REVIEW OF

DEFENCE MATERIEL ORGANISATION (DMO)

MAJOR PROJECTS REPORT (MPR)

2010-11

(E.J. BUSHELL)

(Air Commodore, RAAF, Rtd)

Dated: 2nd February 2012

EXECUTIVE SUMMARY

Analysis of DMO MPR 2010-11 shows that no changes of substance have been made that will improve the performance of the organisation in acquiring and supporting Australia's military capabilities, or provide the transparency and public accountability sought by Parliament.

The DMO continues to demonstrate an inability to understand or manage the diversity of technologies upon which Australia's military capabilities depend, which has led to pleas that the organisation is faced with 'technologically complex acquisitions' that are well beyond those faced by industry in general, and that the risks involved can only be reduced by mandating Military/Commercial Off-The Shelf systems and equipment. However, as there has been little progress in improving the consistency of risk management across major projects, risk continues to be beyond the ability of the DMO to manage. Both Defence and the DMO also seem to have forgotten that the Services, pre-the Defence Reform Program (DRP) and the Commercial Support Program (CSP), managed such difficulties effectively over some 70 years of increasing technology and 'complexity'.

The performance metrics used by the DMO continue to be subjective and outside the scope of the ANAO to audit. The introduction of Materiel Capability Milestones, in addition to the existing Operational Capability Milestones, will only complicate project management and further diffuse transparency and accountability by introducing new layers of process, templates, amendments to manuals and documentation, training, etc to administer the changed functions at all organisational interfaces.

As with previous MPRs, the Defence/DMO response has been to add processes and introduce new and higher levels of executive oversight and governance, the chain now reaching to the Ministers for Defence and Defence Materiel.

Analysis of the four MPRs to date reveals a considerable commonality in the reasons (Lessons Learned) for project problems. The vast majority of these point to totally inadequate project and systems engineering management throughout each of the capability definition, acquisition, and sustainment phases.

The root cause for this may be traced directly to the adoption of the current Defence/DMO commercial, 'business' model which treats project and systems engineering as merely inputs to commercial management processes.

Until project management, systems engineering management, and commercial management assume their proper roles and functional relationships, DMO's current problems will continue, and Australia's military capabilities and security will continue to deteriorate.

BACKGROUND

This review builds upon the author's series of three previous reviews of DMO MPRs covering the period 2007-08 to 2009-10, and should be read in conjunction with those analyses. The Preliminary Report of the Foreign Affairs, Defence and Trade References Committee into Procurement Procedures for Defence Capital Projects, December 2011, is also relevant.

TRANSPARENCY AND PUBLIC ACCOUNTABILITY

While achieving transparency and public accountability in Defence capability acquisition and sustainment is the stated objective of Parliament, it is not seen how these will ever be achieved under present Defence/DMO organisational structures and business management approaches.

Firstly, the key elements that must be transparent throughout each project are cost, schedule and capability against Defence planning requirements and milestones. However, none of these elements, especially schedule and capability, is able to be identified and measured in any objective way. Capability and schedule status are based only upon the Project Manager's subjective assessment of contract status, and as such are outside the scope of the ANAO's review (MPR Page 32), and will remain so into the future under the current 'business' management model.

Secondly, over the four MPRs produced to date, there has been no significant improvement in transparency in cost, capability, or schedule, and hence the MPRs give little, if any, confidence that, after more than a decade, there will be any change over the foreseeable future. The MPRs do, of course, reveal that such is the case, and this is their primary value.

The DMO still pleads for more time to develop its Lessons Learned methodology, its Materiel Capability Milestones, its 'business management' processes and supporting templates, its contract management trials, its Enterprise Risk Management Environment, the new layers of Defence/DMO oversight and governance boards, its Earned Value Management System, and so on... However, under the DMO's 'business model', all these initiatives merely translate into identifying generic problems (from a fundamentally commercial aspect) for which administrative and commercial processes and templates need to be developed, for which guidelines, manuals, and training courses and documentation have then to be developed, introduced, and then new lessons learned and evaluated over time to determine what, if any, improvements in capability performance have resulted; and so the cycle keeps recurring as both Defence and the DMO chase their bureaucratic, administrative, and commercial tails.

This has been the situation for well over a decade, causing increased project management 'complexity', a bogging down in the management of projects, and a lack of accountability, responsiveness and flexibility throughout the Defence/DMO organisations – all impacting capability, cost and schedule. Projects no longer come under Project Managers having the

required project and systems engineering skills and competencies, so risks that arise now escalate through a series of executive boards that end at the Minister for Defence and the Minister for Defence Materiel – where the skills, experience, and competencies needed to resolve project problems do not exist.

The solution is not to continue along these lines, but to replace the current DMO 'business model' with a project and technology focussed, functional organisation where accountability is greatest – an organisation that gets the requirements right in the first place and follows rigorous and continuous project and systems engineering management over the life cycle of the capability.

DMO PERFORMANCE

Cost

A project's total approved budget comprises (MPR Page 87):

- The programmed budget, which covers the approved activities, including approved action to treat risks that were identified prior to the budget's approval.
- The contingency budget, which is provided to cover the costs of any approved actions for new technical, financial and schedule risks or emerging issues that arise within the approved budget scope.

The ANAO report notes that: ***"****...none of the Major Projects in this report has exceeded its approved budgeted costs."* but goes on to say ***"****However, the cost of schedule slippage provided for in budgetary adjustments can be significant."* (MPR Page 51)

It is amazing that projects that are one to six to ten years late, all still come in within their approved budgeted cost. Such a performance may happen only if additional funds are authorised to cover all additional costs arising from technical risk as well as schedule slippage, right up until the project is either cancelled or completed in some manner. That is, the Commonwealth is prepared to pay whatever it takes to complete a project. Under this arrangement, the gap between the original planned project cost and the final cost cannot be identified and analysed, and so the statement that all projects came in within their approved budgeted costs appears meaningless as a performance measure.

However, there are other cost factors that would also benefit from deeper ANAO study:

- Firstly, both Defence and the DMO have been growing strongly over the years, but Defence/ DMO management overheads are not reflected in project costs. Such items relate to direct project management costs, plus an element of DMO (and Defence) overheads, such as for training, media management, consultancies, independent reviews, inquiries, administration, governance bodies, etc. Both Defence and the DMO would benefit from an audit of the overheads that have

accumulated over time, and whether these are reasonable and contributing to performance, transparency and public accountability, or impeding them.

- Secondly, the DMO manages the risks that it encounters through a Project Contingency fund, but it is not known what risks attracted what contingency payment. The ANAO should look at when, how, and why project risks that attracted contingency payment(s) arose, and whether they should have been identified earlier and mitigated before the project had to buy its way out of trouble.

Project Performance

The DMO's assessments of performance in this MPR appear to be increasingly presented so as to give 'best case outcomes'.

The DMO's performance has been the subject of detailed analysis in the author's previous MPR Analyses, but as there has been no significant change only brief comments follow in relation to MPR 2010-11:

Capability Performance

- The ANAO finds:

"The DMO's data suggests that there is a greater confidence in the level of materiel capability that will be delivered, shown by the growing percentage of measures assessed as green. However, since the 2008-09 MPR, there is also a growing number of measures assessed as unlikely to be met." (MPR Page 76).

"*The DMO's key capability measures should be interpreted with some caution due to their lack of rigour as a data system and the high level of uncertainty in forecasting outcomes."* (MPR Page 72).

Schedule Performance

"*Schedule delays increase the overall cost of project delivery as both the DMO and Industry staffing and administration resources are tied up for longer than planned."* (MPR Page 62).

"ANAO's analysis indicates that the application of a preset benchmark score for all types of projects may not depict a project's progress to FOC as accurately as an objective assessment." (MPR Page 58)

"Slippage is primarily a result of underestimating the scope of work..." (MPR Page 23)

DMO PERFORMANCE METRICS

DMO's performance metrics were analysed in detail in the author's last MPR analysis (MPR 2009-10), which noted that they were entirely subjective and did not present any objective measure of performance. Notwithstanding this, the DMO insists that the: "*Maturity Score*

is defined by the DMO as the maturity of a project by way of an objective score based on the Project Manager's judgement at defined milestones in its capability development and acquisition phases."(MPR Page 524). It appears that the DMO has still to decide whether its Score is objective or a judgement – it can't be both.

Furthermore, the basis for and the usefulness of, the "*ideal or benchmark score*" against which the Maturity Score is compared are not explained. Benchmarking, using the UK, US, or indeed almost any other Western Nation as a yardstick, is merely benchmarking against already failed defence capability acquisition systems, and thus set the bar far too low. The US system has been subject to trenchant criticism since the mid-1980s when Congress declared the US Department of Defense and its acquisition organisation to be broken and in need of urgent repair. A number of reforms were launched under the Goldwater-Nicholls Act of 1986, but these have been blocked continually by vested interests in Government, Defense, and Industry, and so remain even more deeply entrenched today. The UK Ministry of Defence and its acquisition organisation have also faced similar criticisms, leading to a UK hardly able to muster and sustain anything more than small, brittle capabilities that will need outside assistance when used.

In all cases, the root causes have been much the same – the downsizing and progressive deskilling of the Services; the abrogation of Service functions into Defence Department bureaucracies to be managed under commercial, common user, service provider contracts; and finally the replacement of experience professional engineers by generalist managers and ultimately by bureaucratic administrators.

CONTRACT MANAGEMENT

Overview

The Commonwealth's power is at its maximum just before it signs a contract; after signature, its power and leverage decline steadily. It is thus important that the Commonwealth be well prepared before contract signature by way of robust Project and Systems Engineering analysis of capability, schedule, costs, and a good measure of the risks envisaged. That is, identify and mitigate project uncertainties before contract signature.

However, analysis of four years of MPRs has shown that the Commonwealth has frequently signed contracts, on commercial grounds, well before capability and support requirements have been established fully and firmly, leading to faulty or missing assessments of capability, schedule and cost elements, as well as missing or incomplete test and acceptance requirements. In such cases, major contract changes and technical risks inevitably arose throughout the projects, impacting cost schedule and capability. In most cases, what capability is finally delivered comes late and at a high cost.

The primary drivers of a project from its inception to its end are project and systems engineering management, not commercial processes, and that management must rest in

the hands of personnel skilled in project management as well as the engineering and maintenance of the technology comprising the system being acquired.

The Project Manager

It is the Project Manager's responsibility to manage his project, but the Defence/DMO 'business' model dictates against his being able to discharge his responsibility and accountability. When a project meets problems the Project Manager needs to be at his strongest, but in Defence's multilateral organisation he is at his weakest. This is because there are so many senior bureaucrats within the bloated Defence organisation with an interest in the project, that when a project encounters trouble they circle like Hyenas to ensure that their interests and reputation are well guarded. The interests of the project then take second place.

