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Australia's Sovereign Capability in Military Weapons

The Australian Government's 2020 Defence Strategic Update (DSU) noted the deterioration of Australia's security environment, particularly the greater potential for state-on-state conflict, and addressed the need for the defence enterprise to be resilient to shocks and outside interference.¹ The 2023 Defence Strategic Review (DSR) identifies that strategic circumstances have further deteriorated; it stresses the need to increase the ability to undertake precision strike targets at longer range and to ensure sufficient stocks of weapons and flags the potential for additional measures, including upgrades to weapon storage and the development of domestic manufacturing capabilities.²

In 2021, the then-Prime Minister announced the accelerated creation of a Sovereign Guided Weapons Enterprise.³ That announcement, which indicated that strategic industry partners would establish manufacturing capabilities, created much excitement in Australia's local defence industry. The government valued investment in the enterprise at AUD \$1 billion, and also noted that the defence industry estimates that local production and export could be worth 40 times that figure over the next two decades, while creating 'thousands of jobs'.⁴ Under these

circumstances, it is no surprise that the local defence industry quickly mobilised to position itself for weapons opportunities; many companies joined two consortia formed months after the announcement: the Australian Missile Corporation and the Sovereign Missile Alliance.⁵

Australia has two fundamental options for supplying its military weapons: purchase from overseas (buy) or manufacture in Australia (build). However, buy or build is not a simple choice. Given the immaturity of Australia's defence industry in producing advanced weapons, 'buy' options might be required to mitigate the country's short-term risks. Thus, there is a temporal consideration in how best to realise the weapons enterprise. Accordingly, the Australian Government Department of Defence (henceforth known as *Defence*), in its launch of the Guided Weapons and Explosive Ordnance (GWEO) Enterprise, characterised its development in overlapping phases of *accelerate*, *grow* and *sustain*.⁶

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In addition to time being a factor, the case for buy or build options will depend on the capabilities and costs of different weapons. Additional options to mitigate sovereign risks exist beyond buy or build. As alluded to in the 2020 DSU, there are other potential measures to increase resilience and self-reliance, such as increasing the availability of weapons through maintenance and logistics arrangements.⁷ Moreover, there might be hybrid options in which domestic industry is involved in part—rather than in the entirety—of the production process. To explore and compare such measures and options, it is appropriate first to discuss what Australia means and seeks to achieve by establishing a sovereign capability.

What Is a Sovereign Capability, and What Are We Getting from It?

Sovereign capability, as defined in the 2018 Defence Industrial Capability Plan, is 'the independent ability to employ Defence capability or force when and where required to produce the desired military effect'.⁸ The purpose of developing a sovereign capability is to support and promote national sovereignty and, at the most fundamental level, protect national security. Sovereign capability is about autonomy of the capability in its totality; that is, having it and being able to decide when, where and how it is deployed to the extent that national security objectives require. Therefore, pursuing a sovereign capability is not merely a matter of building in Australia. Rather, the *sovereign* descriptor is significant for what it communicates about the stakes at hand: the need for ready utility, lethality, credibility and autonomy in support of nothing less than Australia's sovereignty.

The design of a GWEO Enterprise must support these broader objectives. Australia needs to be able to use the munitions (1) when and how they are required, (2) across a possible range of warning times and scenarios, (3) in a challenging strategic climate, (4) while cognisant of supply-chain susceptibilities and (5) in the context of changing alliance dynamics. Thus, decisions around priorities and requirements cannot be made without reviewing the threats to Australian sovereignty that the Australian Defence Force (ADF) must address. Nor can these decisions be made without examining all available means by which to safeguard control and availability of weaponry, such that Australia is ensured of a credible and deployable capability.

In this context, the imperative of a nation-state to possess sovereignty is consistent with or at least a derivative of ‘the recognised right, and the ability to exercise supreme, independent authority over a territory, country, or other asset.’⁹ A sovereign capability is also embedded in strategic military objectives, or ‘how the military component of national power is to be applied to maintain or attain national security objectives’ and national sovereignty.¹⁰

Therefore, the end state of the *sovereign* GWEO Enterprise should be understood as a constitutive element in fulfilling Australia’s strategic *military* objectives—that is, the defence and protection of national sovereignty and security. The GWEO Enterprise should serve *that* end and do so by whatever necessary means. Efforts to maintain national sovereignty must be viewed from a *strategic military* perspective.¹¹ While other aspirations and priorities for the enterprise are important, they must be consistent with and subordinate to that *strategic military* objective. The central question—*What is the security risk that the GWEO Enterprise will address?*—should drive development

of the enterprise. At every turn, defence planners should be asking: *What are we getting from this in terms of our strategic military objectives?*

