

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. As such 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) approach to oversee the life cycle of all acquisition projects from their inception to a final operational capability as part of comprehensive and balanced programs. Second, the author proposes creation of a robust, centralised branch to manage all test and evaluation (T&E), so that all projects have real credible test results that underpin the PMO's decision-making throughout the development and fielding of all new capabilities. Such a centralised T&E branch would bring Australia closer to the rigorous T&E system used in U.S. Defense, as codified in U.S. Congressional Law (Title 10), so that when Australia does choose a non-U.S. development or off-the-shelf, it can do so in an equally informed and sovereign way as its major ally. Strong coordination of projects by a PMO and the central coordination and input of real T&E to all acquisition decisions are key to achieving more consistent, accountable and credible Defence acquisition and to support accountability by the Capability Managers.

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 Australian Senate Inquiry into Defence Procurement (2012) cited testimony by Francis et. al. (2010) into U.S. Defense acquisition stating '*it takes many things for an acquisition to succeed, while only one source of unmanaged risk can cause a poor outcome.* 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 is to improve its acquisition record. The Senate Report concluded the following about Australian Defence acquisition (Australian Senate, 2012, Chapter 15).

'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.'

What is particularly disappointing about the Senate Inquiry findings into Defence acquisition in Australia is that it 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. If you have not read the Senate Inquiry Report, Chapter 2 assesses some \$7.6 billion AUD of projects between 2000 and 2010 had significant management difficulties, which is about ten percent by value for the period. While ten percent of problem projects would be a good record in some industries, closer examination finds most difficulties were largely avoidable. For example, in Chapter 12 they

report that much of the surprise technical risks could have been found substantially earlier with proper use of test and evaluation (T&E), especially before contract.

More recently the Australian Government instituted a First Principles Review (FPR) (Peever et. al. 2015) into all aspects of Defence that found similar concerns to the Senate Inquiry. In particular the FPR 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; ...*
- *Recurring issues with a lack of accountability, ill-defined authority, unclear allocation of responsibility and great difficulty measuring and monitoring real performance; ...*
- *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.’*

In summary the FPR (Peever et. al., 2015) 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’* and they recommended fundamental transformation. The transformation recommended by FPR for the capability development domain included:

- *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; namely PMOs and robust, centralised T&E, both of which have been successfully used in U.S. Defense and their multinational contractors for many years. These two measures would substantially help the new Defence organisation achieve the acquisition reform sought by the Australian Government.

CASE FOR A PROGRAM MANAGEMENT OFFICE (PMO)

PMOs began as centres of excellence in project, programme and portfolio management around the year 2000, generally within organisations with many projects to manage (Dixon, 2015). The ‘P’ in the acronym can be project, program, or portfolio depending on the emphasis of the PMO. Despite the flexibility in application of the name, roles of PMOs have been agreed to such an extent from those first put forward by Kendall and Rollins (2003) that there are now accreditation programs by institutes like the Australian Institute of Project Management (AIPM, 2015). AIPM’s accreditation criteria for PMO are listed at Annex. AIPM currently list eight Australian organisations who are accredited, including the NSW Office of State Revenue, Telstra and Raytheon Australia. Most research today on PMOs is about strategies for successfully leading them (Taylor, 2012), although the paper by Letavec (2007) and book by Tjahjana et. al. (2009) are good for establishment issues. Tjahjana et. al. (2009) has a particularly good list of the benefits of a PMO (pp.7-8), the risks typically seen without a PMO (pp. 6-7) and a sample PMO charter (their appendix C). The consultant industry for PMOs have been active in conducting surveys on the effectiveness of PMOs (i.e, Sandler & Gorman, 2015).

The roles of a PMO usually mix support (coaching) with progress review and compliance, such as in the following list (Kendall & Rollins, 2003; Dixon, 2015):

- 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, and
- help desk.
- project management policies and methodologies

These PMO roles are shown diagrammatically below.



