

November 2009 — Issue 25



## We'll have six of them and four of those

### Off-the-shelf procurement and its strategic implications

by Andrew Davies and Peter Layton

#### Executive Summary

Defence projects the world over have a history of running over budget, behind schedule, or both. One way to minimise such problems is to simply avoid them as much as possible, by buying equipment that's already in production 'off-the-shelf' (OTS)—usually 'military off-the-shelf' (MOTS) for weapons systems, but sometimes 'civilian off-the-shelf' (COTS).

In the past few years, we've seen a number of MOTS acquisitions of major ADF equipment, including C-17 *Globemaster* transport aircraft, M1A1 *Abrams* tanks and *Super Hornet* aircraft. The results speak for themselves. The *Abrams* were within budget and six months ahead of schedule. The C-17s were on time and within budget, and the *Super Hornets* show every sign of following suit. Meanwhile, the developmental *Wedgetail* airborne early warning and control aircraft is years late, while the Joint Strike Fighter program has exceeded the predicted cost and schedule.

The lessons from these successes haven't been lost on the Australian Government. The current acquisition policy states that OTS options will be considered for *all* procurements.

In many ways, this is the continuation of a transformation of not just Australia's

approach to defence procurement, but the economy more broadly. Since World War II, Australia has progressively moved away from a centralised economic model and has embraced a globalised free-market approach to doing business.

OTS-based acquisition provides better project outcomes in terms of predictable costs and schedules, but it has some strategic implications. This ASPI *Special Report* provides some answers to the questions:

- to what extent does relying on the world market for our defence equipment leave us vulnerable to external factors beyond our control?
- what are the implications for Australian defence industries?

Successive Australian governments have identified a need to retain in-country capabilities in a number of priority industry and technology areas. However, there is a tension between the resourcing and sustainability of those priority areas and the desire to benefit from competitive processes wherever possible. Some recent decisions have sent something of a mixed message.

The aim of this paper isn't to argue for something other than OTS purchasing—economics and the ever-rising cost of defence materiel make it an eminently defensible approach. But there are some useful policy

adjustments that could be made to ensure that important capabilities are available within Australia when required. Our suggestion is for government to contract industry directly to provide the desired level of expertise and industrial capacity, rather than relying on it to be an emergent property of industry's response to the government's identified priorities.

What we are suggesting is, in many ways, another logical step along the path that Australia has been following for over sixty years.

## Introduction

Defence projects the world over have a history of running over budget, behind schedule, or both. And the more research and development (R&D) required, the longer the schedule delays and the greater the cost overruns. Accurately estimating the capability, cost and delivery timetable of a new piece of equipment is as much art as science, especially if novel technologies or manufacturing techniques are involved. For defence forces, the impact of such failings on force capabilities and budgets is almost invariably negative, and governments grow tired of major projects appearing in the headlines for the wrong reasons.

Australian examples include the F-111 (ordered in the 1960s during the R&D phase and delivered well behind schedule and at increased cost), the *Collins* class submarines (several years behind schedule), the *Jindalee* over-the-horizon radar (schedule and cost overruns) and the *Super Seasprite* helicopter (cancelled entirely at a total cost of \$1.4 billion).

And it's not only past programs. The *Wedgetail* airborne early warning and control (AEW&C) aircraft, for which Australia is the lead customer, is years late. Australia signed on to the Joint Strike Fighter program at the

beginning of its development in 2002. It remains to be seen when the aircraft will be delivered and at what cost, but there have already been adjustments to the planned delivery schedule and cost. A \$6 billion interim aircraft purchase will provide a measure of insurance, but project risks remain.

One way to minimise such problems is to simply avoid them as much as possible, by buying equipment that's already in production 'off-the-shelf' (OTS)—usually 'military off-the-shelf' (MOTS) for weapons systems, but sometimes 'civilian off-the-shelf' (COTS).<sup>1</sup>

In the past few years, we've seen a number of MOTS acquisitions of major ADF equipment, including four C-17 *Globemaster* transport aircraft, fifty-nine M1A1 *Abrams* tanks and twenty-four *Super Hornet* aircraft, all of which were ordered through the US State Department's Foreign Military Sales program. The results speak for themselves. The *Abrams* were within budget and six months ahead of schedule. The C-17s were on time and within budget, and the *Super Hornets* show every sign of following suit.

The lessons from these successes haven't been lost on the Australian Government. The current acquisition policy states that 'OTS options will be considered ... for *all* procurements' (emphasis added). The examples above suggest that there's a strong case for continuing with this policy, but there are assumptions, some of them implicit, that underlie that conclusion. Buying MOTS, usually from overseas, has implications for the nation's self-sufficiency in defence materiel and for the ability of the Australian defence industry to continue to operate at the same levels as today, and might even restrict the types of war that Australia can fight in the future.

This ASPI *Special Report* examines the consequences of an increasingly OTS-focused

acquisition strategy. The aim of the paper isn't to argue for something else—economics and the ever-rising cost of defence materiel make the OTS approach eminently defensible—but to suggest some useful policy adjustments.

## (M)OTS or development?

At its simplest, OTS procurement means finding a mature product or service that's in production, with all the research, development, testing and evaluation phases complete (and which consequently has a well-defined price). Some ADF equipment—usually not front-line combat equipment—is COTS, but the big ticket platforms are MOTS.

The 2008 Mortimer Review of Defence Acquisition defined MOTS items as:

A product that is already established in-service with the ADF or another military or Government body or commercial enterprise in a similar form to that being purchased at the time of the [acquisition] approval being sought ... The product is sourced from an established production facility and requires (at most) minor modifications with very low risk and complexity to meet regulatory compliance or interoperability with existing ADF and/or allied assets.<sup>2</sup>

Typically, acquisition begins with specifications for the system based on identified requirements. It's at this point that the viability of a MOTS option can be evaluated. And it's here that MOTS solutions can be prematurely rejected, either by incorrectly identifying 'unique requirements' or by making rigid demands for performance that can't be met off the shelf.

If there's no clear MOTS solution, the alternative is a developmental strategy—designing a new platform or system, building a prototype, testing, evaluating and ultimately deploying the product.<sup>3</sup> The major advantage

of this approach is that the system can be tailored to meet the ADF's requirements. A developmental system can be built to provide the best performance in the specific operational scenario and environment that the ADF intends to operate in—at least in principle.

