiles for SEA 4000 (AWDs) and SEA 5000 (Hunter-class frigates) compared to the Rayleigh–Norden model for major industrial projects



Sources: Defence annual reports and PBS.

The program's problems have prompted calls for Plan Bs, whether they involve acquiring complementary capabilities while continuing with the Hunter,[103] or indeed cancelling the Hunter.[104] We examine the options available to the new government in Chapter 5.

SEA 1180: Arafura-class offshore patrol vessel

Arafura-class OPV	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	3,649	1,180	385	364
Other project inputs to capability	983	158	93	221

The SEA 1180 project aimed to spend $366 million in 2021–22 but achieved $385 million. It's rare that a project manages to spend more than planned. It's a good sign that the project is progressing well. Five vessels are under construction, and ship 1 (*Arafura*) was launched in December 2021. According to the most recent MPR, the first vessel is to be delivered in June 2022 for test and evaluation, followed by IOC in December 2022. The project has a substantial 'Other project inputs to capability' line ($983 million), most of which is facilities (from the $918.8 million line in PBS Table 56). Work on those facilities has started, and $218.8 million in work is planned for 2022–23.

ASPI authors have argued for some time now that Defence should be doing more to turn the OPV's latent capacity into actual war-fighting capability as a way to mitigate the risks posed by the long time frames involved in the delivery of the Hunter and SSN programs. Defence has remained tight-lipped about whether it will pursue that course; however, based on anecdotal conversations with industry, it would appear that the Navy is at least assessing options to do so.

The previous government announced that the future mine warfare and hydrographic fleet will be based on a variant of the Arafura-class OPV.

SEA 4000: Hobart-class air warfare destroyer

2020–21 sustainment	2021–22 sustainment	2022–23 sustainment
259	196	247

AWD AEGIS capability upgrade	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	891	152	?	140
Other project inputs to capability	10	7	?	3

The Hobart-class AWDs (aka DDGs) achieved final operational capability in August 2021. It's been a 14-year journey since second-pass approval in 2007. The AWD build project has now fallen out of the Top 30 acquisition projects. The most recent data on its total spend is $8,147 million. While sustainment costs dipped in 2021–22, they're forecast to go back up again this year. Each ship averages out at around $75 million/year, compared to around $45 million/year for the Anzac-class frigates.

The upgrade to its AEGIS combat management system has begun, and it's cracked the acquisition top 30. The work on the ships themselves will be performed at the surface shipyard in Adelaide. The project will also replace the tactical interface (essentially the part of the combat management system that manages everything other than the air warfare capability) with Saab's interface, providing commonality with other RAN vessels, including the Hunter-class frigates. While there's been speculation that at some point the Hobarts' SPY-1D radar would be replaced with the Australian CEAFAR radar being installed on the Hunters, that isn't occurring as part of this upgrade.

As part of the original AUKUS statement, the previous government announced that it would acquire Tomahawk land attack missiles for the AWDs.[105] However, it's hard to imagine a small fleet of three vessels (particularly with one undergoing upgrades for the foreseeable future), which are also the Navy's primary air-defence platform, having the capacity to deliver the number of Tomahawks needed to deliver a meaningful operational effect in a land-strike role.[106]

Anzac-class frigates

2020–21 sustainment	2021–22 sustainment	2022–23 sustainment
375	354	372

We have a similar problem with the Anzac frigates to the one we have with Collins class in determining the total cost of ownership—the sustainment cost doesn't include capability upgrades that are being delivered by acquisition projects. At times, those projects have cracked the top 30, but none makes the cut this year. The ANAO's MPR does include the Anzacs' radar upgrades. There's likely to be at least another $100 million a year on top of the sustainment.

The Anzac-class frigate HMAS *Perth* went into drydock for upgrades in December 2016. Due to the lack of crew, it stayed out of the water for nearly five years. The good news is it has sailed back to Fleet Base West in November 2021.

SEA 1300: Navy guided weapons subprogram

Navy guided weapons program	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	2,129	686	57	235
Other project inputs to capability	37	4	3	4

Missiles play a major role in contemporary naval warfare, as the sinking of the Russian cruiser *Moskva* in the war in Ukraine has reminded us. So it's good that the IIP contains a very large funding line for future naval guided weapons in the FSP ($16.1–24.2 billion) over the next two decades. The problem for transparency is that Defence now treats all of the Navy's guided weapons projects as a single program. That makes sense from an enterprise management perspective, but it makes it even harder to see what's going on with individual weapon systems from the outside.

From the PBS, the total approved budget so far is $2,129 billion (a fairly modest increase over last year of $107 million), so we aren't even seeing the tip of the iceberg yet. Only $57 million was spent in 2021–22, which doesn't get you much in the way of missiles when ESSM air-defence missiles are over US$2 million each and a NSM anti-ship missile is nearly US$2 million.[107] That was a big decrease from $208 million in 2020–21, but spending is planned to increase in 2022–23 back up to $235 million. But it's going to have to grow a lot faster if Defence is going to deliver around $20 billion in naval missiles.

There was a raft of guided weapons announcements in early 2021, which have been followed by a further tranche of announcements in April 2022.[108] Those later announcements haven't been accompanied by a lot of funding, since the approved budget has grown by only $107 million. Key developments in the past year include the following:

- Announcement of the accelerated acquisition of the Norwegian Naval Strike Missile, which will be in service on Hobart-class destroyers and Anzac-class frigates by 2024. ASPI has argued

that this weapon should also be installed on the OPVs and is a logical candidate for local build under the sovereign guided weapons enterprise.

- Announcement of the acquisition of 'maritime mines to secure Australia's ports and maritime approaches'. This was foreshadowed in the 2020 DSU but has garnered little public attention.

- Announcement of the acquisition of Tomahawk land-attack missiles for the Hobarts. As discussed above, this will be ineffectual.

- Commencement of deliveries of the Evolved Sea Sparrow Missile Block 2 air defence missile for the Hobarts and Anzacs, with a $2 billion budget.[109] Australia has been part of the international consortium developing ESSM Block 2 since 2014, and we've already spent hundreds of millions as our share of development funding, so the eventual acquisition was never in doubt.[110] The schedule illustrates the long timelines needed to develop effective missile defence systems.

Earlier announcements in 2021 included cooperative development programs for the SM-6 long-range air-defence missile and the Mk-54 antisubmarine torpedo. There's been no additional information on these weapons since then.

Navy autonomous systems

The Navy's experimentation with 'the small, the smart, and the many' (and, hopefully, the cheap) is accelerating. It's gone from having no large or extra-large autonomous underwater vessel programs to having three, in a very short time. Surprisingly, to those who suggested entering into a cooperative program with the US Navy on its Orca extra-large uncrewed undersea vehicle, that isn't one of the three.

The three programs are different in key aspects, so we're not looking at a direct competition *per se*. In no particular order:

- The first is a program with the US company Anduril, which focuses on autonomous and ISR technologies, announced by the previous government during the election campaign. Its announcement didn't refer to funding, but Anduril's own media release stated that it and the ADF were 'entering into commercial negotiations for a US$100m [c. A$140 million] design, development and manufacturing program for XL-AUVs' (extra large autonomous undersea vehicles).[111] The government's media release does say that it's 'using the innovation funding identified in the 2020 Force Structure Plan, under the auspices of the Robotics Autonomous Systems Sovereign Industrial Capability Priority (RAS SICP) announced in August 2021'. A$140 million would blow the Innovation Hub budget, so at this point we're probably looking at development funding amounting to substantially less than that.

- The second is a program called SeaWolf overseen by the Trusted Autonomous Systems Defence Cooperation Research Centre. Again, during the election it was revealed that the research centre had been working for six months on a 12-metre autonomous underwater vehicle to develop a demonstrator by 2023. The vessel itself is being developed by Canadian company Cellula Robotics and uses long-endurance fuel cell technologies, but a range of local partners are also involved.[112] There haven't been any public statements on the funding involved.

- The third is the Speartooth large unmanned underwater vehicle being developed by the Australian start-up C2 Robotics (Figure 4.4). The focus of this program appears to be on achieving mass by keeping unit costs low and being able to produce units at scale and speed.[113]

Figure 4.4: C2 Robotics' Speartooth large uncrewed underwater vehicle

Source: Author's photo.

In the realm of uncrewed surface vessels (USVs), Ocius's Bluebottle long-endurance USVs continue to demonstrate real work achievements, conducting extended surveillance missions in our northern waters.[114] Ocius has also entered into an agreement with Thales to integrate a small towed-array sonar into the Bluebottle to experiment with antisubmarine warfare missions.[115]

The Navy is also using a decommissioned Armidale-class patrol boat as a test bed for autonomous technologies and concepts of operations. Autonomy trials are due to start in early 2023.[116]

The Navy's deployable mine countermeasures capability is nearing IOC, and the process of getting there has helped it understand the capability requirements and solutions for the replacement for its minehunters under SEA 1905 with autonomous systems. There's been little in the way of public announcements about that project in the past year, however.

Navy aviation

MH-60R Romeo helicopter	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	3,157	2,535	78	143
Other project inputs to capability	206	204	–	–

2020–21 sustainment	2021–22 sustainment	2022–23 sustainment
145	142	166

The MH-60R Seahawk Romeo is still in the top 30 acquisition projects for 2022–23, even though all the helicopters have been in service for around five years (although the original 24 are down to 23 due to the loss of one in an accident, fortunately with no serious casualties). While the capability is consistently falling short of PBS flying-hour targets, it's nevertheless achieving over 5,000 hours per

year, which is a significant increase over the old S-70B-2 Seahawk, which averaged around 3,250 hours for the years for which we have data. Flying costs have stabilised at $25,000–30,000 per hour.

There are more Romeos coming. The announcement by the US Defense Security Cooperation Agency (DSCA) in October 2021 that Australia had been approved to purchase 12 more Romeos was surprising, since the DSU had not flagged more maritime combat helicopters, although it did have a $1–1.5 billion line for a maritime logistics helicopter.[117] In December 2021, the previous government announced that it was going to replace the MRH-90 utility helicopter fleet, leading to the conclusion that the Romeo would be the replacement in maritime roles. Finally, during the election campaign, the Prime Minister announced that 13 MH-60R Romeo maritime helicopters (including one to replace the one lost) would be acquired at a cost of over $2.5 billion plus $360 million for additional facilities at HMAS Albatross near Nowra.[118]

Some have suggested that using Romeos in a logistics role is overkill. Possibly, but we're more likely to see them be used primarily as maritime combat helicopters taking full advantage of their excellent antisubmarine warfare (ASW) and anti-surface warfare capabilities. Overall, it's a huge step-up in capability. The larger number will mean that the Navy can take advantage of the Hunter-class frigate's ability to carry a second helicopter in its mission bay. It could also potentially allow the Navy to explore some alternative operating concepts, such as using the LHDs in an ASW-oriented role. Since the OPVs don't have hangars, we won't be seeing Romeos operating from them.

The Navy's aviation capabilities will also be enhanced by the recently announced acquisition of Schiebel Camcopters to use across the fleet. The Navy's 822X Squadron has been playing a key role in the Navy's uncrewed and autonomous systems journey and has experimented with the Camcopter for several years. That work appears to have enabled a somewhat accelerated selection and delivery process. While the Camcopters will be unarmed, they can take routine surveillance tasks off the Romeos, or cue the Romeos when an armed response is required. The Camcopters will be operated from Anzac frigates and the OPVs.

Overall, the Navy's aviation capabilities have come a long way since the low point of the cancellation of the Super Seasprite in 2008.

Other maritime capabilities

The Pacific Patrol Boat Replacement project (SEA 3036 Phase 1) is no longer in the PBS Top 30. That's not because it's completed its 21 patrol boats but because its planned spend is too low. The 15th boat was delivered on 27 May 2022, so we're over two-thirds of the way through.[119] Deliveries will continue into 2023.

During the election campaign, the government said it would build two more Evolved Cape Class boats for $124 million, bringing the total new Cape-class boats to eight (in addition to two already in service with the Navy).[120] The justification for the first six was to bridge the gap between the ageing Armidale-class patrol boats and the new OPVs and the acquisition of two more was a further capability risk mitigation. The announcement also stated that this would enable the Navy to transfer two of its existing Cape-class patrol boats to the Australian Border Force. Not a bad deal for the Border Force.

The previous government announced that Defence would acquire a Pacific support vessel as part of the Pacific Step-up. While the 2020 DSU stated that it would be built in Australia, an existing vessel has now been acquired overseas. According to the 2022–23 PBS, the total project approval is $193 million.

The Navy's two new resupply ships, HMAS *Supply* and HMAS *Stalwart*, have entered service, appear to be performing well and represent a significant increase in replenishment-at-sea capability.

4.2 Land capabilities

Indirect fires

Much of the public discussion about the Army's capability investment focuses on tanks, but we'll start with what's arguably a more transformative element of Defence's land capability: its indirect fire program. The Australian Army currently has a modest artillery capability. It has around 50 or so M777 155 mm towed howitzers. Donating six of them to Ukraine is in fact a substantial reduction in its inventory. Towed howitzers also have a relatively modest range of around 20 kilometres with standard rounds, which can be extended to around 40 kilometres with a very precise (and also very expensive) Excalibur round.

The Army's current acquisition program will fundamentally change its indirect fire capability. In the 2019 election campaign, the government announced that it would acquire self-propelled howitzers (SPHs), to be constructed in Geelong. The 2020 FSP listed three tranches of protected mobile fires (aka SPHs) with a total provision of $4.5–6.8 billion. On 13 December 2021, on the basis of a sole-source tender process, the previous government announced a second-pass approval of the Korean company Hanwha's K-9 SPH, which will be known here as the AS9 Huntsman. The initial tranche will be 30 AS9s and 15 AS10 resupply vehicles.[121] The total project approval is $1,339 million, but it doesn't yet appear in the PBS top 30.[122]

SPHs will provide greater range, rate of fire and protection than towed howitzers, but additional acquisitions—driven by the 2020 DSU's assessment that the ADF needs longer range strike capabilities to deter an adversary—will provide a completely new kind of capability. The 2020 FSP also included three lines of investment for long-range rocket and missile systems with a total of $3.2–4.8 billion. It was suggested by numerous commentators at the time that the logical solution to that requirement was the US High Mobility Artillery Rocket System (HIMARS), which the US Army and Marine Corps use and which they have demonstrated on exercises here (Figure 4.5).

Figure 4.5: The US Army and US Marine Corps use HIMARS to launch rockets during a firepower demonstration at Shoalwater Bay Training Area, Queensland, during Exercise Talisman Sabre 2021

Source: Defence image library.

HIMARS is a wheeled vehicle that can carry a pod of six rockets from the multiple-launch rocket system family or one Army Tactical Missile System (ATACMS) missile. The MLRS rockets have a range of at least 70 kilometres. That's already longer than SPH, however a new extended range version has a range of over 150 kilometres. The ATACMS missile has an even greater range of over

300 kilometres, but the HIMARS can only carry one. HIMARS is air transportable by both C-17s and C-130Js, meaning the system can be rapidly deployed around our region.

On 26 May 2022, the US Department of Defense announced that Australia had been approved to acquire 20 HIMARS along with Guided Multiple Launch Rocket Systems rockets, pods and a small number of ATACMS. The estimated cost is US$385 million (c. A$540 million).[123]

Earlier, in August 2021, the government had announced that Australia was contributing $70 million to enter into a cooperative development program with the US for the Precision Strike Missile (PrSM).[124] This missile will replace the ATACMS and will also be launched from HIMARS, with two per pod. Public statements by its manufacturer put its range at 499 kilometres,[125] but that number was simply the maximum range that the US and Russia were allowed for ground-launched missiles under the Intermediate Nuclear Forces Treaty. With the treaty now suspended, it's likely that PrSMs will have greater range, particularly since a key reason the US left the treaty was to be able to counter longer range Chinese missiles that weren't covered by it. The US is also seeking to give PrSMs a moving-target capability against land and maritime targets as well as sufficient survivability to defeat air defence systems.

The 2016 DWP also contained a line for a land-based anti-ship missile valued at $400–500 million. No further announcements have been made. The Naval Strike Missile (NSM), which is being acquired for the Navy's major surface combatants, would appear to be a good candidate, particularly since acquiring it for the Army would help generate the economies of scale required to support local manufacture. But the PrSM could also be a candidate should its maritime capability mature.

Taken together, these capabilities will fundamentally change the Army's horizons. Of course, it will have to develop the necessary operating concepts and command and control systems in order to employ the new systems, but the US Marine Corps offers a useful template to learn from.

LAND 19 Phase 7B—Ground-based air defence

Ground-based air defence	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	1,216	592	149	212
Other project inputs to capability	287	15	11	23

LAND 19 Phase 7B is not an indirect fire project *per se*, but the step-up it will deliver in range and overall air defence capability compared to the current RBS-70 system is similar to the step-up from towed howitzers to long-range missiles. As this project is leading the Army's move into 'the age of missiles', it's important to get it right. The project is tracking well, and it's now in the ANAO's MPR, so there's good data to support that assessment. It's on track for its IOC in June 2023 and full operating capability (FOC) in June 2026. Overall, the concept seems to be a good one, integrating a relatively proven overseas combat management system, missiles that are already in the ADF inventory, Australia's world-leading phased-array radar and Hawkei vehicles.

LAND 121 program

The recapitalisation of the Army's truck fleets is also nearing completion. LAND 121 is the Army's complex of truck projects. It's been a long journey, but it's nearly complete. All G-Wagons have been delivered. The medium and heavy component has achieved IOC, and the Hawkei has entered full-rate production. But what do all those trucks cost? In short, over $7 billion. Table 4.1 sets out the most recent public data.

Table 4.1: Cost of LAND 121 project phases ($ million)

Phase	Title	Vehicle solution	Spend to date	Total approval
LAND 121 Phase 3A/5A	Field Vehicles and Trailers	Mercedes G-Wagon	900	900
LAND 121 Phase 3B	Medium and Heavy Capability	Rheinmetall MAN vehicles	2,749[a]	3,400
LAND 121 Phase 5B	Tactical Training Vehicles	Additional Rheinmetall MAN vehicles	717	1,399[b]
LAND 121 Phase 4	Protected Mobility Vehicle—Light	Hawkei	1,525	1,963[b]
Total			**5,891**	**7,662**

Sources: PBS, Defence annual reports.

[a] *No public data after 30 June 2021.*

[b] *Includes Other Project Inputs to Capability.*

LAND 121 Phase 4: Hawkei protected mobility vehicle—light

Hawkei PMV-L	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	1,963	1,525	325	170
Other project inputs to capability	0	0	-	0

The Hawkei protected mobility vehicle—light (PMV-L) has had a long path. The photo in Figure 4.6 was taken at an amphibious trial using a prototype of the vehicle in September 2013. The project has overcome a range of challenges, such as failing blast protection performance tests, reliability problems, the collapse of the Austrian engine supplier, and brake failures. But the Hawkei will be a very valuable addition to ADF capability, offering remarkably high levels of protection for a small vehicle that's still able to be transported slung from a CH-47F Chinook helicopter. It's also being used as the vehicle for other capabilities, such as the Army's air defence project.

Ironically, once the vehicle finally entered full-rate production in September 2020, it's all going to be over very quickly, as deliveries are to be completed in July this year. Spending is ramping down quickly: only $170 million is planned for 2022–23, compared to $325 million achieved in 2021–22. It's not clear what that means for Thales's Bendigo facility. That's the problem with having a local defence industry: once you've set it up you need to keep feeding the beast or suffer 'valleys of death'. For now, there should be significant maintenance and upgrade work on the ADF combined fleet of around 2,000 Bushmasters and Hawkeis.

Figure 4.6: Amphibious trials of a Hawkei PMV-L prototype in September 2013

Source: Author's photo.

LAND 400 Phase 2: Boxer combat reconnaissance vehicle

Boxer CRV	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	5,606	1,851	399	509
Other project inputs to capability	121	44	15	11

We'll now move to the Army's armoured vehicle projects. Of course, the survivability of armour has become an even more debated topic since the Russian invasion of Ukraine. The Army's approach to ensuring survivability has been a combination of increased physical protection, leading to massive increases in size and weight, improved situational awareness provided by more advanced sensors and, in some cases, active defence systems that defeat incoming projectiles in flight. That all comes at significant financial cost.

The first project in the Army's $30–40 billion program to recapitalise its armoured vehicle fleets is the fleet of 211 Boxer combat reconnaissance vehicles that gained second-pass approval in 2018. There's no question that the Boxer will be a vast increase in capability over the current ASLAV (Australian light armoured vehicle) fleet. Nevertheless, the Boxer has many of the hallmarks of defence megaprojects; they take a long time to get into production and consume a huge amount of resources before they deliver any useful capability. The Boxer underachieved against its targeted spend of $520 million in 2021–22 by around $100 million (admittedly, like many projects), managing to move $414 million. That will get it by the end of 2021–22 to a spend of $1,895 million. Considering that that has delivered only the first tranche of 25 vehicles that were built overseas and are likely to remain training vehicles due to their configuration, it's tying up a lot of money for limited return to date. Local production is meant to start this year, and the first vehicles are to come off the assembly line next year. The FOC schedule has remained unchanged for June 2027.

There's been extensive media speculation about technical difficulties, but those don't appear to be borne out by the ANAO MPR. Perhaps the biggest issue is that the Boxer may have a glass jaw. Defence officials stated at Senate estimates earlier this year that it's not fitted with active protection systems. That seems quite remarkable, considering that the cost per vehicle averages out at over

$27 million. Moreover, one of the drivers of the project was to improve the survivability of the combat reconnaissance capability. Officials' justification of the lack of active self-protection was that 'its mission profile doesn't require it, whereas the [LAND 400 Phase 3] infantry fighting vehicle does because it's in the most dangerous situations.'[126]

It seems strange to suggest that a combat reconnaissance vehicle won't be in the most dangerous situations when scouting out the enemy. And if there's one thing we can see in the war in Ukraine, it's that any vehicle can be struck by lethal weapons almost anywhere at any time, not just when they are directly assaulting the enemy's prepared defensive positions. Overall, it seems remarkable that, despite the size of the investment, and a size triple that of the vehicle it's replacing (imposing a range of penalties in terms of deployability), the Boxer is still going to have a serious gap in its protection. Officials did say that they'll keep looking into it.

