

Implementing the Defence First Principles Review

Two key opportunities to achieve best practice in capability development

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Abstract

Recommendations from the Defence First Principles Review are wide ranging but will in most instances be judged by the success of reform of capability development. This paper proposes two key measures on which to judge the early success of Defence's capability development reforms. First, the author proposes the formation of an industry-standard program management office (PMO) to oversee the life cycle of all acquisition projects from inception to final operational capability as part of comprehensive and balanced programs. Second, the author proposes the creation of a robust centralised branch to manage all test and evaluation (T&E), so that all projects have credible test results that underpin the PMO's decision-making throughout the development and fielding of new capabilities. Such a centralised T&E branch would bring Australia closer to the rigorous T&E system used in the US Defense Department and the US Armed Forces, as codified in US Congressional Law (Title 10), so that when Australia does choose a non-US development or an off-the-shelf option, we can do so in an equally informed and sovereign way as our major ally. Strong coordination of projects by a PMO and the central coordination and input of real T&E for all acquisition decisions are key to achieving more consistent, accountable and credible defence acquisitions and to supporting accountability by the Defence's capability managers.



Two RAAF C-130J Hercules conducts a fly past of NUSHIP Adelaide as the ships sails into Sydney Harbour for the first time, October 2015. © Commonwealth of Australia. Department of Defence.

The need for reform of defence capability development

Defence capability development in Australia, as in many other Western nations, has regularly been reviewed and criticised for its failures to deliver all of the necessary capabilities on time and within budgets. The 2012 Australian Senate Inquiry into Defence Procurement cited testimony by Francis and colleagues before a US congressional committee into US defence acquisitions, stating that ‘it takes many things for an acquisition to succeed, while only one source of unmanaged risk can cause a poor outcome.’¹ Therein lies a precept of the Senate’s inquiry report, that Defence must do a better job of managing risk, especially technical risk, if it’s to improve its acquisition record. The Senate report concluded about Australian defence acquisition:²

Defence projects for acquiring major capital equipment ... of a scale and complexity that they present ‘formidable and ever-increasing challenges’. The problems identified in defence procurement, however, are largely a function of the Defence organisation’s own making—unintentionally self-inflicted. They include: inadequate planning and scoping of project; poor risk management from beginning to end of project; failure to appreciate the developmental nature of the project or complexity with integration; poor project management; underestimation of defence industry capacity; lack of skilled workforce; inadequate contracting arrangements; insufficient consideration of through-life support; and a breakdown in the relationship between the relevant service, DMO [Defence Materiel Organisation] and contractors. (p. 249)

What’s particularly disappointing about the Senate inquiry findings is that they followed over a decade of significant investment by Defence into a specialist acquisition organisation, known as the Defence Materiel Organisation (DMO), with the latitude and time to invest in the necessary skills and processes at all levels to do the acquisition function well. Chapter 2 of the inquiry report assessed that some \$7.6 billion of projects between 2000 and 2010 had significant management difficulties, which is about 10% by value for the period. While that proportion of problem projects would be a good record in some industries, closer examination finds that most difficulties were largely avoidable. For example, Chapter 12 reports that many of the surprise technical risks could have been found substantially earlier with the proper use of test and evaluation (T&E), especially before contract.

More recently, the Australian Government instituted the 2015 First Principles Review (FPR) of all aspects of Defence.³ The FPR found concerns similar to those found by the 2012 Senate inquiry. In particular, it found the following points pertinent to this paper:

- Acquisition teams must comply with over 10,000 Defence Materiel Organisation specific policies and procedures which includes 35 policy and procedure artefacts totalling around 12,500 pages on procurement processes and controls. (p. 14)
- Recurring issues with a lack of accountability, ill-defined authority, unclear allocation of responsibility and great difficulty measuring and monitoring real performance. (p. 14)
- The current capability development construct creates a disconnect between customers and the purchaser as well as multiple and unnecessary handover points which increase complexity and risk. (p. 32)

In summary, the FPR found an excess of processes without the governance or accountability to address these disconnects with sponsors, and time-consuming and unnecessary handover points in the acquisition life cycle. Worse still, the FPR found that, despite the DMO experiment, Defence was an ‘*organisation which has drifted from contemporary best practice*’ (p. 1) and recommended fundamental transformation in the capability development domain (pp. 5–6), including:

- A stronger and more strategic centre able to provide clear direction, contestability of decision-making, along with enhanced organisational control of resources and monitoring of organisational performance;
- An end-to-end approach for capability development with Capability Managers having clear authority and accountability as sponsors for the delivery of capability outcomes to time and budget, supported by an integrated capability delivery function and subject to stronger direction setting and contestability from the centre.