However, high performance comes at a price. Contracting a developmental process is very complex and there are many uncertainties to be managed, especially if novel technologies requiring significant R&D are to be incorporated. There's a wealth of data that shows the tendency for initial cost and schedule estimates for development programs to be optimistic. Even if the project can be managed to a successful conclusion, deploying the finished product—which is by definition unique—requires wholly new training and support arrangements. As the sole operator of an innovative, leading-edge military system, the ADF then bears the full costs of ownership, without being able to offset or defray those costs.

Even when a developmental program delivers the specified capability, it usually does it at a higher price than a MOTS solution, and often later. The ADF force structure also pays an opportunity cost in time and money. So the question shouldn't be whether a MOTS system can meet the full suite of capability needs, but whether it's good enough: would lesser performance in the expected operating environment be adequate for the task?

There's a natural tendency to want to equip soldiers who are going into harm's way with the best equipment possible, to give them an operational edge. This can result in an unwillingness to compromise on identified requirements. Sometimes the results are worth it, but sometimes the result is a *lower* level of capability than was available from a MOTS solution that was originally judged to be inferior.

An extreme example is the Super Seasprite naval helicopter project. To meet requirements unique to the ADF, an ambitious development program tried to integrate a range of sophisticated capabilities onto the airframe. The aim was to produce a helicopter that would have provided a real capability boost to the RAN, but the result was *no* additional capability. Even worse, a new helicopter acquisition is now ‘a matter of urgency’.

The problem is neither new, nor unique to Australia. US defence acquisition expert Norman Augustine has neatly summarised the situation:

Sometimes it would seem [better to have] more of a bit less. If not, the ... outcome seems to be to have nothing, albeit of the very highest capability.<sup>4</sup>

Augustine quantifies the impact of demanding requirements on project outcomes in his seventh law of defence acquisition: the last 10% of the performance generates one-third of the cost and two-thirds of the problems. (This is, of course, a variation of the Pareto principle, or ‘80–20 rule’: that roughly 80% of the effects come from 20% of the causes).

## The pros and cons of MOTS

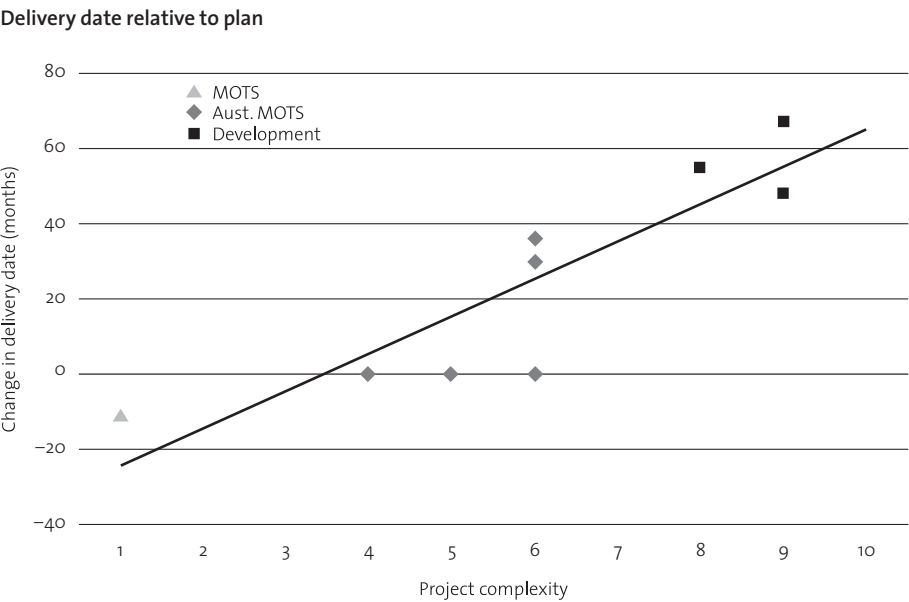
The advantages of MOTS extend beyond lower cost and faster acquisition. With MOTS equipment, the ADF can benefit from the experiences of other users, access their training organisations and doctrine, and generally share the cost of ownership. Moreover, in a time of small wars involving US-led coalitions, the judicious use of MOTS from American sources (or, to a much lesser extent, from NATO countries) allows the development of a force structure that can ‘plug and play’ with allied forces.

For project managers, MOTS offers lower technical, cost and schedule risks, and makes for easier contracting. These characteristics particularly suit large bureaucracies, which favour repeatable processes that deliver similar products to well-defined timetables. Conversely, as ASPI’s recent paper on the future submarine project illustrated, developmental projects require non-standard processes, considerable flexibility and a level of technical proficiency in the project office that’s hard to sustain in a bureaucracy.

It’s no surprise that the Australian National Audit Office (ANAO) includes among its lessons learned from a study of major defence projects that ‘considerable acceleration of the standard acquisition cycle is possible when the major supplies being procured are off-the-shelf production items.’<sup>5</sup> The ANAO data allows some quantification of the difference between MOTS, ‘Australianised MOTS’ (in which MOTS equipment is modified to meet local requirements) and developmental acquisitions. Figure 1 shows the performance of ten major projects, categorised by project complexity, against the planned date of delivery of full operational capability. The results are clear—the more development, the later the delivery. All three of the developmental projects were four years or more late, while all of the projects with low levels of development work (complexity of 5 or less) were on time or even early.

However, MOTS equipment has some disadvantages. There’s an incentive for nations to sell MOTS equipment they have developed. For those with the critical mass of R&D and engineering needed to develop new systems, MOTS sales to other countries help to keep production lines open and increase overall numbers, resulting in lower overall costs of production.

Figure 1: The benefits of MOTS acquisition



Source: ANAO analysis of DMO projects

The United States and European Union countries often take that approach when selling defence equipment. When Australia buys from these sources, it often makes sense to maintain the equipment at the same baseline as its parent service to take advantage of economies of scale in support. But if the parent service upgrades to meet its own requirements, there’s always the possibility that we’ll have to pay for upgrades or changes that we don’t really need. The Australian defence budget could then be driven partly by external forces that we have no control over.