Figure 1: Illustration of PMO Functions

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

Elements of the above PMO tasks all 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. DMO had not fused these functions in one PMO and had not empowered a PMO to deal with individual projects with the authority to suspend project progress and amend funding and workforce. Without that fusing and authority, individual projects could be autonomous, non-compliant and avoid scrutiny by sponsors to the risk of the overall investment portfolio. While this sounds dramatic, it is important to recognise that it only takes a stubborn few to undermine the good of many. Put starkly, Defence really has two directions here, tolerate the problem few projects or improve the governance of all.

In 2014, the Capability Development Group (CDG) within Defence, who oversaw the early project development stages, formed a small PMO to improve 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, this PMO did not get time to bed down its functions and did not achieve an accreditation before the FPR reorganisation which will lead to the disbandment of CDG.

The FPR (Peever et. al., 2015) does not call directly for a PMO, but it certainly recognises for 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 they therefore '*recommend 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.'*

Further, 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.*' As such FPR recommended these functions be relocated '*to Deputy Secretary Policy and Intelligence, [and be] significantly enhanced and strengthened to provide such contest.* If a PMO is to be established, it will need in its charter to serve three parts of Defence as follows due to the responsibility assignments recommended by the FPR:

- provide CASG acquisition policy, standardisation, routine reporting and coaching – this would be the *Project* functions of the PMO;
- provide Policy and Intelligence contesting of major project investment gates and reviews for sponsors – this would be the *Program* functions of the PMO; and
- provide the Vice Chief of Defence Force (VCDF) and Service chiefs the balance of investments (the right projects) – this would be a *Portfolio* functions of the PMO.

A centralised PMO that services the three areas of Defence has to be more efficient and effective than these elements being sub-divided and competing for control and resources. A single PMO provides the the most 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 principals 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 have not been as common as the other roles, since most organisations only have enough projects to sensibly aggregate to one or two programs. Defence, however, has around 180 projects which first aggregate into programs like submarines, fighter aircraft or armoured vehicles and then into portfolios like Navy, Air Force and Army. Portfolio management guidance by Richardson (2015, especially Chapters 33 & 34), Killen (2015) and Baker (2015) 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 like the AIPM so that it's acquisition practices cannot drift too far from industry best practice. Accreditation would mean civilian PMO specialists would regularly subject any Defence-like bureaucracies and processes to scrutiny to ensure they are necessary. Accreditation would also help ensure that the PMO remains balanced across the project, program and portfolio functions as a cohesive whole to a similar standard to industry.

The Australian Taxation Office made the decision to transition to a PMO around 2011 and according to their Assistant Commissioner for the Enterprise, PMO are delivering better projects in accordance with their slogan '*Right Projects, Right Way, Right Results*' (Robertson, 2015). Their PMO encountered some strong resistance by individual projects to the authority and regime of a PMO, so much so that a symbolic large-scale model of the process was built in the foyer of the main building. This model shows a somewhat contentious funnel shape where projects are culled or reset where necessary for excessive risk or poor reviews (Grey & Harrison, 2015).

CASE FOR CENTRALISED TEST AND EVALUATION (T&E) MANAGEMENT

Defence in Western Nations has historically been the main purveyor of T&E as a discipline, possibly predating even systems engineering and operational research. The need for structured T&E is invariably to deal iteratively and safely with development of new technologies and operational revolutions so they can deliver competitive advantage to these militaries. The U.S. Defense is arguably the most rigorous of Western nations for the use of T&E, exemplified in its U.S. Congressional Law, Title 10 which codifies the responsibilities of all key T&E personnel and mandates independent operational assessment prior to production and full operational T&E prior to operational release (i.e. Title 10, Section 2399) (U.S. DoD 2015). Like much of the U.S. culture, there is a movie portraying why such independent rigour was found necessary, known as Pentagon Wars, which most Australian military officers have seen. Pentagon Wars is based on an autobiographical account by a Colonel Burton of difficulties in T&E of the Bradley Fighting Vehicle.