This paper looks at two aspects of contemporary best practice in defence capability development: program management offices (PMOs) and robust centralised T&E. Both have been used successfully by the US defence organisation and its multinational contractors for many years. These two measures would substantially help the Australian Defence organisation to achieve the acquisition reform sought by the Australian Government.

The case for a program management office

PMOs began as centres of excellence in project, program and portfolio management around 2000, usually in organisations with many projects to manage.⁴ The 'P' in the acronym can stand for project, program or portfolio, depending on the emphasis of the PMO. Despite the flexible name, the roles of PMOs have been agreed based on those first put forward by Kendall and Rollins (2003)⁵ to such an extent that accreditation programs are now run by organisations such as the Australian Institute of Project Management (AIPM).⁶ (The AIPM's accreditation criteria for PMOs are listed in the appendix to this paper.) The AIPM currently lists eight accredited Australian organisations, including the NSW Office of State Revenue, Telstra and Raytheon Australia.

Most current research on PMOs is about strategies for leading them successfully,⁷ although a paper by Letavec⁸ and a book by Tjahjana et al.⁹ are good for establishment issues. Tjahjana et al. have a particularly good list of the benefits of a PMO (pp. 7–8), the risks typically faced without a PMO (pp. 6–7) and a sample PMO charter (their Appendix C). The consultant industry for PMOs has been active in conducting surveys on the effectiveness of PMOs.¹⁰

The roles of a PMO usually mix support (coaching) with progress review and compliance, such as in the following list:¹¹

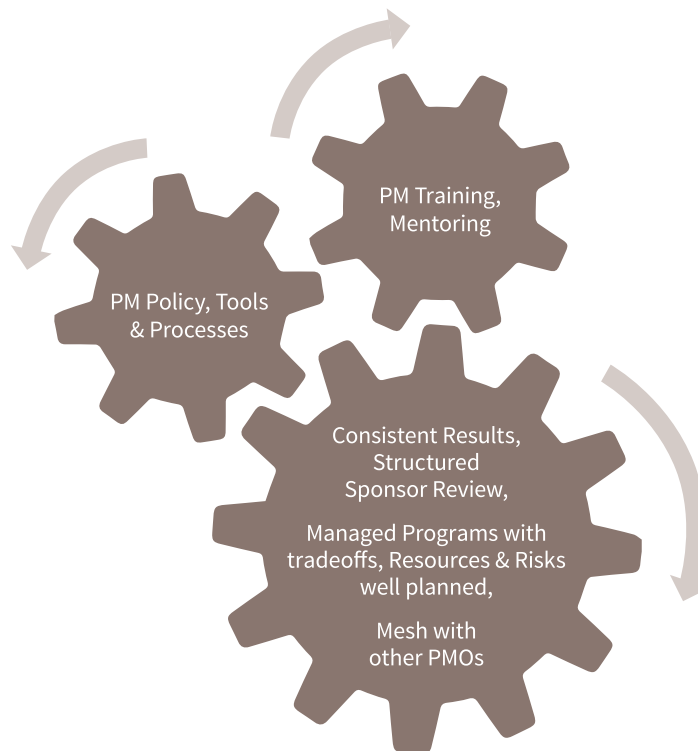
- drive project cycle times down
- facilitate choosing the right project mix
- ensure adequate resourcing
- develop and maintain an executive cockpit through all key portfolios
- track and report high-level progress and compliance
- mentoring
- project management tools and processes
- help desk
- project management policies and methodologies.

These PMO roles are shown in Figure 1.

Where two organisations (such as Defence and its major contractors) are required to work closely together across multiple projects, a PMO also provides an additional point of commonality and exchange, above individual projects, where they can exchange ideas for more seamless and efficient work. In the case of Defence and its contractors, such exchanges would be opportunities to seek common efficiencies over time from lessons learned, without the stresses of negotiation, completion and probity that constrain individual contracts.