Australia could also be affected if the supplier nation takes the MOTS item out of service. Economies of scale can be lost and, without a wider supply chain, support capability could become more expensive, harder to source, or both. We could manage the USAF’s decision to prematurely withdraw the F-111 strike aircraft from service because the RAAF had by then developed significant capability that could be expanded. However, the USAF action increased our support costs and technical

risks, possibly contributing to the withdrawal of the F-111 from service ten years earlier than originally planned in the 2000 Defence White Paper—forcing us to acquire an expensive interim replacement aircraft fleet.

A MOTS item built to the specifications of another nation might not be interoperable with other ADF units or major allies, and might not meet Australian laws, regulations, or safety or environmental standards. Modifications to overcome those shortcomings impose additional costs and risks, limiting the benefits of buying MOTS. One example is the modification of otherwise MOTS naval helicopters to fit Australian ship recovery and deck handling systems.

However, the advantages of MOTS frequently outweigh the disadvantages. In fact, even a modification to the ‘pure’ MOTS approach can still result in a project outcome significantly better than a developmental alternative.

This is clear from the ANAO data, which shows that Australianised MOTS (AMOTS) acquisitions consistently keep to schedule

better than development projects. The acquisition of the fleet replenishment ship HMAS *Sirius* was an excellent use of the AMOTS approach. The chosen strategy was to buy a new COTS tanker and then modify it for its intended role with the Navy. The vessel was delivered years ahead of the original projection and at about half of the budgeted cost.

## Project *Wedgetail* and the new tanker aircraft

Of course, acquisition policies aren't just about buying equipment as cheaply as possible, and judgments need to be made about the ability of the world market to supply the ADF with the equipment that it needs. For example, there was no obvious match for Australia's needs in the mid-1990s, when the Australian Government decided to acquire an AEW&C aircraft—resulting in Project *Wedgetail*.

The available MOTS options were either too large and too expensive to acquire and maintain (the US-sourced Boeing E-3, based on the 707 airliner) or too small to have the capability and endurance required for Australia's geography (such as Sweden's SAAB 2000 *Erieye*, based on a regional commuter airliner and well suited to the Baltic, but not to the expanses north of Australia).

The government decided on a developmental solution—a decision that has had long-term consequences. Essentially, Australia opted to become the lead customer for a new generation of AEW&C aircraft. With a state-of-the-art radar system, the solution identified for *Wedgetail* was expected to be a significantly more capable platform than the MOTS options. Other countries (Turkey and South Korea) expressed interest in follow-on purchases, essentially opting to buy MOTS by virtue of Australia's R&D expenditure.

If an off-the-shelf solution had been selected, the aircraft would probably have been in service for several years by now, albeit without the specified performance. Instead, *Wedgetail* remains high on the government's 'projects of concern' list. The project has been an unhappy experience for both the Defence Materiel Organisation, which is still unable to provide the customer with an operational system, and for the contractor, which has sunk a large amount of its own money into remediation efforts. The prognosis for *Wedgetail* isn't entirely clear, but it seems likely that the result will be a compromise between the desired performance and the performance that can actually be delivered. This experience appears to vindicate Augustine's seventh law.

On the other hand, being the lead customer for a new platform and opting to bear most of the developmental risks doesn't necessarily result in bad outcomes. The RAAF will soon take delivery of a new air-to-air refueller (AAR) aircraft, for which Australia is the lead customer. The aircraft is based on an Airbus A330 airframe—a COTS decision that avoided many risks. Unlike the aircraft it replaces, it will be able to refuel all of Australia's current and planned combat aircraft and those of our allies, making it a very versatile and sought-after asset. As might be expected, not everything has gone smoothly and the project is at least a year behind schedule. It's not surprising that the development of the most novel aspect of the aircraft, the aerial refuelling system, has caused the biggest delay. However, recognition of the risk inherent in such a program and appropriate management of contingency in the cost and schedule have allowed these problems to be negotiated.

## Government and defence procurement aims

Given its advantages, it's perhaps surprising that MOTS acquisition isn't the only approach ever considered. However, it's important to understand the government's aims in acquiring military capability.

The narrowest view is that the aim of defence procurement is simply to acquire and support the capabilities the ADF needs to conduct operations as directed by government, and to do so at the least cost. In this case the government should just go to the world market and find the best value for money, allowing other countries to shoulder the R&D risks and costs.

But governments generally take a wider view than that, and try to invest in *national* capabilities, including in-country industrial capacity and indigenous science and R&D. The reasons include a sense of the importance of having high-tech industries in country, but no doubt there's one eye on political outcomes. For example, the Australian Government wants to generate local jobs, and Australian defence contractors employ people in many electorates.

For these reasons, governments are sometimes prepared to accept the cost premiums that come from effectively subsidising local R&D and industry, accepting them as necessary to achieving wider strategic (and political) aims. Especially in times of strategic threat or economic downturn, the government will be more likely to lean towards solutions that engage local industries—being persuaded by arguments for self-reliance, for maintaining important skills in the local economy, or both.

In fact, most national governments view defence procurement through the lens of wider national interest. The international defence market is highly distorted by 'pork

barrelling' and continued support for poor practices that would be winnowed out through competition in a perfect market. It's a long way from the most efficient competitive model. The defence industry sector is skewed further because the government is usually the sole buyer. This allows a degree of regulation and control, but encourages defence companies to become dependent on government financing for R&D and manufacturing activities.

This imperfect world market is the background environment for Australian acquisition decisions. It's unrealistic to think that we can operate a completely free model in Australia with such boundary conditions. The end result is today's situation, which can be characterised as an 'in-between' strategy. MOTS is to be considered in all cases, but sometimes the government will opt for a developmental solution, either for capability reasons (as with the *Collins* class submarines and the *Wedgetail* aircraft) or because of broader industry considerations.

Nonetheless, the trend is clear. Driven by economic or practical considerations, successive Australian governments have increasingly embraced the world market as the preferred solution. Cutting-edge modern military equipment requires a prodigious engineering effort, and smaller nations are becoming less able to develop new systems in isolation. European Union countries are now collaborating to develop platforms such as the Eurofighter *Typhoon*. Even Sweden (traditionally largely self-sufficient in military equipment) is having to compromise—the *Gripen* tactical aircraft has an indigenous airframe but is powered by an engine of US design origin which has 60% of its parts manufactured in the US.