In developing and designing a GWEO Enterprise, we need to sustain cognisance of what ‘sovereign’ truly means and clarity on the desired outcomes of making a capability ‘sovereign’. Secondary considerations should remain just that: They should not drive the enterprise. Whether components of the capability are foreign-made or Australian-made, whether Australia’s industry is engaged to build the capability and whether there is an impact on Australian jobs or economic benefits—these are all important considerations, of course. However, they must first be aligned with strategic objectives and, specifically, the need for autonomy in where, when and how the capability is put to use.

Sustaining clarity on the strategic objectives also will allow disparate stakeholders with vested interests in the enterprise to pursue more-purposeful engagements; to coordinate and structure decisionmaking against stated criteria and a shared, unquestioned vision; and to build a coherent and lasting national narrative. The resulting benefits include flexibility of enterprise activities to meet changing requirements in operationally relevant time-frames; the delivery of munitions having the greatest possible operational effects; the optimised integrated contributions of people, resources, information and technology; the optimal involvement of industry, academic and defence partners to achieve strategic objectives; and due consideration of the commercial viability of enterprise products beyond their primary uses of serving strategic and operational demands.

Alignment with Military Objectives: Shape, Deter, Respond

For Australia, the core purpose of a sovereign GWEO Enterprise is having autonomy over the availability and use of munitions when they are needed. Having this autonomy might mean that Australia owns or controls relatively more or less of a sovereign process at different times or under different conditions, because the determinant must ultimately be a credible effect and the readiness to deploy. At its core, the promotion and protection of national sovereignty mean that a successful GWEO Enterprise needs to be aligned with Australia's highest-level military objectives in the contemporary context, as articulated in the 2020 DSU.¹²

The 2020 DSU specifically warns of the increased possibility of 'high-intensity conflict in the Indo-Pacific'

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and the need for the ADF to be 'better prepared for such conflict if deterrence measures fail, or to support the United States and other partners where Australia's national interests are engaged'.¹³ Thus, the lethality and readiness of the ADF must be enhanced and logistic support for high-intensity conflict improved. The ADF must possess sufficient depth to sustain key capabilities (and especially munitions), which will necessitate *both* a less 'risk-averse engagement with industry to accelerate capability development and strengthen supply' *and* selective increases in interdependence with partners to ensure 'responsive and assured global supply chains'.¹⁴

The DSU communicated a reset in Australia's strategic and military calculus based on three objectives: *shape, deter, respond*. Australia seeks to *shape* the region, *deter* actions against [Australia's] interests and, when required, *respond* with military force. The DSU laid the foundation for building the enterprise on this rationale in response to 'an increased risk of conflict, in a challenging global strategic environment'.¹⁵

The *shape* objective refers to establishing a 'stable, secure and sovereign region'¹⁶ in Australia's sphere of strategic influence. In the context of the GWEO Enterprise, *shaping* means signaling intent, inspiring confidence, gaining increased international credibility (through development of a world-class guided weapons and explosive ordnance capability), exercising agency within international partnerships and influencing the strategic thinking of other countries as they position themselves within the geopolitical environment.

The *deter* objective is served by both the possession of a credible sovereign guided weapons and explosive ordnance capability in alignment with the 2020 DSU's

focus on deterrence and on the deployability of the deterrent capability. In addition to sending a signal of Australia's deterrence posture, a sovereign guided weapons and explosive ordnance capability, by complicating adversary planning, buys time for positioning and decisionmaking, both strategically and operationally. In short, the art of deterrence is a calculation of statecraft, and force planning should make that statecraft possible.

Finally, and related to the first two objectives, the GWEO Enterprise allows for deployment of a credible *response* to any attacks aimed at Australia. This credibility can be achieved through both the nature of the *response* (the munitions effects) and the ability of Australia to recover from an attack quickly, hold its own and reconstitute its position (the enterprise effect). The enterprise effect is strengthened and sustained through maintenance, repair and overhaul; through test and evaluation (T&E); and by way of stockpiling, production and supply chains that ensure ready access to reliable munitions. The *response* is about possessing, in totality, a deployable capability under the circumstances in which it is required.