The Boxer is not yet in the sustainment top 30, but it's only a matter of time once vehicles start coming off the Australian production line. Based on an economic impact statement on the Boxer released by Defence, we've argued previously that the annual sustainment cost of the vehicle could average $1 million per vehicle making the fleet five times more than the ASLAV. This would also mean that the Army's armoured vehicle fleets would cost more than the Collins submarines, which are currently the ADF's most expensive capability.[127]

Second-pass approval for the Boxer's much bigger sibling, the $18–27 billion IFV project, is nearing. Officials have told Senate estimates that government consideration of the preferred solution is planned for the third quarter of 2022. Senators quite reasonably asked whether, in the light of the need to find billions in offsets for ASD's REDSPICE program, Defence had considered cutting the planned number of IFVs down from 450. The officials were rather cagey in response.[128]

Tanks

An upgrade to the Army's Abrams tank fleet was included in the investment program in the 2016 DWP, with a provision of $0.75–1 billion. The 2020 FSP didn't schedule a replacement until well after 2030 and only had a 'tank assurance' line in the early 2020s. Nevertheless, in January 2022, the government announced an enhancement of the tank capability, but it's more of a replacement and enlargement rather than an upgrade of the existing 59 tanks. According to the announcement, the Army will acquire 'up to' 75 M1A2 SEPv3 Abrams tanks, 29 M1150 assault breacher vehicles, 17 M1074 joint assault bridge vehicles and an additional six M88A2 armoured recovery vehicles. While the tanks themselves will feature significant improvements over the Army's current Abrams, the addition of engineering and bridging vehicles will also improve the versatility of the capability.[129]

The government stated that the cost would be $3.5 billion. That's more that the combined tank assurance and combat engineering vehicle lines in the FSP ($1.5–2.3 billion) but significantly less than the FSP's tank replacement line ($8–11.9 billion). The tank project is not yet in the PBS top 30.

Incidentally, despite claims about the high cost of operating tanks, the Army's Abrams tank fleet has never appeared in the top 30 sustainment products.

The Army's digitisation efforts restarted

Digitisation has been one of the Army's highest priorities for several years. It's meant to be the glue that holds all its other capabilities together. LAND 200 was delivering a complex of aggregated projects, including the Army's battle management system (BMS), distributing information about the battlefield between headquarters and vehicles. We covered the long and rather tortured LAND 200 BMS saga in some detail last year (but in nowhere near the detail of the ANAO's very excellent 2019 audit report titled *Modernising Army command and control—the Land 200 program* and the 2020–21 MPR) and won't repeat it here. But, in short, last year (after well over $1 billion had been spent for

limited capability), things came to a crashing halt for reasons that were only partially explained. Consequently, Defence removed BMS software and hardware from its vehicles and used a stopgap system in its headquarters.

The scale of the project pause can be seen in the fact that LAND 200 spent only $7 million in 2021–22 against an initial target of $156 million. However, the target for 2022–23 is back up to $164 million, suggesting that whatever caused the problem has been resolved. However, the PBS is very light on details, saying that Defence 'will continue to work with the supplier'. Defence provided ASPI with the following information: 'Elbit Systems Ltd (Elbit) and Elbit Systems of Australia (ELSA) are contracted to deliver software releases in order to progressively develop the Battle Management System. Defence continues to work collaboratively with Elbit and ELSA on the delivery of the Battle Management System. The Elbit Battle Management System has not been withdrawn from service and remains in use within Army's training system.'[130] So it's not dead, but it's not clear where it's going.

Army aviation—MRH-90/Black Hawk

On 15 January 2021, the government announced that it would acquire Apache attack helicopters to replace the Tiger armed reconnaissance helicopters, which had consistently struggled to meet various performance targets. Some commentators suggested at the time that the MRH-90 utility helicopter was a more pressing candidate for replacement, considering it had been on the Projects of Concern list for nearly a decade, consistently missed flying-hour targets, and was costing on average $35,000 per hour to operate despite repeated ministerial interventions with industry.[131]

The biggest development in Army aviation in the past year is that the government's patience with the MRH-90 has finally run out. It has announced that the MRH-90 will be replaced by a fleet of up to 40 Black Hawk helicopters.[132]

The announcement didn't include a budget, and the US DSCA hasn't yet notified Congress of State Department approval (a document that provides the cost of the sale). Defence officials informed Senate estimates hearings that the MRH-90 was previously intended to be in service until 2037, that the savings in sustainment costs of operating Black Hawks would be sufficient to cover the cost of acquiring them and that 'overall there would be an improved cost of ownership', even taking the acquisition cost of the new fleet into account. Of course, that picture would have been even better if we had cancelled the MRH-90 earlier. Better late than never.

The MRH-90 continues to be extremely expensive to operate; its $303 million this year makes it the fifth most expensive in Defence and the highest in the Army. But perhaps the most galling aspect of the whole history is that the MRH-90 is still in the top 30 acquisition projects. Surely we can stop shovelling money at it now.

MRH-90	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	3,771	3,522	67	116
Other project inputs to capability	24	24	10	–

2020–21 sustainment	2021–22 sustainment	2022–23 sustainment
279	276	328

With the acquisition of new Black Hawks, the acquisition of light helicopters dedicated to special forces tasks through project LAND 2097 Phase 4 appears to be surplus to requirements, as least for now. In response to a question from ASPI, Defence said that 'the Australian Government has approved the deferral of LAND 2097 Phase 4 to focus on the replacement of the MRH90 Taipan.'[133] Whether that's a temporary or permanent deferral remains to be seen.

Army aviation—Tiger/Apache

The acquisition of the Apache has not yet entered the PBS's top 30 acquisition projects. During the election campaign, the previous government stated that the Apache will cost $5.5 billion plus $500 million for facilities.[134] The US DSCA has stated that the Apache and associated equipment will cost US$3.5 billion.

We commented last year that it seems strange to invest billions in replacing the Tiger now with a crewed platform that will not survive on the battlefield against peer or even near-peer adversaries. If insurgents in Iraq and Afghanistan could shoot down Apache helicopters, any adversary armed with modern anti-aircraft systems will be able to do so without much trouble. That view appears to be confirmed by the conflict in Ukraine. At the time of writing, the Ukrainian military is claiming that it has destroyed 163 Russian helicopters. Even if that's an exaggerated number, video evidence suggests that the real number is very substantial. Unfortunately, Defence was fixated on replacing the platform with a similar platform and missed an opportunity to explore effects-based solutions. In the meantime, the Tiger armed reconnaissance helicopter will cost $164 million to operate this year.

Army aviation—CH-47F Chinook

A bright spot in the Army's aviation capability adventure is that the CH-47F fleet is expanding. The US DSCA notified Congress on 29 April 2021 that Australia was seeking to acquire four additional CH-47F Chinooks at a cost of US$259 million.[135] That would bring the fleet to 14. It's a good move. The Chinook is the only ADF helicopter that can lift the Army's towed howitzers and Hawkei vehicles. Despite its large size, it can still operate from the Navy's LHDs in amphibious roles. This purchase wasn't foreshadowed in the FSP, which said only that Defence would continue to operate the Chinook. The first time our government mentioned it was at the same time the first two helicopters were being unloaded at Townsville on 8 July 2021. [136]

The Chinook has never appeared in the top 30 sustainment products. That would suggest its hourly flying cost is significantly less than that of the MRH-90s, despite it being much larger and more capable than the latter.

Army aviation—UAVs

On 11 March, the government announced that Boeing Insitu Pacific's Integrator was the preferred solution to LAND 129 Phase 3's competition for the Army's new tactical uncrewed aerial vehicle (UAV). The total budget is $650 million, of which $307 million is the contract with Insitu.[137] The Integrator draws on the heritage of the ScanEagle, which has been operated by the Army in the Middle East and by the Navy's 822X Squadron. The media release stated that 'production has already commenced', suggesting that the government had been sitting on the announcement for a while. The Integrator is not armed, so the ADF is still waiting for its first lethal autonomous or uncrewed system.

Other land capabilities

Progress is being made on Defence's smaller amphibious ships. A tender has been released for up to 18 littoral manoeuvre vessels—medium, replacing the aged LCM-8 fleet. Essentially, these will be landing craft with some ability to operate independently, providing the Army with greater inshore amphibious capability. The IIP also contains a line to acquire larger amphibious vessels (presumably a

modern version of the retired LCH fleet). While the Army doesn't like to see itself as a marine corps, between new light amphibious vessels, deployable long-range fires such as HIMARS and the Air Force's airlift assets, the ADF is accumulating all the building blocks necessary to execute an operating concept such as the US Marine Corps's expeditionary advanced base operations.[138]

During the election campaign, the previous government announced a $1 billion upgrade to special forces capability under Project Greyfin[139] and agreement to the first tranche of the Lethality Systems Project (LAND 159) for $527.2 million.[140]

4.3 Air capabilities

Air combat—AIR 6000: F-35A Joint Strike Fighter

F-35A	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	15,796	10,796	1,918	1,261
Other project inputs to capability	1,727	1,534	10	0

2020–21 sustainment	2021–22 sustainment	2022–23 sustainment
258	314	328

The Air Force's air combat capability transition is nearing completion, at least in terms of aircraft deliveries. Figures A9 and A10 in 'Defence in 10 tables' show that flying hours provided by the new fleets now match those of the old F-111 and 'classic' F/A-18 A/B fleets but exceed them greatly in terms of sustainment costs.

F-35A IOC was achieved in late 2020, and the Air Force is pressing on towards FOC in December 2023. All facilities are complete. This year, it's aiming to stand up a squadron at Tindal in the Northern Territory. After averaging around $2 billion per year over the past four years ($2,566 million in 2020–21 was a record for any Defence project), spending is ramping down to $1,261 million this year, which is still the largest project spend for the year due to the cancellation of the Attack class.

2021–22 continued the pattern of achieved flying hours increasing, while at the same time getting progressively worse as a percentage of planned flying hours (Table 4.2); 2021–22's achieved hours are a very substantial 60% increase on the previous year but only 60% of an unrealistic target. Last year, we wondered what the point of the PBS's estimated flying hours was; persistent underachievement didn't stop the Air Force achieving IOC or result in it revising either its short- or long-term targets downwards.

This year, however, the Air Force has finally revised its targets. The target for this year is down to 12,000 from around 14,500. The long-term target for the end of the forward estimates is down from 14,900 to 13,500. Those revisions are a good thing; if the Air Force can achieve its training and preparedness goals flying fewer hours, there's no point punching holes in the sky at great cost.

Table 4.2: F-35A flying hours, planned and achieved, 2015–16 to 2025–26

	2015–16	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25	2025–26
2015–16	500	500	752	2,000							
2016–17	468 (94%)	500	752	2,538	4,564						
2017–18		408 (82%)	752	2,538	4,564	8,204					
2018–19			702 (93%)	2,538	4,564	8,204	11,831				
2019–20				2,036 (80%)	4,564	8,204	11,831	14,519			
2020–21					3,097 (68%)	8,204	11,831	14,519	14,900		
2021–22						4,960 (60%)	11,831	14,519	14,519	14,900	
2022–23							8,773 (74%)	12,000	12,500	13,000	13,500

Actual achievement (with achieved % of flying hours)	PBS estimate for the year	PBS estimate for forward estimate years

Sources: Defence annual reports, PBS.

Sustainment costs are also heading in the right direction. Table 4.3 shows the four years for which we have data. They may not be achieving the hourly flying costs predicted in successive PBSs, but that's because they were based on the unrealistic flying targets discussed above. 2021–22's estimated result will be $35,792 per hour, down significantly from $61,354. It's not as low as for the classic Hornet, but substantially less already than for the combined Super Hornet / Growler fleet.

Table 4.3: F-35A hourly flying costs, predicted versus actual, 2019–20 to 2022–23 ($)

	2019–20	2020–21	2021–22	2022–23
Budget estimate	41,849	32,545	18,257	27,333
Actual	61,354	54,435	35,792[a]	

[a] *Estimated actual only*

Sources: PBS, Defence annual reports.

Air combat—Super Hornet / Growler

Growler airborne attack capability	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	3,436	2,839	168	176
Other project inputs to capability	366	352	1	–

Advanced Growler development	Total approved budget (PAES 2021–22)	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	520	351	81	?
Other project inputs to capability	70	18	9	?

2020–21 sustainment	2021–22 sustainment	2022–23 sustainment
455	442	532

Despite getting second-pass approval 10 years ago, the original Growler project has not closed. According to the PBS, the main task for this year is to 'continue integration works of the Mobile Threat Training Emitter at the Delamere Air Training Area in the Northern Territory'. That's a system that pretends to be an air defence network for the Growler to practise suppression techniques against. Its planned spend is $208 million this year.

Meanwhile, the 'Advanced Growler' upgrade that Australia is conducting as a cooperative program with the US Navy is continuing. Its spend this year has fallen out of the top 30, but the total approval in the 2022–23 PBS of $520 million is just the tip of the iceberg, as Defence's website lists a $5–6 billion total cost.

The combined Super Hornet / Growler capability has cemented its place as Defence's second most expensive capability: the estimated cost of $442 million in 2021–22 jumps to $532 million this year. It is hard to imagine that 35 aircraft cost more to sustain than 28,000 tonnes of frigate, but there it is. The F-35A's hourly flying cost at $35,792 in 2021–22 is already well below the Super Hornet / Growler's ($60,548).

Air combat—Hawk Lead-in Fighter Capability Assurance Program

Hawk Lead-in Fighter CAP	Total approved budget	Spend to 30 June 2022	Achieved spend in 2020–21	Planned spend in 2022–23
Equipment	590	100	?	148
Other project inputs to capability	—	—	—	—

2020–21 sustainment	2021–22 sustainment	2022–23 sustainment
168	165	186

In June 2020, Defence created a bit of a stir among observers of military capability by putting out a request for information on options for the next generation of lead-in fighter capability.[141] Considering that the Air Force's current lead-in fighter, the BAE Hawk 127, had recently completed an extensive and by all accounts successful upgrade to better enable it to prepare pilots for the F-35A and Super Hornet, observers wondered why Defence was looking to replace it. The 2020 FSP, which appeared the next month, was completely silent on the future of fast jet training systems.

The mystery was eventually explained. In May 2019, the Hawk fleet was grounded for three weeks due to an engine problem.[142] Ultimately, the issue was so severe that the existing engines could not be remediated. The request for information was intended to help Defence understand the range of options, from an expensive engine replacement to a replacement of the entire aircraft. In January 2022, the Minister for Defence announced that the engines would be replaced.[143]

According to the 2022–23 PBS, the cost of that replacement will be $590 million. That's a lot, but certainly less than replacing the entire fleet, particularly since that would mean writing off the sunk cost of the earlier $270 million upgrade project.

Sustainment for 2022–23 is $186 million. Over recent years, flying hours have been declining and hourly flying costs increasing significantly. One assumes this is related to the engine problems. Hopefully, the engine replacement will remediate that.

Air-launched weapons

There's a lot going on in the acquisition of air-launched weapons. AIR 6000 Phase 3 is acquiring air-to-surface weapons (total approved budget of $750 million). AIR 6000 Phase is acquiring air-to-air missiles (total approved budget of $840 million).

The previous government also announced (several times) the acquisition of the long-range anti-ship missile (LRASM) for the P-8A and Super Hornet as well as the JASSM-ER for the Super Hornet and F-35A.[144] It's difficult to disaggregate the cost of those weapons, since the various announcements lump together several missiles, platforms, or both.

Air Force UAVs—AIR 7000 Phase 1 (Triton)

Triton	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	1,997	679	284	285
Other project inputs to capability	500	57	10	24

The long saga of the Triton high-altitude, long-endurance unmanned aircraft system (UAS) continues. Two years ago, its future looked a little wobbly when the US Navy put a two-year production pause in place due to other budget priorities.[145] Australia kept ordering its aircraft to help Northrop Grumman's production facilities keep going. The good news for the program is that the two-year production pause announced in the US Navy's FY 2021 budget papers is over. Its FY 2023 budget documentation states that 'The FY 2023 request reflects a Department decision to resume Triton aircraft production in FY 2023 and FY 2024 … Production of the remaining aircraft continues through FY 2027.' The

US Navy is aiming for a fleet of 65 aircraft.[146] In addition to that, the latest budget contains funding to upgrade early production aircraft to modern configurations as well as to modernise airframes, engines and avionics. [147] It's good to know that Australia's senior partner is committed.

The Australian Government has adopted one of the strangest approval strategies in Defence's acquisition history, incrementally approving single aircraft (we're now at three and aiming to get to six or seven). The total approved budget so far is just short of $2 billion, but that will go up as further aircraft are approved, probably to over $2.5 billion.

According to the latest ANAO MPR, IOC is now forecast for between July 2025 and June 2026—a delay of 12–24 months. FOC isn't until after June 2030. The long saga still has a long way to go.

Air Force UAVs—SkyGuardian

After years of Defence consideration of armed UAVs, the 2016 DWP stated that the Air Force would actually acquire an armed, medium-altitude unmanned aircraft. On 16 November 2018, the government announced that it had down-selected to a variant of the General Atomics MQ-9 Reaper and, one year later, announced that the variant would be the MQ-9B SkyGuardian. Defence's website said that second pass will be in 2022.[148] That suggests that IOC will be well into the mid-2020s—around nine years after the government first announced that it would acquire the capability. It's also around 25 years after the Reaper first flew and 18 years after it first flew on operations in the Middle East. We're certainly not early adopters in this space.

So it was somewhat surprising when Defence officials informed Senate estimates hearings at the start of April this year that the SkyGuardian had been cancelled as an offset to fund ASD's REDSPICE program. We can argue whether SkyGuardian was the most appropriate armed UAS for the ADF (something smaller and cheaper that we could build here in larger numbers has been suggested as an alternative). I might have taken SkyGuardian over the Apache attack helicopter. But SkyGuardian wasn't cancelled in order to acquire a more suitable system, and the ADF is still without an armed UAS.

It's not clear how much funding was freed up by the cancellation. The Australian Government announced in November 2019 that SkyGuardian was a $1.3 billion program, but the FSP increased that to $1.6–2.4 billion.[149] In April 2021, the US DSCA informed Congress that Australia had been approved to acquire 12 MQ-9B SkyGuardian air vehicles and associated equipment for US$1.651 billion (around A$2.15 billion).[150] Since there were likely to be significant other project inputs to capability in addition to the US agency's figure, even $2.4 billion was looking a little short.

Officials have informed Senate estimates that only $10 million had been spent by the time of cancellation, so it doesn't appear that Defence was pursuing the acquisition with any urgency.

Air Force UAVs—Loyal Wingman / Airpower Teaming System / MQ-28A Ghost Bat

The Air Force's first armed UAS could be the newly renamed MQ-28A Ghost Bat, which was formerly the Loyal Wingman / Boeing Airpower Teaming System (BATS, get it?). Defence has been reluctant to discuss what roles or capabilities the aircraft will have, but it's increasingly clear that it won't be a persistent surveillance asset like the Reaper. Rather, it appears that it will be flying fast jet air combat roles, either with air combat aircraft and their enabling aircraft such as the Wedgetail or alone. Boeing has stated that ground testing of payloads has begun.[151]

The government announced $115 million for three more aircraft on the occasion of Ghost Bat's first flight in February 2021.[152] The government had stated that total approved funding to date is 'more than $150 million'.[153] However, during the election campaign, the Morrison government announced a further $424 million to continue development and deliver a further seven aircraft.[154] The total provision

in the FSP for 'teaming air vehicles' is $7.4–11 billion. Boeing's announcement in September 2021 that it will build the production aircraft in Toowoomba, Queensland, was good news for Australian industry.[155] Boeing has since said that production aircraft will be delivered from that facility by the middle of the decade and Defence Minister Peter Dutton stated that the Ghost Bat was expected to enter service in 2024–25.

AIR 7000 Phase 2B: P-8A maritime patrol aircraft

P-8A MPA	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	5,639	4,331	132	305
Other project inputs to capability	936	747	114	69

2020–21 sustainment	2021–22 sustainment	2022–23 sustainment
127	132	197

The Air Force's order for P-8As has steadily increased from eight to 12 to 14, which is a good thing in the light of the aircraft's broad capability and their range. Plus, the aircraft exists, so we get a quick return on investment. While the government has said that it will be accelerating the acquisition of the NSM and the JASSM-ER, it hasn't said whether it would accelerate the previously announced acquisition of LRASMs for the P-8A. That would also be worth pursuing if it's feasible.

We now have around six years of data for the P-8A in Australian service. Hourly flying costs have been stable and achieved flying hours have been steadily increasing (Table 4.4). The jump up to 7,200 planned hours in two years' time is probably the result of acquisition of the final two aircraft. The AP-3C maritime patrol fleet averaged around 7,500 hours, so the P-8A is still short of that but the combined future P-8A/Triton maritime patrol fleet will dramatically exceed it once the Triton eventually enters service.

Table 4.4: P-8A flying hours, 2016–17 to 2025–26 and hourly flying costs, 2018–19 to 2022–23 ($)

	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25	2025–26
Flying hours	519	2,774	4,564	4,848	4,939	5,200	6,600	6,600	7,200	7,200
Hourly cost ($)			24,540	29,500	28,953	25,385	29,848			

Sources: PBS, Defence annual reports.

AIR 555 Phase 1—MC-55A Peregrine long-range ISREW aircraft

MC-55A Peregrine	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	2,234	1,584	328	309
Other project inputs to capability	558	207	101	129

2020–21 sustainment	2021–22 sustainment	2022–23 sustainment
–	–	94

Despite its $2.5 billion plus price tag, Defence's future signals intelligence fleet of four MC-55A Peregrine long-range ISREW (intelligence, surveillance, reconnaissance and electronic warfare) aircraft hasn't garnered a lot of attention. That's the way Defence likes it. From the little public information available, the project appears to be progressing well. Defence doesn't discuss the exact capabilities of the aircraft. The sight of the first aircraft flying in the US with an extensive array of lumps, bumps and antennas has prompted speculation among plane spotters.[156] Regardless of what they are, the Peregrine is likely to be very capable electronic warfare and signals intelligence (SIGINT) platform. It could be to SIGINT what the Wedgetail is to airborne early warning and control (AEW&C); the Wedgetail is so good the USAF has chosen it to be its own AEW&C aircraft (after Turkey, South Korea and the UK also acquired it). We should also note that the multi-INT version of the Triton that Defence is acquiring also has a SIGINT package, so Defence should have substantial SIGINT collection capability.

With over half the total budget spent and a further $309 million planned for 2022–23, the aircraft should start being delivered soon. That's reinforced by the fact that sustainment spending is starting: the system is vaulting into the sustainment top 30 at $94 million, even though only 450 flying hours are planned.

AIR 6500: Integrated air and missile defence

Joint Air Battle Management System	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	352	70	?	115
Other project inputs to capability	86	9	?	9

According to the PBS, Phase 1 of AIR 6500 'will provide a Joint Air Battle Management System which will form the architecture at the core of the ADF's future Integrated Air and Missile Defence capability'. That's the system that's meant to hold together all of the air capabilities we've just discussed. Things had been very quiet until August 2021, when the government announced that it had down-selected to two contenders: Lockheed Martin Australia and Northrop Grumman Australia. According to that announcement, the total provision is $2.7 billion.