## A model for defence procurement strategies

While ‘going MOTS’ might seem an easy approach to defence procurement, the effects of the strategy flow on to local defence industry and beyond. Figure 2 shows a model that’s useful for understanding the evolution of Australia’s defence procurement and its strategic consequences. The figure is divided into four quadrants based on two major variables—the degree of MOTS versus development on the vertical axis and the degree of government intervention in the market on the horizontal axis. (The vertical variable is very similar to the complexity measure employed by the ANAO, as shown on the horizontal axis in Figure 1.)

Most projects are hybrids of MOTS and developmental acquisition strategies and involve elements of government intervention in the market. They aren’t fixed at one point in the diagram and may move as the projects evolve. But the broad-brush picture that emerges from this model allows attention to be usefully focused on strategic issues while avoiding the complexities of individual purchases and the confusion and emotion they sometimes inspire.

The four quadrants are:

**DIY (Do-It-Yourself).** ADF equipment is designed and built by an indigenous Australian defence industry capable of performing all of the steps required to develop and build leading-edge equipment. Once a strategy pursued by many nations, it’s increasingly the province of only the largest. However, it remains a national defence strategic choice, as shown by Sweden, a nation of nine million people that largely follows this model (but with increasing difficulty).

**Owner–Builder.** ADF equipment is mostly MOTS, chosen through international

competition but favouring suppliers who use local entities in Australia to build, assemble and/or modify the equipment.

**Outsource the Lot.** ADF equipment is the most cost-competitive MOTS equipment available, but must come mainly from close allies and nations that can provide strong guarantees of long-term support. Australian industry involvement is assessed on a cost-competitive basis rather than by any ‘national interest’ test.

**Home Handyman.** ADF equipment is mainly MOTS, chosen through international competition but favouring suppliers who use an indigenous Australian defence industry developed to support the equipment for the long term (but not to design and develop it).

## The strategic implications of MOTS

Acquisition strategies shape not only the immediate future force but can also influence decisions for years or even decades to come, especially when there’s a significant impact on industry. They can have implications for the sustainability of the future force over the long term by closing off options (or at least making them prohibitively expensive) and through incurred opportunity costs.

Usually, there’s a trade-off between independence and cost—the more national independence an acquisition approach provides, the greater the upfront costs. However, costs can be offset to some extent by gains in the ability to optimise military equipment for ADF purposes, and in national defence self-sufficiency and industrial development. The real trick is to work out when those gains make the enterprise cost-effective—a calculation that’s far from easy.

Consider a DIY program versus an OTS alternative. The costs of DIY include not only



Figure 2: Defence acquisition and national capability—a conceptual model



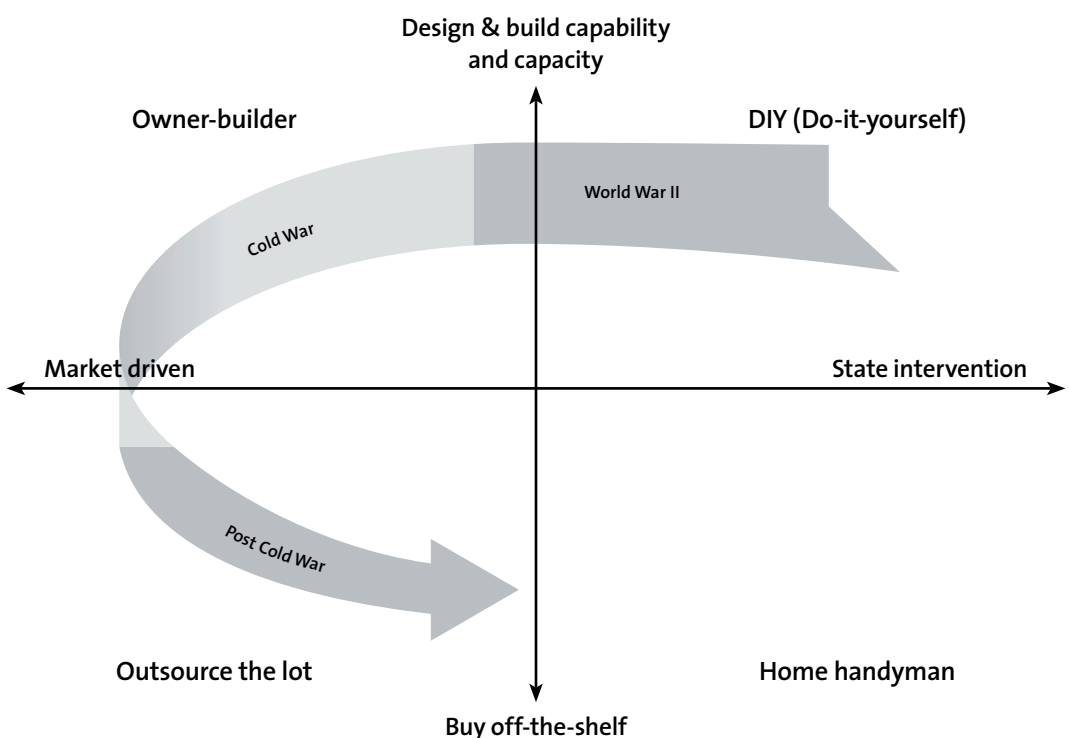
the premium for an Australian build, but also the opportunity cost to the wider economy, which must do without the skilled managers, engineers and workers employed in the program. The DIY opportunity cost is particularly hard to quantify, but might be reflected, for example, in wage pressures in related sectors. The benefits from DIY include the recycling of expenditure into the local economy (which is hard to quantify but occurs with most in-country government expenditure anyway) and possible savings in through-life costs. The calculation of the business case will be specific for each defence acquisition decision.

But it's not just about the economics. There are also essentially unquantifiable aspects related to notions of national independence. The lower half of Figure 2 shows acquisition approaches that are particularly reliant on overseas suppliers. Australian governments must consider how acceptable that is. It could be imprudent to rely on outsourcing the lot or being a home handyman when

contemplating wars of necessity on which national survival might depend, as capabilities acquired in those ways are particularly vulnerable to disruptions in maintenance and spare part resupply chains, whether caused by act of war or for political reasons. In wars of choice, that possibility is likely to be of less concern.<sup>6</sup>

Before and during World War II (a war of necessity), the emphasis was on DIY as much as possible. For a brief period, there was a serious concern that Australia would have to fend for itself, so cost-effectiveness took a back seat. Notions of complete self-sufficiency were quickly forgotten after the war. As Australia's strategic circumstances brightened, there was a progressive shift to the owner-builder approach, in which Australian industry was called upon to assemble, maintain and sometimes modify defence equipment, but only rarely to design it and build it from scratch. Since the end of the Cold War in 1990, the pace of outsourcing has accelerated (see Figure 3).