Capability Elements as Enterprise Building Blocks

Defence considers manufacturing to be just one of seven capability elements within the GWEO Enterprise.¹⁷ The six others are research and development, education and training, T&E, maintenance and repair, storage and distribution, and disposal.

The first three of those elements are, to a great extent, prerequisites to manufacturing advanced weapons. Research and development provide the technical expertise

to not only produce existing technologies but enhance and integrate them—essential activities to defeat a pacing threat. Education and training provide the human element of the production and sustainment capabilities in both Defence and industry. T&E is critical given that the confidence in the use of weapons is grounded in proving their effectiveness and safety. This requires operational certification, testing facilities and operational testing at realistic ranges (reflecting the growing range of guided weapons entering the ADF inventory). The expansion of weapon types puts pressure on the proofing capability within Defence; it may need this capacity to be increased.

Enhanced domestic-based maintenance arrangements for ADF weapons would increase the availability of inventory and thus spur a rapid improvement in sovereign capability. For example, complete weapons are routinely transported to the United States for relatively simple maintenance tasks, such as surface finishing. Australia could avoid such inefficient use of logistics and loss of availability by performing such maintenance in-country or by swapping out unserviceable components locally rather than sending entire systems overseas. These relatively modest changes would substantially improve inventory availability in the short term.

Availability of weapons is a function not only of inventory but also where the inventory is stored and how it is distributed. Thus, a high priority for the GWEO Enterprise is targeted investment in storage and distribution to enhance timely access for operations. Such a priority should include protecting the guided weapons and explosive ordnance assets through passive defence measures, such as hardening, redundancy, dispersal, disaggregation and deception.

As part of the capability life cycle, disposal is a key activity at the end of the guided weapons and explosive ordnance service life.¹⁸ Ensuring that munitions life is appropriately managed all the way through the execution of proper disposal plans will ensure the efficient management of the guided weapons and explosive ordnance inventory.

Mitigating Sovereign Risk

If sovereignty is concerned with maintaining access to or control over the resources required to achieve military objectives, then the sovereign enterprise also should be concerned with mitigating the risks of losing that access or control. This risk focus acknowledges the adversarial role within conflict, which means that the adversary will seek to exploit Australia's vulnerabilities to compromise its capabilities and achieve military advantage. The 2020 DSU highlighted the importance of becoming more resilient to shocks and outside interference.

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Focusing on risk requires that Australia consider not only what it could do to achieve sovereignty but also what could be done to confound its success and how to reduce that risk. Adversarial scenario analysis helps focus our attention on the key factors that could thwart success.¹⁹

For example, sovereign risks might arise because overseas manufacturing is not responsive to Australia's needs. There might be varying reasons, from the interdiction of supply routes to the divergent priorities of countries that control such manufacturing. In a significant conflict scenario in which demand exceeds supply, differing national priorities are certainly possible, even with our closest allies. Such risks would seem to bolster the case for a domestic weapons manufacturing capability. However, a drive towards domestic manufacturing also would need to be balanced in view of five other factors: capability, supply chains, time, cost and surge.

Capability: Sovereign weapons manufacturing should not come at the expense of overall capability to support higher-level objectives. The ADF has a variety of different weapons suited to a variety of desired effects. To achieve economies of scale in production, it might be desirable to consolidate weapon types, but care needs to be taken to not detract from overall capability. This balance between (1) cost savings from consolidating and standardising weapon types and (2) operational flexibility from retaining weapons variety is a key consideration for defence planners. In general, the greater the variety of weapons required, the more challenging and costly the objective of relying solely on indigenous manufacturing.

Supply chains: Advanced weapon systems involve complex supply chains for components; hence, sovereign risks might remain with respect to the supply of com-

ponents. These risks might be mitigated by building the components in Australia, but that could come at significant cost. An alternative might be to stockpile components; however, accessing stockpiled components and integrating them into existing or restarted production lines will have time and cost implications. Either way, maintaining and producing a reliable supply of many types of weapon components will challenge the notion of sovereign capability.