The project is in the acquisition top 30 for the first time with a planned spend of $124 million. That's unusual because the PBS says that, in 2022–23, the project's focus is on tendering for a strategic partner, which indicates that it's not at second pass yet, even though its total approved budget is $438 million. That's a lot of money when you haven't started acquisition of the solution. It suggests that Defence is using an incremental approval strategy and spending significant sums up front to mitigate risks and understand the solution space.

AIR 8000 Phase 2: C-27J (formerly Battlefield Airlifter)

2020–21 sustainment	2021–22 sustainment	2022–23 sustainment
83	81	?

The C-27J Spartan transport aircraft (Figure 4.7) has consistently missed flying-hour targets. It's also been extremely expensive to operate, costing more per hour than a massive C-17A. It's got all the hallmarks of a perennial underperformer along the lines of the MRH-90 and Tiger armed reconnaissance helicopter. Defence brought this upon itself by selecting the C-27J as a frontline battlefield airlifter even though the USAF was divesting itself of the platform. It's cost Defence hundreds of millions to maintain the advanced capabilities of its C-130J's fleet, such as electronic warfare self-protection, and there it can leverage the USAF's investment in its own fleet. It was never going to be viable for the RAAF to do the same for the C-27J without the USAF.

Fortunately, Defence is finally accepting reality. First, in the 2021–22 PBS, Defence revised the 'sustainable rate of effort' (that is, its mature-state goal) down from 7,500 hours to 5,500. That's still 64% more than it's been able to achieve, but at least it's a more realistic goal. Then, in July 2021, Defence announced that the C-27J would focus on regional humanitarian and emergency response.[157] It's a positive development; it removes the need for expensive self-defence capabilities and gives the ADF a platform dedicated to the growing emergency response role.

In 2021–22, based on the PAES's revised estimates, it still achieved only 3,700 hours, but that's still better than in any previous year, and the cost came down dramatically from $30,000 per hour to just under $20,000. The system is aiming for 5,500 hours in 2022–23. It has now fallen below the cut-off point for the sustainment top 30 ($81 million), suggesting that its more focused role will result in lower cost of ownership. If it can deliver 5,500 hours a year for something less than $81 million (that is, around $15,000 per hour), that will be a good outcome.

Figure 4.7: A RAAF C-27J Spartan transport aircraft delivers critical food supplies to Coober Pedy in South Australia, after the region was cut off by floodwater

Source: Defence Image Library, online.

4.4 Joint and advanced capabilities

Sovereign guided weapons enterprise

In the 2020 DSU, the government directed Defence to examine 'the potential for a new sovereign guided weapons and explosive ordnance production capability to mitigate supply risks, especially for those munitions with long lead-times'. On 31 March 2021, the government announced that it would establish a guided weapons 'enterprise' and accelerate the development of a sovereign guided weapons manufacturing capability.[158] The foresight of that decision has been confirmed by the key role precision-guided weapons are playing in the war in Ukraine.

Since then, the government has announced two 'strategic partners' in that enterprise: Raytheon Australia and Lockheed Martin Australia. That was hardly surprising, considering that between them they produce the vast majority of the ADF's guided weapons. The government has announced the acquisition (sometimes 'accelerated') of various guided weapons from overseas,[159] but it hasn't announced which weapons will be produced in Australia and how that would be done.

AUKUS advanced technologies

In addition to SSNs, the original AUKUS announcement on 16 September 2021 also referred to cooperation on four areas of advanced technology:[160]

- cyber capabilities
- artificial intelligence
- quantum technologies
- additional undersea capabilities.

On 6 April 2022, the AUKUS leaders released a second joint statement that announced additional areas for collaboration:

- hypersonic and counter-hypersonic capabilities
- electronic warfare
- innovation
- information sharing.

While working groups have been formed to commence trilateral activities, so far there have been no statements about funding commitments or specific projects in any of those areas.

Space capabilities

The 2020 DSU got serious about space. In contrast to previous strategic documents, such as the 2016 DWP, which emphasised ensuring bandwidth, resilience and redundancy but didn't specify how that would be done, the DSU was much more forthright, stating that the government's plans 'include communications satellites and ground control stations that will be under sovereign Australian control, increasing our self-reliance and resilience'. Overall, the DSU put much greater emphasis than previous policy on acquiring sovereign space-based assets rather than simply obtaining space services or access to allies' capability. The DSU also established space as a domain. Its overall investment in the space domain was $7 billion over the coming decade. The DSU listed only four investment lines in the domain, but, over the two decades, the combined provisions of those lines are very respectable at between $9.0 billion and $13.4 billion.[161]

Recently, then Defence Minister Peter Dutton announced the establishment of Defence Space Command under a two-star officer.[162] The command isn't a separate service. It reports to the Chief of Air Force but has joint staffing. The minister also released the Defence Space Strategy.[163] Crucially, the strategy explicitly sees itself as part of a larger national space enterprise working with the Australian Space Agency and the space industry. The space strategy, however, doesn't list planned defence space projects.

It's difficult to determine how much Defence is spending on space capabilities. Because Australian Space Command is not a group or service in its own right, it isn't a program in the PBS.

The 2022–23 PBS top 30 acquisition projects list contains one space domain project: Protected Satellite Communications (JNT 9103 Phase 1).

Protected Satellite Communications	Total approved budget	Spend to 30 June 2022	Achieved spend in 2021–22	Planned spend in 2022–23
Equipment	451	153	?	126
Other project inputs to capability	28	11	?	3

On 29 July 2021, the government announced that it had established Defence Project 9358 to explore options for a ground-based space electronic warfare capability. No budget or schedule was provided.[164]

Below the horizon of the IIP's major projects, there are a number of activities being supported by innovation funds and organisations. One example is the Air Force's M2 Cubesat, which is enabling research on satellite formation flying.[165]

Space surveillance capability, including overhead persistent infrared sensors and C-Band space surveillance radar, is part of the Wide Area Surveillance sustainment product (CAF 13) along with JORN. That's estimated at $130 million in 2022–23.

Projects of Concern

According to the 2020–21 Defence annual report, the following two projects remain on the Projects of Concern list:[166]

- AIR 9000 phases 2, 4 and 6 (MRH-90 multi-role helicopters). The MRH-90 has now been a project of concern since November 2011. It's also a sustainment 'product of interest'. It's probably not surprising that the government's patience ran out and it decided to replace the fleet early.

- AIR 5431 Phase 1 (deployable defence air traffic management and control system). The project has been on the list since August 2017.

Chapter 5: Decisions for the new government

Key points

- Defence's current funding line was developed in 2015, when our strategic circumstances were very different. Moreover, it's questionable whether that funding line is sufficient to acquire and operate Defence's capability plan.
- The government can't create a coherent military strategy that aligns ends, ways and means unless it is very clear about what it wants the ADF to do. Is it a bit of everything? Or should the ADF focus on certain roles in particular places?
- The Navy is facing serious capability risk. The government needs to assure itself that Defence has developed a robust hedging strategy to mitigate it. There are many possible options, and many don't necessarily involve ships or submarines.
- Defence is facing serious workforce challenges. It needs to make sure its capability plans are aligned with achievable workforce targets.
- The government has the opportunity to re-set the conversation with parliament and the Australian people. Greater transparency around defence is necessary and possible. But the government needs to empower Defence to release more information.

The new government will be confronted with many decisions relating to national defence. Some of them will be pressing and require immediate attention. Some may require embarking on different courses of action from those recommended by the Department of Defence. Some may require accepting sunk costs—financial and political—and moving on. Virtually all those choices have implications for funding and spending. This chapter examines the broad decision space around the most pressing issues.

It goes without saying that many agencies play a role in protecting national security. This chapter, however, focuses only on the Defence portfolio.

5.1 Defence budget pressures

Perhaps the biggest issue is to decide whether the funding line set out in the 2020 DSU is enough. Before we answer that question, we need to refine it: enough to do what? To provide some context, let's first look at the pressures on the current funding line.

The current funding line was developed in a different era

The funding line set out in the 2020 DSU continues to grow in real terms to 2029–30 (see Chapter 2). But it's important to remember that it's still the same funding line that was set out in the 2016 DWP, albeit with a further four years added on. No increases have been made to it since 2016. However, significant additions have been made to the list of things that those funds are intended to acquire.

The world and our region have changed dramatically, and Australia's strategic circumstances are very different from when the DWP was being developed in 2015. China was only starting its *de facto* annexation of the South China Sea and militarisation of features there. We've also seen the imposition of CCP rule and repression in Hong Kong, the internment of millions of Uyghurs and extended campaigns of economic coercion against countries that merely question those actions, further

revealing the CCP's true colours. With the signing of the Sogavare-Beijing security agreement and China's revelation of a proposed 10-nation regional security agreement with South Pacific nations, China's ambition to play a major, direct role within Pacific states and across our near region is undeniable. Russia's illegal and completely unjustifiable invasion of Ukraine shows that authoritarian states will continue to use armed force to achieve their ends, even if many in the West had come to consider war to be unthinkable.

The relative power balance between the US and China continues to change, and the US is looking to its allies and partners to do more. Considering that the US currently spends around 3.5% of GDP to underwrite the security of those partners, it's a reasonable sentiment.

Is it enough to deliver the force structure set out in the 2020 Force Structure Plan?

In addition to the changing environment, there are other pressures on the defence budget that the new government will need to understand before it considers any adjustments to future defence funding.

The government will need to reassure itself that the DSU funding line is sufficient to deliver the capabilities in Defence's investment plan.[167] It's difficult to speak definitively on the affordability of the future force from outside Defence, but there are clear areas of pressure. They include the following:

- Entirely new ADF capabilities, such as:
    - self-propelled howitzers and land-based long-range fires
    - ballistic missile defence
    - medium-range ground-based air defence
    - large UAVs, such as Triton
    - sovereign-owned space-based surveillance and communications satellites.
- Significant enhancements in size and capability to existing fleets that bring substantial acquisition and operating costs. For example:
    - the doubling of the Navy's tonnage through the acquisition of more and larger ships such as the 10,000-tonne Hunter-class frigates to replace the 3,600-tonne Anzacs and the 1,800-tonne OPVs in place of the 300-tonne Armidale-class patrol boats
    - replacement of the Army's armoured fleet with vehicles that are three times as heavy and orders of magnitude more complex
    - the Army's ground-based air defence system
    - the significantly greater cost of the Air Force's air combat fleet than the fleets it replaced (see Figure A9 in 'Defence in 10 tables')
    - much larger replacement fleets in the later 2020s and 2030s as described in the DSU (in areas such as airlift, air-to-air refuelling and maritime logistics ships)

    - the REDSPICE cyber program doubling the size of ASD and costing $9.9 billion across the decade
    - an increase of 18,500 more people (on top of the growth set out in the 2016 DWP and 2020 DSU)

- The cost of the SSN capability, which will be significantly more than for the Attack-class conventional submarines and for which no additional funding has been included in the DSU funding line. The increased funding will need to cover not only the boats themselves, but also the national infrastructure required to operate the SSN enterprise safely and in accordance with our non-proliferation obligations.[168]
- The phenomenon of Defence's initial costs estimates when capabilities are first entered into the investment program turning out to be significantly less than the final approved budget:
    - The future frigate budget has grown from $30 billion to $35 billion to $45 billion
    - The replacement attack helicopters have grown from $3.4–5.1 billion to $6 billion at approval
- The lack of offsets to cover new costs, since no existing capabilities are being retired without replacement (the only major offset that's been made public is the cancellation of the SkyGuardian armed UAV, which had not yet been acquired).
- Defence's rapidly growing contractor workforce, which is vital to deliver the capability program, but also costs significantly more than public servants and consumes capability investment funds (discussed in Chapter 3).
- Inflation (discussed in Chapter 2), which is already eroding Defence's buying power.

Without visibility of Defence's internal cost estimates, there's no way to definitively say whether the FSP is affordable. But we can also take a high-level, intuitive approach to grasp the size of the challenge. During the Howard and Rudd/Gillard governments, defence spending averaged around 1.7%–1.8% of GDP. Under the subsequent governments, spending grew to around 2.0%–2.1%, and the DSU funding line will sit between 2.1% and 2.2% over the forward estimates (noting that predicting GDP is a fraught activity). Those percentages represent very large growth in terms of both nominal and real dollars, but the cost of military equipment is increasing much faster than inflation. Moreover, that spending growth is only a 20%–30% increase as a percentage of GDP. The question is: is that enough to cover the very large capability increases outlined above? As its first order of business, the government will need to assure itself that it is.

The budget is always full

The defence budget is always full. And because Defence over-programs to ensure that it can still spend all the funding it gets from the government should projects slip, it's more than full. That means that, if any new capabilities are put into the acquisition plan, something has move to make room. Generally, Defence manages this financial pressure by delaying projects. However, in our current strategic circumstances, time is no longer a free good. In fact, it's become the scarcest, most valuable resource for the government and Defence to spend, reversing decades of thinking and policy. Our warning time has evaporated, so we can't continue to delay the delivery of new or replacement capability to some undefined point in the future, particularly when many of the key capabilities in the DSU are already scheduled for the late 2020s and 2030s.

Then there's the blunt stick of cancelling projects. This is the option of last resort for Defence; however, we saw this occur recently with the cancellation of the SkyGuardian project to offset the funding required for the REDSPICE cyber program. This would also indicate that any cash windfall over the next few years generated by the cancellation of the Attack-class submarines has already been used to accelerate the replacement of other priorities, such as helicopters and long-range missiles (see Chapter 4).

Of course, because the budget is always full, a reduction in defence funding also means reductions in capability. As we've discussed in Chapter 2, a reduction from the DSU funding line to a number fixed at 2% of GDP would result in a reduction of around $3–4 billion per year in the near term. Should GDP growth stall, that reduction could be significantly greater.

5.2 First things first: what does the government want the ADF to do?

Is the defence budget enough? Enough to do what? The DSU sets out three tasks for the ADF: shape, deter, respond. But who is it trying to shape, and where? Who is it trying to deter from doing what? And what kinds of undeterred actions is it responding to? Without addressing those questions, it's impossible to generate a coherent force structure, let alone work out what it would cost.

Since the end of World War II, Australia hasn't faced any direct threats. No potential adversary had the intent or capability to project power against us, and even if they did, our US ally's military provided deep insurance. That meant that reinforcing the US's commitment to Australia became the most important task. So, while strategic policy stated that the primary purpose of the ADF was to defend Australia, in practice Defence developed a broad force that could generate a range of options for governments to provide low risk contributions to international—generally US-led—coalitions. This has led to a force that's broad, but not deep, and a design philosophy that emphasises 'options' and the quest for the optimally 'balanced force'—a term of Defence theology that, like much theology, varies in meaning depending on the user's world view but is always used to justify their ideal outcome. It's led to each service getting a very equal share of the pie, as we saw in Chapter 3.

The challenge for planners is that now there's a potential great-power adversary with long reach, and our major ally's resources are stretched. There's no certainty that the US will enjoy qualitative and quantitative superiority in all places at all times or be able to provide us with the military support we require in all circumstances. A recognition of this is driving AUKUS, but what does it mean for our force structure? It raises a number of uncomfortable questions that require hard conversations.

Our previous strategic circumstances also meant that Defence could practise capability-based planning rather than threat-based planning because there were no credible threats. Capability-based planning means you'll have a useful 'chunk' of capability to provide in any contingency. Threat-based planning allows you to focus (witness the turnaround in Ukrainian capability over the past eight years) but it can leave you unprepared for the unpredicted. Our current circumstances, in which there's a growing credible threat, suggest that it's time to practise more threat-based planning.

We won't fight alone (unless the Indo-Pacific becomes a fundamentally different place), but what capabilities do we absolutely have to hold in quantity ourselves? Certainly, our own nuclear deterrent is off the table, but, below that, there are many possibilities, which all depend on how we think that we'll fight.

The 2020 DSU offered the start of a new conversation about force structure, stating that new capabilities were required. Instead of generating an ADF that prioritised the ability to defend itself, it stated that offensive capabilities that could impose cost on a potential great power are needed, including long-range strike. It also referred to asymmetric capabilities—a very different approach for an ADF that has relied on technological superiority. Those statements suggest a force structure that's

intended to deny a major adversary access to our near region. That's supported by some of capabilities listed in the DSU, such as longer range missiles and sea mines.

That kind of force would inevitably be significantly different from a balanced one with a bit of everything. And it could look very different, depending on how far out from Australia a denial concept starts—the acquisition of SSNs suggests a long way out, yet the Air Force's strike capabilities built around fighters are relatively short range. And the enduring question in our force structure debates is 'What is the role of the Army?'

Despite a $48 billion budget that grows over the decade, there's no way that the ADF can develop enough of all forms of military capability to meet all conceivable contingencies. All force structures require prioritisation—and it's better to prioritise consciously than by unconsciously adhering to ingrained theological concepts of balance.

There are no perfect answers to these questions (but there are certainly some very bad ones). Ultimately, strategy is about ensuring that ends, ways and means are aligned. That means the government will need to assure itself that Defence's force design process has a golden thread of logic starting with a clear understanding of what the government wants it to do, working through coherent operating concepts that can achieve those goals, and ending at a robust yet affordable force structure that can put those operating concepts into practice. There's no place for wishful thinking or abstract doctrine divorced from our real-world circumstances.

5.3 The risk to the Navy's capability

We're facing strategic risk in the very extended transitions in the Navy's surface and subsurface combat fleets. That's not because the National Naval Shipbuilding Enterprise won't deliver ships. Rather, there's high risk that it won't deliver the ships we need in the time frames that we need them. Perhaps more than any other area of capability, the shipbuilding enterprise embodies the disjuncture between our strategic circumstances and Defence's investment plan. While a local shipbuilding capability is a good thing, it needs to be able to deliver ships when we need them, rather than produce on a slow and steady drumbeat designed to ensure jobs for the grandchildren of today's shipbuilders.

Those risks have been discussed in detail in other publications. In an era of increasing strategic tension, we face the risk of the Collins-class submarine and Anzac-class frigate ceasing to be relevant capabilities before their replacements arrive. Based on Defence's statements about schedule, it will be the second half of the 2030s before we have useful numbers of Hunter-class frigates and potentially the mid-2040s before we have an SSN capability (as opposed to an initial boat). By that time, the Collins boats will be well into their 40s. Plus we already have a submarine capability gap by any objective measure.[169]

If we were facing major risk in only one of the two fleets, it might be possible to let the current plan take its course, but we can't do that when both fleets are facing similar risks.[170] The options for each fleet are similar but not identical. An element common to both is that, in an era when we no longer have warning time, we don't have unlimited time to identify and then deliver solutions.

The surface fleet

Much has been written about the Hunter class. Analysis has focused on the schedule (which has experienced significant delays so far even before the start of construction), its small number of missile cells compared to other surface combatants, and the potential effect of design changes and compromises.[171] Options to address the risk broadly fall into the following categories:

- Cancel the Hunter and acquire different ships.

- Continue with the Hunter but acquire different ships as well.
- Continue with the Hunter and acquire complementary capabilities.

Regardless of one's view on the Hunter, cancelling it would be as momentous as the Attack-class cancellation, but without a similarly momentous increase in capability from acquiring SSNs as the long-term compensation. The cost of cancellation would include:

- $2,010 million in sunk costs[172]
- over four years of wasted effort
- a further blow to Australia's credibility as an international partner
- alienation of an AUKUS partner, whose assistance will be needed to develop an SSN capability, regardless of which boat is chosen.

Without the compensation of an SSN-like step-up in capability, it's difficult to see those costs being worth paying.

The next broad option is to continue with the Hunter while building other ships. If a mature design were chosen, along with an industry partner with capacity, such an approach could deliver ships faster, but the feasibility of achieving that would need to be well understood. The vessel would have to be an existing design with minimal modifications (which is easy to say, but harder to deliver in practice, particularly if Defence insists on particular weapons, sensors or combat management systems).

Whatever vessel was chosen, significant work would probably need to be conducted overseas due to limitations on capacity at the Osborne shipyard, which is moving towards the start of construction on the Hunter. This could be a hybrid build (such as the LHDs were) with some or, indeed, a lot of work done overseas. While that may be unpopular with some, in a time of crisis countries seek assistance and capability wherever they can find it. Moreover, even under a hybrid build approach, more shipbuilding work in total would be conducted in Australia than is currently planned. Additional Hobart-class AWDs would appear to be an obvious candidate to explore, but once the aperture is opened to consider significant elements of overseas build there are potentially other candidates. The key selection criteria is speed of delivery.

Under this approach we should leave the final number of Hunter-class ships open. The government should certainly not commit up front to the nine originally planned, particularly if the last ones are to arrive in the late 2040s. Supporters of the Hunter will no doubt say that it will be cheaper to commit to all nine up front, or that it will provide 'greater certainty'. We would be wise to remain sceptical of such claims. The United Kingdom only contracted for three vessels in its first batch of Type 26 frigates. And the argument that the magic number is three destroyers and nine frigates is another piece of unsubstantiated Defence theology.

The third option is to continue with the Hunter while putting additional effort into complementary capabilities. Since this option is similar to complementary capabilities for submarines, we discuss it below.

The submarine fleet

In the submarine space, there are also three high-level options. They're not mutually exclusive, and the government could adopt combinations of them. Since the new government expressed support for

AUKUS in opposition, cancelling the pursuit of an SSN capability is not one of the three options discussed.

The first option is to accelerate the establishment of the SSN capability. No doubt the Nuclear-Powered Submarine Taskforce is examining options to do that, but it's important to keep the solutions aperture wide. This could include building the first boats overseas in an existing yard and using that as an opportunity to train Australian workers. Or examining hybrid build options for the first few boats. Or deciding on a division of effort where our partner focuses on construction while we focus on maintenance. Of course, there are many fundamental inputs to capability beyond the boats themselves. We need to address all of them, which makes a significantly faster transition to SSNs unlikely.[173]

The second is to acquire a conventional submarine as a gap-filler; since there are many conventional submarines, there are many sub-options. One broad sub-option is to acquire an off-the-shelf submarine. Granted, any truly off-the-shelf solution that could be acquired quickly would fall short of the Navy's requirements, wouldn't have the same combat system and weapons as the Collins and US Navy boats, and would be identical to many regional capabilities rather than 'regionally superior'—which is why we originally went down the Attack-class path. But if the main requirement is to ensure that we can maintain a submarine capability throughout the long transition to a future SSN capability, an off-the-shelf solution could meet that. Moreover, as we're inevitably confronted with a greater PLA presence in the archipelagos to our near north, a small, stealthy conventional submarine could have an enduring role in those areas and would provide an enduring return on investment, considering that the last SSN mightn't be delivered until the late 2050s.

The other sub-option is to acquire a 'Son of Collins', most likely in the form of Saab's A26 design modified for our purposes. The key would be the extent of the modification. If it's modified to meet the original SEA 1000 requirements for range, combat system and weapons, then we risk a rerun of SEA 1000 and following a path that can't be delivered in time to meaningfully bridge the gap. If the point of a Son of Collins is to mitigate risk in the submarine transition, there needs to be rigorous requirements control.