**Figure 3: The national journey towards outsourcing**



The Australian economy has undergone a remarkable transformation since World War II, and the broad direction shown in Figure 3 also reflects a series of decisions by Australia to fundamentally change the nation's economic strategy. After the war, we decided not to extensively liberalise trade as other nations were doing, mainly because we relied more on agricultural exports—a sector not covered by the General Agreement on Tariffs and Trade (the forerunner to the World Trade Organization). Much of Australian industry remained sheltered behind relatively high trade barriers, which had the unintended consequence over time of lowering national productivity, GDP growth and our standard of living.

However, a series of major economic reforms beginning in the 1980s opened up the Australian economy, considerably boosting the nation's GDP, national productivity and per-capita incomes.<sup>7</sup> These reforms included the privatisation of government-owned commercial enterprises and large-scale reductions in tariff protection for the manufacturing sector. Australia deliberately moved from the DIY and owner-builder eras to embrace free-market competition, economic rationalism and the global economy. In the terms of Figure 2, we've mostly decided to outsource the lot.

The combination of better strategic circumstances and the evolution of our national economy has meant that this trend has also been manifested in the defence materiel sector. The history of the Australian military aviation industry provides a clear example. The Government Aircraft Factory (GAF) was created in the World War II period by the federal government when the supply of front-line aircraft from overseas was a problem and strategic circumstances (especially in the first half of 1942) were dire. The GAF quickly developed the ability to produce indigenous front-line aircraft.

While they were no world-beaters, they were certainly seen to be better than relying on supply from allies who would reasonably put their own national survival first. By the time GAF was able to design and build high-performance military aircraft, the ability to source aircraft from overseas was firmly re-established.

During the Cold War, there was a gradual rundown of our national capability and capacity as military aircraft became more complex (and thus more expensive and demanding to develop). In an interim step, we retained the ability to make major modifications to overseas designs (for example, by putting British engines into the American F-86 Sabre to produce Australian-unique variants that were assembled here). GAF and its successors then reoriented progressively towards in-country aircraft assembly—an owner-builder approach. By the time the F/A-18 Hornet was acquired in the 1980s, there was essentially no Australian design input. After the Cold War, the organisation was privatised, joined the free-market economy and focused on composite aircraft component manufacture for Boeing and Airbus.

What would be required for Australia to go back to designing and building its own aircraft? We'd need to identify and develop a wide range of skills and engineering capacity that essentially duplicates the efforts of other nations. The project managers, engineers and skilled workers would have to be recruited (and developed) and wouldn't be available to other industries.

In short, in return for some self-sufficiency in aircraft manufacture, we would forgo many of the advantages that we gained in the 1980s when we moved decisively to become a part of the globalised economy. Part of that process involved emphasising internationally competitive sectors of the Australian

economy, with a concomitant redistribution of skilled people and resources away from import substitution industries. By doing so, Australia gained access to greater economies of scale and the ability to leverage and enjoy the benefits of the much larger R&D sector of the international economy.

This isn't true only of aircraft. Building defence equipment in Australia has a potential opportunity cost from moving resources away from industrial sectors where we have competitive advantages into one where we don't. That tension was evident at the time of the decision to acquire air warfare destroyers (AWDs). In 2007, when the economy was booming and there was a distinct skills shortage, debate arose about the merits of building overseas versus building in Australia. Some argued that building here would take scarce skilled people away from competitive Australian companies that were growing the national economy and generating export income.

Tasman Economics was commissioned by the Australian Industry Group Defence Council to study the Minehunter and Anzac ship projects. The consultants determined that the two projects, with a total expenditure of over \$6.5 billion (in 2002 dollars), contributed some \$4 billion to GDP, generated or sustained almost 10,000 jobs annually during the ship construction phase, and helped Australian defence companies export their products.<sup>8</sup> However, the study didn't consider the opportunity costs to the rest of the economy of tying up capacity that could have been generating exports, or the flow-on effects of government expenditure elsewhere in the economy. Small production runs of defence equipment, with a relatively high proportion of fixed costs, will always run the risk of being economically inefficient.

Where ADF needs can't be met by MOTS, the cost penalties of local manufacture might

be justified. The successful Bushmaster protected mobility vehicle may be one such case. The vehicle's development was more protracted and costly than Defence originally forecast (which shouldn't surprise anyone familiar with Augustine's laws). In 2001, Defence recommended that the contract be terminated, but the Defence Minister did not concur. The project continued and eventually delivered an operational capability that would have been difficult to obtain through a MOTS purchase and that has proven to be ideally suited to operations in the Middle East and Afghanistan.<sup>9</sup>

## A 'home handyman' approach?

The four-quadrant chart (Figure 2) suggests an option that Australia hasn't tried before: building a national defence support industry by encouraging the growth of a small number of large national companies—national champions—with significant capabilities and capacities. This would constitute an enhanced national support base and offer a hedge against unexpected overseas support disruptions and short-notice operational imperatives.

However, two major issues would need to be addressed. First, we would either have to grow our own R&D and construction capability, incurring a substantial learning penalty, or find MOTS suppliers willing to transfer the required support technology and skills to Australian companies (as was done, with acrimony, in the *Collins* submarine project). Overseas MOTS suppliers would naturally be unwilling to strengthen Australian industry capabilities and capacities in such a way, sensing potential future competition. Second, government intervention of that type would be expensive and would potentially draw funding away from much-needed ADF operational capabilities or from other government priority areas. There doesn't seem to be much government enthusiasm for

this approach, other than in the submarine and shipbuilding sector.

However, it works for the US (or at least has worked until now). There, the scale of industrial effort in support of the development of military systems (combined with the amount of taxpayer funding provided to defence industries) allows for the long-term investment and effort required for cutting-edge projects—and for shouldering the burden of an inevitable proportion of failures. The benefit to Australia of MOTS acquisitions, of course, is that we can benefit from US investment in the ‘home handyman’ approach while taking little of the risk.