Time: The time dimension is key. Decisions should be made as to whether the GWEO Enterprise priority is (1) to develop a capability that will reduce near-term risk or (2) to cultivate the more-deliberate, long-term development of a weapons industry. Because strategic guidance has identified a lack of strategic warning time as an issue, weapon inventories need to offer a higher level of near-term preparedness. Therefore, this risk is concerned with *strategically relevant timeframes*. Given that the previously accepted strategic warning time is no longer an appropriate basis for defence planning,²⁰ strategically relevant timeframes have become shorter. Thus, longer-term development of industry will be less relevant to a sovereign weapons capability in the event of a nearer-term conflict. Additionally, and with similarities to the effect of disruptions to supply chains during the COVID-19 pandemic, we are seeing a shift in defence planning from a just-in-time to a just-in-case approach. Consistent with the concept of strategically relevant timeframes, the DSR in April 2023 identified a need for *accelerated preparedness*, with an immediate priority to increase GWEO stocks from existing suppliers to enhance the force-in-being.²¹

Cost: The cost premium for domestic weapon manufacturing might be prohibitive compared with buying and stockpiling foreign-made weapons. The domestic

cost premium also might impose an opportunity cost on other defence capabilities within a finite defence budget. A domestic cost premium, however, is relevant only if an option to buy is available, which might not be the case in times of tension when demand exceeds supply. Nevertheless, planning the GWEO Enterprise should account for the business case for domestic manufacture, including the premium to build locally and the demand for the weapon. In general, options for domestic acquisition that require establishing a manufacturing base will be more costly than simply making a purchase.

It might be tempting to assess affordability simplistically in terms of a weapon's unit production cost. However, when considering acquisition options, it is important to account for the total cost of ownership. The total cost includes nonrecurring costs, especially developmental and operational T&E activities, in addition to production and sustainment costs. It also is worthwhile to analyse not only the cost of a weapon capability but the effect of its application—that is, the damage done to and thus cost

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imposed on an adversary. Such an analysis is useful to avoid committing exquisite weapons to low-value targets and to determine when committing multiple weapons to high-value targets is appropriate.

Surge: The greatest risk to the availability of weapons in conflict is the inability of production to surge to higher demand levels. This risk might endure regardless of whether weapons are produced domestically or overseas, although domestic arrangements would be less prone to divergent priorities from an overseas producer. Sovereign manufacture arrangements should include consideration of how surge production capability could be achieved.

The predominant risk is the gap between weapon requirements in peacetime and in times of conflict. This risk would be further exacerbated by a protraction of conflict.²² Stockpiling of weapons might mitigate the risk;

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however, the cost of stockpiling might be prohibitive, including not only the purchase cost but the costs of storage and maintenance.²³ Even with unlimited funding, the existing reality of demand exceeding supply for the new strategic requirements defined by the DSU would challenge a stockpiling strategy. Advanced weapons might be exhausted during the early stages of a conflict and might not be as quickly restocked, regardless of where they are manufactured. The time in which weapon inventories are expended could be shorter than the production timeframes required to resupply inventories.

Therefore, this risk is concerned with *operationally relevant timeframes*. The imperative of operationally relevant timeframes will create tension between efficient peacetime scaling of production and urgent wartime scaling-up of capacity to surge. In some cases, this wartime scaling-up might be possible with a cost premium. Otherwise, such scaling might be cost prohibitive, in which case the government might have to accept risk. Defence might have to consider the trade-off between accepting the longer timeframes required for weapons that are more capable versus meeting operationally relevant timeframes with explosive ordnance munitions and weapons that are less complex, such as those designed to deliver affordable mass.²⁴ Choosing the latter in the case of domestic production might constitute setting a low technology threshold for the weapons that will be replenished and used in protracted conflict. This choice might be necessary in the early tranches of the enterprise while industry capacity is developed; potentially, increasing the expertise of industry over time could raise the threshold for weapons that are more capable. Nevertheless, the reality is that only munitions and weapons that are less complex are likely to be produced in operationally

relevant timeframes and thus will remain critical elements in Australia's sovereign weapons capability, especially in relation to protracted conflict.

Australia does have mature capabilities for munitions manufacture as well as for some rocket motor components.²⁵ But given both the immaturity of the Australian defence industry with respect to guided weapons and the time required to develop infrastructure and skills, the strategically and operationally relevant timeframes suggest that one potential strategy that should be evaluated would be to buy and stockpile advanced weapons while focusing the country's immediate build investments on the ability to resupply explosive ordnance and lower-end guided weapons. Efforts to develop higher-end capabilities could progress in parallel. How, then, should the GWEO Enterprise encourage such efforts?