The government needs to understand the risk calculus of any interim submarine option. What's the minimum capability that we're seeking to acquire to bridge the gap, and how does setting requirements beyond that increase the technical and schedule risk?

Defence has already rejected any bridging submarine option; there's no doubt that trying to operate three very different submarine fleets simultaneously would severely tax a defence organisation the size of Australia's. Capability transitions are hard; it took many years to get the Collins to the point at which it was meeting international benchmarks. There's the risk that, instead of preserving our submarine capability, pursuing too many lines of effort simultaneously could collapse that capability completely.

The third option to address risk in the submarine transition is the same as for the surface force; that is, to look beyond those platforms to acquire other systems. The key is to focus on the effects we seek from frigates and submarines and see how we can achieve them more quickly (and possibly more affordably) with other systems. For example, if one of the effects we seek from SSNs is a long-range strike effect that can act as a conventional deterrent against an aggressor, we could investigate other systems with that capability.

There are many possibilities across the spectrum of cost and technological maturity. One high-end option would be the B-21 bomber currently under development for the USAF (Figure 5.1). It would deliver a massive capability boost. And, if we're looking at effects, it can deliver a broad range of them, including ASW if we consider that ASW can be conducted by sinking boats in harbour or by air-delivered mines. The B-21 could potentially be delivered in useful time frames, but the cost would be

so large (indicatively, $25–30 billion) that it could be met only by cancelling another megaproject (preferably one not already in contract) or by increasing the DSU funding line significantly.

A more affordable option could be long-range strike UAV; however, nothing suitable currently exists. Long-range missiles are another, as are fleets of 'the small, the smart and the many' (that is, fleets of small, virtually disposable systems that can be quickly built at scale, deployed, lost and replaced).

One path that the government should consider urgently is the possibility of 'up-gunning' the OPV fleet. These vessels are about to enter service, have sufficient space to carry lethal capability and can be produced quickly and at scale. One option could include installing the Naval Strike Missile that is already being acquired for larger surface combatants. ASW sensors are another possibility. We can't afford the luxury of operating 1,800 tonne vessels with no war-fighting capability.[174]

All of these options have their own constellations of risk and opportunity—which is why they should be pursued in conjunction with the current shipbuilding plan.

Figure 5.1: Not a submarine, but it can still sink ships and will exist this decade: the B-21 bomber

Source: Northrop Grumman, online.

5.4 Accelerating capability

The fundamental question is: does Defence's investment plan hedge sufficiently against capability risk this decade? Currently, the bulk of its investments are still going into megaprojects that are slowly delivering traditional crewed platforms. Megaprojects have been essential to delivering the high-end capabilities that have formed the core of Western militaries, but, regardless of their benefits, all megaprojects are problematic—and increasingly so. As the complexity of crewed systems increases (driven in large part by the need to protect their crews), the time needed to design and build them has as well, and the cost has escalated exponentially.

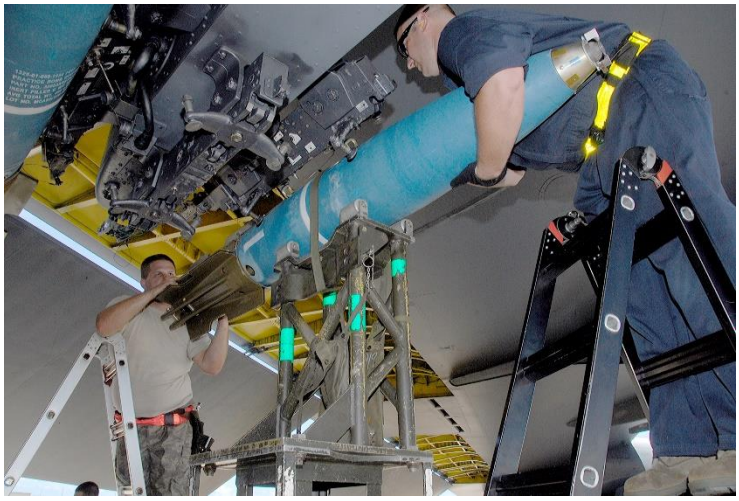
The problem that this presents is that huge amounts of money are tied up, potentially for decades, before we get any capability return. This is an enormous opportunity cost that limits other choices, places bets on the near term being safe and assumes a potentially erroneous view of what the longer term environment looks like. The Future Frigate project is likely to spend over $15 billion before the first vessel enters service; the SSN program could spend twice that. Moreover, reducing the scope of those projects doesn't help that much in the short to medium term (it takes just as much time and money to complete a design and set up a production facility for a run of three ships as it does for a run of nine). But there's also the risk that, in an era of rapid technological change and strategic uncertainty, the capability will be irrelevant by the time it's delivered. The previous government assessed that the Attack class would be obsolete the moment it was launched. Fortunately, we had spent 'only $4 billion' by that point; imagine if it had been $40 billion.

History is replete with examples of incumbents not reacting to innovative threats until it's too late. We're seeing an example right now in Australia's electricity sector. The parallels with the energy sector are very clear: incumbents failed to acknowledge the risk posed by new entrants to the market using new technologies in new ways.[175] So how do we make sure Defence isn't building the equivalent of coal-fired power plants? How do we avoid the trap of tens of billions of dollars in stranded assets?

The problem is that we can't be sure about what the future will bring. But we do know that the near future—the rest of this decade—is becoming considerably more dangerous, with a more direct security threat in our near region, than planners forecast in 2016 and indeed as recently as 2020. When faced with uncertainty, businesses hedge. ASPI has previously written about how to hedge against capability risk.[176] As the business saying goes, 'fast, cheap, good—pick two.' If good means conventional crewed platforms, we can't get them fast or cheap, so we may need to redefine what's good if we want a hedging strategy that offers something different.

Michael Shoebridge has used a 'slow food, fast food' metaphor to suggest a two-speed approach. The familiar, decades-long megaprojects are the slow food—artisanally designed, with premier ingredients lovingly hand selected and carefully assembled, at great expense and in small numbers. To hedge against the risks of the megaproject slow-food menu, we need to be pursuing simple technologies that can be acquired quickly and in mass.[177] That includes disposable drones that Australian industry can design and produce at scale. It includes the guided weapons that will be consumed in vast quantities in any future conflict, and which Australian industry can produce. We are seeing signs of this approach with the announcement of the acquisition of sea mines (Figure 5.2).

Figure 5.2: Also not a submarine, but it can sink ships and it already exists: the aircraft-laid Quickstrike mine



Source: US Air Force, online.

How do we pay for the fast food? Fortunately, it's cheap, but if we want it fast and in mass, it will still require significant investment. As we've noted, the IIP is always full. And the megaprojects give us little ability to be flexible and adjust. So it's likely that something big would have to be cut or reduced to free up cash.

The one remaining megaproject that Defence has not yet committed to is the $18–27 billion LAND 400 Phase 3, which is scoped to acquire 450 infantry fighting vehicles. And that gets us back the previous point. What does the government want Defence to do and where does the Army fit into that, particularly if we're adopting operating concepts focusing on denial in maritime environments? That's a question the government needs to answer before it goes all in on that $18–27 billion investment.

5.5 Workforce risk

Defence has a people problem. Or rather, it has a lack-of-people problem. And for an organisation that believes people are its most valuable asset, that could become a very serious problem.

Civilian workforce

There are two main challenges, which we've touched upon in Chapter 3 and previous editions of *The cost of Defence*. The first is Defence's growing use of an external workforce, particularly contractors who are doing what Defence describes as jobs that are normally done by APS or ADF personnel. The contractor workforce has grown from 4,669 to 8,311 in three years and is potentially costing over $1 billion more than an equivalent number of APS staff per year. However, there's no way that Defence could have delivered its ambitious capability plan without contractors.

There are certainly good reasons to use contractors in certain circumstances, but it should be done when it presents value for money. That value might not be purely financial but relate to responsiveness, flexibility, and so on. The government should assure itself that Defence is using contractors because that's the best option, not because it's the only option. So far, Defence has provided little evidence to Senate estimates to demonstrate that that's the case. Much better data is needed to confirm the value-for-money case, and it needs to be made public.[178] That's even more the case now, with the new government focused on reducing waste in government spending and seeing reductions in contractors and consultants as part of this agenda.

We've also discussed the doubling of ASD's workforce over the next few years. Again, the government should assure itself that that's achievable, particularly since other capabilities have been cancelled as offsets for that growth.

ADF workforce and future force structure

The second challenge is that the current FSP requires the ADF to grow by 20,000 personnel over the next two decades (with most of the growth in the first decade). That means it needs to grow by over 1,000 per year to operate the new capabilities in the acquisition plan. Unfortunately, the ADF has averaged only 300 net growth on average over the past six years. The problem is that the ADF's separation rates have been consistently around 8%–10%, meaning that losses cancel out recruitment. Defence has certainly been trying to make its total employment offer more attractive, but the separation rate has stubbornly sat in that band.[179]

Since those increased numbers of personnel are needed to operate the capabilities being acquired, it raises the question of whether it makes sense to pursue a force structure that Defence potentially can't staff and takes 20 years to deliver even if it can. Australia's force structuring philosophy has always relied on leveraging technology to compensate for its limited numbers of people, but we probably need to push that approach even further.

Autonomous systems are part of the solution. As autonomy and artificial intelligence improve, many of the dull, dirty and dangerous tasks can be offloaded to autonomous systems, and Defence's people can focus on the things that only humans can do. It will be even better for Defence if much of the residual human work involved in operating systems can be done by civilians, who could even be external workforce.

But it may be that Defence needs to shift the balance of investment further towards systems that can deliver lethal effects with fewer people, particularly if the weapons, sensors and delivery systems can be built cheaply in Australia so they can be rapidly replenished in time of crisis and conflict. The advanced capability streams of AUKUS are crucial here.

Again, the government will need to assure itself that:

- Defence can recruit and retain those people
- the planned force is viable should Defence not be able to recruit and retain them
- Defence is exploring force structures that can deliver the required effects while minimising the number of uniformed personnel needed to do so.

5.6 The ADF and support to the civil authority

The DSU stated that 'within Australia, the intensity and frequency of disasters—such as the 2019–20 Black Summer bushfires—will test Australia's resilience. Disaster response and resilience measures demand a higher priority in defence planning' (page 16). It also announced that Defence will 'enhance [its] capacity to support civil authorities in response to natural disasters and crisis.'

Since then, we've also seen unprecedented flooding as well as prolonged ADF assistance to Covid-19 measures and disaster response missions in the South Pacific. Since the DSU, an almost continuous ADF participation in such activities at home and abroad with large numbers of personnel has become the new normal. As noted in Chapter 3, in 2021–22 Defence received more supplementation for domestic operations than for overseas ones for the first time.

The ADF has significant inherent capacity to conduct such tasks—that's why it gets called into assist[180]—but it's difficult to identify any new investments or structural changes either in the 2020 FSP or announced since then that are dedicated to that role.[181] The Army's 2nd Division (an Army Reserve formation) has been given primary responsibility for the Army's contribution to domestic disaster relief and domestic security missions, but that doesn't replace its foundational war-fighting role (Figure 5.3).[182]

There's certainly been a lot of public discussion about the optimal role for the ADF.[183] The royal commission into the bushfires stated that 'There appears to be a lack of understanding about the role, capacity and capability of the ADF in relation to natural disasters', but it didn't make any recommendations about what its role or capabilities should be.[184]

Figure 5.3: Australian Army soldiers from the 5th Engineer Regiment use earthmoving equipment to clear debris from a flood-affected house in Lismore, NSW, as part of Operation Flood Assist 2022

Source: Defence image library, online.

At the heart of the debate is the question of whether it makes sense to use extremely expensive military assets in this role when civilian ones are far cheaper. Even though the ADF has many useful assets in inventory, there's still an opportunity cost involved in using them in civil support roles, particularly if those deployments are repeated. Assets and people aren't available for training in war-fighting roles, risking a degradation of skills. And with a military helicopter costing $35,000–40,000 per flying hour, there are potentially better ways to get value for money.

It's possible that Defence has developed a long-term strategy to meet this challenge, but, if it has, little has been made public. There are three broad options for the new government, again noting that they aren't completely discrete and that potential futures could involve mixes:

The first continues business as usual. Defence's role in civil assistance continues to grow, but, other than developing some command and control structures (that is, headquarters) to manage responses when called upon, it doesn't acquire dedicated assets for this role.

The second would solidify civil support as a core ADF function, but it would develop specific, cheaper ADF capabilities dedicated to the role. The Army Reserve, for example, could focus on that role, potentially overseas as well as in Australia. It would be supplemented by some new investments, such as a squadron of civilian-standard helicopters.

The third option would consciously invest in developing capability in other organisations, whether new or existing. The ADF would return to being a tool of absolute last resort for civil contingencies.

All options have advantages and disadvantages. The key to making good decisions in this space is to make the costs, both financial and opportunity, visible. Until that happens, the ADF will be seen as a free good in times of emergency. Not only is it not a free good, but it may also in fact be the most expensive approach.

5.7 Transparency

Why is a better conversation with the public needed?

Our final section goes not to what funds should be spent on, but to the issue of transparency about how those funds are spent. In opposition, the Labor Party was critical of the level of transparency in government. This is at the heart of its commitment to a national anticorruption commission.[185] But its dissatisfaction with the state of transparency and accountability can be seen in other areas, including the Defence portfolio. Senator Penny Wong stated at Senate estimates shortly before the election that 'the trend towards "less accountability", I think, is problematic.'[186]

The succession of reports into shipbuilding delivered by the Senate Economics References Committee outline what can be described as the nadir of interaction between the parliament, the government and the Department of Defence. The reports catalogued cases of Defence refusing to provide information, even when it had already been released under freedom of information requests, of fighting senators' requests for information in the Administrative Appeals Tribunal (and losing) and resisting the implementation of committee recommendations.[187] Because of this behaviour the committee made the extraordinary recommendation that:

> With the aim of increasing its staff's awareness of their democratic responsibilities:
>
> - the Department of Defence re-examine its induction and training programs and corporate culture regarding its role as a department answerable to the Australian people through the processes of the Australian Parliament; and
>
> - report back to the Parliament on the progress it is making on those induction and training programs.[188]

Why is greater transparency needed? In addition to the usual principles of transparency and accountability being central to ensuring good governance in a democracy, we can make several arguments for why it is crucial for the Defence portfolio now.

First, the federal budget is facing years of structural deficits. There will be competition for every defence dollar. As noted in Chapter 1, Australians generally don't regard defence as a big issue, even when they have concerns about the actions or intentions of a powerful foreign state. The government will need to explain very clearly why defence spending is needed and win the confidence of the Australian people that those funds are being spent well on essential capabilities. While Australians' trust in government is still relatively high compared to some other Western democracies, a simple approach of 'Trust us, we know what we're doing' simply doesn't cut through.

Second, key capability acquisitions take years to design and deliver. It's essential to bring the Australian public along as a trusted partner on the journey. The government and Defence were unable to convince the public that $80–90 billion in expenditure on the Attack-class submarines was worth it, and support had evaporated even before the Morrison government announced the cancellation. The SSN journey will be longer, harder and even more expensive. It could take 20 years to deliver the first SSN and a further 20 to deliver the remainder. It will be six further election cycles and $30 billion in sunk costs before we see boat 1. That means trusting that the public 'can handle the truth' through the ups and downs of what will be a difficult journey.

Thirdly, Defence needs to demonstrate it is doing everything possible to enhance Australia's security as fast as possible. Transparency can help drive faster delivery as well as reveal the risks in current plans and processes and ensure they are properly addressed.

Improved engagement with the public needs to start with the government itself. It also needs to empower officials to speak with the media and with the public. They, after all, are the subject-matter experts. Of course, there's always the possibility of an official diverging from the standard talking points, but that shouldn't be seen as a risk, but simply as part of a richer conversation. In the US, military officers participate actively in debates in journals. Here, any public contribution from a serving ADF officer goes through layers of vetting to the point that it becomes a vanilla mirroring of official talking points.

Annual reporting on key enterprises

An informed conversation requires information. There are many areas in which Defence could publish better information. When people who follow Defence's acquisition program for a living can't track what's going on and have to conduct forensic analyses of multiple, woefully incomplete sources to create an incomplete picture, something's gone wrong. If better transparency makes my job redundant, so be it.

Currently, there's nothing like an annual report on the key enterprises in the capability program. The ANAO MPR publishes very detailed information on around 25–30 of the largest, most complex projects. That's a valuable and indeed vital contribution to transparency, but information on individual projects, no matter how detailed, doesn't provide an understanding of how broader enterprises are progressing, plus the vast majority of projects are invisible anyway.

The previous government published its Naval Shipbuilding Plan in 2017. Since then, there have been no updates, despite the enterprise planning to spend over $100 billion, and potentially $200 billion once the SSN program is included. The government should release an updated plan as soon as possible. But it should also publish an annual report on the enterprise, covering not just progress on the individual projects but on enterprise-level aspects, such as workforce development, infrastructure, the status of existing capabilities and their ability to bridge the transition to their replacements,

achievement against spending targets, and progress against key schedule milestones.[189] Ideally, the ANAO should have a role in ensuring accuracy and objectivity.

Considering the importance of our submarine capability, there should also be annual report on submarine capability, including:

- the Collins capability and the progress of upgrade projects and the life-of-type-extension
- other measures, whether unilateral or under AUKUS, to develop autonomous undersea capabilities
- the progress of the SSN program.

There should also be an annual update on progress in AUKUS's advanced technologies program, perhaps as part of a report to Parliament about what has been achieved to increase Australia's military capability over the preceding 12 months.

Noting that the sovereign guided weapons manufacturing enterprise could commission tens of billions of dollars worth of weapons in Australia and is as important to ADF war-fighting capability as shipbuilding, there should also be a similar report on that enterprise.

Such reporting is possible. There's an excellent precedent: Defence's innovation and industry programs publish a very comprehensive annual report that provides real data, which could serve as a model for the enterprises listed above.

More detail in the public investment program

In the public version of the IIP that was released with the 2016 White Paper, Defence removed all individual project names and numbers. This was repeated in the 2020 FSP. There's now no public document that lists Defence's projects and what they're meant to be delivering. It's a remarkable situation when we can't see what is in a $270 billion investment program. Sometimes Defence makes public reference to project names and numbers, but there's no 'Rosetta stone' that relates them back to the high-level narrative in the FSP.

It's frustrating for industry—I haven't met anyone in defence industry who believes that there's sufficient information in the FSP to allow industry to understand Defence's investment plan. Yet Defence consistently refers to industry as a trusted partner.

Defence currently conducts industry briefings on its capability program, which it argues fill in the missing detail. Unfortunately, those briefings are not open to all stakeholders and certainly not to the public. The briefings should be posted on Defence's website. Again, there's no reason it can't be done; the US Department of Defense does it.

And, despite a commitment to deliver annual updates to the public version of the investment program, nothing was released until four years later with the FSP.[190] I've heard Defence seniors say it would be confusing for industry if an altered plan were released every year. Again, it's a strange situation in which Defence thinks releasing the most accurate version of its plan is more confusing than releasing nothing.

Better information on progress in the capability program

ASPI has highlighted many times the paucity of information on the capability program. If a project isn't in the PBS's top 30 projects or the ANAO MPR's 25–30 projects (which are largely the same as those in the PBS), it's essentially invisible.

There's no reason why Defence can't publish every year the following information on every project over a certain total approved budget (say, $50 million):

- total approved budget and spend to date
- planned in-year spend and achievement against it
- broad description of scope
- originally planned and currently planned IOCs and FOCs
- last major milestone achieved and next planned milestone.

This information is not classified or commercial-in-confidence (since it's already published in the PBS for the top 30 projects). This is information that Defence holds, so there's no administrative overhead involved in publishing it. All projects, including military equipment, facilities and ICT, should be included.

Clear announcements when key milestones are achieved

The previous government gave up on making clear announcements about project approvals and milestones. While it referred to 'investments' in its media releases, it wasn't possible to tell what milestone in the capability development and acquisition process had been reached. For example, often no clear distinction was made between an in-principle decision (such as entry into the investment program) and entry into an actual acquisition contract. Rarely were project names and numbers used—and that probably wouldn't have helped, since the public investment program no longer had project names and numbers that announcements could be tied back to. Announcements about decisions were delayed until a time that best suited the government's political purposes.[191] The result was a blancmange of dollars and numbers of jobs, but little information on how capability delivery was tracking.

While it's the prerogative of governments to choose the timing of announcements, in the spirit of a bipartisan approach to defence policy, a standard, bipartisan approach should be adopted in which project approvals and other investment decisions are announced within one month of the decision, providing clear information on what's been agreed. This would also include decisions that are politically inconvenient but of significance to national security.[192]

Transparency on other issues

While this section has focused on the capability program, there are other areas of Defence activity that would benefit from greater transparency. For example, there's virtually no reporting on operations. It's possible to find the annual cost and the number of personnel deployed, and Defence assesses itself in its annual report as having met its performance metrics, but there's no reporting on strategy or progress towards strategic goals. In fact, the Defence annual report is almost silent on what Defence is doing on its operations—which is remarkable, considering that the core business of Defence is to conduct operations. It's hard to think of a business in the private sector whose annual report is so silent on its core business.

Chapter 6: The cost of war

Dr Ben Stevens

Key points

- The human cost of war on Ukraine has been massive. In addition to thousands of deaths, around 14 million (one-third) of its people have been displaced. The cost of reconstruction will be hundreds of billions—a bill growing daily.
- The war is also extracting a huge cost on Russia. Casualties are likely far higher than President Putin expected as are the disruptions to the Russian economy caused by international sanctions.
- It's difficult to put a cost on the aid, both humanitarian and military being provided to Ukraine. US aid packages totalling US$53 billion have been authorised.
- The Russian invasion has prompted increased defence spending, particularly in Europe where NATO members have reinvigorated their long-standing, but often unfulfilled, commitment to reach 2% of GDP.
- The ripple effects of the conflict have spread across the globe. Disruptions to Ukrainian and Russian food exports are driving up costs and creating food insecurity in many countries. The unintended consequences are unpredictable. Even Australia, one of the world's largest energy exporters, is experiencing cost spikes in its electricity sector due to global gas and coal shortages.

While the cost of defence can be high, the cost of war is much higher, as we're currently witnessing in Ukraine. The Russian invasion of Ukraine on 24 February 2022 didn't come as a total surprise to many experts, given the massive build-up of Russian forces near the Ukrainian border in the previous weeks. Nevertheless, it shocked much of the world, particularly those who had convinced themselves that war is inconceivable in the modern world because the human and financial cost is so great that no rational leader would deliberately impose it.