Each of the Services in Australia has a healthy history in T&E, evident in the infrastructure and agencies in places like Monegeetta (land), Woomera (aerospace) and HMAS Stirling (Maritime). However, reviews into Defence T&E since the Service acquisition agencies were amalgamated in the late 1990's 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 (Australian National Audit Office (ANAO), 2001-2; Department of Defence (DoD), 2008; ANAO, 2011; Australian Senate, 2012; ANAO, 2015). For example, the Senate Inquiry into Defence Procurement found in the decade 2000-2010 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.'* Five recommendations concerning T&E were made by the Senate Inquiry and accepted by Defence (Australian Government, 2012), mainly to:¹

- issue a centralised T&E policy,
- increase opportunities for 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 Scientist and competent T&E staffs collaborate on technical risk assessments and their early testing and mitigation,
- improve T&E competency management in maritime and land domains, and
- offer Government preview T&E opportunities before contract (i.e., 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 on: 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 (users) in project T&E (DoD, 2015). The new 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 (Joiner, 2015). The figure below is adaptation from the T&E policy (DoD, 2015) showing the application of T&E through the Defence acquisition life-cycle.

¹

Recommendations 21-25 and recommendation 11 which is related to 22.

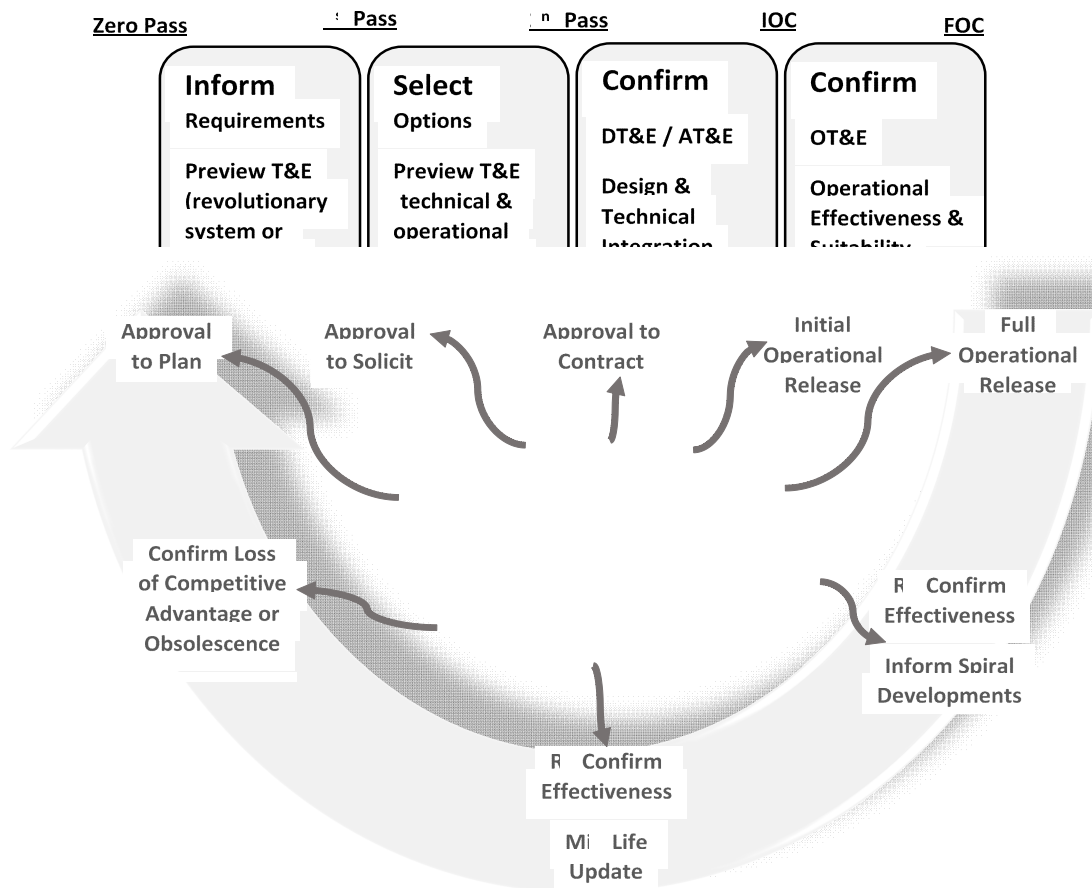


Figure 2: Illustration of Use of T&E in Defence life-cycle²

Despite the progress in Defence in 2013-14, the ANAO report into Defence T&E tabled this month in Parliament has continued to find deficiencies in: T&E policy; compliance to those policies; and with management of T&E competency. The report notes again³ the decentralised nature of T&E organisation in Defence with some 12 different T&E organisations, many of which are highly specialised to unique military functions,⁴ and it recommends the FPR reorganisation as an ideal opportunity to strengthen T&E. The challenge for FPR in addressing how to organise T&E is how to get 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 life-cycle above, each project either competing for a limited T&E resource or worse, not engaging because their advisors and contractors want to do the testing at the end (when it is too late). Think of a matrix of 12 teachers each teaching a different subject and 180 students each of various ages and the challenge is to get the right teachers working with 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).

Central coordination of T&E is key to success and can be facilitated by an effective PMO to ensure timely input to, and review of, project T&E. There is also enormous benefit from central T&E coordination to the PMO. If you consider the project manager's need to manage the competing

² Acronyms used in this figure are: AT&E is acceptance T&E, DT&E is developmental T&E, and OT&E is operational T&E.

³ The ANAO audit into Defence T&E of 2001-2 also noted the decentralisation of T&E organisations.

⁴ For example, helicopter-ship operating envelopes, aircraft carriage and delivery of cargo, and explosive proofing.

demands of cost, schedule and capability, then also consider what are 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 are not consumed without achieving the necessary capability.