## MOTS and strategy

In summary, Australia’s increasingly MOTS-focused defence acquisition strategy has emerged as a consequence of:

- the scale of the enterprise needed to produce state-of-the-art military systems
- the tendency of development projects towards cost and schedule overruns
- a national economic strategy increasingly geared towards market-driven solutions
- Australia’s increasingly benign strategic circumstances.

The first three factors provide good support for MOTS acquisition, but it’s worth exploring the last factor and asking whether the strategic rationale is robust against possible future changes.

The recent Defence White Paper predicts that the most common form of conflict to 2030 will be prolonged offshore intra-state conflict, and that such conflict could involve external states conducting security and stability intervention operations.<sup>10</sup> Current conflicts certainly don’t threaten Australia’s survival, and Australian involvement in overseas conflicts is more discretionary than in earlier times. In wars of discretion, problems in

sustaining particular equipment can be frustrating and may, in the worst cases, require the government to reconsider the deployed force’s composition and functions or to acquire new equipment. But such problems wouldn’t endanger the Australian nation, so the other factors tend to take precedence when setting acquisition policy. The focus is on getting the biggest bang for the buck, rather than on force sustainability in a time of grave national crisis.

We need to be careful here—it’s easy to mistake local industry capability that duplicates overseas capacity for self-reliance. But, unless we can manufacture and support end-to-end systems, we could end up with an expensive illusion of independence. The AWDs are an example. While the hulls will be built here, the radar, combat system and all the weapons will be sourced from overseas.

And sometimes paying a premium doesn’t guarantee self-sufficiency. Generating in-country support capability appears to require more than taking an owner–builder approach and trusting the market to deliver the required flow-on capabilities.

The Productivity Commission’s 1994 report on defence procurement cited a good example of this approach failing to deliver the desired result. In this case, unusually, some numbers on the premium are publicly available. The commission summarised the approach taken to the acquisition of the F/A-18 Hornet in the 1980s:

The assembly in Australia of 75 F/A-18 fighter aircraft during the 1980s incurred a premium, estimated by the Department of Defence to be some \$700 million — 17% of the total project cost of \$4.5 billion (in 1993 prices).

For this additional cost, Australia’s defence self-reliance was to have been enhanced by industry’s capacity to maintain and

provide through-life support for the aircraft. This [proved] to be difficult to sustain and maintenance [was] carried out by the RAAF.<sup>11</sup>

As evidenced by the servicing in Australia of other aircraft that were purchased ready-made from overseas, Defence can obtain the required expertise whether or not an aircraft is assembled in Australia. Today the F/A-18 fleet is maintained by a contractor.

Self-sufficiency is clearly difficult to achieve for a country that has otherwise embraced the global economy and the fluid allocation of resources across national borders. But how much does it matter? Are we getting away with it because of an unusually happy set of strategic circumstances?

## Assurance of supply

The real test is to consider the implications of a change for the worse in Australia's strategic circumstances. If regional interstate war returned and Australia became involved in a war of necessity, what would our acquisition strategy mean for our ability to defend ourselves? There's a disconnect—geographically as well as functionally—between Australia and our suppliers of critical military equipment.

The ADF, if equipped principally with MOTS equipment, would become particularly sensitive to changes in supply and support from overseas sources. We could conceivably find ourselves in a drawn-out conflict without enough war stocks. Or a country from which we'd bought MOTS equipment might be unable or unwilling to provide technical and logistic support. The level of acceptable vulnerability is a strategic decision, and addressing it may involve costs that would reduce the benefits gained by choosing MOTS.

This isn't an abstract concern. In the 1960s, some European countries objected to Australia's use in the Vietnam War of military

equipment purchased from them. They placed various forms of restrictions and supply embargoes on the equipment. Similar political objections have resulted in arms embargoes elsewhere. For example, after the outbreak of conflict in the Falkland Islands in 1982, NATO and the Common Market applied an arms embargo on Argentina that prevented it from obtaining additional *Exocet* missiles.

Recognising this problem, later Australian defence purchases from other nations have generally included memoranda of understanding in which the selling nation agrees not to place restrictions on the sale of spare parts and support items. Such agreements are now common in the globalised defence industry and have been shown to work, even if the cause of supply disruption is a non-state player. Nicholas Hayek, president and majority owner of Swiss watchmaker Swatch, disagreed with the 2003 Iraq War. He instructed a Swatch subcontractor to cease shipments of a component needed by the US for the manufacture of GPS-guided weapons. The Swiss Government intervened, advising the company that it had a legal requirement to supply and directing it to honour its contract. Supply quickly resumed.

So mechanisms exist to make supply arrangements more robust. However, international agreements aren't perfect guarantees. The supplying nation may find itself in pressing strategic circumstances that override contractual, legal or moral pressures to honour its contracts. All nations hold limited stocks of critical maintenance items. In extremis, they might choose to keep them for the sole use of their own military forces. Australian firms playing a role in a global supply chain could provide some insurance against that possibility. If Australia makes a military item or spare part that the overseas supplying country urgently requires for its own needs, there may be a stronger incentive

for it to supply Australia to avoid disruption to its own supply chain.

An obvious way to overcome supply concerns is to hold larger stocks of critical spares and weapons in Australia. This approach is taken by countries such as Israel, which face wars of necessity and can't afford to run short of critical maintenance items. However, an inherent downside of this approach is its high cost. In most circumstances, it will mean writing off very large sums when the equipment reaches the end of its usable life by becoming out of date or obsolescent, negating the low-cost advantage of the initial MOTS purchase.

Luckily, the situation may be less critical than first appears. With the exception of the major powers, all countries are in the same boat—smart weapons and other sophisticated items have to be sourced from somewhere else. If Australia were in conflict with a major power with greater strategic depth than our own, restocking with a new shipment of weapons would, at best, buy a little time. In that circumstance, either our own major power ally would be with us and would be able to resupply us, or we would lose.

## Strategy and procurement policy—the situation today

The Australian Government has been wrestling with the notion of self-sufficiency and what it means for the local defence industry and its ability to provide in-country support for ADF capabilities. After the release of the Defence White Paper, the government laid out a set of 'priority industry capabilities' (PICs). According to the publicly released fact sheet, the PICs are intended to be those capabilities that provide us with an 'essential strategic advantage by being available within Australia'.