Pathways to Develop the Enterprise

The DSR has directed the rapid establishment of domestic GWEO manufacturing, while Australia's defence industry has embraced the prospect of build opportunities. Notwithstanding the accelerated timeframe associated with the DSR direction, we recommend an incremental or evolutionary approach to those build options to manage risk for both industry and Defence. We characterise this approach in terms of pathways that aim towards a longer-term objective of domestic weapons production while still delivering outcomes in accordance with sovereign capability along this journey.

Component maintenance: One pathway is to drive local system expertise down to the component or 'irreducible minimum' level to increase weapon availability

through maintenance efficiencies. Cultivating this expertise also would raise domestic capabilities in other aspects of the enterprise. Such expertise would boost domestic abilities to assemble and manage entire weapon systems through an understanding of individual component life, issues, reliability and contribution to system performance. Moreover, such expertise would enhance domestic abilities to stockpile long-lead-time components and to facilitate upgrades of those components.

The potential for such local 'whole-of-system' expertise might be limited for weapons that are not easily reducible—the so-called wooden round systems, such as the Harpoon anti-ship missile. However, guided weapon systems are increasingly modular; some families of weapons have common or similar components, which strengthens the argument for increasing local whole-of-system knowledge. From a system engineering perspective, whole-of-system expertise represents a *top-down* approach to growing the industry element of the enterprise. Developing such expertise should be an activity in which domestic defence industry organisations with maintenance responsibilities incrementally reduce reliance and dependency on licensing while they cultivate their own system expertise.

Participation in global supply chains: A second pathway is for Australian industry to become more involved in weapon system development and production through participation in global supply chains. Such efforts might indirectly contribute to improved ADF weapon capability, similar to Australian industry participation in the Joint Strike Fighter (JSF) development. Unlike the initial establishment of supply chains for the JSF, though, guided weapons production largely depends on supply-chain arrangements among established parties that could pose barriers to new

entrants. Nonetheless, opportunities for participation of new entrants might arise if (1) weapons production resumes or ramps up, (2) an existing component supplier does not meet standards, (3) a component becomes obsolete or (4) the manufacturer seeks an update of component technology.

A new Australian entrant into the global weapon supply chain would need to meet the design and performance specifications for any associated component but would be unlikely to have access to the intellectual property used to create the component. While this situation would pose a technology challenge to Australian industry, it also would be conducive to innovation. The development of technical expertise through component supply-chain opportunities could be considered to be a *bottom-up* approach to growing a domestic weapon industry.

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The maintenance-driven growth of whole-of-system expertise and the supply-chain-related development of component technology expertise should not be mutually exclusive pathways but rather complementary efforts, the combination of which should help build Australian industry capability while increasing weapon availability. These two pathways should enable future options for domestic manufacturing through a structured evolution over time.

Weapons co-production: A third pathway—an opportunity made possible by the existing manufacturing shortfall of advanced weapons²⁶—is for Australian industry to establish co-production facilities to bridge the gap between demand and supply. Such a co-production arrangement would require agreement from the parent country, primarily the United States, as well as time and investment in the fundamental inputs to capability as represented by the seven capability elements discussed previously.²⁷ Such an arrangement would be further enabled by the top-down and bottom-up pathways discussed previously.

New weapon development: There is the potential for Australia's industry to develop new weapons on its own, especially if supported by government funding for research and development.²⁸ However, our review of international case studies found that advanced weapons take many years to develop, build, test and refine to the standards of quality and performance needed.²⁹ Although such efforts might not bear fruit in the near term, their development should be supported because they might, in future, achieve the ability either to resupply affordable mass weapons or achieve performance breakthroughs that confer a military advantage.

While the development of such weapons might be pursued in a competitive manner, we note that improvements are more likely to come from incremental or evolutionary

achievements rather than from entirely new (revolutionary) weapons. Notwithstanding the prospect of breakthroughs, Australian industry should seek to build on expertise rather than reinvent it; accordingly, cooperative arrangements such as co-development—including with allied industry—should be a precept of the GWEO Enterprise.

Conclusion

From the outset of Australia's guided weapons and explosive ordnance efforts since 2021, the concept of an enterprise has promoted the achievement of military objectives with resilience to shocks and interference. Thus, the GWEO Enterprise is focused on the *assurance* of capabilities rather than the upstream *design* of the force. The enterprise is concerned not with defining weapon requirements but with ensuring that those requirements can be delivered and supported.