Elements of the PMO tasks listed above existed within the DMO for projects at the time of its disbanding but they were divided between line management, a standardisation branch and a relatively new project performance review area. The DMO had not fused these functions into one PMO and had not empowered a PMO to deal with individual projects with the authority to suspend project progress and amend the project funding and workforce. Without that fusing and authority, individual projects could be autonomous and noncompliant and could avoid scrutiny by sponsors, to the risk of the overall investment portfolio. While this sounds dramatic, it's important to recognise that it only takes a stubborn few to undermine the good work of many. Put starkly, Defence really has two directions here: tolerate the few problem projects or improve the governance of all.

Figure 1: PMO functions



In 2014, the Capability Development Group within Defence, which oversaw the early project development stages, formed a small PMO to improve the coordination of project proposals and their review, as well as to obtain greater industry input and awareness in the early development stages. This PMO also sought to undertake the portfolio aspects of a PMO across the Defence Capability Plan. Unfortunately, however, the office didn't get time to bed down its functions and didn't achieve accreditation before the FPR reorganisation, which will lead to the disbandment of the Capability Development Group.

The FPR doesn't call directly for a PMO, but it certainly recognises (p. 40) that for successful capability development standardised management and reporting tools are necessary to enable the leaders of this function to manage the business well, and therefore recommends that there be significant investment in the development of:

- An operational framework which briefly but comprehensively explains how the organisation operates and the roles and responsibilities within it;
- A detailed set of life-cycle management processes which provide the project and engineering discipline with which to manage complex materiel procurement from initiation to disposal; and
- A review architecture which reinforces accountability at all levels and brings together information at each level upon which good management decisions can be made.

The FPR also recognised that the '*kernel of an appropriate arm's-length contest organisation is already present in the Independent Project Performance Office in the Defence Materiel Organisation and the Capability Investment and Resources Division in Capability Development Group*' (p. 38). The review recommended that these functions be relocated '*to Deputy Secretary Policy and Intelligence, [and be] significantly enhanced and strengthened to provide such contest*'. With these recommended responsibility assignments, if a PMO is to be established its charter will need to require it to:

- provide the Capability Acquisition and Sustainment Group with acquisition policy, standardisation, routine reporting and coaching (these would be the *project* functions of the PMO)
- provide policy and intelligence contesting of major project investment gates and reviews for sponsors (the *program* functions)
- provide the Vice Chief of the Defence Force and service chiefs with a balance of investments (the right projects; the *portfolio* functions).

A centralised PMO that services the three areas of Defence has to be more efficient and effective than a system in which those elements are subdivided and competing for control and resources. A single PMO provides a more cohesive interface to the services, industry, accrediting institutes and government than divided or Defence-unique options. If the PMO has an independent charter of services for the three principles listed above, all three can review and ensure adequate service without the PMO drifting too much towards any of the three key areas.

Academic guidance on the portfolio aspects of a PMO has not been as common as for the project and program roles, since most organisations have only enough projects to sensibly aggregate to one or two programs. Defence, however, has around 180 projects, which first aggregate into programs such as submarines, fighter aircraft or armoured vehicles and then into portfolios such as Navy, Air Force and Army. Portfolio management guidance by Richardson,¹² Killen¹³ and Baker¹⁴ would therefore be directly applicable to the portfolio component of a Defence PMO.

Defence should require the PMO to be externally accredited with an institute such as the AIPM so that its acquisition practices can't drift too far from industry best practice. Accreditation would mean that civilian PMO specialists would regularly subject any Defence-like bureaucracies and processes to scrutiny to ensure that they are necessary. Accreditation would also help to ensure that the PMO remains balanced across its project, program and portfolio functions as a cohesive whole, similarly to industry business standards.

The Australian Taxation Office decided to transition to a PMO model in about 2011. According to its Assistant Commissioner for the Enterprise, the PMO is delivering better projects in accordance with the slogan, '*Right projects, right way, right results*'.¹⁵ The PMO encountered some strong resistance to its authority and regime from individual projects, so much so that a symbolic large-scale model of the process was built in the foyer of office's main building. The model shows a somewhat contentious funnel shape, in which projects are culled or reset where necessary for excessive risk or poor reviews.¹⁶

The case for centralised test and evaluation management

The defence organisations of Western nations have historically been the main purveyors of T&E as a discipline, possibly predating even systems engineering and operational research. T&E is invariably needed to deal iteratively and safely with the development of new technologies and operational revolutions so that they can deliver competitive advantage to the militaries.