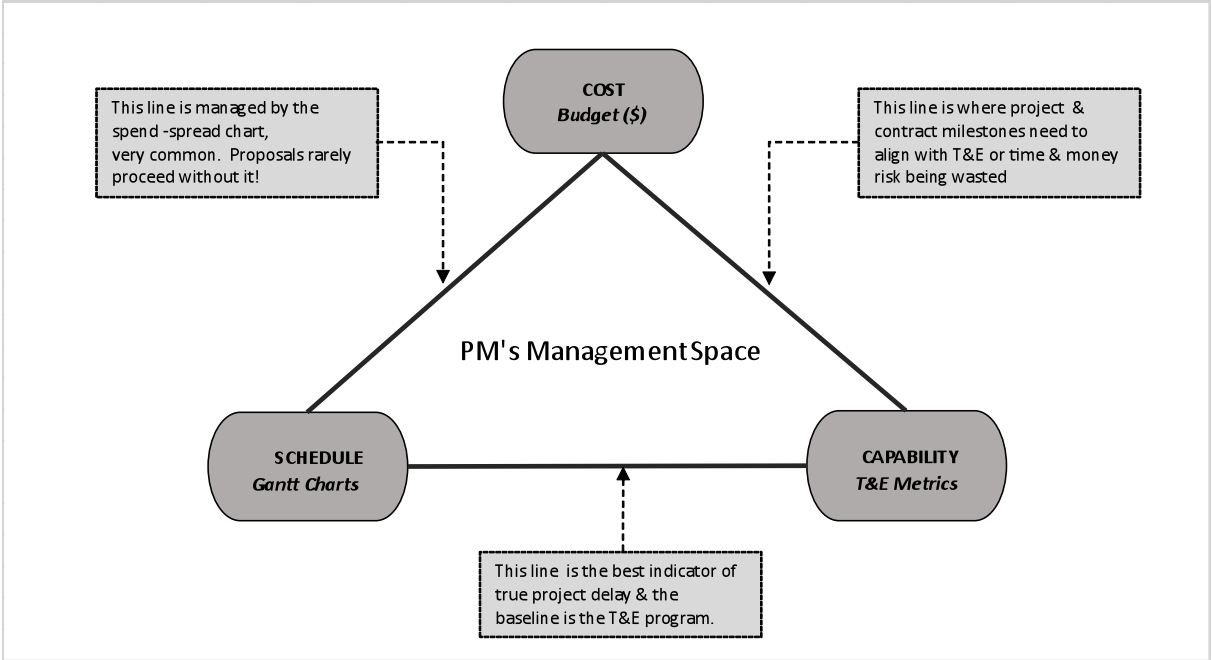


Figure 3: Illustration of the importance of T&E in managing projects

The most recent report to Government on major projects by the DMO and ANAO (2014) shows that there are universal measures for cost and schedule to aggregate the success or otherwise of projects. In terms of capability, however, unlike in the U.S., Australian Defence has not refined T&E metrics to enable measured progress reports on capability achievement (i.e., percent completed). The U.S. Director of OT&E (DOT&E) provides an annual report to Congress (DOT&E, 2015) that covers the T&E of all major projects, regardless of where they are in their life-cycle. For example DOT&E have reported difficulties with the Joint Strike Fighter achieving only about 75 percent of its T&E milestones for each of the last four years. Such information is a direct and useful basic measure not reflected in the current Australian major projects reports.

Australian Defence has operated a lead T&E office since 2007 known as the Australian Defence T&E Office (ADTEO) from within the early project proposal group. This 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 did not have authority on the T&E of projects during the contracted period, nor coverage of approximately three-quarters of the overall Defence operational T&E.

Australian Defence is increasingly seeking military-off-the-shelf capabilities, usually from the U.S., and one of the under-pinning reasons for that increase is the rigor of the U.S. T&E which assures these U.S. capabilities work. Turn this argument around and it is imperative that if Australia wants to retain a sovereign capability to develop some capabilities itself, or to choose off-the-shelf from countries other than the U.S., then Australia requires a Defence T&E capability with a greater alignment of rigor to its U.S. counterparts. If Australia does not make this investment, Australian developmental capabilities and purchases from Europe and Asia are likely to continue to surprise Defence officials.

CONCLUSIONS

Australian Defence capability development 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 finally the First

Principles Review have all highlighted that there is a proportion of acquisition projects with poor practices and that overall the organisation is no longer contemporary best practice. These reviews have all recommended more informed decision-making of capability development by the Services and therein the following aspects (to more or less extent):