However, the document takes a notably ambivalent approach and falls a long

way short of endorsing anything like the mandated level of in-country activity that's characterised past defence policy. The continuing trend towards a market-based approach is revealed in several places:

... operating in a PIC arena does not automatically mean that [industry] will receive special support or that Defence will pay a premium for PICs. As outlined in the White Paper, the National Security Committee of Cabinet will make decisions about whether and how to provide support to PIC based on a robust business case. Support will only be provided in cases where market failures would be so detrimental to our strategic interests as to justify intervention. On current analysis, Defence does not consider that any PIC requires Cabinet level market intervention.<sup>12</sup>

There's a strong sense in the document that the government hopes that the desired level of indigenous industry capability will be an emergent property of industry's response to the government's priorities, rather than one that's mandated (and paid for up front) by government.

From industry's point of view, the PICs are problematic, especially when investing in those areas doesn't guarantee an 'inside track'. The 2008 sonar decision for the AWD is a case in point. A multinational defence contractor had made a significant investment—employing scores of people—in an Australian-based sonar facility, at least partly because underwater detection was identified as a strategic industry. Yet the decision was made to award the contract to another, off-shore, company. Of course, there's no reason that shouldn't happen—the procurement process should select the supplier that offers the best all-round package of capability, cost and support—but the process illustrates the difficulty in leaving



what are supposed to be Australian ‘essential strategic advantages’ entirely to the market. The losing bidder now has to decide whether to continue with its level of investment in Australia, or if it’s in the company’s interest to rationalise its worldwide sonar activities, bidding back into the Australian market when it has an opportunity to do so.

One approach might be for the government itself to invest in facilities and people in priority areas. This line of thought is reflected in the PIC document:

[The] Government has decided to establish Centres of Excellence to address any identified capability or capacity shortfalls in our PICs. These centres will have a number of roles, including managing skill enhancement programs, targeting research and development activities, and exploiting commercialisation and export opportunities. The first of these centres will be in the Electronic Warfare environment.

As with the previous approaches discussed in this paper, the question should be whether the centres are the best way of producing the required results, both in cost-effectiveness and in providing the desired strategic depth.

## The way ahead—policy settings for the future

Australia’s current procurement policy settings are something of a ‘historical accident’. It’s almost as if successive governments haven’t been able to bring themselves to embrace a purely market-based approach to defence procurement, despite their instincts telling them to head in that direction. As early as 1994, the Industry Commission said that Defence should be wary of paying premiums for Australian supply and endorsed a general strategy to ‘avoid them as far as possible’. The current policy is almost, but not quite, at that point.

There are a number of reasons for the reluctance to finally go down that path. It’s difficult to quantify the costs and benefits of different approaches, and opportunity costs are often insufficiently considered in ‘proving’ the viability of options. Industry is very good at promoting its interests and can do so using arguments about the national interest that also have a political resonance, such as employment and skills for Australians. And it’s satisfying, at an almost visceral level, to see big projects delivered in-country.

There are certainly good reasons to have a baseline level of capability not only in-country, but accessible by government. Buying MOTS isn’t necessarily easy. While the purchase of C-17s—pretty much the only western-sourced aircraft of their type on the market—is a relatively straightforward decision, choices are often more complex than that. If there are competing types, or if the system to be procured has to be integrated onto a platform already in service with the ADF, technical expertise is required to evaluate the suitability and performance of the contenders and to robustly estimate the total cost. Having a level of expertise available to government certainly helps to make Defence a cannier buyer.

For example, ASPI’s recent paper *How to buy a submarine* argued that having the submarine design and support expertise of ASC available to the project office will be critical to the success of the future submarine project.<sup>13</sup> In many ways, the journey described in Figure 3 in this paper has seen the naval design capability that was once resident in the RAN and the predecessors of the Defence Materiel Organisation transferred to the industry sector. In this case, the government has opted to retain ownership of ASC, which makes access to its expertise straightforward. That’s not the case across the defence sector.

The three fundamental questions that any policy settings must address are:

1. What capabilities are so important to the ADF that the government must have access to them?
2. What activities need to be performed in Australia to ensure that those capabilities are available when required?
3. What is the best way to procure the goods and services needed to provide those capabilities and activities?

The government has already answered the first two questions. The PICs identify the capabilities for which the government sees advantage in having in-country expertise (though not to the point of paying much for it).

However, there seems to be a question mark over the whole notion of PICs, at least from industry's point of view. Despite underwater systems being a longstanding entry on the list of priority technologies, the AWD sonar experience seems to show that the world market was perfectly capable of providing the required solution.

That isn't the only example—many of the PICs cover areas in which the world market offers considerable expertise. For example, the 'High end system and "system of systems" integration' PIC seems to be well covered by a number of large integration firms around the world. Again, the AWD project seems to offer a counter-example. The project's high-level systems integration is being performed by a multinational systems integrator that tendered successfully for the work. Several other firms would also have been credible choices. So identifying the PICs doesn't guarantee that the companies that invest in them will win work in those fields. Similarly, the government won't necessarily get the outcome it wants—firms can opt in or out as they judge to be in their interest, and the

level of national capability at any given time will be subject to (perfectly valid) business decision-making.

A much better approach would be to take the final step in embracing a market-driven approach. A contract is the best way to obtain surety of supply and price. If the government wants assurance of a certain level of industry capability based in Australia, or to be able to draw on expertise to augment its own in-house acquisition process, or both, it should go to the market and find the most capable suppliers, and then specify the desired in-country component. For example, this could include contractual requirements to train and sustain an Australian workforce at a certain size and level of expertise.

Contracting for PICs would have mutual benefits. Defence businesses would have the opportunity to bid as potential suppliers and then invest if they win, or to divert their resources into more profitable ventures if they don't. Government would get the capabilities it needs and avoid the expense and time required to manage the PICs. It would also allow for market testing. A by-product of this approach would be the identification of any areas where industry was unable or unwilling to offer contracted services. In that case, government would have to decide whether it wished to build the capability itself, or whether it would rely on the market to provide it when required.

## Conclusions

Short of some serious reappraisal of Australia's broad economic approach, the world market seems set to provide the ADF with its equipment from now on. Strategically, Australia is highly dependent on overseas suppliers. However, we've been that way for decades; the alternatives look expensive, and the degree of independence that we could realistically achieve is questionable anyway.