The US defence organisation arguably uses the most rigorous T&E among the Western nations. This is exemplified in US Congressional Law, Title 10, which codifies the responsibilities of all key T&E personnel and mandates independent operational assessment before production and full operational T&E before operational release (Title 10, Section 2399).¹⁷ A 1998 movie, *Pentagon Wars*, shows why such independent rigour was found necessary. The movie, which most Australian military officers have seen, is based on an autobiographical account by a Colonel Burton of difficulties in T&E in the development of the Bradley fighting vehicle.

Each of the Australian services has a healthy T&E history, which is evident in the infrastructure and agencies in places such as Monegeetta (land), Woomera (aerospace) and HMAS Stirling (maritime). However, reviews into Defence T&E since the service acquisition agencies were amalgamated in the late 1990s have found deficiencies in T&E policy, planning, competencies and resourcing. Equally importantly, reviews have also found T&E to be inconsistently or inadequately applied, especially early in the

acquisition process.¹⁸ For example, the 2012 Senate Inquiry into Defence Procurement in the decade to 2010 found evidence that Defence *'undervalues technical advice and has serious shortcomings in technical analysis, critical to engineering based projects; particularly its downgrading of the importance of T&E.'* Six recommendations concerning T&E were made by the Senate inquiry and accepted by Defence, mainly to:¹⁹

- issue a centralised T&E policy
- increase opportunities for the development of deep technical expertise in T&E
- reinforce the role of capability managers in managing appropriate T&E throughout the acquisition life-cycle
- have defence scientists and competent T&E staffs collaborate on technical risk assessments and their early testing and mitigation
- improve T&E competency management in the maritime and land domains
- offer government preview T&E opportunities before contract (that is, de-risk, try-before-buy), even if the acquisition is 'off the shelf'.

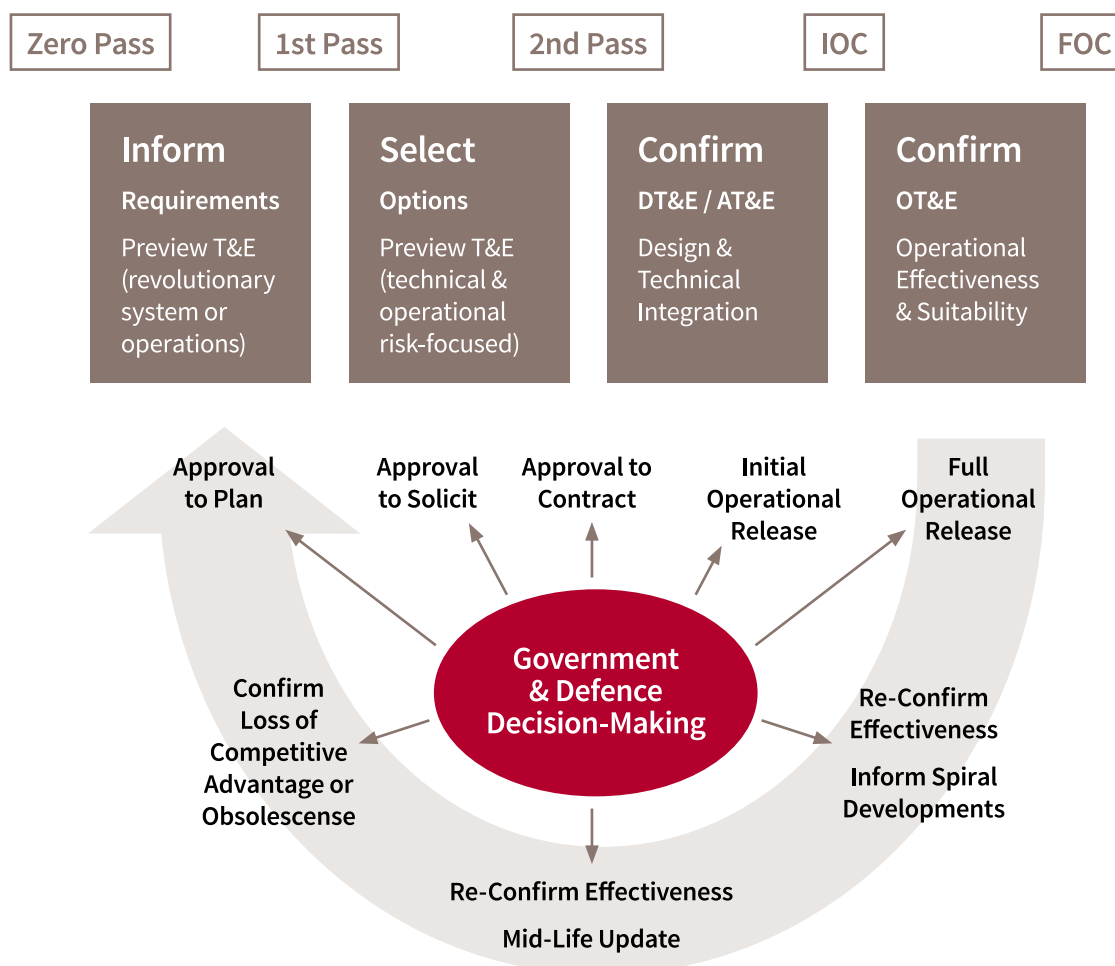
Defence made good progress on many of these recommendations, particularly the issue of a centralised T&E policy governing the need for T&E early and setting clear benchmarks for how to plan early T&E based on technical risk, what T&E plans are mandatory, how often they are to be updated and the necessary consultation and involvement of the services (the users) in project T&E.²⁰ The formal workshopping of technical risk by T&E organisations with defence scientists has been very successful in bringing practical preview T&E options to solicitation, highlighting risks in certifying capabilities and balancing the natural tendency to defer to the technical experts of tenderers.²¹ Figure 2 shows the application of T&E through the Defence acquisition life-cycle.