- 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, and
- standardised management and reporting tailored wherever possible to risk.

This paper has looked at two organisational reforms that would provide contemporary best practice in improving the management, review and information available to sponsors to make better acquisition decisions. PMOs have become best practice for better portfolio, programme and project management in Government and industry, as exemplified by the U.S. Defense and underway at the Australian Taxation Office. PMOs help sponsors deliver better mentored, more comprehensively reviewed and appropriately revised projects. Such a PMO may need to have multiple parts, however for the sake of continued best practice and for standardised interface with industry, the Defence PMO 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 sourced with uncertain prior T&E pedigree. 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 only be achieved by establishing a central T&E Branch to work with a PMO similar to U.S. Defense. These two measures together can ensure earlier appreciation of technical and other risks through practical early T&E and continued project engagement with Service T&E organisations through until a final operational capability is achieved.

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BIOGRAPHY

Group Captain (Dr) Keith Joiner, CSC (Ret’d) joined the Air Force in 1985 and became an aeronautical engineer, project manager and teacher over a 30-year career before joining the University of New South Wales in 2015 as a senior lecturer in test and evaluation. From 2010 to 2014 he was the Director-General of Test and Evaluation for the Australian Defence Force where he was awarded a Conspicuous Service Cross. Dr Joiner has an MSc in Aerospace Systems Engineering with Loughborough University in the United Kingdom, a PhD in Calculus Education and a Masters of Management. In previous roles he was a design engineer for aircraft and missiles, a project

engineering manager, a chief engineer for several aircraft types, and an air base commander. In 2009 he did wartime service in Baghdad for the Multi-National Force Iraq where he was awarded a U.S. Meritorious Service Medal for his work developing drawdown plans. He is a Certified Practising Engineer and a Certified Practising Project Director.

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