We already sit towards the upper end of the OECD defence spending table at 2% of GDP (except for the permanent United Nations Security Council countries), so it would be a major decision to spend more of GDP to become more self-sufficient in weapon systems. We would also have to hope that our R&D people could produce systems that compete with the products of manufacturers from other countries with much more advantageous economies of scale.

It's possible for a country of Australia's size to provide more of its own defence materiel. Sweden can (just) do it, with a population less than half of ours, but the Swedish tax take is almost 60% of GDP while Australia's is closer to 35%. Australia decided long ago to eschew the centralist approach in favour of something much more free-market in its nature, and defence procurement policy has followed suit.

The government has almost reached the point of embracing the market as the most efficient way of procuring equipment for the ADF, but has retained a few vestigial elements of market intervention. With the aim of retaining in-country expertise in identified priority areas, the government has indicated to industry that it will look kindly upon investment in those areas but won't (at this point) support them financially. There's no guaranteed quid pro quo, and government has been willing to make specific acquisition decisions that are more consistent

with a free-market approach. As a result, there's no surety of return on investment for industry, and no guarantee of capability for government.

The logical next step in the evolution of defence procurement policy is for the government to decide what capabilities it needs to have in-country, and then find the right suppliers to contract to provide the necessary goods and services.

## Endnotes

- 1 There's also 'government off-the-shelf' (GOTS) for systems that have been developed through government procurement systems but aren't military. Equipment used to collect or analyse intelligence data transferred between allied nations is an example of GOTS acquisition.
- 2 *Going to the next level: the report of the Defence Procurement and Sustainment Review*, Commonwealth of Australia, 2008, Annex F4.
- 3 There are several variations on this process. The most common is 'spiral development', which involves incremental development; additional functionality is added in a series of steps. Software-intensive systems, such as command and control systems, are often developed this way.
- 4 Norman R. Augustine, *Augustine's Laws and Major Systems Development Programs*, American Institute of Aeronautics and Astronautics (2<sup>nd</sup> edition), New York, 1983, p 47.
- 5 *Defence Materiel Organisation Major Projects Report 2007–08*, Australian National Audit Office, November 2008.
- 6 Wars of necessity concern the most important national interests—there are few practical alternatives to the use of military force and there would be great costs to the nation if the war were not fought. Wars of choice concern less important national interests—realistic alternatives to the use of military force are available, and there would be low costs to the nation if the war were not fought.
- 7 From a Defence viewpoint, the changes in national economic strategy since the 1980s have been highly successful. The resulting steadily rising GDP has allowed substantial and almost effortless real defence budget increases over the past two decades.
- 8 *Impact of Major Defence Projects: A Case Study of the Minehunter Coastal Project Final Report*, Tasman Economics, Canberra, January 2002.  
  
*Impact of Major Defence Projects: A Case Study of the ANZAC Ship Project Final Report*, Tasman Economics, Canberra, February 2000.
- 9 *Defence's Project Bushranger: Acquisition of Infantry Mobility Vehicles*, Australian National Audit Office Report No.59 2003–04, Canberra, June 2004.  
[http://www.anao.gov.au/uploads/documents/2003-04\\_Audit\\_Report\\_59.pdf](http://www.anao.gov.au/uploads/documents/2003-04_Audit_Report_59.pdf)
- 10 *Defending Australia in the Asia Pacific century: Force 2030*, Department of Defence, 2009, p. 22.
- 11 *Defence Procurement*, Report No. 41, Industry Commission, Canberra, 30 August 1994, available from [http://www.pc.gov.au/\\_\\_data/assets/pdf\\_file/0005/6971/41defenc.pdf](http://www.pc.gov.au/__data/assets/pdf_file/0005/6971/41defenc.pdf)
- 12 Department of Defence Fact Sheet, Priority Industry Capabilities, Canberra, 2009. [www.defence.gov.au/dmo/id/pic/PIC\\_Factsheet.pdf](http://www.defence.gov.au/dmo/id/pic/PIC_Factsheet.pdf)
- 13 Sean Costello and Andrew Davies, *How to buy a submarine: Defining and building Australia's future fleet*, Australian Strategic Policy Institute, 29 October 2009

## Acronyms and abbreviations

ADF	Australian Defence Force
AEW&C	airborne early warning and control
AMOTS	Australianised military off-the-shelf
AWD	air warfare destroyer
COTS	commercial off-the-shelf
DIY	do-it-yourself
GAF	Government Aircraft Factory
GDP	gross domestic product
IMF	International Monetary Fund
MOTS	military off-the-shelf
OECD	Organisation for Economic Co-operation and Development
OTS	off-the-shelf
R&D	research and development
UN	United Nations

---

## About the Authors

**Andrew Davies** is the Director of the Operations and Capability Program at ASPI.

**Peter Layton** has extensive experience in capability development in Australia and overseas. Peter is currently a member of the Royal Australian Air Force Reserve. The views expressed are the author's and do not necessarily reflect the official policy or position of the Department of Defence or the Australian Defence Force.

## Important disclaimer

This publication is designed to provide accurate and authoritative information in relation to the subject matter covered. It is provided with the understanding that the publisher is not engaged in rendering any form of professional or other advice or services. No person should rely on the contents of this publication without first obtaining advice from a qualified professional person.

## About Special Reports

Generally written by ASPI experts, Special Reports are intended to deepen understanding on critical questions facing key strategic decision-makers and, where appropriate, provide policy recommendations. In some instances, material of a more technical nature may appear in this series, where it adds to the understanding of the issue at hand. Special Reports reflect the personal views of the author(s), and do not in any way express or reflect the views of the Australian Government or represent the formal position of ASPI on any particular issue.

### ASPI

Tel +61 2 6270 5100  
Fax + 61 2 6273 9566  
Email [enquiries@aspi.org.au](mailto:enquiries@aspi.org.au)  
Web [www.aspi.org.au](http://www.aspi.org.au)

© The Australian Strategic Policy Institute Limited 2009

This publication is subject to copyright. Except as permitted under the *Copyright Act 1968*, no part of it may in any form or by any means (electronic, mechanical, microcopying, photocopying, recording or otherwise) be reproduced, stored in a retrieval system or transmitted without prior written permission. Enquiries should be addressed to the publishers.