Despite the progress in Defence in 2013–14, the Australian National Audit Office (ANAO) report into Defence T&E tabled in parliament in November 2015 found continuing deficiencies in T&E policies, compliance with those policies, and the management of T&E competency.²² The report noted again²³ the decentralisation of T&E organisation in Defence (involving some 12 different T&E organisations, many of which are highly specialised to unique military functions²⁴) and recommended the FPR reorganisation as an ideal opportunity to strengthen T&E. The challenge is to have competent T&E planned and conducted early enough to address technical risks, when the 12 T&E organisations are decentralised and there are some 180 acquisition projects at various stages in the acquisition life-cycle, each either competing for a limited T&E resource or, worse, not engaging because its advisers and contractors want to do the testing at the end (when it's too late).

Think of a matrix of 12 teachers, each teaching a different subject, and 180 students of various ages: the challenge is to get the right teachers working with the right students at the right time. Now imagine that the students are put in charge of where they spend their money and their curriculum, but that the teachers are in charge of who is allowed to graduate by setting the final exam (in the case of T&E, being safe and effective for operational service).

The central coordination of T&E is the key to success and can be facilitated by an effective PMO to ensure timely input to, and review of, project T&E (Figure 3). There's also enormous benefit from central T&E coordination to the PMO. If you consider the project manager's need to manage the competing demands of cost, schedule and capability, then also consider the measures that project managers use to assess the combination of the paired demands. Clearly, T&E is a critical means, if not the only means, for a project manager and the PMO to measure capability and ensure that cost and schedule aren't consumed without achieving the necessary capability.