This chapter explores the cost of the war in Ukraine. It starts with the direct cost to Ukraine and Russia and follows the ripple effects outwards. The most immediate effects are the human suffering, death and mass people movements from Ukraine on a scale that's difficult to quantify. Then there's the physical destruction in Ukraine. There's also the impact on Ukraine's and Russia's economies. The ripples extend to neighbouring countries in the form of billions in aid funding as well as commitments to increase their own defence spending. Beyond that, there are the negative flow-on effects on the global economy, which could have dramatic second- and third-order effects as food and fuel prices soar.

Of course, with the conflict still ongoing, the costs are increasing, whether they be the direct costs of Russia's indiscriminate shelling of Ukrainian cities or the spiralling cost of food for some of the world's most vulnerable people. This chapter is by necessity only a very preliminary review.

6.1 The cost of war on Ukraine and Russia

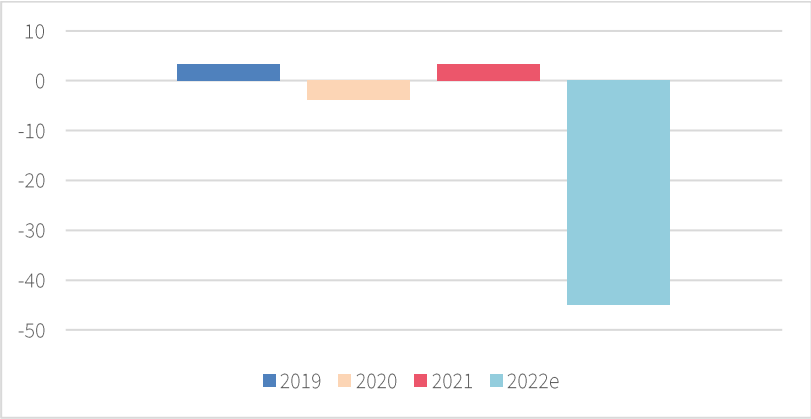
Let's start with what's perhaps the greatest cost: the loss of human life caused by Russia's invasion. Civilian and military casualties carry substantial intangible and financial costs. Military losses are difficult to verify due to the ongoing fighting and deliberate exaggerations by both sides.

We'll start with Ukrainian losses. Ukrainian authorities rarely release complete combat casualty numbers, probably to help maintain morale, but President Zelensky last provided a figure of 2,500 to 3,000 dead by mid-April.[193] For the same period, US intelligence agencies estimate that between 5,500 and 11,000 Ukrainian soldiers have died, while there have been more than 18,000 wounded.[194] Russian estimates of Ukrainians killed in action are over 23,000 by mid-April.[195] Estimates for civilian deaths also vary. The UN gave a figure of 3,930 by 23 May, but it also believed the actual figures to be far higher; the mayor of the Ukrainian port city of Mariupol stated that more than 10,000 civilians had died in that city by mid-April.[196]

The mass displacement of Ukrainian civilians is a further human cost. As of 23 May 2022, more than 7 million Ukrainians have become war refugees in other countries, while 7.1 million have been internally displaced.[197] The impact of having a third of its pre-war population of 41.9 million as refugees or internally displaced is extraordinary and makes Ukraine's spirited defence all the more remarkable. This disruption and the destruction of major infrastructure have generated considerable food, water and electricity shortages.

The Ukrainian economy has been hit hard by the conflict and mass refugee movements. A World Bank projection, based on the assumption that the conflict will continue for several more months, is for a 45% GDP contraction this year (see Figure 6.1).[198] That assessment is predicated on collapsing investment, mass displacement, shipping blockages, declining exports and imports, loss of incomes and equipment losses.[199] World Bank macroeconomic projections also indicate that the national poverty line could jump from 1.8% in 2021 to 19.8% by the end of this year.[200]

Figure 6.1: Ukrainian real GDP growth at constant market prices, 2019 to 2022 (annual % change)



e = Estimate

Source: World Bank Macro Poverty Outlook Report 2022.

Reconstruction will place a huge additional strain on the postwar Ukrainian economy. The Vienna Institute for International Economic Studies has estimated that reconstruction costs in the Donbas, even before the fighting in 2022, exceeded US$21 billion, based on 2020 rates.[201] However, the pre-war reconstruction costs already pale in comparison to the destruction since February 2022. Again, estimates vary significantly. The Centre for Economic Policy Research estimated on 11 April that reconstruction would cost between US$220 billion and $540 billion, the latter figure being roughly three times Ukraine's pre-war GDP.[202] The Kiev School of Economics' ongoing economic

calculations show that Ukraine is suffering around US$4.5 billion worth of damage to civilian infrastructure each week.[203] Probably using the Kiev School's figures, President Zelensky referred to a US$600 billion reconstruction bill in early May.[204]

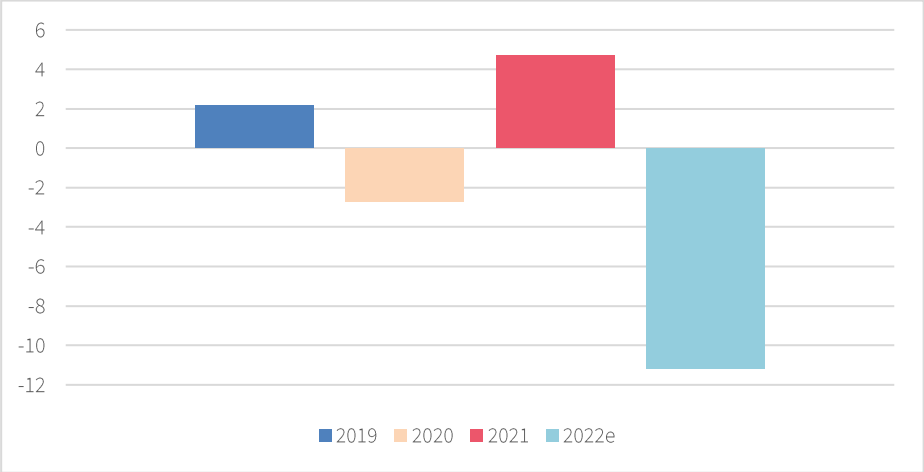
The dire humanitarian situation won't affect just the Ukrainian economy, but also countries hosting refugees due to the costs of providing housing, food, medical care and other social services. Most refugees have fled to neighbouring countries: Poland has taken in 3.5 million refugees, Romania 960,000 and Moldova more than 470,000 as of 25 May.[205] Polish estimates for the cost of hosting its refugees this year is €24 billion and for Moldova US$378 million (roughly 3% of GDP), while Romania's small economy is also coming under significant strain.[206] *The Economist* Intelligence Unit estimates that supporting 5 million refugees could cost Europe around €50 billion just for 2022.[207] To support Moldova, Germany and other European donors have pledged US$720 million in loans and financial support, while the EU has made amendments to redirect €17 billion from its cohesion policy funds to help refugees.[208] Those funds will complement donations to the Red Cross and affiliated refugee groups, including a €9.1 billion fund being raised by global donors via the Stand Up For Ukraine fundraiser.[209] In addition to the international refugee aid, many European nations are pledging to support the struggling Ukrainian economy.

Russia is also suffering major human losses. Not surprisingly, estimates vary. Ukraine provides daily updates of Russian losses with Ukraine's latest estimate being 30,000 Russian dead by 29 May.[210] Russian has been reluctant to release numbers, but those that it has released are much lower with Moscow giving a military death figure of 1,351 by 25 March.[211] Western intelligence services 'or defence organisations' numbers split the difference but tend to be closer to the Ukraine estimates. British estimates for Russian military deaths by 23 May offer a figure of 15,000, compared to Ukraine's latest estimate of 30,000 killed.[212] Estimates of wounded unable to rapidly return to duty are at least double the killed-in-action figures, given the patterns of modern conflict.

Those losses are being compounded by material losses. The most recent Pentagon estimates from 26 May calculate that Russia has lost roughly 1,000 tanks, 350 artillery pieces, 36 fighter-bombers and more than 50 helicopters since February.[213] It will be difficult for Russia to replace specialised equipment in the short term, due to ongoing sanctions on key raw materials.

While Russia hasn't experienced major infrastructure destruction on the scale of Ukraine, sanctions and the overall cost of maintaining wartime operations are projected by the World Bank to cause Russia's real GDP growth to shrink by 11.2% this year and inflation to jump from 6.7% to 22% (Figure 6.2).[214] This substantial cost is being predominantly driven by Western sanctions on Russian foreign currency reserves, major businesses, and oil, gas and energy imports and by the exclusion of Russian banks from international financial mechanisms. More than 1,000 international companies have either withdrawn from Russia or suspended trading in Russia, many flights to Russia have been halted, and the export of luxury goods to Russia has been banned by the EU and the UK.[215] Russia's reliance on imported goods that are now subject to sanctions, such as auto parts, cellphones, machinery and mechanical goods, is having a reverberating effect throughout the national economy.

Figure 6.2: Russian real GDP growth at constant market prices, 2019 to 2022 (annual % change)



Source: World Bank Macro Poverty Outlook Report 2022.

Russia's responses to sanctions have had mixed success. It has banned some exports, initiated asset seizures of foreign-owned businesses and assets such as aircraft, and prevented foreign investors from selling their stocks. But nationalising foreign-owned businesses won't necessarily keep them going, seizing aircraft won't keep Russia's aviation industry flying, and imports of spares from the US and the EU are under sanction. The rouble initially depreciated by 30% against most major currencies; however. it has since recovered due to action by the Russian central bank as well as measures such as requiring foreign purchasers of Russian oil and gas to pay in roubles. However, a strong rouble isn't that useful if there's nothing to purchase with it.

Russia is the world's second largest crude oil exporter after Saudi Arabia and it is still raking in oil and gas revenue for now, helping to fund its war effort. In the longer term, the outlook is less rosy; Western European customers are seeking to diversify away from Russian energy imports, either to other suppliers or renewables, and many are planning to ban or at least limit Russian energy imports as soon as possible. The loss of European energy customers in the long term would be disastrous due to Russia's reliance on income from energy exports.[216] This is another of Putin's 'own goals'.

The ripple effects of Putin's war have contributed to Russian declines in employment, wage growth and private consumption, which is expected to drop by 8.5%.[217] The World Bank poverty line rates (US$5.5/day) are also likely to increase from 2% to 2.8% (an increase of more than 1 million people), although such impacts are unlikely to sway Putin unless they grow by orders of magnitude.[218]

6.2 Military, humanitarian and economic aid

The Kiel Institute for the World Economy has traced at least €64.6 billion in government-to-government commitments to Ukraine from 24 January to 10 May 2022, of which the US is providing over 65%.[219] That figure includes commitments by 37 nations, and at least 25 nations are providing military equipment to Ukraine (see Table 6.1). International aid has included goods or money to assist with military logistics, refugee support and settlement, energy resources, economic packages to bolster Ukraine's economy, medical equipment, emergency services equipment and other humanitarian goods. Australia has provided A$285 million in total military and humanitarian aid since late February.[220]

US aid spending has dwarfed aid from other countries: the Biden administration has passed two large economic packages worth at least US$53 billion since February. An initial aid package worth

US$13.6 billion signed in mid-March[221] included more than US$4 billion in humanitarian support, US$1.8 billion in economic aid and US$6.5 billion to support US troop deployments to Europe and help replenish weapon stocks sent to Ukraine.[222] A US$40 billion assistance package was later passed by the US Senate on 19 May, including US$8.8 billion in general economic aid, US$4.4 billion to combat global food shortages, US$900 million for refugee support, US$9 billion to replenish US weapon stockpiles and US$11 billion in weapons transfers.[223]

The US$11 billion equipment transfer is being provided through the Ukraine Democracy Defense Lend-Lease Act, which was approved on 9 May.[224] Lend-lease is centred on the principle that military supplies are being provided on the basis that they will later be returned, or that substitute goods of equal value will be provided in return. The Biden administration believes that leasing would bypass most current arms export regulations and, therefore, reduce the delay of weapons deliveries to Ukraine.[225]

The cost of equipment doesn't end at the unit price. It's unclear whether international aid figures also include all costs, such as logistics, transport, the resources needed to sustain the capability (such as spares), and the training of Ukrainian soldiers to use it.

The types of military equipment being supplied have escalated from shoulder-fired missiles supplied in late February to heavier long-range weapons such as 155-millimetre howitzers and armoured vehicles being provided by late April (see Table 6.1). This escalation is largely a reflection of the disparity in air and armoured power between the two combatants and offers a glimpse into the intense fighting. Large quantities of individual items, such as Javelin anti-tank missiles, which the Pentagon estimated in 2020 to cost US$178,000 per missile launched, have contributed to sizeable international aid contributions.[226]

The effort to supply Ukraine has revealed many European countries' meagre holdings of modern equipment. In many cases, donor countries have had to provide older weapon systems that were no longer in frontline use. That includes such items as M113s and German Cold War-era Strela anti-air missiles. Some of the equipment has shown its age and neglect; 700 Strela rockets of the 2,700 donated by Germany were reported to be unusable.[227]

German Chancellor Olaf Scholz stated in late April that the reserves of Germany's military stockpiles were pushed to the limit, and that local industry couldn't easily resupply any heavy weaponry, such as howitzers.[228] This exposure of German resupply is symptomatic of its decades of low defence spending. Since Western countries have run down their holdings, donor countries will need to urgently re-equip their own militaries. Because the cost of military equipment tends to increase exponentially from generation to generation, the cost of replacing donated equipment is likely to be substantial.[229]

Even the US will need to restart or expand its own production lines, particularly for its low-stock and older items. This a major issue, as the US has donated roughly a third of its Javelin stock (around 7,000 Javelins). Current production rates are low and will take years to replenish stocks.[230] Lockheed Martin and Raytheon were awarded two contracts worth US$309 million in mid-May to jointly boost Javelin production.[231] The push to rapidly ramp up US production lines is likely to be a trend that European powers that have made fresh defence spending commitments will need to follow.

Table 6.1: Major military aid contributions to Ukraine since 2014, as of 22 May 2022

Country	Capabilities sold or donated as aid	Value of donation[a]
Australia	M777 155-mm howitzers, Bushmasters, M113 APCs and anti-armour capabilities.	A$285 million (US$202 million)
Belgium	FNC-type assault rifles, machine-guns, anti-tank grenade launchers and fuel.	€21 million (US$22.4 million)
Canada	M72 rocket launchers, hand grenades, commercial satellite resolution technology, machine-guns and other small arms, sniper rifles, M777 howitzers, pistols, Carl Gustav M2 recoilless rifles and unknown armoured vehicles.	C$118 million (US$91 million) in military aid. Canada has also allocated C$500 million (US$389 million) in its budget for additional military aid. An additional C$620 million (US$483 million) in potential load aid.
Croatia	Small arms and ammunition	€16.5 million (US$17.6 million)
Czech Republic	T-72 tanks, BVP-1 infantry fighting vehicles, MANPADS anti-air systems, mortars, machine-guns and other small arms.	US$130 million
Denmark	Protective vests, Stinger anti-air missiles and anti-tank weapons.	US$143 million
Estonia	Javelin anti-tank missiles, 122-mm howitzers, anti-tank mines and pistols.	€227.5 million (US$243 million)
Finland	Assault rifles, disposable anti-tank weapons, rations, vests and helmets.	€114 million (US$121 million)
France	Milan anti-tank missiles, Javelins, Mistral anti-air missiles, fuel, uniforms, electro-optical infra-red systems, Caesar 155-mm howitzers and small arms.	US$109 million in military aid and at least €300 million (US$321 million) in potential loans.
Germany	Anti-tank missiles, Stingers, Strela anti-air missiles, Unimog medical vehicles, Matador anti-tank weapons, anti-tank mines, grenade launchers, Gepard anti-air tanks, Marder infantry fighting vehicles, Leopard 1A5 tanks, Panzerhaubitze 2000 howitzers, drone defence systems, MG3 machine-guns and other small arms.	Increased its military support fund to €2 billion (US$2.14 billion) this year, of which most will go to Ukraine or affiliated EU funds. Around €4 billion (US$4.28 billion) in civilian grants and loans since 2014.
Greece	Portable rocket launchers, Kalashnikov rifles and ammunition.	
Ireland	Non-lethal equipment, including protective equipment and fuel.	€500 million (US$534 million)
Italy	Stingers, mortars, Browning machine-guns, small arms and anti-tank missiles.	US$124.5 million
Japan	Bulletproof vests and non-lethal goods.	US$200 million
Latvia	Stingers, drones and non-lethal goods.	€220 million (US$235 million)
Lithuania	Stingers, mortars, anti-tank and anti-air weapons, machine-guns, communications equipment and other small arms.	€100 million (US$106.8 million)

Luxemburg	NLAW anti-tank missiles, jeeps and tents.	
The Netherlands	Helmets, vests, metal detectors, detection robots, Stingers, various small arms, 2D ground surveillance radars, AN/TPQ-35 weapon locating radars and Panzerhaubitze 2000 howitzers.	US$181 million
New Zealand	Helmets and vests.	NZ$26.5 million (US$17.1 million)
Norway	M72 anti-tank weapons, vests, helmets and air defence systems.	US$208.6 million
Poland	Mortars, Piorun portable anti-aircraft missile systems, FlyEye drones, various small arms, 23-mm anti-air gun ammunition, helmets, R-73 air-to-air missiles, T-72 tanks, 2S1 Carnation howitzers, infantry fighting vehicles and rocket launchers.	US$4.3 billion
Portugal	G3 rifles, Iveco armoured vehicles, 155-mm howitzers, radios and small arms.	€12.1 million (US$12.9 million)
Romania	Vests, fuel, various small arms, helmets.	€3 million (US$3.2 million)
Slovakia	120-mm ammunition, fuel, S-300 air defence system and anti-tank missiles.	€200 million (US$ 213.6 million)
Spain	Various small arms, grenade launchers and ammunition.	€100 million (US$106.8 million)
Sweden	AT4 Anti-tank weapons, vests, medical equipment and helmets.	US$39.6 million since 2014
Turkey	TB-2 drones.	
UK	Aerial surveillance flights, Starstreak anti-air missiles, anti-tank missiles, NLAW anti-tank missiles, Javelins, armour, helmets, sale of two Sandown-class minesweepers, anti-ship missiles, Brimstone missiles, Spartan APCs, various protected mobility vehicles, Stormer air defence vehicles, electronic warfare equipment and night vision equipment.	£2.8 billion (US$3.52 billion)
US	Military training, Javelins, Mark VI patrol boat sales, Humvees, mortars, various small arms, various drones, intelligence and surveillance systems, radars, electronic warfare equipment, satellite imagery support, Stingers, helmets, anti-air systems, howitzers, M113s, protective equipment and Mi-17 helicopters.	At least US$53 billion in total military, economic and humanitarian aid since February. At least $26.5 billion of the $53 billion is some form of security assistance. This includes lend-lease transfer valuations, troop redeployments to Europe and the replenishment of US weapon stockpiles.

a Valuations are likely to be considerably more as some countries haven't given valuations of their aid, while some have contributed to EU funds or simply have not reported their full valuations. Most valuations include military, humanitarian and financial aid. Valuation data for Greece, Luxemburg and Turkey has not yet been released by their respective governments.

Source: Data collected by ASPI from the latest national government statements and verified media reports.

While Western militaries don't have troops on the ground in Ukraine, they're involved in the war by supporting Ukrainian forces in other ways. This includes the provision of intelligence, although all

parties are naturally reluctant to provide details. That also comes at a cost, for example through sustaining higher rates of effort by surveillance aircraft.

6.3 International increases to defence spending

While Russian President Vladimir Putin's motives and rationality continue to be debated, it's clear that he did not feel deterred by NATO's military power. The failure of deterrence is, in part, a consequence of many NATO states enjoying a post-Cold War peace dividend. That, along with an unwillingness to take Russian revisionism at face value and an overreliance on American taxpayers to foot the security bill, was behind past low military spending (see Table 6.2).

In an effort to restore defence capability, NATO members made a pledge in 2006 to commit 2% of GDP to military spending,[232] but many have fallen short. NATO reaffirmed the 2% benchmark in 2014 following the Russian annexation of the Crimea, but only three members met it. During his 2018 European tour, President Donald Trump stressed that many members were still short of the target. By 2021, still only eight members met the target.[233] Germany was the most notable resistor to the 2% guideline; it spent only €47 billion, or 1.5% of GDP, in 2021.[234]

The Russian invasion of Ukraine reminded many countries that war hasn't been abolished and prompted many NATO countries to pledge substantial increases to their current military spending, or at least finally meet their 2% commitment. The invasion provided a catalyst for German Chancellor Olaf Scholz to issue a statement in late February promising a one-off sum of €100 billion, or nearly 2% of GDP, for the Bundeswehr in the 2022 budget.[235] Scholz prefaced his spending promise by citing 24 February (the date of the Russian invasion) as a watershed moment and stated that it was clear that Germany 'must invest much more in the security of the country'.[236]

Germany's early promises were soon followed by other European states making similar statements. Sweden,[237] Lithuania,[238] France,[239] Belgium,[240] Latvia,[241] Poland,[242] Romania,[243] Italy,[244] Norway,[245] Kosovo[246] and several other European NATO states[247] have also all promised to substantially boost their military spending. The UK is yet to specify any increases, but has already committed £47.4 billion to defence spending by 2024–25.[248] Most nations' pledges, regardless of their past and current NATO status, will increase their defence budgets to 2% or more of their current national GDPs, which correlates to the 2006 commitment. This is significant for Sweden (currently a non-member state), as it is increasing its defence budget from 1.3% to 2% of GDP by potentially 2028.[249] The membership status of Sweden and Finland, is likely to change after their 19 May submission to join NATO.[250]

Table 6.2: European NATO defence expenditure

Country	Yearly shares of real national GDP (%)		
	2014	2021 estimates	Current 2022 pledges[a]
Albania	1.35	1.41	n.a.
Belgium	0.97	1.07	1.54 by 2030
Bulgaria	1.31	1.62	n.a.
Croatia	1.82	2.16	n.a.
Czech Republic	0.94	1.40	2.0
Denmark	1.15	1.40	2.0 by 2033

Estonia	1.93	2.16	2.5
France	1.82	1.93	2.0
Germany	1.19	1.49	2.0
Greece	2.22	3.59	n.a.
Hungary	0.86	1.69	2.0 by 2024
Italy	1.14	1.54	2.0
Latvia	0.94	2.16	2.5 by 2025
Lithuania	0.88	2.03	2.5
Luxemburg	0.37	0.54	0.72 by 2024
Montenegro	1.50	1.63	n.a.
The Netherlands	1.15	1.45	2.0
North Macedonia	1.09	1.54	2.0 by 2024
Norway	1.55	1.74	n.a. (US$313.57 million increase for 2022)
Poland	1.86	2.34	3.0
Portugal	1.31	1.55	1.89 by 2024
Romania	1.35	1.88	2.5
Slovak Republic	0.99	1.73	n.a.
Slovenia	0.97	1.22	2.0 by 2030
Spain	0.92	1.03	2.0
Turkey	1.45	1.60	n.a.
United Kingdom	2.13	2.25	n.a.