There are, however, two ways in which the GWEO Enterprise needs to interact with the force design function within Defence. First, there is a question of which weapons should be candidates for domestic production, in part or in whole. The enterprise should help Defence address this question by considering operational priorities, quantities and risks, as well as the types of weapons that would be needed early in a conflict (which might be suited to a stockpile approach) versus those that may be needed in protracted conflict (which might be more suited to domestic industry production). Choices for domestic production also need to take into account the cost implications and the capacity of industry to take on a greater role.

Second, the GWEO Enterprise might inform Defence's force design function of future shifts in weapon capabilities

and costs, which could generate changes in requirements. Related changes in cost-per-effect might justify trade-offs between the quality and the quantity of individual weapons systems.³⁰ New technologies also could lead to changes in weapon requirements.

As options for domestic production activities are identified, there is a strategic risk that such activities could be seen as commercial threats by those who represent the existing weapons environment (especially in the United States). However, noting the shortfalls in precision-weapons production, co-production activities should represent not only a response to these shortfalls but a risk mitigation to Australia and the United States through diversification. Accordingly, options for co-production should be developed within a strategic alliance framework that emphasises cooperation rather than competition.

But for now, the critical priority for the GWEO Enterprise, consistent with the DSR direction towards accelerated preparedness, is to mitigate risks in access to and control over the resources to ensure the availability of guided weapons and explosive ordnance. In the case of

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sophisticated precision weapons, the immediate need is to buy sufficient weapon stocks to support deterrence and response options. There are additional immediate improvements in storage and distribution, maintenance and repair, and education and training that can lead to increased availability of guided weapons and explosive ordnance and thus to reduction of sovereign risk.

Attention to all seven capability elements of the GWEO Enterprise—from development to disposal—will not only increase weapon availability in the short term but

help develop the capacity of industry for future domestic production options. In this regard, key enablers will come from the promotion of two mutually reinforcing pathways for the enterprise: first, the top-down development of system and maintenance expertise; and second, the greater participation in weapon supply chains, providing greater bottom-up technical component expertise. These pathways will help grow the enterprise while delivering incremental reductions in sovereign risk.

Notes

¹ Australian Government Department of Defence, 2020, p. 40.

² Australian Government Department of Defence, 2023.

³ Dutton, Price, and Porter, 2021.

⁴ This was announced by the previous government and was based upon industry estimations.

⁵ See Australian Missile Corporation, 2021; and Sovereign Missile Alliance, undated.

⁶ See Australian Government Department of Defence, undated-a.

⁷ While a widely held interpretation of sovereignty is concerned with who controls resources to achieve an effect, measures that provide greater access to those resources also reduce risks; thus, we take a more inclusive view of sovereign risks.

⁸ Australian Government Department of Defence, 2018, p. 17.

⁹ Frühling, 2017, p. 3.

¹⁰ Thaler, 1993, p. 5.

¹¹ Morgenthau, 1948.

¹² Australian Government Department of Defence, 2020.

¹³ Australian Government Department of Defence, 2020, p. 29.

¹⁴ Australian Government Department of Defence, 2020, p. 29.

¹⁵ Australian Government Department of Defence, 2020.

¹⁶ Dibb, 2020.

¹⁷ Australian Government Department of Defence, 2020.

¹⁸ Australian Government Department of Defence, 2021.

¹⁹ See Pincombe and Pincombe, 2010, as derived from the strategy scrutinizing concept addressed in Mintzberg, 1994.

²⁰ Australian Government Department of Defence, 2020, p. 14.

²¹ Australian Government Department of Defence, 2023, p. 81.

²² Conflicts inevitably are of a longer duration than planned; see O'Hanlon, 2023.

²³ These costs include acquisition and consider maintenance and limited system life.

²⁴ Gunzinger, 2021.

²⁵ Examples included ammunition and explosive ordnance facilities in Benalla in Victoria and Mulwala in New South Wales.

²⁶ Bowman and Montgomery, 2022.

²⁷ For a definition of fundamental inputs to capability, see Australian Government Department of Defence, 2021, p. 11.

²⁸ There are examples of Australian technology development that demonstrate this potential, such as the Nulka active decoy; see Australian Government Department of Defence, undated-b.

²⁹ Mouton, Rhodes et al., 2022.

³⁰ See, for example, Mouton, Bartels et al., 2022.

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Abbreviations

ADF	Australian Defence Force
DSR	Defence Strategic Review
DSU	Defence Strategic Update
GWEO	Guided Weapons and Explosive Ordnance
JSF	Joint Strike Fighter
T&E	test and evaluation

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About This Perspective

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