Figure 2: The use of T&E in the Defence acquisition life-cycle



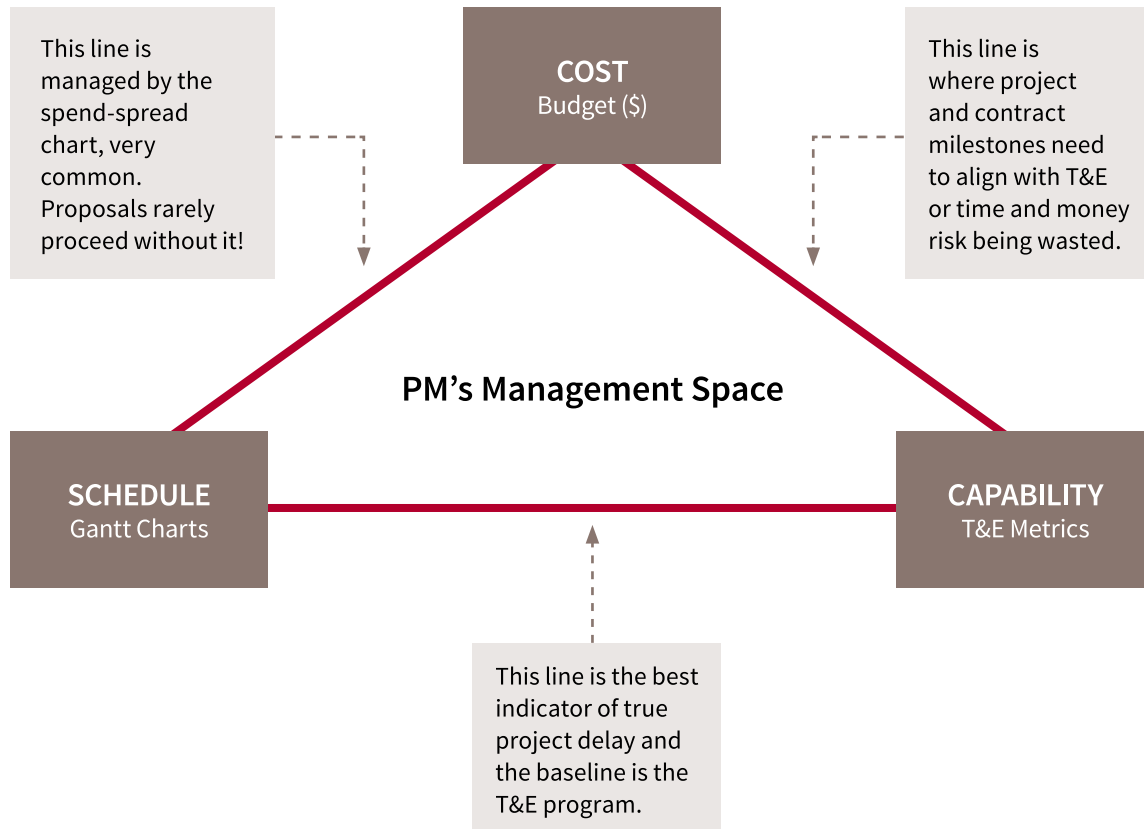
AT&E = acceptance T&E; DT&E = developmental T&E; OT&E = operational T&E.

Source: Adapted from Department of Defence (DoD), *Defence capability development manual* (DCDM), Part 3, 'Test and evaluation' and Part 2, Chapter 7, 'T&E planning in capability development', DoD, Canberra, 2015.

The most recent report to government on major projects by the DMO and the ANAO shows that there are universal measures of cost and schedule that can be aggregated to demonstrate the success or otherwise of projects.²⁵ For capability, however, unlike in the US, the Australian Defence organisation hasn't refined T&E metrics to enable measured progress reports on capability achievement (that is, percentage completed). The US Director of OT&E provides an annual report to Congress that covers the T&E of all major projects, regardless of where they are in their life cycles.²⁶ For example, the director has reported difficulties with the Joint Strike Fighter, which achieved only about 75% of its T&E milestones for each of the past four years. Such information is a direct and useful basic measure, but is not reflected in the current Australian major projects reports.

Since 2007, Defence has operated a lead T&E office (the Australian Defence T&E Office) from within the early project proposal group. The office was tasked to lead overall T&E policy development and early T&E planning, had review rights on early project proposals and did some preview and operational T&E. Significant limitations on it, however, were that it had no authority on the T&E of projects during the contracted period and did not cover around three-quarters of overall Defence operational T&E.

Figure 3: The importance of T&E in managing projects



The Defence organisation is increasingly seeking military-off-the-shelf capabilities, usually from the US, and one of the underpinning reasons for that increase is the rigour of US T&E, which assures that those US capabilities work. If Australia wants to retain a sovereign capability to develop some capabilities, or to choose off-the-shelf capabilities from countries other than the US, then we need a Defence T&E capability with equal or greater rigour than the T&E of US counterparts. If we don't make this investment, Australian developmental capabilities and purchases from Europe and Asia are likely to continue to surprise Defence officials.