Before the current Defence/DMO organisations evolved, and a commercial approach to capability acquisition enshrined, the Project Manager, after considering all aspects, took decisions "*in the best, over-all interests of the project"*, and documented and circulated them so that all involved were advised. This clear line of authority and accountability was replaced by, amongst other changes, the formation of Project Boards to oversee projects - Boards with members comprising those very bureaucrats most likely to have caused, or been involved with, the project's problems in the first place.

The Project Manager is thus not in a position to manage his project as he should, with the result that projects continue to suffer, and military capabilities continue to erode for want of proper management. That this approach has not worked since its inception is reflected in the MPR analyses conducted over four years, particularly the 'Lessons Learned' (but not properly attributed and actioned), as well as the Projects of Concern List.

THE CONTINUING FLIGHT TO PROCESS AND INCREASING LEVELS OF 'GOVERNANCE'

A common response to problems, both real and imaginary, identified in all MPRs has been to introduce more processes and increase the level of executive oversight. The problem with processes and their associated templates is that they are mandated as standard treatments to problems where they do not apply, and so the DMO keeps scoring 'own goals'. In effect, the Project Manager's hands are tied and he cannot take sound project/engineering or commercial management decisions.

In this latest MPR, we now have:

- The formation of an Independent Project Performance Office (IPPO) to:
    - Oversee the remediation of all Projects of Concern.
    - Implement the new Early Indicator and Warning System designed to help identify and correct potential problems with projects. (MPR Page 83)

- Tightened processes for the Projects of Concern List "*to better focus the attention of senior management within the Defence Organisation and Industry on solving the issues required to remediate listed projects".* Decisions on removals or additions to the List now rest with the Minister for Defence and the Minister for Defence Materiel. (MPR Page 82). The usefulness of such Boards becomes doubtful where a project's basic requirements are deficient or missing.
- More rigorous Gate Review process. Gate Review Boards *"Normally comprise senior line management, relevant people with key skill sets from other parts of the DMO, and at least two independent members with extensive Defence or commercial experience." The IPPO will appoint a Senior Project Analyst to conduct an independent analysis of preparedness and identify key issues to bring to the Board's attention."* Boards are mandatory at six specified project milestones. (MPR Page 82 on)
- Improved DMO 'business approaches'. The DMO's business model, which comprises contract and procurement, finance, human resources, acquisition, risk management, industry management, etc" (MPR Page 84) continues to be focussed on commercial functions to the exclusion of project and systems engineering functions – the core reason behind the continued failure of the organisation to manage projects in a professional manner, and, as a direct result, the proliferation of processes and ever-increasing levels of executive oversight. The ANAO, makes the following comments on DMO's business systems:
    - *"In the 2009-10 MPR, the ANAO reported that the control environment of each examined project differed due to the large range of corporate and project management IT applications being employed by the different project offices. During the 2010-11 review, the same observations apply across the 28 Major Projects. This has again resulted in an inconsistency between the information produced by each of the project's IT systems (ie, risk management, financial management and document management systems) and highlights an issue for the DMO in ensuring reliable and consistent information to properly inform project management and decision making in relation to Major Projects".* (MPR Page 84)
- The introduction of Materiel Capability Milestones in addition to Operational Capability Milestones. This has, in effect, deleted the DMO's Operational Capability delivery role and made it one of simply providing materiel to the Services who will now have the responsibility to actually create the military capability. This will make the objectives of the MPR much more difficult to achieve, as it will introduce a whole raft of new processes, amendments to manuals, and new templates and requirements to administer the functions with all interfacing organisations – breaking down further the project life cycle and introducing more difficulties for sane project management.

- The mandating of MOTS/COTS procurement, which is a totally inappropriate response to Defence/DMO's total aversion to 'complexity' (any system development, integration and test and acceptance functions), and risk.
- *"A key challenge for both DMO and the Australian Defence Industry is to improve the project management, scheduling, logistics, procurement, and engineering services provided to the Australian Government."* (MPR Page 90). As a result, considerable effort and expense are being devoted to:
    - Skilling Australia's Defence Industry (SADI).
    - Industry Skilling Program Enhancement. (ISPE).
    - Priority Industry Capability Innovation Program (PIC IP)>
    - Skills Australia working with Defence.

  The cost of these 'initiatives', which must be enormous, would be much reduced if the Services, which have primary accountability for providing military capabilities, were re-skilled and regain responsibility for their capability development, acquisition and sustainment functions. It will never be possible to provide the range and depth of the skills and competencies required by Defence, the DMO and Industry under current organisational arrangements, as well as provide those need by the Services and the Capability Development Group.

MPR 2010-11 simply follows in the steps of all previous MPRs in adding process and increasing the levels of executive oversight, often under the guise of 'governance', which will only further impede the ability of the Project Manager to do his job properly, and further diffuse accountability.

MANDATING MOTS/COTS

Mandating MOTS/COTS equipment will inevitably result in non-critical thinking about Australia's capability requirements, which will lead to the practice of procuring capabilities that are based on the technical and strategic views and opinions of foreign countries from past eras. This policy will inevitably start a drift away from what Australia needs to meet its unique requirements to what other nations (especially the US) have designed to meet their unique requirements. MOTS/COTS equipment must be evaluated against Australia's capability requirements, like any other candidate equipment. Where such equipment meets those requirements it should be acquired. That is, the requirement must drive the equipment selection – not any mandated equipment.

There is no better case study for this than the Super Hornet acquisition – an aircraft totally unsuited to Australia's strategic and tactical needs, but acquired simply because it was politically attractive and was quick and easy to buy and operate.

If a model is needed, it should be an Evolved Off-The-Shelf (EOTS) Model, managed under an Evolutionary Engineering Design and Development doctrine under robust Project and Systems Engineering disciplines. This is the lowest cost and lowest risk methodology for

acquiring capabilities, irrespective of perceived risk and 'complexity', that meet Australia's requirements.

RISK MANAGEMENT AND THE ENTERPRISE RISK MANAGEMENT FRAMEWORK (ERMF)

The subject of risk management has been examined in detail in all of the author's previous analyses of MPRs. In this MPR, The ANAO notes that *"...it is not uncommon for previously or unanticipated major risks to emerge despite the risk management processes in place to identify and manage risks."* (MPR Page 86).

MPR 2010-11 shows the DMO is still working on ways to improve its standard of risk management, making an *"effort to understand and map the business and its controls in the context of Enterprise Risk Management*." At the project level, the ANAO saw "*There has been little progress in improving the consistency of risk management across the Major Projects."* (MPR Page 39, 40).

Coming under the DMO Special Counsel, risk management is commercially (contract) driven, completely ignoring the fact that the primary cause of project risk lies in the operational and technical areas of the project, and that these (largely potential and manageable) risks demand a very different approach, an approach requiring skills and competencies different from commercial (contract terms and conditions) management. Effective capability management requires that all capability functions - operational, systems and equipment engineering, test and acceptance functions and support requirements, including their associated risks, must come under tight Project and Systems Engineering management, and that commercial management must be constrained to contract management that supports project management objectives. In that way, the horse is before the cart, and can get somewhere.

However, the current situation is:"*The ANAO expects that further development and tracking of emergent risk data over the next few years could support analysis around the type of major risks that emerge each year and how well risk management mechanisms are anticipating major risks".* (MPR Page 86). The concept that project risks may be managed by having a log of generic risks against which processes and templates will be developed on how to manage them is not, and will never be, successful. Risks vary in many ways between projects, as do their impacts, and they can only be identified and mitigated under tightly-integrated project and systems engineering management procedures. However, they do need to be identified and mitigated promptly for each project, not simply recorded for analysis against 'business' processes.

The prospects for the DMO ever developing an Enterprise Risk Management Framework that works are about as remote as Defence ever developing a series of tightly-integrated processes that will provide for the management of all Defence functions from the top to the bottom.

EARNED VALUS MANAGEMENT SYSTEMS (EVMS)

"*EVMS is a method of using actual cost and schedule information to measure and report project performance, as well as forecast future performance, and can be used to ensure that project payments do not exceed the value of work performed."* (MPR Page 89)

"The Defence Procurement Policy Manual (DPPM) states that projects must apply earned value management to all contracts valued at $20 million or more..." (MPR Page 89)

However, some Contractors see EVMS in a different light:

"DMO has invented a whole new 'earned value' technique in which progressive payments are made during the design phase for bogus ersatz paper products that justify payment to the contractor for work carried out during design.

Indeed, a whole new internal bureaucracy exists to administer this technique. Contractor X could not believe his good fortune. They had to take no risk at all. They dubbed the Earned Value drones "Earned Value Fundamentalists." There was no argument. Earned Value must be the least contentious of clauses in an acquisition contract. It provides a plausible veneer in which the Commonwealth can accept risk and yet continue to pay the Contractor as he descends deeper and deeper into trouble. It is not even accidental, it's deliberate!"

Payment should generally be made only upon the Contractor achieving clear and agreed milestones that have been established by skilled and competent Project and Systems Engineering staff, milestones that are able to be measured objectively against mutually agreed test and acceptance criteria. Throughout a project, of course, these activities depend upon the capabilities required being fully and accurately specified by the user from the very beginning of a project. All of these are technical functions (Project and Systems Engineering), not Commercial ones!

COMMON REASONS BEHIND PROJECT PROBLEMS

Analyses of the four MPRs raised to date reveal a considerable commonality in the reasons given for problems (Lessons Learned) in the Project Data Summary Sheets (PDSS). The vast majority of the reasons point to a lack of rigorous project and systems engineering management throughout all throughout all capability definition, acquisition and sustainment phases.

The root cause behind this situation may be traced directly to the adoption of Defence/DMO's 'business' model, which focuses on "contract and procurement, finance, human resources, acquisition, risk management, industry management, etc." (MPR Page 84). Project and systems engineering do not rate a mention, but are treated only as inputs to commercial processes.

Until project management, systems engineering management and commercial management functions assume their proper roles and precedence in capability development, acquisition and sustainment, the current problems will continue to arise and Australia's military capabilities and security will continue to deteriorate.

An analysis of the reasons behind project problems for representative major projects is at Annex A.

ANALYSIS OF DMO MPR 2010-11 PDSS

Analysis of the Project Summary Data Sheets (PDSS) for MPR 2010-11 confirm that nothing of substance has occurred to improve project performance, transparency or accountability. Annex B comprises an analysis of MPR 2008-09 and MPR 2009-10, updated to include comments arising from MPR 2010-11. It also includes a Measure of the Risk Consequence for each project, based upon DMO and Australian risk management standards.

SUMMARY

Analysis of MPR 2010-11 shows that no changes of substance have been made that will improve performance of the organisation in acquiring and sustaining Australia's military capabilities, or provide the transparency and accountability sought by Parliament.

DMO performance metrics remain subjective, and fall outside the scope of the ANAO Report; hence a meaningful assessment of performance is almost impossible.