Less than 1.5%	1.5%–2.0%	More than 2%

a 2022 pledges up to 21 May 2022. Some 2022 pledges are to be implemented in the current or upcoming financial year, while some other countries are either expected to meet their pledges over multiple years or lack a concrete deadline. The nations designated 'n.a.', with the exception of Norway, are still considering their options or have pledged to retain their current defence spending levels.

Source: All 2014 and 2021 estimates were from NATO's Defence Expenditure of NATO Countries (2014–2021), while the 2022 pledges were collected by ASPI from government information releases and verified news reports.

Japan is also likely to increase its defence budget. That trajectory pre-dates the invasion of Ukraine but has no doubt been reinforced by it. While a US treaty ally, Japan is located close to two authoritarian powers, with both of which it has territorial disputes. It's within the context of threats from a Russia–China axis that Japan's ruling party is now considering doubling the country's

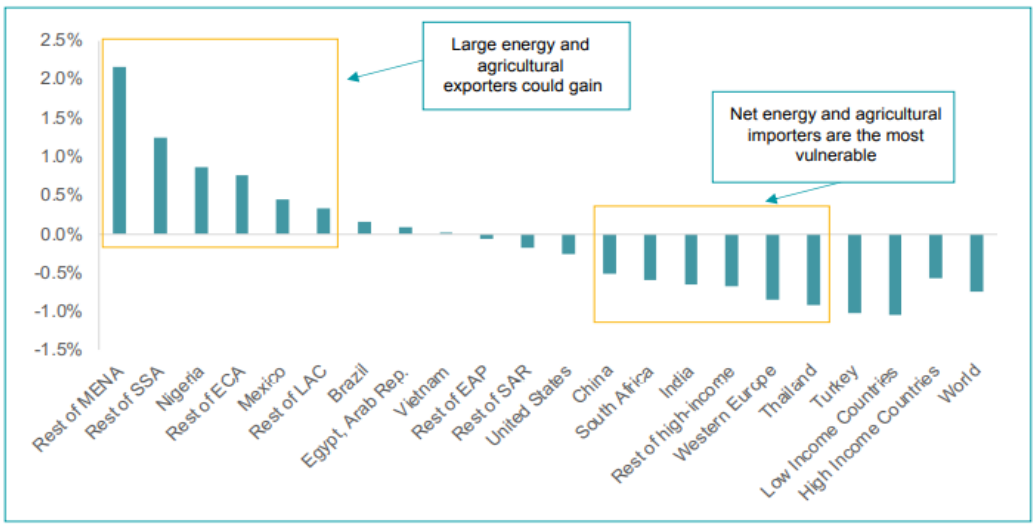
defence budget to roughly US$107 billion, or 2% of GDP, following the invasion of Ukraine.[251] The decision to expand spending, and to remove restrictions on defence exports, has gained strong ruling-party support only after the invasion of Ukraine and after most NATO pledges were made. The effective doubling of its defence budget is a clear indication that Japan considers that its capabilities have lagged those of its neighbours and that it's seeking to develop sufficient deterrent capability to avoid the costs of war that are currently damaging Ukraine and the international economy.

6.4 Impact of the war on the global economy

The disruption to trade caused by the fighting, sanctions, and Russia's blockade of Ukraine's Black Sea export lanes continues to generate extensive flow-on costs around the globe. In addition to trade, international logistic supply chains, tourism, foreign direct investment and energy, oil and food prices have also been negatively affected. The International Monetary Fund's *World economic outlook* report in April projected a 3.6% GDP rate for the global economy for 2022 and 2023, which represents drops of 0.8% and 0.2% from its earlier forecasts in January this year.[252]

The impact is going to be very different in different countries. For example, World Bank data from April indicates that Thailand, Vietnam and low-income countries have experienced some of the sharpest declines due to their reliance on imported energy for key sectors, while major net exporters of crops or energy, such as Nigeria, have experienced export surges (Figure 6.3).[253]

Figure 6.3: Change in real income in selected countries and regions, 2022



Source: World Bank report on the 'Impact of the War in Ukraine on Global Trade and Investment'.

The Russian occupation of Ukrainian ports and blockade of Ukraine's shipping are having a dramatic impact on global food prices. Surges are primarily a response to the gap left by reduced Russian and Ukrainian exports, which previously accounted for nearly 25% of global wheat exports and 15% of corn and fertiliser exports.[254] Wheat prices have jumped by 40% since the start of the conflict. Price increases are likely to be exacerbated due to the effects of protectionist trade policies, of which 67 have been introduced since late February.[255] Many countries have sought to secure their own food supplies first; for example, India banned wheat exports in mid-May, citing concerns over local heatwaves reducing stock and the war in Ukraine raising domestic prices.[256] High fertiliser prices have driven many net importers, such as China, to introduce subsidies to local farmers to drive down food production costs.[257]

Historically, food crises have triggered regional political crises such as the Arab Spring—a series of anti-government protests in North Africa and the Middle East in the early 2010s.[258] Therefore, the war in Ukraine and resultant policies have potentially created conditions for significant political and social instability. Higher prices are predominantly affecting net food importers in Africa, such as Somalia. Before the Russian invasion, Russia and Ukraine accounted for 90% of Somalia's wheat imports and nearly 80% of the Democratic Republic of the Congo's.[259] However, many Middle Eastern and North African nations have offset the increase in food prices, as they're large net energy exporters, but many of the low-income nations are still likely to be hit hard.

The increase in staple food prices has driven the global food crisis to famine levels worldwide. Before the Ukraine conflict, many low-income nations were already at risk of famine due to war, extreme weather conditions in Africa, high livestock prices, increased food demand after Covid-19 and global supply-chain disruptions. Just prior to the war, the UN estimated that more than 140 million people were suffering from acute hunger and urgently required food assistance.[260] Aid funding is also struggling to cope, as the UN World Food Programme's operating costs have increased substantially because of the war.[261] Therefore, we can't rule out significant second- and third-order effects of the war in Ukraine.

The disruption to the interconnected global economy is not only affecting food prices, but also the prices for raw materials and metals. Russian is a large exporter of aluminium, iron, steel, copper and nickel (its nickel accounts for 12% of the global export share). Russian metal is heavily used for construction, motor vehicles and machinery in countries such as the US, which imported around US$3.1 billion of Russian metal per year during the 2018–2020 period.[262] Many central Eurasian and European states are also heavily dependent on Russian metals.[263] While some metals can be sourced from alternative sources, the Ukraine war is still likely to result in substantial cost increases and interruptions throughout the supply chain. In addition to aluminium and iron price rises in the first quarter of 2022, nickel also rose 35% during that quarter.[264] Metal producers in energy-intensive activities are currently experiencing the ripple effects; for example, many German metal companies have been forced to halt production because of inflated energy prices.[265]

The impact of the war on production and ongoing sanctions against Russian crude oil, petroleum products and gas have generated a massive increase in energy prices (Table 6.3). Brent crude oil averaged $116 per barrel in March 2022; that was an increase of 55% from last December, which eased only with releases of strategic oil reserves by the US and others.[266] Similarly to food subsidies, some governments have resorted to subsidies to alleviate prices, but that may in fact increase demand, thereby keeping prices high in the long term. In addition to surging petrol prices, natural gas also rose to record-breaking levels in Western Europe and rose by a third in the US during the same December–March period.[267] Europe has been hit hardest by the commodity price increase, as it previously relied on Russia for 35% of its natural gas, 20% of its crude oil and 40% of its coal, but developing economies have also been hit hard.[268]

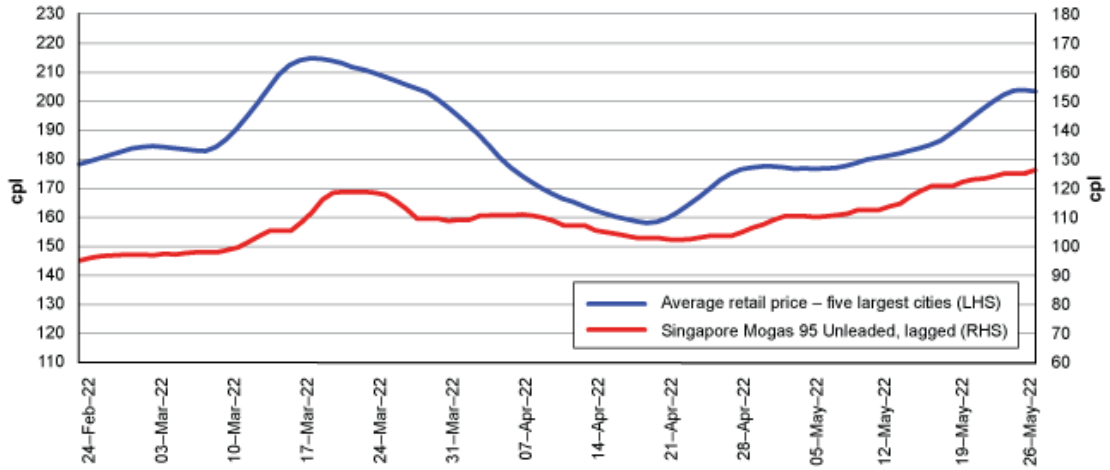
Table 6.3: World Bank commodities price forecast (nominal US dollars)

Commodity	Unit	2020	2021	2022f	2023f	2024f
Price indices in nominal U.S. dollars (2010=100)						
Energy a/		52.7	95.4	143.6	125.8	110.8
Non-Energy Commodities		84.4	112.0	133.5	121.7	117.8
Agriculture		87.5	108.7	127.9	118.0	117.8
Beverages		80.4	93.5	103.5	99.7	100.2
Food		93.1	121.8	149.7	134.2	133.5
Oils and Meals		89.8	127.1	164.9	141.9	140.6
Grains		95.3	123.8	149.0	133.6	132.6
Other food		95.5	113.1	130.3	124.8	125.1
Raw Materials		77.6	84.5	87.2	87.8	88.4
Timber		86.4	90.4	86.4	89.5	90.8
Other raw materials		67.9	78.0	88.1	85.9	85.9
Fertilizers		73.2	132.2	223.7	198.3	168.5
Metals and Minerals b/		79.1	116.4	134.8	120.6	112.1
Base Metals c/		80.2	117.7	143.9	131.9	123.8
Precious Metals		133.5	140.2	144.4	131.5	127.0

Source: World Bank's 'Commodity markets outlook report: the impact of the war in Ukraine on commodity markets'.

The ripple effects have been felt as far away as Australia, where average retail petrol prices reached 182.4 cents/litre in late February, which was the highest inflation-adjusted price since 2014.[269] Average retail petrol prices in Australia's five largest cities reached a high of nearly 215 cents/litre in mid-March following sanctions (Figure 6.4).[270] However, average prices largely dropped following the federal government's announcement of a fuel excise cut to come into effect on 30 March.[271]

Figure 6.4: Average Australian retail petrol prices, 24 February to 26 May 2022 (A$)



Source: Australian Competition and Consumer Commission, 'About fuel prices', online.

However, while it may be macabre to mention it, Australia will benefit from the economic disruptions caused by the war. As a large energy and food exporter, Australia is well situated to fill the gaps in Ukrainian and Russian production and will also enjoy higher commodity prices. Australian Government forecasters expect national commodity exports to rise to A$424.9 billion (US$318 billion) for the fiscal year to 30 June, which is up a third from earnings in 2020–21 and nearly $50 billion since the December quarterly report.[272] That growth is likely to be driven by higher iron ore prices, which increased from projections of US$118/tonne to US$160/tonne in 2022.[273] Government forecasters are also projecting that liquefied natural gas is set to double from A$32 billion in 2020–21 to over A$70 billion in 2021–22, while the average price of coking coal has increased from US$123/tonne in 2020–21 to US$348/tonne.[274] However, it's debatable how long

the higher prices due to uncertainty will remain. So, while Australians may be suffering a hit at the petrol pump, some sectors of the Australian economy will do well, particularly those that have managed to insulate themselves from fuel price increases.

6.5 Conclusions

In summary, the invasion has imposed massive direct costs on Ukraine in human, economic and physical terms. Russia, too, is enduring great cost, probably in ways that Vladimir Putin didn't anticipate. But the ripples extend much further out. Europe will endure higher energy costs for some time to come. Around the world, food insecurity will be exacerbated for those least able to manage it, potentially leading to political instability.

It's difficult to know what level of European defence spending could have deterred Putin, and military equipment alone is not enough to deter. Resolve and a willingness to use those capabilities are just as important. But the death, destruction and disruption caused by the war in Ukraine suggest that short-term savings achieved by running down defence capabilities in times of peace can incur huge costs in the longer run. Ultimately, the cost of investing in military capabilities to deter coercive authoritarian regimes could be far cheaper than the costs of war.

Appendix 1: Local versus overseas spending

Every year, Defence provides ASPI with a breakdown of local and overseas acquisition and sustainment spending by Capability Acquisition and Sustainment Group (formerly the Defence Materiel Organisation). This is reproduced below in Table A1.1 and discussed further in Chapter 3.

Defence doesn't break the data down any further, so we don't have a split between primes and small-to-medium enterprises, for example, or between foreign countries.

We now have a decade of data. Overall, the total split is fairly even between acquisition and sustainment spending (52.2% to 47.8%). But the split between local and overseas spending is very different in acquisition and sustainment spending. Acquisition has averaged a rough one-third local to two-thirds overseas spend, whereas sustainment has been the opposite, at two-thirds local to one-third overseas. We can draw some conclusions from this data:

- Sustainment is absolutely essential to generate capability, and the bulk of this is done in Australia.
- Focusing on local acquisition spending or jobs misses the key fact that more dollars are spent on local sustainment. We don't have data on local jobs in acquisition and sustainment, but it's reasonable to assume that there are more jobs in the latter.
- The local acquisition percentage has fluctuated between 25% and 44%. Currently, it's on an upwards trajectory even as the total acquisition spend increases, suggesting that the Australian defence industry can grow in response to consistent funding and demand signals.
- The local sustainment has remained consistently around two-thirds even as the total sustainment spend has grown substantially, again reinforcing the assessment that the local defence industry can grow to meet consistent demand.

Acquisition spending appears to fall in 2022–23, but that is probably driven by the fact that only approved projects' budgets are included in the data. Any project approved after March 2022 will not be included, so it's highly likely that the total acquisition figure for 2022–23 will increase.

Table A1.1: Capability Acquisition and Sustainment Group, local and overseas spending, 2012–13 to 2022–23 ($ million)

	Acquisition			Sustainment		
	Local	**Overseas**	**Total**	**Local**	**Overseas**	**Total**
2012–13	1,515	1,946	3,461	3,346	1,224	4,570
	44%	56%		73%	27%	
2013–14	1,604	2,669	4,273	3,218	1,407	4,625
	38%	62%		70%	30%	
2014–15	1,648	4,926	6,574	3,536	1,482	5,018
	25%	75%		70%	30%	
2015–16	1,989	4,436	6,426	3,852	2,097	5,949
	31%	69%		65%	35%	
2016–17	2,120	4,152	6,272	3,891	1,706	5,597
	34%	66%		70%	30%	
2017–18	2,453	4,855	7,308	3,863	2,118	5,982
	34%	66%		65%	35%	
2018–19	2,456	5,555	8,011	4,288	2,482	6,770
	38%	62%		69%	31%	
2019–20	2,617	5,360	7,977	4,359	2,629	6,988
	33%	67%		62%	38%	
2020–21	3,535	5,739	9,274	5,245	2,411	7,656
	38%	62%		69%	31%	
2021–22	3,724	5,540	9,264	5,465	2,470	7,935
	40%	60%		69%	31%	
2022–23	2,956	4,094	7,050	5,739	2,779	8,518
	42%	58%		67%	33%	
Total	**26,617**	**49,272**	**75,889**	**46,802**	**22,805**	**69,607**
	35%	**65%**		**67%**	**33%**	

Source: Data provided by the Department of Defence.

Appendix 2: ‘Commissioned’ versus commissioned ships

Senate estimates hearings have included some heated exchanges between the previous government and the then opposition over their relative achievements in naval shipbuilding. The coalition government stated that it had commissioned or was commissioning very large numbers of Australian-made ships, but such claims are confusing when we don’t distinguish between two meanings of the term ‘commission’. The first is to order or authorise the production of something; that is, the start of a construction process. The second is to mark the entry of something such as a ship into service; that is, the end of a construction process. The previous government also used the term to refer to vessels that were in its investment plan but were not under contract and, indeed, for which no project had been started. We should also note that there’s also a gap between a vessel being delivered to Defence by the builder and its actual commissioning into service as a Royal Australian Navy ship.

We’ve attempted to unpack the status of various naval acquisition projects. We haven’t included vessels that entered service under the previous government but had been ordered earlier (such as the three Hobart-class destroyers and the two Canberra-class LHDs).

In Table A2.1, the ‘planned number’ is the number in the IIP or publicly stated elsewhere by the government. ‘In contract’ is the number for which a build contract has been awarded. We should note that no construction contracts have been awarded for Hunter-class frigates despite the approved project budget to date of $7,066 million. ‘Delivered’ refers to vessels that have been handed over to Defence, regardless of whether they have been officially commissioned into service. To give a sense of scale, we’ve distinguished between ships (including submarines) and patrol boats. For completeness, we’ve also included vessels acquired overseas.

Table A2.1: Status of shipbuilding projects

Class	Built in Australia	Planned number	In contract	Delivered	Notes
Guardian-class Pacific patrol boat	Yes	21	21	15	Being gifted to Pacific island nations, Papua New Guinea and East Timor.
Cape-class patrol boats	Yes	2	2	2	ADV Cape *Fourcroy* and ADV Cape *Inscription* in service.
Evolved Cape-class patrol boats	Yes	8	8	1	Two added to original six during election campaign.
Hunter-class frigate	Yes	9	0	0	Design work being conducted; no vessels in contract.
Attack-class submarine	Yes, but cancelled	12	0	0	Project cancelled September 2021.
Arafura-class offshore patrol vessel	Yes	12	12	0	Five under construction; first to be delivered in late 2022.
Supply-class replenishment ships	No (Spain)	2	2	2	HMAS *Supply* and HMAS *Stalwart* now in service.
Multi-role aviation training vessel	No (Vietnam)	1	1	1	MV *Sycamore*; operated and crewed by Teekay Shipping.
Pacific support ship	No (Norway?)	1	1	1	Originally to be built in Australia; existing ship acquired overseas.
Total vessels		68	47	22	

Total ships/patrol boats		37/31	16/31	4/18	
Total vessels built in Australia		64	43	18	
Total vessels for Australia		47	26	7	
Total vessels built in Australia for Australia		43	20	3	
Total ships built in Australia		33	10	0	

Table A2.2 shows vessels that are in the IIP but that haven't yet gone to tender or are smaller vessels, such as landing craft. According to the latest statements from the government or Defence, all are to be built in Australia

Table A2.2: Additional projects in the IIP

Class	Number	Status
Sea-lift and replenishment vessels	2	No public information beyond 2020 FSP.
Future mine warfare and hydrographic vessels	At least 8	Government has stated will be based on variant of OPV design. No tender yet released.
Future army watercraft	Up to 18	Small landing craft to replace LCM-8. Out to tender.
Large army watercraft	?	Large landing craft potentially capable of independent operations. No tender yet released.
Salvage and repair craft	1	No public information beyond FSP.
Nuclear-powered attack submarines (SSNs)	'At least 8'	Taskforce to report to government in early 2023 on 'optimal pathway'.

We don't make any judgements about which is the right way to count but simply note that, depending on how and what you count and which milestone you use, you can come to very different numbers, ranging from 0 to something around 90.

Acronyms and abbreviations

ADF	Australian Defence Force
AEW&C	airborne early warning and control
ALP	Australian Labor Party
ANAO	Australian National Audit Office
ANI	Australian Naval Infrastructure Pty Ltd
APS	Australian Public Service
ASD	Australian Signals Directorate
ASLAV	Australian light armoured vehicle
ASW	antisubmarine warfare
ATACMS	Army Tactical Missile System
AWD	air warfare destroyer
BMS	battle management system
CASG	Capability Acquisition and Sustainment Group
CCP	Chinese Communist Party
CPI	Consumer Price Index
DCP	Defence Cooperation Program
DSCA	Defense Security Cooperation Agency (US)
DSU	2020 Defence Strategic Update
DWP	Defence White Paper
FOC	full operating capability
FSP	2020 Force Structure Plan
GDP	gross domestic product
GST	goods and services tax
HIMARS	High Mobility Artillery Rocket System
ICT	information and communications technology
IFV	infantry fighting vehicle
IIP	Integrated Investment Program
IOC	initial operating capability

ISREW	intelligence, surveillance, reconnaissance and early warning
LHD	landing helicopter dock
LOTE	life-of-type extension
LRASM	long-range anti-ship missile
MPR	*Major projects report*
NATO	North Atlantic Treaty Organization
NSM	Naval Strike Missile
OECD	Organisation for Economic Co-operation and Development
OPV	offshore patrol vessel
PAES	Portfolio Additional Estimates Statements
PBS	Portfolio Budget Statements
PMV-L	protected mobility vehicle—light
PrSM	Precision Strike Missile
RAAF	Royal Australian Air Force
REDSPICE	Resilience, Effects, Defence, Space, Intelligence, Cyber and Enablers
SIGINT	signals intelligence
SPH	self-propelled howitzer
SSN	ship, submersible, nuclear (nuclear-powered fast attack submarine)
UAS	unmanned aircraft system
UAV	uncrewed aerial vehicle
USAF	US Air Force
USFPI	United States Force Posture Initiative
USV	uncrewed surface vessel

Notes

[1] It's not actually a Chinese saying, apparently. But it's a good one anyway. 'May you live in interesting times', *Quote Investigator*, online.

[2] Will Leben, 'Let's hold our horses on drawing lessons from war in Ukraine', *The Strategist*, 19 May 2022, online.

[3] When ASPI argued for the need for Australia to develop the means to respond to China's growing coerciveness, we were derided as cowboys. Oddly, German Chancellor Olaf Scholz isn't being derided as a cowboy for stating days after the invasion that Germany will finally achieve NATO's 2% of GDP defence spending benchmark.

[4] Paul Kelly, 'Dawning of the great national realignment', *The Australian*, 28 May 2022, online.

[5] Another oddity is how China denounces what it calls 'unilateral sanctions' imposed in response to an illegal and unprovoked invasion but imposes its own unilateral sanctions in response to the heinous crime of hurting the feelings of the Chinese people.

[6] In terms of ship numbers at least. The US Navy still has an edge in tonnage and missile cells. One of the ships in the Russian taskforce was the cruiser *Varyag*—a sister ship of the *Moskva*, which didn't manage to put up much of a fight against Ukrainian shore-launched anti-ship cruise missiles in the Black Sea in April 2022.

[7] 'Pacific nations walk away from trade and security deal with China as Australian aims to "build stronger family"', *ABC News*, 30 May 2022, online.