Conclusions

Defence capability development in Australia is going through a once-in-a-generation reorganisation after a long period of experimenting with a specialist and somewhat autonomous organisation doing that function. An inquiry by the Australian Senate, several audits by the ANAO and the FPR have all found that there's a proportion of acquisition projects with poor practices and that overall the organisation is no longer performing at contemporary best practice levels. These reviews have all recommended more informed decision-making on capability development by the services, particularly for:

- improved life-cycle management processes
- better accountability through better contestability and review architectures
- technical risk awareness
- earlier and better T&E, even if the acquisition is off-the-shelf

- better engagement with industry
- standardised management and reporting, tailored wherever possible to risk.

Two organisational reforms would provide contemporary best practice in improving management, review and the information available to sponsors to make better acquisition decisions.

PMOs have become best practice for better portfolio, program and project management in government and industry, as exemplified by the US defence organisation and as is now underway in the Australian Taxation Office. PMOs help sponsors deliver better mentored, more comprehensively reviewed and appropriately revised projects.

A Defence PMO may need to have multiple parts, but for the sake of continued best practice and for a standardised interface with industry, it needs to be accredited by an institute as a cohesive whole.

T&E is fundamental to a Defence PMO balancing capability with cost and schedule, especially developmental capabilities and those with uncertain T&E pedigrees. The current 12 Defence T&E organisations are decentralised, and their coordinated and timely input to some 180 Defence acquisition projects throughout the life cycle can be achieved only by establishing a central T&E branch to work with a PMO, similarly to the arrangements in the US defence organisation.

These two measures together can ensure the earlier appreciation of technical and other risks through practical early T&E and continued project engagement with service T&E organisations until a final operational capability is achieved.

Appendix 1: AIPM PMO accreditation recognition criteria

1. Organisational Leadership and Innovation

- mixed matrix structure reflected in HR policy and practice
- alignment of operations and project management for effective resource management
- executive commitment to management by projects expressed in policy and quality documentation

2. Organisational Strategic Planning Link

- business objectives in project delivery terms clearly available, accessible to all
- business benefits (outcomes) part of planning and continued review process for all initiatives undertaken
- initiatives undertaken (as projects) have success criteria related to business KPIs that are measured for effectiveness at project completion

3. Organisational Business Results Focus

- project objectives referred to strategic/business objectives as a matter of course before business case approval
- project managers monitor business benefits progressively with adequate delegated authority to act in the business interest
- a matrix matching business goals, KPIs and project objectives is accessible per program of projects for regular review to improve overall business performance

4. Organisational Customer and Market Focus

- project scope definitions always developed with client to ensure end-user and market requirements are met
- internal and external clients are regularly involved in progress reviews to ensure business benefits
- innovative and better means of achieving results are encouraged

5. Organisational Support Processes

- methodologies/procedures reflect project delivery focus
- quality management system aligned to project delivery process
- skills matrix adopted to project delivery competence at team member, project manager and program manager levels
- supportive systems aligned to project management process
- clear delineation capex/opex costing (i.e. costing system distinguishes assets maintenance/works costs from projects costs)

6. Data, Information and Knowledge Availability

- organisation is structured and systems are supportive of project delivery (required data readily available and accessible for initiation of projects)
- a corporate repository exists of lessons learned from past projects to be of business benefit for future initiatives
- information is shared across the organisation (a learning culture based on past experience)

7. Human Resource Management Alignment

- skills development is encouraged in internal mentoring and a support program that ensures business opportunities are captured from workforce experience
- individual performance objectives and potential rewards/remuneration are linked to measurement of project success criteria
- advancement/succession is based on competency measurement at three Australian Qualifications Framework levels

8. Consistency of Application of Project Management Functions

Processes in place to ensure all nine functions of project management can be:

- applied consistently across the organisation
- matched to business processes (e.g. project risk accumulated for view of program risk and overall business risk)
- used to benefit of the business, client and/or community

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Acronyms and abbreviations

AIPM Australian Institute of Project Management

ANAO Australian National Audit Office

DMO Defence Materiel Organisation

FPR First Principles Review of Defence

PMO program management office

T&E test and evaluation

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