Corrective measures taken by Defence/DMO continue to rest upon adding process and increasing the number, and elevating the levels, of executive oversight and governance. This will only detract from the Project Manager's ability to do his job properly and open the system to unwarranted and intrusion by vested interests. After more than a decade, the DMO appeals for even more time for its changes to show fruit.

The common reasons behind the DMO's problems point to wholly inadequate project and systems engineering management during all project phases – capability development, acquisition and sustainment – an inevitable result of adopting a 'business' (commercial) model for managing high technology military capability requirements, and using generalists rather than engineering professionals in management roles.

This management model must change to one focussed upon project and systems engineering management under competent staffs if competent project management is to be achieved.

ANNEXES:

A. COMMON REASONS BEHIND PROJECT PROBLEMS.
B. UPDATED ANALYSIS OF PROJECT SUMMARY DATA SHEETS.

ANNEX A

COMMON REASONS BEHIND PROJECT PROBLEMS

The following table, drawn from the Key Lessons Learned in DMO MPR 2009-10, highlights the common reasons behind DMO's major project problems. In the great majority of cases, the problems encountered have arisen from a failure to adhere to rigorous Project, Systems and Equipment Management Systems throughout all phases of the acquisition and sustainment of major projects. The examples given are not exhaustive, but representative of the underlying causes behind projects failing to achieve their objectives in capability, schedule and cost.

Problems Encountered	Comments
Project: ***Air Warfare Destroyer Build:*** • Sub-contractor quality deficiencies. • Shortage of skills. • Configuration management problems. • Design changes. • Change Management procedures. • Shipyard capabilities and capacity. • System integration. • Project Office expertise. • Drawing management and delivery. • Tech assistance from US Navy. • Alliance Contract risks. • Contract escalation indexation. • Support data availability. • Unclear Certification requirements. • Certification data not available.	All of these problems should have been identified, scoped, and included in early project management planning. Several (such as configuration, design changes, and change management) are covered by standard engineering management systems. Others require project planning effort to identify project-specific requirements and procedures, and negotiate how they will be managed, in consultation with interfacing organisations (eg, US Navy and contractors). Project planning should also have stated the maintenance policy to drive support activities, and through inspection verify the capabilities and quality standards at contractors. All of these problems were largely avoidable.
Project: ***AEW&C:*** • Project effort underestimated. • Project time underestimated. • Technical complexity underestimated. • Contract complexity underestimated. • Risk management underestimated. • Inadequate Contractor resourcing. • Inadequate support from 'stakeholders'. • Inadequate resources and time to provide in-service support	These problems also indicate an absence of early project management planning and subsequent management. As a result, the problems encountered have resulted in capability, schedule and cost penalties that were quite avoidable.
Project: ***Muti-Role Helicopter:*** • Inability to meet capability requirements not understood. • Maturity of aircraft design not assessed or understood. • Limited intellectual property rights affected impacted capability development, value for money, availability of required data, and system integration.	Each of these problems should have been identified, scoped and management approaches determined as part of early project management planning. In this way, many would have been avoided, while others would have been identified early and appropriate management procedures determined. Government and DMO entered into this project

• Maintenance documents inadequate. • Inadequate in-service support. • Delays due to manufacturing defects. • Capability targets delayed by design and reliability problems. • Certification delayed by immaturity of design. • Training impacted by lack of rate of flying effort available.	with eyes wide shut. The inevitable consequences have and will continue to haunt the Services so long as it is in service.
Project: ***Amphibious Deployment:*** • Wide impacts of regulatory requirements. • Requirements creep. • Combat and Communication Systems may not meet requirements. • Insufficient funds for logistics support, training and spares. • Unable to certify Air Space Management System. • Lack of clarity surrounding ship acceptance process. • Integration complexity underestimated.	Again, this project has suffered from a lack of early project management planning. Each problem reflects a failure to identify, scope and plan the activities that the project will have to manage, before the project was submitted by DMO for Government decision. This project is fated to encounter more problems as it proceeds.
Project: ***Bushmaster***: • In the early planning phase of the project, the operational concept and functional performance were not clearly defined, making it difficult to understand and undertake appropriate cost-capability trade-offs. • Lack of Contractor ability to provide adequate cost estimates, and inability by Defence to evaluate the validity of the cost data. • Testing was not sufficiently planned.	These 'Lessons Learned' reflect wholly inadequate project planning and was also a high risk project to put before government.
Project*: FFG Upgrade*: • Requirements and specifications must be well defined. • How the capability should be acquired should be resolved at the time of capability and project definition. • Verifying and validating software development should be contractually covered. • Upgrades should always follow the acceptance of the first platform. • The risk associated with complex software changes and integration must be properly managed. • The contract schedule should be realistic	These "Lessons Learned" reflect a total absence of any Project Management disciplines. They ensured that the project would fall victim to costly problems and frustrations that were entirely unnecessary. They are an indictment of the current acquisition methodology being pursued by the DMO.

and contain: - milestones to assess contractor performance. - payments should be should be subject to achievement of clear project milestones. - milestones should reflect delivery of contracted requirements. - ILS milestones should carry the same weight as primary equipment milestones. - Contractors should focus more upon ILS requirements. - The contract should be clear on Configuration Management. - Objective acceptance criteria are required. - Progressive acceptance methodology should be implemented for all project data, documentation, supplies and requirements acceptance.	

Example:

> "***A proper balance needs to be kept between proper engineering processes and contractor-perceived commercial imperatives to minimise risks that unrealistic technical programs will actually result in delays to the overall schedule." (***Lessons Learned, HF Mod Project Manager, MPR 2009-10).

ANNEX B

UPDATED ANALYSIS OF

PROJECT DATA SUMMARY SHEETS (PDSS)

THE SHEETS THAT FOLLOW ARE BASED UPON

THE PDSS FROM THE

DMO MPR 2008-2009

UPDATED TO INCLUDE COMMENTS ARISING FROM

DMO MPR 2009-2010

AND

DMO MPR 2010-2011

ATTACHMENT 1 PROVIDES A MEASURE OF THE RISK CONSEQUENCE LEVEL FOR EACH PROJECT, BASED UPON DMO AND AUSTRALIAN RISK MANAGEMENT STANDARDS

AIR WARFARE DESTROYER BUILD

General.

Comments on this project were included in the author's analysis of the 2007-08 DMO MPR, although the project was not included in that MPR. These included:

- Operational analysis of longer-term threats suggests that the project's capability expectations are overly ambitious when emerging regional air power and anti-shipping missile (supersonic cruise and ballistic) capabilities are factored in.

- The solution seen by Defence/DMO as ensuring that this project avoids the fate of earlier major projects has been the establishment of yet another layer of bureaucratic review – the establishment of an Air Warfare Destroyer Alliance Principals' Council.

Summary Comment on 2008-09 MPR:

The Air Warfare Destroyer Project is in extreme danger of failing for the following reasons:

- The decision by Defence/DAO/DMO to abandon due diligence in the management of major projects, which led to proven Project/Engineering/Risk/IV&V Management systems and procedures being avoided, 'dumbed down', and made subservient to contract management, left Defence/DMO open to pressures from manufacturers and open to subjective decisions taken at ministerial and departmental levels. This is a generic problem common to all projects now managed by Defence/DMO.

- The adoption of a new contracting methodology that has not been proven to be appropriate for high technology military systems. This will introduce yet another data base from which DMO and ANAO will have to try to retrieve meaningful project status data.

- A critical dependency upon developing and commissioning a new dockyard from a 'green site' to meet project milestones.

- The absence of an agreed Certification Basis and agreed Certification Plan at the time of contract signature, without which no project should proceed to contract signature.

- The reliance upon a higher review organisation lacking in required competencies, and an 'external facilitator'.

Comment on PDS Content.

Although listed as an Acquisition Category 1 project, which means that it will require extensive project and schedule management, and have very high levels of technical difficulty, there is no mention of just how these challenges will be managed, resolved, and reported in an objective, accurate, timely and auditable manner.

Defence/DMO has chosen to trial an Alliance-based contracting methodology for this project on the basis of its having been used successfully on a museum and a highway project. Just how this approach is seen to be appropriate for a high-technology naval capability, with its unique systems engineering integration challenges, is not explained. The additional organisational and functional

interfaces that will have to be negotiated must only add to project risk

Alliance contracting has become a popular funding model for government infrastructure projects, aiming to share the risk of cost over-runs between government (the taxpayer) and the private sector. In practice it seems to simply shift financial risk back to the taxpayer. A recently-commissioned Victorian Treasury study found that so-called alliance contracting costs blew out between 48% and 55%, the highest of the three funding models studied.

This finding is not surprising, as any contract, particularly those involving high technology systems, are prone to cost over-runs if the customer does not have the required project and engineering management competencies appropriate to the technology involved. Governments, and DMO, fall into this bracket, as they focus upon the wrong risks. Not having the project and engineering competencies required, they fail to manage properly the risks associated with capability, schedule and cost. They concentrate upon the risk (liability) to the contract without understanding that risks are embedded mainly in the technical (capabilities) and schedule areas.

This new contracting approach will, as stated by DMO,' *have to be used on a number of projects before all lessons will have been learned*', so will be in a trial mode. This approach must be assessed as only adding new and unidentified risk to those projects upon which it will be used.

Within the complex management structure devised for this project, it is difficult to identify the project and other management skills and competencies that DMO will bring to the table.

Major Challenges.

The six major challenges listed are so elementary as to be hardly worth mentioning. DMO should, at this stage of the project, and after some ten years of experience, be able to better qualify and quantify those major areas requiring project, engineering and risk management focus.

Schedule Performance.

DMO states: *"Progress to achievement of planned in-service dates for the three ships and their support system is as scheduled"*.

Capability Performance.

DMO states: *"The current status is that planned capability will be achieved"*.

Both schedule and capability assessments must be considered as being prematurely optimistic, subjective, and of little value, particularly in view of the significant, if unqualified and unquantified, problems lurking under 'Major Project Risks'.

Major Risks, Issues and Linked Projects.

The items included in this section are too broad and are seen primarily from a contract aspect. Most are merely generic risks, lacking in capability, schedule and cost focus. The project would be difficult enough to manage if it were built in an experienced, working shipyard, but to expect a new and competent shipyard becoming available from scratch to meet project milestones, is beyond optimism. The skills and competencies that must put in place have been greatly underestimated.

Finally, any project that '*does not have an agreed Project Certification Plan and Certification Basis'*

should not proceed as it embeds certain and indefinable risks. The absence of such basic pre-requisites for executing a minor, let alone major capital equipment procurement contract was the root cause of the SEA 1411 Super Sea Sprite debacle, the Collins Class Submarine misadventures and the continuing challenges within the Wedgetail AEW&C Project, to name but a few.

Have these lessons been learned? Clearly not.

Key Lessons Learned.