[8] For example, Joseph R Biden, Jr, *Interim National Security Strategic Guidance*, March 2021, online.

[9] Congressional Budget Office, *Additional information about the update budget and economic outlook: 2021 to 2031*, US Congress, July 2021, online.

[10] Office of the Chief of Naval Operations, *Report to Congress on the annual long-rage plan for construction of naval vessels for fiscal year 2023*, April 2023, online.

[11] We discussed this issue in more detail in the 2019–20 edition of *The cost of defence*, 18–20, online. Nothing has changed except that the challenge facing the US Department of Defense has continued to deepen. See also Marcus Hellyer, 'The US Navy needs to admit it can't outbuild China', *The Strategist*, 28 January 2021, online.

[12] Michael Shoebridge, *What is AUKUS and what is it not?*, ASPI, Canberra, 2021, 4, online.

[13] For an update on what's happened since the original 16 September 2021 announcement, see Marcus Hellyer, Ben Stevens, *AUKUS Update #1: May 2022*, ASPI, Canberra, 2022, online.

[14] The gas-led recovery was always an oxymoron. If Australian industry is paying under $8 per GJ of gas, increasing gas production—even if some of that production were to be reserved for Australian customers (which can't be assumed by any means)—would reduce the cost only marginally (although it's unlikely to reduce it at all due to the location of the new gas). Compared to the cost of other inputs, such as labour, marginally reduced gas prices would have minimal effect on the international competitiveness of Australian businesses. However, by tying Australian gas markets into global markets, the potential increase in cost could be catastrophic.

[15] For a worst-case scenario, see David Llewellyn-Smith, 'Ruinous oil and gas prices could lead Australia into recession', *News.com*, 1 June 2022, online.

[16] Mark Ogge, *APPEA members who pay no income tax*, Australia Institute, May 2022, online. Perhaps the biggest irony is that China has been on-selling cargoes of imported gas, including from Australia's Northwest Shelf, since Covid-19 lockdowns have dampened demand. 'China flips to selling LNG export cargoes as pandemic curbs dent demand', S&P Global, 29 April 2022, online.

[17] In 2019, the year before the Covid-19 lockdowns suppressed demand. Department of Foreign Affairs and Trade, 'Australia's top 25 imports, goods & services', Australian Government, online.

[18] And sometimes even the most reliable partner can't help you when you need it. Hence the agonising about a Plan B for our defence strategy.

[19] Australian Government, *Budget paper no. 2: Budget strategy and outlook 2022–2023*, 2022, 43, online.

[20] Australian Government, *Budget paper no. 2: Budget strategy and outlook 2022–2023*, 2022, 38.

[21] Australian Government, *Budget paper no. 2: Budget strategy and outlook 2022–2023*, 2022, 44.

[22] John Ferrari, 'How the Pentagon's bad inflation math made a hollow budget', *Breaking Defense*, 12 April 2022, online.

[23] In any case, the government's national security credentials weren't helped by the late-breaking revelations of a security deal between Solomon Islands and China that could see the latter having an enduring military (or at least paramilitary) presence in Australia's own 'first island chain'.

[24] Lowy Institute Poll 2021, online.

[25] Lowy Institute Poll 2021.

[26] Our analysis focuses on the government's funding for Defence, known as the 'appropriation'. Defence also has funding from other sources, such as 'own source revenue', which includes funding it receives in return for the provision of services to its members (such as food at messes) or partners (such as fuel). In 2022–23, those other sources are around $1 billion (PBS Table 1, serial 14). Generally, our analysis is based on appropriated funds but, sometimes, due to the presentation of numbers in the PBS, the numbers presented here include own-source revenue.

[27] Department of Defence (DoD), *Portfolio Budget Statements (PBS) 2022–23*, Australian Government, 2020, online.

[28] Our tracking shows increased shortfalls against the 2020 DSU finding line in 2024–25 ($1,295 million) and 2025–26 ($2,322 million). We shouldn't assume that Defence's funding has been cut by that amount, as there are two main factors that can account for the difference. The first is that the PBS shows only variations over the forward estimates. However, exchange-rate adjustments extend indefinitely into the future, so the shortfalls in 2024–25 and 2025–26 are likely to reflect exchange-rate adjustments made in 2020–21, when those years were still beyond the PBS's forward estimates. That is, there's potentially $1–2 billion in foreign exchange adjustments in 2024–25 and 2025–26 that is 'invisible' to us. The second is that some variations are listed in the PBS as 'not for publication' due to commercial or national security sensitivities, so we can't see what their values are. However, most of them seem to be 'absorbed'; that is, they're funded out of Defence's existing appropriation and therefore don't result in changes to the overall appropriation.

[29] In its 2022–23 Budget papers, the government's estimate for the CPI is 4.25% in 2021–22 and 3% in 2022–23. The percentage increase in future defence spending in real terms will move around as assessments of the CPI change. The 2021–22 estimate has already been overtaken by actual economic data, as we discuss below. In short, our 'real' numbers are not fixed and final.

[30] Australian Government, *Budget paper no. 2: Budget measures 2022–2023*, 2022, online.

[31] Significant measures in previous years listed as 'not for publication' have included the Pacific Step-up and the construction of shipyards at Osborn in Adelaide.

[32] For a discussion of the 2021–22 Defence PAES, see Marcus Hellyer, 'Is Defence turning money into capability fast enough?', *The Strategist*, 15 February 2022, online.

[33] Defence informed ASPI that 'An Estimates Variation in the 2022–23 Budget subsequently reversed this measure based on a decision by Government for the OSI to utilise prior year unspent appropriation before seeking new funding that would require offsets from Defence.' Email from Defence media, 6 May 2022.

[34] Australian Government, *Budget paper no. 2: Budget measures 2022–23*, 2022, 70, online.

[35] PBS 2022–23, 13. It may be that the absorbed figure is the value of equipment provided in kind that will not be replaced.

[36] Oddly, there's a mysterious amount of $8.7 million in 2022–23 that's being taken away from Defence but is not going to ASD.

[37] Peter Dutton, 'Multi-billion dollar large ship infrastructure for Henderson, Western Australia,' media release, 15 March 2022, online.

[38] DoD, *2020 Force Structure Plan*, Australian Government, 2020, 120, online.

[39] Marcus Hellyer, *The cost of Defence: Part 1: ASPI 2020 Defence Strategic Update brief*, ASPI, Canberra, August 2020, online.

[40] Future sustainment isn't the total cost of sustainment in the future, or even the total cost of sustaining the new systems that Defence will acquire in the future. Rather, it's the difference between the predicted sustainment cost of new systems and the sustainment cost of the current in-service systems that they'll replace. That is, if the annual sustainment cost of a system is $100 million per year, and the predicted sustainment cost of its replacement is $150 million, then the future sustainment cost is $50 million. Defence officials have informed Senate estimates hearings that the breakdown of the $270 billion was $225 billion in acquisition funding and $45 billion in future sustainment. Foreign Affairs, Defence and Trade Legislation Committee, Estimates, Australian Parliament, 6 April 2002, 14, online.

[41] Marcus Hellyer, *The cost of Defence: Part 2: ASPI 2020–21 defence budget brief*, ASPI, Canberra, 2020, 18, online.

[42] Peter Bacon et al., 'The $773 billion question: Inflation's impact on defense spending,' McKinsey & Company, 28 March 2022, online.

[43] Australian Bureau of Statistics, 'Consumer Price Index, Australia', 27 April 2022, online; Philip Lowe, 'Statement by Philip Lowe, Governor: Monetary Policy Decision', Reserve Bank of Australia, 3 May 2022, online.

[44] Defence confirmed that it isn't automatically compensated for inflation: 'The funding line established in the *2016 Defence White Paper*, and updated in the *2020 Defence Strategic Update*, provides for long-term growth in Defence funding and takes into account factors including the long term GDP growth rate projected by Treasury at the time. The overall funding line is adjusted by No Win/No Loss adjustments (Major Operations or Foreign Exchange) or Government decisions including transfers to other agencies. If inflation exceeds the underlying assumptions, Defence would have an opportunity to discuss revised assumptions with Government.' Email from Defence media, 1 June 2022.

[45] The breakdown in PBS Table 4b shows the Department of Defence's planned *expenditure*, which draws on Defence's appropriation as well as Defence's own-source revenue. That means it doesn't sum to the Defence line in PBS Table 4a, which is just Defence's appropriation.

[46] Technically, but not quite in an accounting sense. That's because the Capability Acquisition Program includes things that in an accounting sense are operating costs and, conversely, its Capability Sustainment Program includes items that in an accounting sense are 'capitalised'. Nevertheless, it's quick and easy to use the Capability Acquisition Program as Defence's capital budget, and *The cost of Defence* uses the terms 'capital' and 'acquisition' interchangeably.

[47] *The Cost of Defence Public Database*, ASPI, Canberra, online.

[48] However, due to changes made to the presentation of the PBS in 2020–21, it's now possible to see capital expenditure by group. It's provided in each program's (that is, each of Defence's groups' and services') cost summaries. We show those in Chapter 3.

[49] *The Cost of Defence Public Database*, online.

[50] These numbers refer only to the Department of Defence and don't include ASD. They also include own-source revenue, so they sum to line 15 of PBS Table 1, not line 5, which is the department's appropriation from the government.

[51] The 2022–23 consolidated defence appropriation divided by 25,879,266, which was the Australian Bureau of Statistics' population clock prediction for Australia's population on 27 April 2022.

[52] Defence's corporate plan translates the programs' objectives into performance criteria. The annual report then assesses the programs' performance against those criteria. We used to summarise the assessments in *The cost of Defence*, but since the self-assessments almost always said that the objectives had been met, there's little point continuing to do so. Interestingly, however, progress in the Naval Shipbuilding Plan was assessed only as 'Partially Achieved'. And that was before the cancellation of the Attack-class submarine.

[53] We've discussed what the taskforce will be doing in Andrew Nicholls, Jackson Dowie, Marcus Heller, *Implementing Australia's nuclear submarine program*, ASPI, Canberra, December 2021, online.

[54] It should be noted that service personnel costs are attributed to a member's parent service rather than the group where they're posted, so that means the funding for groups that have a large number of embedded service personnel (such as Strategy, Policy and Industry, Joint Capabilities, Australian Defence Force Headquarters, and CASG) is understated.

[55] That's because the PBS now shows each program's total capital expenditure. Previously, it showed only the depreciation of existing capital assets in each program's budget, not the acquisition cost of new ones.

[56] We've taken the data from each program's cost summary, using the lines 'Purchases of non-financial assets' and 'Purchases of inventory'.

[57] This means extra money to cover operating costs and the rapid acquisition of any equipment specific to an operation. If Defence was going to buy the equipment anyway (that is, the equipment is already included in its investment program), then it generally doesn't receive supplementation for the purchase.

[58] DoD, *Operations*, Australian Government, 2022, online.

[59] DoD, *Annual report 2020–21*, Australian Government, September 2021, online.

[60] The Cost of Defence Public Database, ASPI, Canberra, online.

[61] DoD, *2016 Defence White Paper*, Australian Government, 2016, 146, online.

[62] Scott Morrison, Peter Dutton, 'Defence workforce to grow above 100,000,' media release, 10 March 2022, online.

[63] DoD, *Annual report 2020–21*, Australian Government, September 2021, 120–121, online; Australian Public Service Commission, *State of the service report 2020–21*, Australian Government 2021, online.

[64] This data was compiled by ASPI analyst Dr Huon Curtis.

[65] DoD, *Annual report 2020–21*, Australian Government, September 2021, 4, online.

[66] There's very little information anywhere else either, unless a project is in the ANAO's *Major projects report*, but that generally covers even fewer projects than the PBS, although in much greater depth. It's a curious situation that projects whose individual budgets can be many hundreds of millions of dollars are effectively invisible to the public.

[67] The Cost of Defence Public Database, ASPI, Canberra, online.

[68] Peter Dutton, '$3.5 billion to accelerate missile strike capabilities for the ADF,' media release, 5 April 2022, online.

[69] Foreign Affairs, Defence and Trade Legislation Committee, Estimates, 1 April 2002, 33–35, online.

[70] Scott Morrison, Peter Dutton, Melissa Price, '$428 million investment in airbase upgrades to create jobs and keep Australians safe', media release, Liberal Party of Australia, 22 April 2022, online.

[71] Melissa Price, Jim Molan, '$700 million defence facility expansion to protect nation and deliver jobs in Eden-Monaro', media release, Liberal Party of Australia, 10 May 2022, online.

[72] Parliamentary Standing Committee on Public Works, *Current inquiries*, Australian Parliament, 2021, online.

[73] This approach might upset accountants, but it's a useful way of presenting the budget to the rest of us.

[74] Australian Government, *Budget 2022–23: Agency resourcing*, Budget paper no. 4, 2022–23, March 2022, 82–83, online.

[75] Again, accountants might take issue with this.

[76] See Part 2 of 2020–21's *The cost of Defence*, 42; Marcus Hellyer, 'Australia's defence budget in the age of Covid-19: unsustainable sustainment?', *The Strategist*, 23 June 2020, online.

[77] The Cost of Defence Public Database, ASPI, Canberra, online.

[78] Marcus Hellyer, *The cost of Defence 2020–2021: Part 1: ASPI 2020 Defence Strategic Update brief*, ASPI, Canberra, August 2020, 35, online.

[79] Melissa Mackay, 'Work begins on $270 million US fuel storage facility on Darwin's outskirts,' *ABC News*, 19 January 2022, online.

[80] Parliamentary Standing Committee on Public Works, *Current inquiries*, Australian Parliament, 2021, online.

[81] Our figures for 2021–22's achieved acquisition spending are derived by subtracting the 2021–22 PBS's total expenditure to 30 June 2021 from the 2022–23 PBS's total expenditure to 30 June 2022. This can give a slightly different result from using the revised estimates for 2021–22 spending in the 2021–22 PAES.

[82] The Pacific Patrol Boat disappeared from the PBS's top 30 in 2021–22 and has stayed out, so we don't have visibility of its predicted spend for this year. Since the delivery rate of boats has stayed steady over the past few years, we're assuming that this year will be similar to 2020–21's $85 million. The other projects are all in the PBS 2022–23 top 30.

[83] See Chapter 6 of Andrew Nicholls, Jackson Dowie, Marcus Hellyer, *Implementing Australia's nuclear submarine program*, ASPI, Canberra, 2021, online.

[84] According to Defence (Foreign Affairs, Defence and Trade Committee, Defence portfolio, 2022–23 Budget Estimates, question on notice no. 36, portfolio question no. 37), 'This will be spent in a range of areas including:

- Contributions to other Government entities such as Department of Foreign Affairs and Trade (DFAT), Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) and Australian Nuclear Science and Technology (ANSTO) who will undertake work in direct support of the Task Force;

- Expenses incurred by our United States (US) & United Kingdom (UK) partners in direct support of the work of the Taskforce;
- Technical studies; and
- Taskforce operating costs including travel.'

[85] Senate Foreign Affairs, Defence and Trade References Committee, Estimates, 1 April 2022, 4–16, online.

[86] Before they were removed, the approved budget was $5,818 million.

[87] This is SEA1000 First Pass approval (including studies, external service providers, legal fees and travel)—$18.8 million and SEA1000 Phase 1A (including science and technology, competitive evaluation process, program support and studies)—$185.9 million. Foreign Affairs, Defence and Trade Committee, Defence portfolio, 2022–23 Budget Estimates, question on notice no. 7, portfolio question no. 7.

[88] Senate Finance and Public Administration Legislation Committee, Estimates, 5 April 2022, 28, online. At the time of writing, a question on notice regarding which facilities could be reused was unanswered.

[89] Peter Dutton, '$3.5 billion to accelerate missile strike capabilities for the ADF', media release, 5 April 2022, online.

[90] Senate Foreign Affairs, Defence and Trade References Committee, Estimates, 1 April 2022, 33–35, online.

[91] Marcus Hellyer, 'What's the real cost of Australia's submarine capability?', *The Strategist*, 24 August 2021, online.

[92] Peter Dutton, 'Defence capability and Australian industry to benefit from periscope replacement', media release, Liberal Party of Australia, 18 April 2022, online.

[93] The announcement didn't say whether the installations could be conducted only during full-cycle dockings, in which case all six boats wouldn't be completed until 2036. If they can also be done in mid-cycle dockings, then they could be completed much sooner.

[94] Cameron Stewart, '$10bn refit for ageing Collins-class submarines amid China concerns', *The Australian*, 10 June 2021, online.

[95] Peter Dutton, 'Key naval projects confirmed for South Australia', media release, 16 September 2021, online.

[96] Defence provided the following clarification: 'Collins LOTE is approved through the normal gate process that acquisition projects are subjected to, and is being executed through sustainment funding as CN62. The cost estimate for LOTE remains $4.3 – 6.4 billion as outlined by Government. The ongoing sustainment costs for the Collins class submarine are, and will continue to be, funded separately under CN10.' Email from Defence media, 1 June 2022.

[97] Foreign Affairs, Defence and Trade Committee, Defence portfolio, 2021–22 Additional Estimates, question on notice no. 74, portfolio question no. 75.

[98] Foreign Affairs, Defence and Trade Committee, Defence portfolio, 2021–22 Additional Estimates, question on notice no. 76, portfolio question no. 77.

[99] Foreign Affairs, Defence and Trade Committee, Defence portfolio, 2021–22 Additional Estimates, question on notice no. 75, portfolio question no. 76.

[100] Marcus Hellyer, 'Getting real about schedule for Australia's future frigates', *The Strategist*, 19 August 2021, online.

[101] Marcus Hellyer, 'Hunter-class frigate report indicates Australian naval shipbuilding in disarray', *The Strategist*, 2 February 2022, online.

[102] The model is described in an online tutorial: Heather F Chelson, Richard L Coleman, Jessica R Summerville, Steven L Van Drew, *Rayleigh curves—a tutorial*, Society of Cost Estimation and Analysis, June 2004, online.

[103] Marcus Hellyer, *Delivering a stronger navy, faster*, Canberra, ASPI, 2021, online.

[104] David Shackleton, *The Hunter frigate: an assessment*, Canberra, ASPI, 2022, online.

[105] Scott Morrison, 'Australia to pursue nuclear-powered submarines through new trilateral enhanced security partnership', media statement, 16 September 2021, online.

[106] Marcus Hellyer, 'Does the Royal Australian Navy need Tomahawk missiles,' *The Strategist*, 16 February 2021, online.

[107] Department of the Navy, Department of Defense, *Fiscal year (FY) 2022 budget estimates: Navy justification book, volume 1 of 1: Weapons procurement*, Navy, US Government, May 2021, online.

[108] Peter Dutton, '$3.5 billion to accelerate missile strike capabilities for the ADF', media release, 5 April 2022, online. For a discussion of the developments see Marcus Hellyer, 'What's up with the Royal Australian Navy's weapons program?', *The Strategist*, 11 February 2021, online; Marcus Hellyer, 'Making sense of Australia's salvo of missile announcements', *The Strategist*, 7 April 2022, online.

[109] Peter Dutton, 'Cutting edge self-defence missiles for navy's ships', media release, Liberal Party of Australia, 5 May 2022, online.

[110] DoD, 'Missile upgrade will boost Navy protection', media release, Australian Government, 29 June 2014, online.

[111] Peter Dutton, 'Autonomous undersea warfare capability for Australia's navy', media release, Liberal Party of Australia, 5 May 2022, online; 'Anduril and the Royal Australian Navy to partner on extra large autonomous undersea vehicles', media release, Anduril, 4 May 2022, online.

[112] 'TAS and RAN reveal "underwater Loyal Wingman" project', *Australian Defence Magazine*, 12 May 2022, online.

[113] Ridzwan Rahmat, 'Indo Pacific 2022: Royal Australian Navy breaks cover on Speartooth large unmanned underwater vehicle', *Janes*, 11 May 2022, online.

[114] '2 months, 4 bluebottles, 6400 miles, no fossil fuel', Ocius, 23 November 2021, online. It's possible to watch Ocius's Bluebottles at work in real time by clicking a link on Ocius's website, online. At the time of writing, four Bluebottles were conducting surveillance at Rowley Shoals off Broome. Previously, they have operated at Ashmore Reef.

[115] 'Thales Australia and Ocius advance autonomous threat detection and surveillance', media release, Thales, 10 May 2022, online.

[116] Tim Fish, *Indo-Pacific 2022: RAN to test large ASV concepts*, Mönch Publishing Group, 14 May 2022, online; 'Autonomous ships', Austal, online.

[117] Defense Security Cooperation Agency (DSCA), 'Australia—MH-60R multi-mission helicopters and related defense services', media release, US Government, 8 October 2021, online.

[118] Scott Morrison, Peter Dutton, Melissa Price, 'Securing our national security and local defence jobs and skills', media release, Liberal Party of Australia, 9 May 2022, online.

[119] 'Austal Australia delivers 15th Guardian class patrol boat', media release, Austal, 26 May 2022, online.

[120] Scott Morrison, Peter Dutton, Melissa Price, 'Keeping our borders safe and supporting Australian industry', media release, Liberal Party of Australia, 18 April 2022, online; 'Austal Australia to build an additional two evolved Cape-class patrol boats for the Royal Australian Navy,' company announcement, Austal Limited, 18 April 2022, online.

[121] Scott Morrison, Peter Dutton, '$1 billion defence contract, sovereign defence manufacturing facility in Geelong announced', media release, 13 December 2021, online.

[122] Email from Defence media, 28 April 2022. The value of the contract with Hanwha is $1,048,081,691.11, according to AusTender. You have to love the precision that generates the last 11 cents.

[123] This was another example of the Australian public learning of major defence acquisitions through the US's disclosure processes rather than our own (virtually non-existent) ones. DSCA, 'Australia — HIMARS launchers', news release, US Government, 26 May 2022, online.

[124] Peter Dutton, 'Australia and the US partner to spearhead precision strike missile capability', media release, 12 August 2021, online. The corresponding US announcement has more information: Office of the Deputy Assistant Secretary of the Army for Defense Exports and Cooperation, 'US and Australian Defense Departments to partner on precision fires', news release, US Government, 28 July 2021, online.

[125] 'Precision Strike Missile (PrSM)', Lockheed Martin, online.

[126] Senate Foreign Affairs, Defence and Trade Legislation Committee, Estimates, 6 April 2022, 25, online.

[127] Marcus Hellyer, 'Australia's defence budget in the age of Covid-19: unsustainable sustainment?', *The Strategist*, 23 June 2020, online.

[128] Senate Foreign Affairs, Defence and Trade Legislation Committee, Estimates, 6 April 2022, 16–18, online.

[129] Peter Dutton, 'Enhancing the ADF's armoured combat capability', media release, 10 January 2022, online. As usual, the public learned of the acquisition through the US's disclosure processes rather than through our own: DSCA, 'Australia — Heavy armoured combat systems', news release, US Government, 29 April 2021, online.