While hardly classifiable as a 'lesson', this section is important in that it warns "*that it takes time and effort to develop the culture necessary to achieve improved outcomes"*, and advises that an invaluable external facilitator has been engaged to help make the Alliance work. This attitude seems to fit into DMO's '*..hope that over the next five or 10 years of this (MPR) report you see a transition where things do not happen anymore or when we mitigate some of those risks"*, as given in evidence at the JPCAA hearing into the 2007-08 MPR on 19th March 2009. Australia can hardly be expected to accept a continuance of these 'things' which impact directly the country's security.

Project Maturity Score and Benchmark.

See body for analysis for an assessment of the usefulness of these scores.

COMMENT ON 2009-10 MPR

Major Challenges

The 2009-10 MPR now lists five challenges which remain generic in form and provide no insight as to where specifically the challenges are or what might be planned to meet them. For example, "Ensuring that Navantia's production drawings are able to meet the requirements of the three shipyards in Australia while minimising the impact on production for the Shipyards.", masks an apparent failure of DMO's AWD Project Management organisation to ensure that the Prime Contractor's drawing system is known and followed by all involved in the project, especially the three Shipyards. Any incompatibilities (Contractor interface problems) or deficiencies in drawing control will impact directly the engineering integrity of the design and its production, and will compromise the configuration baseline, causing widespread problems. Importantly, MPR 2009-10 omitted the faulty construction of the first central keel block at BAE's Williamstown Shipyard, which, prima-facie, indicates a serious failure in drawing/production process specification control.

In addition, the second new challenge, "Managing expectations about changes to the existing platform design in order to avoid design changes which are not essential.", suggests that the system performance and engineering specifications being used are inadequate, and that there is also an inadequate change management system.

Both new challenges need to identify what is missing in AWD project planning and take corrective action promptly.

Schedule and Capability

DMO foresees no schedule slippages, despite the keel block problem and delays in production at BAE due to late contract award and the major risks recorded.

DMO assesses capability will be delivered on schedule, although two systems will not become available until 2017-18.

Project Risks

This section now includes emergent risks that have surfaced during 2009-10. In brief, these include:

- ***'Production efficiency compromised by skilled labour shortages necessitating embedding resident contractor teams'. Project planning would be expected to determine whether all involved have the workforce with the required skills and competencies before going ahead.***
- ***'Indexation gaps between contracts may increase costs'. Contract Terms and Conditions normally include aspects such as this, and should be settled before contract signature.***
- ***'Supportability data are insufficient to ensure adequate support'. Supportability should come under a Project Management Plan Sub-PLan. Supportability planning is an iterative procedure, based upon the evolving System Configuration Baseline an an established Maintenance Policy driven by the manner in which the system will be operated and supported. Supportability should be planned to be in place by the time the system enters service. In this, and other projects, DMO does not appear to understand the basics of how sustainability is managed under project management procedures.***

The awarding of a Measures of Effectiveness Score of 100% at this stage, when no measurable capabilities have been delivered, borders on the over-optimistic.

Project issues and Lessons Learned

The major project issues and lessons learned indicate a lack of emphasis or understanding of the role and importance of project management over contract management in the acquisition and sustainment of military weapon systems. The three Lessons Learned have been given a Category of Systemic Lessons of Governance, Resourcing and Contract Management – no mention of project management lessons.

Project Maturity Scores

The project has now been given a Project Maturity Score of 51 against a benchmark of 50. The score for Requirement is now given as 8 against a benchmark of 7, despite one of the major challenges being an unstable requirements baseline.

Project Risk Level (See Attachment 1)

In the light of DMO's continued difficulty in managing complex projects, especially those with integration tasks, this project has the potential to reach the highest level of project risk of Severe/Catastrophic.

COMMENT ON 2010-11 MPR.

Since the 2009-10 MPR, this project has slipped one year, which means that it now has a Project Risk Consequence of 'Major'. As with other major projects that populate this report, as well as Defence's Projects of Concern List, the Major Challenges, Major Risks and Major Issues recorded point to inadequate Project and Systems Engineering Management skills and

competencies within both Defence and the DMO. In particular, the statement at Page 187 that *"Risk is managed through the allocation of management reserve"* ***reinforces the perception that that the DMO, rather than manage risk, which generally arises in the engineering and project management areas, tries to manage risk, usually after the event, through contract management process, essentially 'buying its way out of trouble'.***

For example, the first major risk/challenge/issue encountered with the project related to deficient production documentation, but this would not have happened had the DMO followed standard project engineering procedures and conducted and early engineering/quality assurance audit of all potential contractors to ensure that they had in place acceptable and auditable quality assurance and documentation management systems and standards, as well as clearly defined change management systems and procedures. This is critically important where more than one contractor is involved with a project. If not done, production difficulties will arise, as they did here, and system configuration management will be made difficult, if not impossible, with adverse impacts upon seaworthiness, engineering and maintenance management, and support engineering. The Project Manager should also have Resident Engineer at all major contractors to monitor and coordinate contractor performance and resolve problems as they arise.

Lessons Learned.

The first Lesson Learned states *"Formation of the Alliance, a new organisational structure - takes time and effort to develop the culture necessary to achieve improved outcomes"****, and the CEO DMO has stated that it has to be used on a number of major projects before its effectiveness can be assessed. That this form of contracting was adopted, without any explanation as to why it was adopted over others, the advantages perceived, or how its appropriateness and effectiveness would be measured, makes the decision more of a gamble than a sound commercial decision, suggesting that the DMO is out of its depth in both project and systems engineering management as well as contract management.***

Project Maturity and Materiel Capability Performance.

When read against the Major Project Risks, Issues and Challenges recorded, these scores appear to have little, if any, basis in reality. They still appear as 'Potemkin Numbers'.

Summary.

This project will continue to encounter severe problems, which would have been better identified and controlled had the project been managed under strict Project and Systems Engineering methodologies rather than commercial administrative processes.

The project has moved quickly to reach a Project Risk Consequence of 'Major', and has the potential to reach 'Severe/Catastrophic', the top level of risk.

BRIDGING AIR COMBAT CAPABILITY
(Refer also body of this analysis and Annex B)

General.

The background to this project re-writes some of the history of its birth, but does classify it as a *'directed government solution*'. However, it is important that this project be seen as part of Australia's New Air Combat Capability (NACC).

The Super Hornet, an aircraft rejected by other Western nations as a fighter replacement, was marketed robustly by the maker to Defence and Government and was purchased abruptly as a 'no brainer', against the advice of Air Force. Both Government and Defence had been provided with substantive data and analysis that showed that the aircraft would not be able to guarantee regional air superiority, as required by government policy. However, Manufacturer's promises were accepted without question, even where they conflicted with the basic laws of physics.

As a result, the decision was criticised severely by the Leader of the Opposition and the shadow Minister for Defence before the last election, both promising to rectify what was wrong, and many hoped that this would occur.

The new Minister for Defence, Fitzgibbon, soon initiated a two-part review of Defence/DMO New Air Combat Capabilities planning – the first covering the decisions taken in regard to the unnecessarily early retirement of the F-111 and the decision to purchase the Super Hornet – Part 2 would later review the Howard Government's JSF decisions.

Part 1 of the review was conducted internally by Mr Neil Orme of Defence. Mr Orme was provided with substantial personal and written submissions by individuals and Air Power Australia, which analysed and detailed the areas of risk associated with the New Air Combat Capability decisions being taken by Defence, including the JSF Project. He also had the many US governance reports issued over the years to guide him. These submissions and reports were simply unacknowledged and totally ignored, despite continuing assurances that Defence welcomed open discussion of its plans and programs. The failure of Defence/DMO to take note of the extreme risks associated with the aircraft may be measured by comparing the content of the Orme Report and the presentations made.

Since then, Government, Defence, and DMO have been kept abreast, in detail, of the many areas of risk associated with the JSF Project, but no risks have been admitted by Defence/DMO or apparently by the over fifty 'specialists' involved with the JSF and NACC projects. All Defence/DMO statements have merely repeated the clearly discredited statements emanating from the manufacturer and the US Project Office which have always marched in 'lock step'. The JSF Project is analysed in more detail in the body of this analysis.

The Minister's decision to remain 'Hornet Country', an aircraft ignored by other nations in search of a high capability air combat aircraft, and Defence/DMO's blind commitment to the JSF will not only enshrine Australia's inability to exercise air supremacy in our region, but will condemn Australia's management of defence capabilities in the eyes of the world. This subject is analysed further at Annex B.

Lessons Learned.

The Key Lessons Learned simply record basic knowledge that the RAAF possessed some 70 years ago.

Collateral Damage.

The Super Hornet Project continues the destruction of Australia's military capability skills base:

- First, Australia lost the high technology skills and competencies base that had been built up at Amberley, QLD, to support the F-111 Fleet, including systems integration and embedded software/hardware development, when the aircraft was prematurely retired. These core skills, which were critical to the support of Australia's future air combat capability, were abandoned by Defence.

- Second, similar, albeit less developed support facilities and competencies established at Williamtown, NSW, for the F/A-18 Fleet will be largely disbanded as the Super Hornet, with its overseas support contract, comes into service and the current A/B models deteriorate. This will leave another major hole in Australia's air combat support capabilities.

- Finally, when the AP-3C Orion is replaced by an aircraft supported by overseas contractors, Defence will direct that the Edinburgh, SA, support facility be disbanded, and with that will go the last of Australia's major local support capabilities.

This is the inevitability of Defence/DMO policy to let supply and long term support contracts to foreign companies having no business reason to set up support facilities in Australia. Defence/DMO policies are based upon a perceived reduction in cost and risk, which will, in the end:

- Greatly increase cost.
- Result in the further debilitation and de-skilling of the Services and Australia's defence industry.
- Lead to the collapse of Australia's defence self-reliance.
- Greatly increase risk to Australia's security.

Guaranteed!

COMMENT ON 2009-10 MPR

Subsequent to the above, the US record of discussion, approved by the US Secretary for Defense, advises that the Australian Minister for Defence at the time "*expressed his opinion ...that the review (into the purchase of the Super Hornet and commitment to the JSF) would likely not result in any decision other than to keep the JSF and continue with the Super Hornet purchase, explaining that the Government felt it had to respond to Australian public concerns that the previous government had not based these decisions on capability requirements but rather on political expediency."* ***This may explain why the substantial technical advice and operational analysis given Government and the DMO was totally ignored.***

Capability Status and Lessons Learned

No deficiencies in operational capability have been recorded, but the delivery of facilities and Support and Test Equipment needed to support initial operations are outstanding, which must impact capability. Resourcing and Requirements Management are given as the Category of Systemic Lessons arising from this project.

COMMENTS ON 2010-11 MPR

The comments above in regard to the 2009-10 MPR remain pertinent. Despite the Orme Review of Australia's New Air Combat Capability decisions being revealed as a sham, Defence and the DMO continue to insist that the Super Hornet (F/A-18F) will provide the regional air superiority capability required by Government. The new Secretary of Defence in his early public statement (Weekend Australian, 3-4 December 2011) even weighed in, insisting that "*the RAAF's Super Hornets mean there won't be an air capability gap even if the JSFs are delayed****" The Secretary then went on to say that "****the RAAF will eventually fly the JSF despite delays and increasing costs", **and** "the project is running reasonably well." **He added that** "This is a global enterprise and it's not going to fold."***

Regrettably, his statements indicate that he has not been briefed well. He has not brought any operational or engineering expertise to the air capability debate, but is merely following the party line – echoing manufacturer and project office propaganda. The size of a project, when it comes to failure, merely determines the scale of the damage that will result, unless the failure is managed intelligently – a remote possibility under current US and partner nation's defence competencies.

MULTIROLE HELICOPTER

General.

This project has been entered into too early and planned inadequately due to a lack of in-depth experience with helicopter technology and an absence of sound project management disciplines. This parallels problems observed in Europe with the same basic NH90 design, detailed in the February, 2010, disclosure of the highly critical BundesWehr Luftlande- und Lufttransportschule (Airborne and Air Transport School) operational suitability assessment report, which recommends "using alternative aircraft whenever possible in an operational scenario".

This is highlighted in, for example:

- The immaturity of the design, requiring costly retrofit to achieve the required capability.
- A lack of understanding of the role and functions of configuration management in identifying and quantifying support requirements accurately and timely, for example, spares and technical documentation.
- An inability to coordinate project milestones, evidenced by the inadequate flying effort achieved, which has also impacted Service flying training.
- Failure to analyse system and equipment reliability against the configuration baseline as it matures, a basic function of project management which drives requirements for manpower, skills and training, technical documentation, repairable items and breakdown spares, facilities, tools, test equipment, and so on, to meet the unique support needs of the Service operating the equipment.

This project seems to have been driven by schedule at the expense of capability and sustainability.

Maturity Scores and Benchmark.

A total score of 57 against a benchmark of 57 hardly reflects reality. The question of the value of these scores is analysed in the body of this paper.

Risks.

Although mostly identified as "There is a chance...", the major risks listed do give a better insight than many projects. However, they are still at too high a level and are all problems that should have been identified and managed (fixed) under standard project engineering procedures.

Each 'risk' begs the question:

'How and why did this happen?"

The answers to that question would have led to the real 'lessons learned' being identified and the appropriate corrective action taken for that project and for future projects.

Finally, the remedial actions given for each of the 'risks' identifies a lack of understanding and application of the standard project/engineering management procedures that must be applied rigorously and consistently on every project. In the absence of responses to the question raised above, the lessons learned provide no insight as to why these 'risks' and 'issues' occurred and how they might be corrected for the future.

COMMENT ON 2009-10 MPR

The 200-10 MPR now gives the project a total score of 61 against benchmark of 57 for delivering the ISD capability.

However, new major challenges that have now arisen include:

- ***The aircraft has had to be delivered in "progressive capability configurations as systems are matured and certified...".***
- ***Progress in important areas has halted due to an engine failure and investigation.***
- ***The Aircrew Information Set (the Flight Manual and Check List) is unsuitable for Australian conditions and has to be re-written accordingly.***
- ***Problems have led to the IOC being delayed by 12 to 18 months, the Navy now being Jun 2011 and the Army Oct 2012.***
- ***The six major risks that have arisen over 2009-10 have resulted in aircraft being accepted that do not meet the required capability and will thus have to undergo block capability upgrades. These in turn will also impact acceptance certification, training, the withdrawal of the Black Hawk and Sea King aircraft, the aircraft's IOR, and require voids and porosities in the tail sections to be rectified.***

The nexus between the Project Maturity Scores and reality is thus a mystery.

Key Lessons Learned

The key lessons learned are merely categorised as stemming from Resourcing, Contract Management, and Off-the-Shelf Equipment. No mention is made of a lack of helicopter technology competencies and skills, or any lack of project management skills and competencies.

This project has fallen to almost every risk that can arise, and was fated before it started.

Finally, there is no indication DMO heeded the clear warning delivered by the German Airborne and Air Transport School, which recommended:

"Using alternative aircraft whenever possible in an operational scenario."

COMMENTS ON 2010-11 MPR

Schedule Performance (page 207):

"*The project stopped accepting aircraft in November 2010 as the aircraft did not meet all contractual requirements, this will impact the achievement of capability milestones from 201-11 to later financial years. The final aircraft is scheduled to be delivered in mid 2014; however this timeframe may be affected by the current non conformance delays. Initial Operational Capability (IOC) for Navy and Army are also likely to be deferred****."***

The thirteen aircraft accepted will all have to be returned to the manufacturer to undergo in-Service retrofit to bring them up to operational capability standard.

Management Process.

This project was subject to a Gate Review in February 2011, but this process does not seem to have solved anything. It merely required the DMO *"to work with the contractor to implement a remedial plan to improve availability of the helicopters by addressing engineering reliability issues"* ***– issues that would have been identified and redressed, before they became problems, under project and systems engineering management methodologies, had they been followed. The usefulness of the Gate Review process in resolving embedded engineering problems must be questioned. The Review did, however, avoid the project being added to the Projects of Concern List.***

Despite all this, the project retains a Project Maturity Score of 61 against a benchmark of 57! The scores awarded are impossible to reconcile with the risks, issues and challenges that exist and will continue to exist.

The warning given by the German Airborne and Transport School about *"using alternative aircraft whenever possible in an operational scenario"* ***still hangs over this aircraft.***

AIRBORNE EARLY WARNING AND CONTROL AIRCRAFT

Capability Performance.

Comments on this project were included in the author's analysis of the 2007-08 DMO MPR.

"Integrated system performance is currently not meeting specification. … However, remediation of all radar performance shortfalls is not expected to be achieved by final delivery of the system". The project is some four years behind schedule, so should be able to provide many useful 'lessons learned'.

Major Project Risks.

As for so many other projects, the risks recorded are generic and have not been tested by the simple question: *"How and why did this happen?"* so as to get to their root cause(s) and identify the corrective action needed.

Lessons Learned.

All 'lessons learned' fail to provide answers that can be used to modify management systems and procedures to prevent future occurrences, as they are couched in subjective, generalist terms rather than objective, management terms. The project still reflects inadequate management systems and technical expertise.

Contractor Support - Good Value for Money?

Considerable concern is felt in regard to the Minister's recent statement regarding the Wedgetail Through Life Support Contract. The fundamental question relates to how DMO determined that the contract provided good value for money. When the RAAF managed its own operating, intermediate and deeper maintenance facilities and contractors, determining contract scope and value for money was relatively straightforward and accurate. As DMO cannot fall back on that hands-on experience, the way in which DMO determines whether Australia is getting value for money needs to be better explained and made transparent.

A first look by an ex-RAAF engineer officer with project and maintenance management expertise points out:

- The contract for $A800 million for provision of *"Services including logistics, training, spares management, aircraft deeper maintenance, engineering and supply chain management*" for six Wedgetail aircraft over five years comes nominally to about $A26.7 million per aircraft per year.

- In contrast, the Boeing F-111 Weapon System Business Unit contract provided services, including logistics, training, spares management, aircraft deeper maintenance, engineering and supply chain management, including numerous SME sub-contractors, plus capability enhancements, at a total average support contract cost of about $A100 million per year. For the fleet of 27 aircraft, this amounted to about $A3.7 million per aircraft per year. With, say, an average of 12 mission-ready aircraft on line, this amounted to about $A8.7 million for each aircraft per year. Even going down to the six aircraft on line during later years, the cost comes to $A16.7 million per aircraft per year.

While some may argue with the comparative scope and costs quoted, the figures give a reasonable AEW&C Contract to be good value for money. One has also to factor in the reduced visibility and control of activities that impact directly force capability readiness and sustainability that come with DMO's support contracts, as well as the dwindling skills base of the Services and our defence industry base, and Australia's self-reliance.

COMMENT ON 2009-10 MPR

The IOC and FOC for this project have been left unchanged, whereas:

- ***The radar, the system central to key capabilities required of this weapon system, has been excised and made the subject of a separate re-mediation program, and***
- ***Further technical challenges in the development of the Electronic Support Measures (ESM), Electronic Warfare Self Protection (EWSP) and ground support systems are also expected.***

As a result, "Overall technical and schedule risk is assessed as high."

While a revised schedule baseline has been struck, it is still not possible to determine when full AEW&C capabilities will be provided, thus the IOC and FOC dates given cannot be achieved in accordance with their accepted definitions.

The dates given are thus unreliable and misleading.

Lessons Learned

Seven lessons are recorded, attributed to:

- ***First of Type Equipment (2).***
- ***Schedule Management (1).***
- ***Contract Management (3).***
- ***Resourcing (2).***

It is important to note that not one lesson has been attributed to deficiencies in engineering expertise, or the absence of robust project/engineering management. This project started along sound project and engineering management lines, but these were replaced by generalist-driven, contract-centric, administrative process, with the inevitable results now seen. The technical scope and difficulties inherent in such a project were not identified and managed properly from that time.

This project has been at a Risk Co0nsequence Level of Severe/Catastrophic for two years.

COMMENTS ON 2010-11 MPR.

The comments above, stemming from MPR 2009-10 remain pertinent and are reinforced by this latest MPR. The first aircraft, "in a 'final' configuration 'capable of supporting all operational tasking short of high-end war fighting", is scheduled for delivery in March 2012, in which case the total delay to this milestone against the original contract baseline will be about 64 months, but there is a three months' risk to this date. However, exercises (Page 198) have shown that much engineering and integration work remains to be done before AEW&C capability

requirements will be met.

The project has been on the Projects of Concern List since 2010-11.

It is important to recall that this project started off as a 'model' one which collapsed when standard RAAF project and systems engineering management methodologies were abandoned in favour of commercial-orientated, contract management process under people having wholly inadequate management skills and competencies. That Defence and the DMO have learned no real lessons from this (or any other major project) is evidenced by the seven Key Lessons Learned given at Page 206, and the categories to which they have been allocated. Project and systems engineering management causes have simply been ignored!

It is impossible to imagine that this project would have deteriorated to the extent that it has had the RAAF retained its Engineer Branch and its Chief of Air Force Technical Services. However, this observation may be applied to every AIR Project, whether RAAF, Army or Navy, as no AIR project has been managed successfully since Defence and its acquisition arm was established, and commercial processes were introduced as the primary management focus.

The direct and indirect costs in both money and capabilities that have resulted from the current Defence/DMO organisations have been enormous and are patently unsustainable and unacceptable.

AMPHIBIOUS DEPLOYMENT AND SUSTAINMENT (LANDING HELICOPTER DOCKS)

Status.

The Project Summary states that the project is within budget, on schedule, and delivering the required capabilities. The project thus gives itself a maturity score of 45 against a benchmark of 45.

Major Risks.