[130] Email from Defence media, 1 June 2022.

[131] Defence recently informed the Senate that it 'has spent $2.092 sustaining the MRH90 fleet since FY06/07' (to 31 March 2022). Foreign Affairs, Defence and Trade Committee, Defence portfolio, 2022–23 Budget Estimates, question on notice no. 12, portfolio question no. 12.

[132] Peter Dutton, 'Strengthening Army's helicopter capability', media release, 10 December 2021, online.

[133] Email from Defence media, 11 May 2022.

[134] Scott Morrison, Peter Dutton, Melissa Price, 'Securing our national security and local defence jobs and skills', media release, Liberal Party of Australia, 9 May 2022, online; DSCA, 'Australia—AH-64E Apache helicopters', US Government, 3 June 2021, online.

[135] DSCA, 'Australia — CH-47F Chinook helicopters', news release, US Government, 29 April 2021, online.

[136] Peter Dutton, 'More Chinooks to boost Army's heavy-lift capability', media release, 8 July 2021, online.

[137] Peter Dutton, 'Australian Army invests $650 million in uncrewed aerial systems', media release, 11 March 2022, online.

[138] Marine Corps Warfighting Laboratory Futures Directorate, *Tentative Manual for EABO*, Quantico, Virginia, online.

[139] Scott Morrison, Peter Dutton, '$1 billion cutting-edge kit for Australia's special forces', media release, Liberal Party of Australia, 6 May 2022, online.

[140] Peter Dutton, 'Delivering enhanced weapons for our Defence force', media release, Liberal Party of Australia, 13 April 2022, online.

[141] Andrew McLaughlin, 'RFI released for RAAF Hawk 127 LIF replacement', *ADBR*, 5 June 2020, online.

[142] 'RAAF Hawks back flying after three-week ground due to engine issue', *Australian Aviation*, 10 June 2019, online.

[143] Peter Dutton, '$1.5 billion fast-jet training aircraft contract delivers more jobs', media release, 21 February 2022, online.

[144] Defence has also informed the Senate that it 'anticipates' that LRASM will be available on the F-35A by 2028. Foreign Affairs, Defence and Trade Committee, Defence portfolio, 2022–23 Budget Estimates, question on notice no. 24, portfolio question no. 25.

[145] Marcus Hellyer, 'US to "pause" production of Australia's Triton drones', *The Strategist*, 27 February 2020, online.

[146] Department of Defense, *Fiscal Year (FY) 2023 budget estimates, April 2022: Navy: Justification book, volume 1 of 3: Aircraft procurement, Navy: Budget activities 01–04*, 185–203, online.

[147] Department of Defense, *Fiscal Year (FY) 2023 budget estimates, April 2022: Navy: Justification book, volume 2 of 3: Aircraft procurement, Navy: Budget activity 5*, 885–902, online.

[148] DoD, 'AIR7003 Phase 1 MQ-9B SkyGuardian armed remotely piloted aircraft system', Australian Government, December 2020, online.

[149] Linda Reynolds, 'Cutting edge remotely piloted platform chosen in billion dollar project', media release, 28 November 2019, online.

[150] DSCA, 'Australia — MQ-9B remotely piloted aircraft', news release, US Government, 23 April 2021, online.

[151] Nigel Pittway, 'Boeing details MQ-28A payload ground test phase', *Australian Defence Magazine*, 24 March 2022, online.

[152] Andrew McLaughlin, 'Loyal Wingman makes first successful flight', *ADBR*, 2 March 2021, online.

[153] Peter Dutton, 'First Australian built uncrewed combat aircraft named', media release, 21 March 2022, online.

[154] Peter Dutton, 'Morrison government's investment in Loyal Wingman program to strengthen Australia's air combat capability', media release, Liberal Party of Australia, 15 May 2022, online.

[155] 'Boeing selects Australia for company's first final assembly facility outside North America', news release, Boeing, 22 September 2021, online.

156 Dan Parsons, Tyler Rogoway, 'Australia's new MC-55 Peregrine electronic warfare jet breaks cover (updated)', *The Drive*, 11 May, 2020, online.

[157] DoD, 'Spartan to enhance response and engagements', *Defence News*, 25 July 2021, online.

[158] Scott Morrison, Peter Dutton, Melissa Price, Christian Porter, 'Morrison government accelerates sovereign guided weapons manufacturing', media release, 31 March 2021, online.

[159] Marcus Hellyer, 'Making sense of Australia's salvo of missile announcements', *The Strategist*, 7 April 2022, online.

[160] For an overview on progress to date on AUKUS, see Marcus Hellyer, Ben Stevens, *ASPI AUKUS update 1: May 2022*, ASPI, Canberra, 2022, online.

[161] The Defence Space Strategy states that the DSU 'includes over AUD$17 billion in space capabilities to 2036'. While there's no reason to doubt that, the figure can't be verified from the FSP discussion of the space domain. DoD, 'Australia's Defence Space Strategy', Australian Government, March 2022, online.

[162] Peter Dutton, 'Address to the 2022 Royal Australian Air Force Air and Space Power Conference, Canberra', 22 March 2022, online.

[163] DoD, 'Australia's Defence Space Strategy', Australian Government, March 2022, online.

[164] Peter Dutton, 'Defence explores options for space electronic warfare', media release, 29 July 2021, online.

[165] Royal Australian Air Force, 'M2 Cubesat', online.

[166] Defence confirmed to ASPI that the list hasn't changed (email from Defence media on 26 May 2022). It also stated that there are 13 projects on the Projects of Interest list, which is essentially the naughty corner where projects get sent to mend their ways before they're put on the Projects of Concern list. They are the following:

- Future Frigate—Design and Construction (SEA 5000 Phase 1)
- New Air Combat Capability (AIR 6000 Phase 2AB)
- Civil–Military Air Traffic Management System (AIR 5431 Phase 3)
- Battlefield Command System (LAND 200 Phase 2)
- Satellite Ground Station—East and Wideband SATCOM Network Management (JNT 2008 Phase 5B2)
- Airborne Early Warning and Control Interoperability Compliance Upgrade (AIR 5077 Phase 5A)
- Maritime Operational Support Capability (SEA 1654 Phase 3)
- Jindalee Operational Radar Network (AIR 2025 Phase 6)
- MQ-4C Triton Remotely Piloted Aircraft System (AIR 7000 Phase 1B)
- Light Tactical Fixed Wing Capability (formerly Battlefield Airlifter) (AIR 8000 Phase 2)
- Fixed Defence Air Traffic Control Surveillance Sensors (AIR 5431 Phase 2)
- Submarine Escape and Rescue System (SEA 1354 Phase 1) (contract termination being finalised)
- Project title withheld (for security reasons).

[167] Defence's current investment plan is not identical to the last public release of the plan: the 2020 FSP. The SkyGuardian medium-altitude long-endurance armed UAV is gone. More cyber capabilities are in. No doubt other changes have been made to the classified plan, but from what we can tell from the public information, it's still broadly the same plan as the FSP (which was largely the same as the public 2016 IIP that accompanied the 2016 DWP). Nearly all the capability announcements that the government has made since the DSU was released on 1 July 2020 are about progressing capabilities that were in the 2020 FSP.

[168] The precise nature of that infrastructure hasn't yet been defined: Andrew Nicholls, Jackson Dowie, Marcus Hellyer, *Implementing Australia's nuclear submarine program*, ASPI, Canberra, 2021, online.

[169] We already have a submarine capability gap because the 2009 DWP said that we needed to grow the submarine force to 12 boats. That is, even in 2009 it was recognised that we needed additional submarine capability. No government has walked back from that. However, we aren't going to have any additional submarine capability until the late 2030s, in the best case. So we have a gap against what we actually need. Defence officials have said that there won't be a gap, but that's only because they define the requirement as having two boats available for operations. But why is two boats the magic number? Is having just two Collins boats available for operations in 2039 really the submarine capability we need? Marcus Hellyer, 'Australia already has a submarine capability gap', *The Strategist*, 5 November 2021, online.

[170] We should also note that the key strategic risk mitigator for submarine capability has been used already and it falls short. Conducting a life-of-type-extension the Collins might have just got us through the transition to the Attack class, but it doesn't get us to the SSN fleet. Moreover, the LOTE as currently planned is so extensive that it is in essence a 'Son of Collins' and has substantial technical and schedule risk. That is, our main risk mitigation strategy itself has serious risks.

[171] David Shackleton, *The Hunter frigate: an assessment*, ASPI, Canberra, 2022, online; Marcus Hellyer, *Delivering a stronger navy, faster*, ASPI, Canberra, 2021, online.

[172] Based on the expenditure to 30 June 2022 in the 2022–23 Defence PBS (page 108).

[173] We discuss a range of SSN construction approaches in Andrew Nicholls, Jackson Dowie, Marcus Hellyer, *Implementing Australia's nuclear submarine program*, Canberra, ASPI, 2021, online.

[174] Marcus Hellyer, *From concentrated vulnerability to distributed lethality—or how to get more maritime bang for the buck with our offshore patrol vessels*, ASPI, Canberra, 2020, online.

[175] Marcus Hellyer, 'Innovation in Australia's electricity sector holds lessons for Defence', *The Strategist*, 4 May 2021, online.

[176] For example, Chapter 6, 'How to hedge in maritime (and other) capability', in Marcus Hellyer, *The cost of Defence: ASPI defence budget brief 2019–20*, ASPI, Canberra, 2019, online.

[177] Michael Shoebridge, 'Nuclear submarines increase Australia's need for speed', *The Strategist*, 24 September 2021, online.

[178] Of course, it will be very hard to get the genie back in the bottle. If Defence's APS staff have made the rational decision to leave Defence to be paid over 50% more by a service provider contracting them back into Defence to do roughly the same job, why would they go back to being public servants?

[179] There's also anecdotal evidence that the ADF is about to suffer its own version of 'the great resignation', with members who joined to be war fighters becoming tired of over two years of domestic response activities, such as Covid-19 and Flood Assist.

[180] I've assessed that around 40% of Defence's capability investments have some utility to national support tasks and 17% have direct utility. Marcus Hellyer, 'The Australian Defence Force's domestic role (part 1): How much does it do?', *The Strategist*, 13 February 2020, online.

[181] The Army has introduced the Army Interim Commercial Helicopter contract, which is providing two leased civilian helicopters that will be flown by Army pilots. The aircraft have participated in disaster response efforts, but the program appears to be driven more by remediating aircrew currency shortfalls caused by lack of availability of the MRH-90 than by having dedicated disaster-response assets. Nigel Pittway, 'Value adding—Army's Plan Corella', *Australian Defence Magazine*, 30 May 2022, online.

[182] David Thomae, 'The evolving role of the 2nd Division within Australia's defence mobilisation strategic framework', presentation to the Royal United Services Institute for Defence and Security Studies, NSW, 31 August 2021, online.

[183] See, for example, *The Strategist*'s articles under the tag for HADR, online; Mark Armstrong, *Every possible capability: some implications for the Army Reserve call out for Operation Bushfire Assist 2019–20*, Australian Army Research Centre, 2020, online; Tom Lowrey, 'Should natural disaster responses be part of the Australian Defence Force's job?', *ABC News*, 9 March 2022, online.

[184] *Royal Commission into National Natural Disaster Arrangements*, paragraph 7.1, online.

[185] Australian Labor Party, 'Fighting Corruption: National Anti-Corruption Commission,' online.

[186] Senate Foreign Affairs, Defence and Trade Legislation Committee. Estimates, 1 April 2022, 11, online.

[187] Senate Economics References Committee, *Australia's sovereign naval shipbuilding capability: interim report*, May 2021, online; *Australia's sovereign naval shipbuilding capability—Future Submarine Acquisition: A shambles—we don't think so, we know*, February 2022, online; *Australia's sovereign naval shipbuilding capability*, May 2022, online.

[188] Senate Economics References Committee, *Australia's sovereign naval shipbuilding capability—Future Submarine Acquisition: A shambles—we don't think so, we know*, February 2022, Recommendation 3, online.

[189] Such information exists and can be made public. For example, as Minister for Defence, Linda Reynolds provided regular updates to the Senate on planned naval shipbuilding workforce by project and state. This was discontinued after she moved to a new portfolio.

[190] 'To ensure that industry has access to current information, an online version will be periodically updated to reflect changes in the program.' DoD, *2016 Integrated Investment Program*, Australian Government, 11, online.

[191] For example, the previous government saved up a large number of capability decisions to be announced during the election campaign. Due to caretaker conventions, these announcements were posted on the Liberal Party of Australia website rather than on Defence's website. After the election they were taken down. It's not a great model for transparency.

[192] Recent examples of the inconvenient being the decision to acquire the Pacific Support Vessel overseas rather than building it in Australia, and the cancellation of SkyGuardian.

[193] Derek Saul, 'Ukraine war's mounting death toll: latest estimates suggest Russian troops have been hit harder', *Forbes*, 26 April 2022, online.

[194] Jane Arraf, 'Deaths of foreign fighters draw renewed attention to the military volunteers in Ukraine', *New York Times*, 1 May 2022, online.

[195] Elena Teslova, 'Russian claims over 23,000 Ukrainian troops killed in war', *AA*, 16 April 2022, online.

[196] Office of the High Commissioner, 'Ukraine: civilian casualty update', UN Human Rights, 26 April 2022, online; Yuras Karmanau, Adam Schreck, Cara Anna, 'Mariupol mayor says siege has killed more than 10k civilians', *AP News*, 12 April 2022, online.

[197] High Commissioner for Refugees (HCR), 'Operational data portal: Ukraine refugee situation', UN, 25 May 2022, online; '7.1 million people displaced by the war in Ukraine: IOM survey', International Organization for Migration, 5 April 2022, online.

[198] World Bank Group, *Macro poverty outlook: country-by-country analysis and projections for the developing world*, World Bank, Washington DC, 2022, 82–83.

[199] World Bank Group, *Macro poverty outlook*, 83.

[200] World Bank Group, *Macro poverty outlook*, 83.

[201] 'Ukraine: reconstruction of Donbas will cost at least USD 21.7 billion or 16% of Ukraine's GDP', Vienna Institute for International Economic Studies, 25 June 2020, online.

[202] 'What will it cost to rebuild Ukraine?', *The Economist*, 16 April 2022, online.

[203] Ashish Valentine, 'Here's how much it could cost to rebuild Ukraine and who would pay for it', *NPR*, 26 May 2022, online.

[204] Peter Saidel, 'Zelensky estimates cost of rebuilding Ukraine at $600 billion', *Wall Street Journal*, 3 May 2022, online.

[205] HCR, 'Ukraine refugee situation'.

[206] Henry Foy, Sam Fleming, James Shotter, 'Poland urges EU to unlock funding as cost of housing refugees soars', *The Financial Times*, 26 March 2022, online; Charles Davis, 'How Moldova, with a population smaller than Los Angeles, is accepting more Ukrainian refugees per capita than any other country', *Business Insider*, 28 April 2022, online.

[207] Karen Gilchrist, 'Three million migrants have now fled Ukraine—with the majority going to Poland. That could have major repercussions', *CNBC*, 16 March 2022, online.

[208] 'Moldovia to receive more than $720m in aid from EU donors', *al-Jazeera*, 5 April 2022, online; 'Ukraine: €17 billion of EU funds to help refugees', *OCHA Reliefweb*, 4 April 2022, online.

[209] Kate Abnett, 'Global donors pledge 9.1 billion euros to support Ukrainian refugees', *Reuters*, 10 April 2022, online.

[210] 'Russia scraps age limit for new troops in Ukraine', *BBC*, 29 May 2022, online.

[211] 'Russia scraps age limit for new troops in Ukraine'.

[212] 'Russia scraps age limit for new troops in Ukraine'.

[213] Ellen Mitchell, 'Pentagon says Russia racks up personnel, weapons losses', *The Hill*, 26 May 2022, online.

[214] World Bank Group, *Macro poverty outlook*, 74–75.

[215] 'What sanctions are being imposed on Russia over Ukraine invasion?', *BBC*, 17 May 2022, online.

[216] Charles Riley, 'Putin's plan to prop up the ruble is working. For now', *CNN*, 31 March 2022, online.

[217] World Bank Group, *Macro poverty outlook*, 74–75.

[218] World Bank Group, *Macro poverty outlook*, 74–75.

[219] Arianna Antezza, Andre Frank, Pascal Frank, Lukas Franz, Ekaterina Rebinskaya, Christoph Trebesch, *The Ukraine Support Tracker: Which countries help Ukraine and how?*, working paper no. 2218, Kiel Institute for the World Economy, 2022, 3.

[220] Charbel Kadib, 'Australia to send M113 APCs, additional Bushmasters to Ukraine', *Defence Connect*, 19 May 2022, online.

[221] Katie Lobosco, 'Here's what's in the $13.6 billion Ukraine aid', *CNN*, 15 March 2022, online.

[222] Lobosco, 'Here's what's in the $13.6 billion Ukraine aid'.

[223] Catie Edmondson, Emily Cochrane, 'The Senate overwhelmingly approves $40 billion in aid to Ukraine, sending it to Biden', *New York Times*, 19 May 2022, online.

[224] Christopher Bluth, 'America's massive "lend-lease" aid plan for Ukraine recalls similar help in Britain's "darkest hour"', *The Conversation*, 13 May 2022, online.

[225] Bluth, 'America's massive "lend-lease" aid plan for Ukraine recalls similar help in Britain's "darkest hour"'.

[226] Office of the Under Secretary of Defense and Chief Financial Officer, *Program acquisition by weapon system: United States Department of Defense fiscal year 2021 budget request*, US Department of Defense, Washington DC, 2020, 5–13.

[227] Oliver Nia, 'German anti-aircraft missiles offered to Ukraine not usable: report', *AA*, 4 March 2022, online.

[228] Sabine Siebold, Sarah Marsh, Andreas Rinke, 'Explainer: Why is Germany not sending Ukraine heavy weapons?', *Reuters*, 22 April 2022, online.

[229] Marcus Hellyer, *Understanding the price of military equipment*, ASPI, Canberra, 2022), 21.

[230] Mark F Cancian, 'Will the United States run out of Javelins before Russia runs out of tanks?', *Battlespace*, 12 April 2022, online.

[231] Nathan Gomes, 'Lockheed–Raytheon JV wins $309 mln Javelin missile contract from US Army', *Reuters*, 17 May 2022, online.

[232] NATO, 'Funding NATO', 1 April 2022, online.

[233] NATO, 'Funding NATO'.

[234] NATO, 'Funding NATO'.

[235] Olaf Scholz, 'Policy statement', 27 February 2022, online.

[236] Scholz, 'Policy statement'.

[237] Simon Johnson, 'Sweden's defence budget could reach 2% of GDP in 2028, military says', *Reuters*, 11 April 2022, online.

[238] Andrius Sytas, 'Lithuania to ramp up military spending, PM says', *Reuters*, 7 March 2022, online.

[239] Phillip Pullella, 'Pope says increased defence spending after Ukraine is "madness"', *Reuters*, 25 March 2022, online.

[240] Christina Mackenzie, 'Seven European nations have increased defense budgets in one month. Who will be next?', *Breaking Defense*, 22 March 2022, online.

[241] Mackenzie, 'Seven European nations have increased defense budgets in one month. Who will be next?'.

[242] Mackenzie, 'Seven European nations have increased defense budgets in one month. Who will be next?'.

[243] Mackenzie, 'Seven European nations have increased defense budgets in one month. Who will be next?'.

[244] Mackenzie, 'Seven European nations have increased defense budgets in one month. Who will be next?'.

[245] Mackenzie, 'Seven European nations have increased defense budgets in one month. Who will be next?'.

[246] Dejana Saric, Pierre Morcos, *The war in Ukraine: aftershocks in the Balkans*, Center for Strategic and International Studies, 15 April 2022, online.

[247] Saric & Morcos, *The war in Ukraine: aftershocks in the Balkans*.

[248] Mackenzie, 'Seven European nations have increased defense budgets in one month. Who will be next?'.

[249] Johnson, 'Sweden's defence budget could reach 2% of GDP in 2028, military says'.

[250] John Henley, 'Sweden and Finland to formally submit Nato bids "hand in hand"', *The Guardian*, 18 May 2022, online.

[251] Chieko Tsuneoka, 'Japan ruling party calls for defense spending boost to 2% of GDP', *Wall Street Journal*, 21 April 2022, online.

[252] International Monetary Fund (IMF), *World economic outlook: War sets back global recovery*, IMF, Washington DC, 2022, xiii.

[253] Michele Ruta (ed.) *The impact of the war in Ukraine on global trade and investment*, World Bank, Washington DC, 2022, 7.

[254] Ruta *The impact of the war in Ukraine on global trade and investment*, 8.

[255] Ruta *The impact of the war in Ukraine on global trade and investment*, 8.

[256] 'India bans wheat exports, cites food security and soaring prices', *al-Jazeera*, 14 May 2022, online.

[257] Amanda Lee, 'China pledges US$1.5b in grain farmer subsidies to offset soaring production costs', *South China Morning Post*, 22 May 2022, online.

[258] Jason Lalljee, 'Russia is disrupting food prices worldwide and it could cause civil unrest—it's happened before', *Business Insider*, 10 March 2022, online.

[259] Daniel Maxwell, 'Ukraine war pushing food prices near all-time highs', *Asia Times*, 29 April 2022, online.

[260] Antonio Guterres, 'Lack of grain exports driving global hunger to famine levels as war in Ukraine continues, speakers warn Security Council', UN Security Council, 19 May 2022, online.

[261] Maxwell, 'Ukraine war pushing food prices near all-time highs'.

[262] D Winkler, L Wuester, D Knight, 'The effects of Russia's global value-chain participation', in Dejana Saric, Pierre Morcos, *The war in Ukraine: aftershocks in the Balkans*, Center for Strategic and International Studies, 15 April 2022, 61, online.

[263] Winkler et al., 'The effects of Russia's global value-chain participation', 61.

[264] World Bank Group, *Commodity markets outlook*, 2.

[265] Winkler et al., 'The effects of Russia's global value-chain participation', 60.

[266] World Bank Group, *Commodity markets outlook*, 1.

[267] World Bank Group, *Commodity markets outlook*, 1–2.

[268] World Bank Group, *Commodity markets outlook*, 10.

[269] 'War in Ukraine and OPEC production limits pushed February petrol prices to eight-year high', media release, Australian Competition and Consumer Commission (ACCC), 14 March 2022, online.

[270] 'About fuel prices', ACCC, 27 May 2022, online.

[271] 'Monitoring fuel prices following the excise cut', ACCC, 27 May 2022, online.

[272] Clyde Russell, 'Column: Russia's war deliver massive boost to Australia's commodities', *Reuters*, 4 April 2022, online.

[273] Russell, 'Column: Russia's war deliver massive boost to Australia's commodities'.

[274] Russell, 'Column: Russia's war deliver massive boost to Australia's commodities'.