However, the optimistic Summary above has to be read against the five major risks being encountered, covering potential regulatory changes, changes in requirement, inability of the combat system to meet performance requirements, possible damage to propulsion pods, and inadequate funding for sustainment.

Each of these should have been qualified and quantified in terms of problem or risk, and appropriate project/engineering/risk management actions planned and taken. The piecemeal remedial actions proposed will prove to be inadequate in the absence of such management actions.

Major Project Issues.

The integration complexity highlighted will almost certainly test the management of this project, but the remedial action proposed does not generate confidence that the management of engineering complexity is understood. The project, at this stage must thus be given a low probability of succeeding.

COMMENTS ON 2009-10 MPR

The 2009-10 MPR identifies a number of broad risks, both potential and emergent, as well as several Major Project Issues. These reinforce the assessment that this project will be a severe test for the management methodology being followed, and that the probability of success is low.

The IOC and FOC are now both planned for Nov 16.

The Risk Consequence Level for this project is now at Major, with the potential to reach Severe/Catastrophic.

COMMENTS ON 2010-11 MPR.

A further four Major Project Risks have been identified as the system integration and the system test and acceptance phases approach – two of the areas common to other projects where the DMO inevitably runs into major problems.

ARMED RECONNAISSANCE HELICOPTER

General.

Comments on this project were included in the author's analysis of the 2007 – 08 MPR.
This project has experienced the range and type of difficulties that usually stem from incoherent project/engineering/risk management.

It is noted that $A6.5 million has been 'harvested' from this project, but whether this forms part of the Defence Strategic Reform Program is not revealed, nor have the impacts that will arise from the cuts.

The detail on this important project does not make good reading. It reinforces the impression that the project was scoped inadequately, and not resourced and managed properly. Where 'project planners' are mentioned, it appears that their functions relate more to contract administration than coherent project/engineering/risk management.

Major Challenges.

The major challenges listed reflect tasks that should have been handled in the project management sphere, the systems engineering sphere, and the support engineering field respectively.

For a project that is said to be 27 months later than originally planned, with some major elements up to 62 months late, has been re-baselined, and is still facing considerable challenges, to be assessed as "*still expected to deliver the required capability within the approved budget*" stretches credibility.

Risks, Major Issues and Lessons Learned.

Again, these sections give insufficient insight as to how and why these risks and issues arose, and the lessons learned do not get to the nub of the problems so as to be able to correct them in a timely way and feed changes back into management systems to ensure that they are managed properly on future projects.

COMMENTS ON 2009-10 PR

This MPR highlights:

- ***Inadequate repairable and breakdown spares support.***
- ***Australian Aerospace's inability to deliver aircraft from production and its retrofit lines on time.***
- ***Type acceptance tests are still continuing.***

The stated achievement of the Initial Operational Capability in Sep 09, in the form of an "Initial Operational Test and Evaluation Readiness Milestone", is difficult to accept under the military definition of Initial Operational Capability (IOC). Similar difficulties arise in accepting a Project Maturity Score of 58 against a benchmark of 57, and a schedule score of 9 against a baseline of 8, on a project that is at least 27 months behind its IOC schedule and 42 months behind its Final Operational Capability (FOC) schedule. Statements such as these exemplify the gap between reality and DMO's assessment of its own performance.

Lessons Learned

These relate to the following Category of Systemic Lessons: Off-the Shelf Equipment, Resourcing, and Contract Management, with no mention of any project or engineering management problems. One lesson relates to a need for "The use of integrated teams with strong processes and empowered staff facilitated by appropriate contractual arrangements.", and another to "Resolve or escalate minor disputes as they arise to prevent escalation to major contract dispute." Both identify a lack of adequate Project/Engineering Management, and a primary focus upon contract over project management.

This project has been at a Project Risk Consequence of Severe/Catastrophic for the past 18 months.

COMMENTS ON 2010-11 MPR

The IOC for this project has slipped out a further seven months to 34 months, and both the IOC and FOC remains hostage to the range of problems listed at Pages 276 and 277.

Developments over the past year emphasise the inevitable results of Defence/DMO not adopting a robust project and systems engineering management methodology, but relying upon standard commercial processes under which project and systems engineering functions are considered advisory to commercial management, and may be handled by unskilled staff.

AIR TO AIR REFUELLING CAPABILITY

General.

"Airbus Military's ability to meet the contracted schedule milestones continues to be the greatest challenge due to an underestimation of the overall scope and complexity of work and system improvements introduced during the development".

This situation is indicative of a project that was embarked upon when inadequately scoped, planned and resourced with the required skills and competencies, and proceeded without sound project / engineering / risk management systems and procedures in place. The usual over-reliance upon contract management and contractor support for tasks that must be managed by the customer is also evidenced.

Major Risks, Issues, and Lessons Learned.

The risks and issues listed provide better than generic statements and highlight a number of risk/problem areas that should normally have been identified in time and mitigated through standard project/engineering/risk management procedures before they emerged as real risks/ problems/issues.

There is still a confusion between risks, problems, and 'issues', the latter term these days being used to describe any number of unqualified and unquantified 'things'. The word 'issues' should be discouraged at all levels in project management.

Again, the risks and issues listed have not been tested to identify the root cause(s), and so the 'lessons learned' are not of much use in the practical project management sense of ensuring that they do not cause problems for future projects.

Comment on 2009-10 MPR

This program has slipped further due mainly to "Underestimation of the overall scope and complexity of work and system improvements introduced during the development.", coupled with difficulties with the development testing and the achievement of civil certification.

The aircraft will be now delivered and accepted carrying a number of non-compliances against "the minimum requirements of the Initial Operational Requirement." Despite this, the Measure of Effectiveness given at Page 240 is 100% green – that is, meeting the capability requirements specified in the Materiel Acquisition Agreement.

Three pages of the MPR (241-243) identify a range of Major Project Risks and Major Project Issues, and record many Lessons Learned, including:

- ***Delays in developing the Human Machine Interface.***
- ***Delays in agreeing how non-compliances will be managed.***
- ***Problems with aircraft acceptance.***
- ***Difficulty in developing a reliable schedule.***
- ***Schedule delays at the Australian Conversion Centre.***
- ***Hardware and software for major refuelling components are still in the development and test phases.***
- ***Training delayed by development testing.***
- ***Requirements still being developed for the Mission Planning System***

All of these are problems that are managed best under Project/Engineering systems; they will not yield in time, cost or capability to contract administration processes.

Key Lessons Learned

These relate to:

- ***Poor initial assessment of the technical challenges involved, especially integration of systems, software integration, and development and testing.***
- ***Lack of a robust design maturity assessment.***
- ***Inability of the Contractor to support* customer requirements.**

While all of these fall within the scope of project management, the Categories of Systemic Lessons given them are: First of Type Equipment, Schedule Management and Contract Management.

This project now has a Risk Consequence Level of Major with the potential to rise to Severe/Catastrophic.

The Risk Consequence for this project is now Major, with the potential to reach Severe/Catastrophic.

COMMENTS ON 2010-11 MPR

The IOC for this project has slipped a further 18 months to 36 months, and the FOC a further 12 months to 33 months. The risk consequence for this project remains at Severe/Catastrophic, and was placed on the Projects of Concern List on 15th October 2010.

Major Project Risks

These have been increased to include:

- ***Technical problems will persist after the aircraft enters service, requiring a complex, overlapping of project and in-service management activities.***
- ***The final boom system may not meet capability requirements.***

Major Project Issues

These now include:

- ***Difficulty in achieving contract schedule, including a "Commitment by both parties for open and honest communication for the joint management of schedule risks."***
- ***The maturity of the Mission Planning System***

Key Lessons Learned

None of the lessons identifies inadequate project and systems engineering management and expertise, the core factor behind the risks that have matured throughout the project.

Costs

The MPR records:

- ***"The project remains within budget." (page 303) and***
- ***"Costs are within the approved Budget with remaining contingencies commensurate with residual risks." (page 314)***

That a project currently running some three years late, and has encountered a stream of major capability and contractual problems, is still within budget raises questions as to the the transparency of the DMO's budgets.

Milestone Progress Difficulties (Page 309)

The introduction of DMO's Initial and Final Materiel Release Milestones now leaves the Initial and Final Operational Capability Milestones unhinged from the primary objective of the MPR – to provide project status against the achievement of the planned operational capability milestones. In effect, the new Materiel Milestones allow the DMO to close projects off at FMR (often with outstanding tasks) and pass them to the Capability Manager to complete and arrange introduction into service. In the case of this project, the RAAF will be handled a large outstanding workload that it is not organised, manned or skilled to manage. The IOC and FOC dates for this project are now largely meaningless.

This project provides a good example of what can go wrong when project and systems engineering management methodologies do not comprise the primary project management focus, but are subordinated to commercial contract process.

HORNET F/A-18 UPGRADE – PHASE 2

General.

Comments on this project were included in the author's analysis of the 2007 – 08 MPR.
This project faces several 'risks' which seem to be managed through an amalgam of project office and contractor activities.

The key lessons learned reinforce this impression, as the majority of the activities listed for contractors and Product Teams are normally core project management functions that rightfully belong to the customer, the DMO Project Office. This arrangement also highlights the many different approaches adopted by DMO, which are more contract than project management focussed, ***giving*** rise to the problems faced by ANAO/JCPAA in trying to get objective and consistently accurate and comparable project status information across projects.

A key concern with this project, as well as Phase 3.2 of the Hornet Upgrade Program, is the cost effectiveness of the work being done as an element in Defence's NACC planning, faulty as that planning might be. ***The extent to which this project will extend the fatigue life of the Hornet fleet has yet to be proven, especially in the light of the continued problems being encountered by the JSF, which will require the current aircraft to fly even longer.***

Notable by its absence is any mention of the failed approach taken by the DMO in Air 5376 Phase 2.3 in, against strongly founded technical advice from within Defence and Industry, the then Head of Electronic Systems Division of the DMO with the support of the then Under Secretary of the DMO, ensured the selection of an extremely high risk solution Radar Warning Receiver (RWR) System (the ALR-2002) over the recommended ALR-67 Version III RWR system, which is only now being installed into the F/A-18 Hornet aircraft.

This decision resulted in over 5 years and some (estimated) A$440 million dollars of project capital budget funds being wasted, along with the commensurate personnel, travel and subsistence, and related costs associated with the ‘project management’ of this fraught solution. An estimate of the overall wastage of Commonwealth resources s would put the amount, conservatively, at well over half a billion dollars.

Major Risks and Issues.

Two major risks/issues are recorded for both Phase 2 and HACTS under '*There is a Chance...'*. Remedial action in all cases is contract centric. Under project management procedures, each 'risk' would be classified as a problem or a risk and if a risk, the classification of that risk and the manner in which it will be managed under project management procedures.

Key Lessons Learned.

These generally relate to what contractors are to do and contract management activities. Many of the activities recorded are DMO Project Office functions, as DMO carries accountability for the visibility and control of all project/engineering/risk/IV&V activities.

COMMENTS ON 2009-10 MPR

This MPR highlights:

- ***Long-term aircraft availability may be affected by fatigue that will impact aircraft capability.***
- ***The capability of the Project Office will be affected by the loss of critical staff.***
- ***The inner wing aft closure rib will not achieve its full life.***
- ***A lack of repairable items, which should have come under a project sub-plan for sustainment.***

Lessons Learned

These relate to the need for integrated teams, and better contract management, which would normally come under Project/Engineering Management, but have been given Categories of Systemic Lessons of: Governance, Resourcing, Schedule Management and Contract Management.

The loss of Project Office skills is in line with the continuing de-skilling of local, especially RAAF, skills and competencies as Hornet engineering, maintenance management and supply support moves off-shore under DMO's total system support contracting methodology.

While shown as on schedule, the project still faces risks.

COMMENTS ON 2010-11 MPR

The comments above are still pertinent to this project. The project does not have major Materiel or Capability milestones, so progress is not possible to identify or measure.

This MPR notes that long-term Hornet availability (and capability) may be affected by structural damage outside the scope of the project. The inner wing rib modification is also of concern in that it may not provide the life extension expected.

This project continues to encounter risks and problems that should have been identified and managed under normal project and systems engineering management methodologies. It also heralds a range of risks inherent in Defence's decision to abandon the highly competent fatigue monitoring and rectification organisation that had been built up within the RAAF and DSTO in favour of outsourcing the function to the aircraft manufacturer.

C-17 GLOBEMASTER HEAVY AIRLIFTER

General.

This project lost about a year because essential operational equipment was not delivered with the aircraft, as it would normally have been under pre-DRP/CSP RAAF management.

This failure indicates poor or absent project management procedures in that support requirements were either not identified in the operational requirement and/or support requirements specification, and were not included in the project management support plan.

Again, the risks stated and the lessons learned do not identify just how and why these things happened and how they might be avoided on future projects.

It should not take "*a couple of years to develop up the sustainment"* as DMO advised the JPCAA Hearing of 19th March 2009. Pre-DRP/CSP, RAAF showed how sustainment requirements can be integrated into Project Planning and managed such that all sustainment requirements are in place by the time an aircraft/system arrives in country.

Finally, the support contract entered into for this aircraft should be tested to see whether it provides value for money. The USAF certainly found its contract far too expensive and sought changes. Is DMO's contract costing too much?

COMMENTS ON 2009-10 MPR

This MPR states that full capability is being delayed by outstanding long lead-time support. This should have been determined, procured and delivered earlier in the project to coincide with the arrival of the aircraft, as would have happened under normal RAAF engineering management. The equipment outstanding includes: role equipment, Cargo Compartment Training Service, Ground Support Equipment, and Facilities.

Against this, the Project Maturity Score given is 67 against a benchmark of 67, a 'Traffic Light' measure of 100%, and the statement "Project activities have been achieved on schedule."

The Key Lesson Learned has been categorised as 'Military Off-The-Shelf'.

In fact, the project is now 11 months late and has a Project Risk Consequence of Major.

COMMENTS ON 2010-11 MPR

The current status of this project is confusing. While all four aircraft "*have been delivered ahead of schedule, and associated support equipment is being delivered to schedule****", "****significant project activity remains to deliver outstanding, long lead-time logistics support provisions, role equipment, a Cargo Training System, Ground Support Equipment and facilities."* ***The actual status is thus unclear.***

This project also highlights difficulties arising from now having Materiel Release Milestones as well as Capability Milestones. In this case, FMR is planned to be achieved by Jan 11, with FOC planned for Dec11, but there is no indication as to whether RAAF will be able to meet this date. The report has thus lost sight of the real objective of achieving the final operational capability.

The Key Lesson Learned merely identifies a lack of early project management in not properly identifying and planning support requirements – not a difficult task.

The effectiveness of the Defence Support Group, in terms of its technical competencies, cost, and responsiveness, is also raised.

GUIDED MISSILE FRIGATE UPGRADE IMPLEMENTATION

General.

Comments on this project were included in the author's analysis of the 2007 – 08 MPR.
This project experienced serious problems which DMO failed to identify in nature, extent, and impact, so that timely and effective action was not taken and the real lessons learned were not identified and used to good effect on future projects.

Delays in achieving Initial Operational Capability (IOC) are recorded as being 55 to 71 months, and Final Operational Capability (FOC) from 48 months to 65 months, and then only after reaching a *'pragmatic agreement with Navy'*, the nature and impacts of which are not revealed.

Major Risks and Issues.

Although all assets are recorded as having reached their FOC during December 2009, this section reports that "*There is a chance that..."*

- The Combat System Software may not meet contracted requirements.
- Upgraded systems may not have effective software support and configuration management in place.
- Upgraded systems may not have acceptable reliability and maintenance data which will impact capability and support.
- The Warfare Systems Support Centre may not be ready.
- The project may not meet current Navy Technical Regulatory requirements under the contract.
- The required Electronic Support System performance may not be met.
- The Torpedo Defence Systems integration and performance may not be met.
- The Hull Mounted Sonar may not meet performance requirements.

The remedial actions given are largely contract and outsourcing orientated. They reflect no sense of any firm project management control; for example, there is no sign of those core project management functions that relate to project planning, developing and managing the design and configuration baselines, or support requirements determination (there are many others of course). Against this background, a maturity score of 57 against a benchmark of 57 would, prima facie, seem difficult to justify.

Key Lessons Learned.

These lessons, as for the other projects reported, list the most basic competencies, without which no project should ever proceed. They are all indicative of a lack of even a basic understanding of project management and the competencies required. Peppered throughout this list are what contracts should contain and what contractors should do – hardly a word about what DMO should be doing to overcome the perceived 'risks and issues'; nothing about project/engineering/risk/IV&V management deficiencies within DMO. This project, like many, failed because it wasn't managed properly by people with the required management structures and competencies – it was managed by generalists using contract and business processes.

There is much to learn from this project, especially with the Air Warfare Destroyer Project coming along, as well as early planning for a Collins Submarine replacement. However, with DMO not being a true learning organisation, and being focussed on contract administration and process rather

than project management and engineering, what is seen in these PDSs can be expected to continue.

COMMENTS ON 2009-10 MPR

This MPR advises that further significant problems have been encountered. The nine lessons learned exemplify a lack of rigorous and relevant project and engineering management skills and competencies. However, they have been given Categories of Systemic Lessons of:

- ***Requirements Management.***
- ***Contract Management.***
- ***Schedule Management.***
- ***First of Type Equipment.***

On present planning, this project will be at a Risk Consequence Level of Severe/Catastrophic for 7 years.

COMMENTS ON 2010-11 MPR

Following "*A pragmatic agreement with Navy****", and*** *"enabling a three-phased 'incremental' approach for IOR as operational release****", this project has almost staggered to some sort of finish line, although several Project Issues relating to the Electronic Support System, the Underwater Warfare System, and the Hull Mounted Sonar remain.***

The changes that have occurred with this project make performance against planning difficult to untangle (See Pages 323 and 324). For example, the FMR is given as DEC 11 for both its originally planned and the achieved milestones, and the same date appears as both the planned and achieved dates for the FOC. An amazing achievement when, in reality, the operational release finally agreed upon varied from the original capability planning dates as follows:

Ship	*Planned Date*	*Achieved Date*	*Months Late*
Sydney	*JUL 04*	*JUL 11*	*84*
Melbourne	*DEC 04*	*JUL 11*	*79*
Darwin	*JUN 05*	*JUL 11*	*75*
Newcastle	*DEC 05*	*JUL 11*	*67*

Cost and Capability Performance

For the achievement above, The DMO has awarded itself a 100% Measure of Capability Performance, and a Cost Performance that "*remains within the current approved project budget****", neither of which gives a confident measure of performance.***

This project demanded tight project and systems engineering management. That this was absent is reflected in the above.

HORNET STRUCTURAL UPGRADE PHASE 3.2

General.

The comments relating to the Hornet Upgrade Phase 2 Project relate also to this project.

Major Risks and Issues.

The Major Risks and Issues recorded relate to the unknown impact of fatigue damage and the lack of maintenance managed items to support the new aircraft configuration. The latter points to the failure to maintain close attention to the changes taking place in the aircraft's configuration baseline – a project management responsibility, to calculate the variations to fly away kits and maintenance pipelines, and ensure that timely notice is given of the new supply requirements- all tasks previously done by RAAF as a matter of course.

Of major longer-term concern is the fatigue state of RAAF aircraft and the soundness of future fatigue monitoring programmes as a result of DMO policy to include fatigue management in the maker's sustainment contract. RAAF and DSTO had an envious reputation for the fatigue management of Australia's military aircraft, a function now dispersed and outsourced. Defence/DMO will, hopefully, learn quickly that aircraft manufacturers face a problem in monitoring the unique fatigue spectra, fatigue damage and fatigue lives of each RAAF aircraft. The results can, in the extreme, impact flying safety (airworthiness), as well as Australia's air combat capability. Fatigue management of Australia's military aircraft should remain in Australia and be managed closely by Australians.

Key Lessons Learned.

These miss somewhat the objective of recording lessons learned for use in refining/changing management policies, systems, and procedures.

COMMENTS ON 2009-10 MPR

Key Lessons Learned

These relate to:

- ***The management of repairable parts.***
- ***The cost savings stemming from DSTO data re the centre barrels.***
- ***The additional work potential with ageing systems.***

The Categories of Systemic Lessons given them are: Schedule Management and Requirements Management.

This project is still doubtful in regard to its cost/effectiveness and faces latent risks in fatigue management.

COMMENTS ON 2010-11 MPR

32 of 59 aircraft have been modified to SRP1D standard, the remainder being scheduled for

completion by August 2013. Completed aircraft will provide 78 to 85% of the original design fatigue life.

The ten aircraft scheduled for centre barrel replacement under SRP 2 were delivered in June 2010. These aircraft will provide up 85 to 100% of the original design fatigue life.

The Hornet fatigue status should also note Project AIR 5376 Phase 3.1, a program designed to provide 64 to 78% of the original design fatigue life.

However, the actual level of structural integrity, and thus fatigue life, of the Hornet fleet will depend upon:

- **The integrity of those structures that have not been subject to inspection/modification.**
- **The accuracy of the post-modification life extension calculations made.**
- **The effectiveness of future fatigue management arrangements introduced under Defence policies. These have the potential to raise fatigue risks in all fleets.**

BUSHMASTER PROTECTED MOBILITY VEHICLE

General.

Comments on this project were included in the author's analysis of the 2007 – 08 MPR. The Critical Design Milestones for the Vehicle Initial Review run from 12 to 26 months late, depending upon vehicle type. System Integration now runs from 6 to 26 months late, while contractor Test and Evaluation progress is from 6 to 37 months over time.

Major Risks and Issues.

As reported, "*There is a chance*" that delivery of operational capabilities may be delayed by:

- Changes due to operational feedback (now retired).
- Delays in processing Engineering Change Proposals (ECPs).
- Changes required by the need for sustained towing.
- Complex requirements in the specifications for the development of the Protected Mobility Air Defence Variant due to new operational requirements and the effects of foreign sales.

The remedial actions given consist mainly of contractual activities and enlisting 'stakeholder' involvement. However, standard project management procedures should drive approved operational and technical requirements in a closely coordinated way, and in turn monitor contractor performance in meeting those requirements at specified milestones. Variations to project planning, including those recorded as risks and issues, are then coordinated controlled through the project management system, which in turn drives any necessary contractor/contract activity. This project seems to suffer from inadequate or ineffective project management, allowing the contractor to control the project.

The fact that *"Thales has provided an undertaking to consult the Commonwealth where any potential schedule conflict arises from other customer inquiries"* reinforces this impression.

Major Project Issues.

These relate to:

- The unavailability of wiring harnesses.
- The late construction of facilities, which raises the question as what advantages accrue from having Defence Support Group become involved in a project in which they have no specialist competencies.
- Delays in processing ECPs.
- A shortage of headsets compatible with the alternative wiring harnesses procured.

Three of these four would be expected to have come under standard project management procedures. The fourth, the lateness of the facilities points to one of many unnecessary and risk-laden interfaces that exist in all Defence/DMO processes.

Key Lessons Learned.

The three key lessons learned are as recorded, as follows:

- *In the early planning phases of the project, the operational concept and functional performance requirements were not clearly defined, making it difficult to understand and undertake appropriate cost-capability trade-offs.*
- *Cost Estimating – there was a lack of industry capability to provide adequate cost estimates and inability by Defence to evaluate the validity of the cost data.*
- *Testing program – significant contingency planning should be conducted for compliance testing of a new capability.*

These all indicate a lack of the most basic competencies required before a project can even be considered, and a total absence of any project management framework. That this project was allowed to proceed with these deficiencies is damning. It was planned to fail. In short, too much reliance upon contract administration and inadequate project/engineering/risk management, and no IV&V!

COMMENTS ON 2009-10 MPR

Over the past year, the IOC and FOC for this project have slipped, the project having encountered:

- ***Delays in design approval for the SOTASip harness.***
- ***Failure of Contractor's preliminary ECA design.***
- ***Lack of Government Furnished Materiel.***
- ***Delays in the construction of facilities.***
- ***Delays in processing and implementing Engineering Change Proposals.***

All point to a problem with project management and planning, but they have been given Categories of Systemic Lessons of: Contract Management, Requirements Management, and First of Type Equipment.

Despite the delays to IOC (8 months for the PP1 and 4 months for the PP2) and FOC (37 months for the PP1 and 19 months for the PP2), DMO gives the project a perfect score against its benchmark and a 'Traffic Light' of 100% green.

The project now has a Risk Consequence Level of Severe/Catastrophic.

COMMENTS ON 2010-11 MPR

This project faces a range of Major Risks and Issues (Pages 346, 347) that may still exist when the project is planned to be closed (handed over) in 2013, which will pass problems into the introduction-into-service and subsequent sustainment phases.

The Key Lessons Learned, see above, would have been avoided had the project been managed under Project and Systems Engineering disciplines rather than Commercial (contracting) processes.

HF MODERNISATION

General.

Comments on this project were included in the author's analysis of the 2007 = 08 MPR.

Although this project records a delay of some 74 months for both Initial and Final Operational Capabilities, and 127 months for the Mobiles, the project still earns a DMO Project Maturity Score of 54 against a baseline of 55 – whatever that means.

Major Risks.

The two additional risks included in this report relate to the Fixed Network's failure to meet the contracted Grade of Service and Speed of Service, as well as inadequate software design documentation. Both problem areas are to be managed by '*working closely with, and monitoring, the contractor, both passive activities*'. There is no sign of any active project management here.

Major Project Issues.

The addition items included in this report covered:

- The Contractor's failure to meet the schedule has been 'fixed' by revising the schedule.
- Fixed Network software development had not achieved the agreed schedule.
- Contractor delays will delay completion of Mobiles upgrades beyond current project date.
- As a consequence of delays to final system acceptance, and the inability of Navy to provide needed operators, the project has had to get the contractor to fill the gap.

These are all indicative of a less than robust project management system.

Key Lessons Learned.

These remain unchanged from the 2007-08 MPR.

This project is symptomatic of one starting without an adequate requirements baseline, inadequate or missing project management planning, inadequate engineering skills and competencies, inadequate risk management, and no IV&V plan. Despite this, the project was allowed to proceed, relying solely upon contract administration.

COMMENTS ON 2009-10 MPR

Project Planning

Planning has undergone significant changes. The IOC was influenced by contractor delays with software development and system instability leading to deferral of operational capability. The FOC is now over five years late with some work being passed to Navy, again leading to deferral of operational capability.

The IOC is now 65 months late, and the FOC 120 months late, but DMO gives it a Maturity Score of 59 against a benchmark of 57, and a 'Traffic Light' of 100% green, with major risks and issues yet to be faced.

The project has been on the Projects of Concern List since 29th January 2011.

Lessons Learned

These include:

- ***Risks associated with the requirements instability, and importantly the statement that "A proper balance needs to be kept between proper engineering processes and contractor-perceived commercial imperatives to minimise risks that unrealistic technical programs will actually result in delays to the overall schedule."***
- ***Accessibility requirements have to be managed.***
- ***Milestone payments should be tied to deliverables with well defined objectives.***
- ***Substantial IT projects should keep abreast of emerging COTS solutions.***

All of these risks fall within the role of Project Management and integrated Engineering Management, and this project identifies and actually voices concerns about the absence of these disciplines. However, they have been given Categories of Systemic Lessons of:

- ***Requirements Management.***
- ***Contract Management.***
- ***Schedule Management.***
- ***First of Type Equipment.***
- ***Off the Shelf Equipment.***

This project has been at a Project Risk Consequence of Severe/Catastrophic and is currently assessed to be 10 years late.

COMMENTS ON 2010-11 MPR

This project still faces major risks, the new ones identified in this MPR being:

- ***Severe difficulties with the availability and integration of HF modules into LAND 121 vehicles.***
- ***Mobile upgrades delayed because of the complexity of integrating communications systems into each platform and the availability of platforms.***
- ***LAND training is inadequate.***

This project was poorly managed from its beginning, as evidenced by the first two Key Lessons Learned (Page 371. See also above comments):

- ***Risks associated with requirements instability, software development, and systems engineering were known at contract signature, but not adequately considered in contract negotiations.***
- ***A proper balance needs to be kept between proper engineering processes and contract-perceived commercial imperatives.***

Project Status

That this project is still "tracking within its approved Budget", and has been awarded a Materiel Capability Performance Score of 100% is unreal.

Unfortunately, this project was driven by Commercial (contract) processes that failed to acknowledge the need for critical project and systems engineering management before any contracting was even considered, and that this pre-contract project and engineering activity had to continue uninterrupted throughout the project and into the introduction into service and sustainment phases.

This is another example of Commercial imperatives displacing critical project and systems engineering management - with the inevitable and adverse impacts upon Capability, Cost, and Schedule.

ARMIDALE CLASS PATROL BOAT

General.

Comments on this project were included in the author's analysis of the 2007 – 08 MPR.

The project seems to have been an attempt by DMO to be a 'smart' buyer by acquiring a commercial design that, seemingly, had only to be modified to meet RAN operational requirements. The chosen vessel however also required Navy to change its traditional crewing policy to fit the constraints of the commercial design.

The vessel has encountered serious design defects which have led to it being virtually 'black balled' by RAN sailors on both operational and safety grounds. Needless to say, Defence/DMO and the RAN hierarchy have lauded the vessel.

Despite this, DMO's PDS states that "*All vessels continue to meet Navy's operational requirements"*.

Progress to FOC.

The project is now 33 months late, due to outstanding defects. FOC is now estimated to be 2011.

Major Risks and Issues.

These are recorded, as follows:

- *Navy standards are different to commercial standards resulting in a risk to customer acceptance.*

- *Contractor inability to provide support vessels throughout the life of the in-service phase of the contract (performance risk).*

One would expect Navy to have had such risks well in view and under tight control at least ten decades ago!

Lessons Learned.

Both of the Key Lessons Learned are simply generic, and are symptomatic of a failure to follow established project management, engineering management, risk management, and IV&V methodologies from the beginning of this project to the end. This project highlights the the capital risks accepted by DMO in embarking on a project of medium complexity, relying wholly upon contract administration for its management. The project has cost Australia much in time, money, and compromised and late capability requirements, but there is no sign in this PDS that any real lessons have been identified and digested.

COMMENTS ON 2009-10 MPR

The Initial Operational Capability (IOC) dates for each of the boats were not specified by Navy until after acceptance of the boats for reasons not explained. The Final Operational Capability (FOC) date has now slipped a further three months due to latent defects requiring the boats to go through a rectification program. The FOC now given for this project is 3 years late.

Lessons Learned

These emphasise:

- ***The schedule did not allow time to determine the modifications needed to meet requirements, leading to a dynamic design baseline throughout the production phase that resulted in complication, expense and inefficiencies. This is given a 'Category of Systemic Lessons' of 'First of Type Equipment'.***
- ***Failure at project inception to determine Navy standards that the commercial vessel had to satisfy. This is given a 'Category of Systemic Lessons' of 'Requirements Management'.***
- ***Combining the acquisition and support of the fleet in one contract led to disputation and complications in managing defects where the prime contractor is not the ship builder. This is given a 'Category of Systemic Lessons' of 'Contract Management'.***

There is not one mention of inadequate project management, or the absence of sorely-needed operational and engineering skills and competencies to drive the project – as well as the contract. The Category of Systemic Lessons attributes these lessons learned to First of Type Equipment, Requirements Management and Contract Management.

This project demonstrates a lack of even a basic project management organisation with the relevant operational and engineering skills and competencies.

The contract-centric management approach adopted for this project has failed on every count and is still failing to this day, and yet DMO awards itself perfect Measures of Effectiveness Score of 100%.

This project highlights almost every lesson in how not to manage a technology-based acquisition, especially a military one. It also demonstrates the uselessness of DMO's 'Lessons Learned' approach in obtaining management feedback.

The project has a Risk Consequence of Severe/Catastrophic, and is currently assessed to be 3 years late.

COMMENTS ON 2010-11 MPR

This project continues to rectify shortcomings embedded by early commercial management decisions and actions.

The project represents a good case study of the serious problems that will inevitably result from a wholly inadequate (or absent) focus upon project and systems engineering management. However, none of the problems encountered has been sheeted home to this deficiency, so no real lessons have been learned.

COLLINS REPLACEMENT COMBAT SYSTEM.

General.

Comments on this project were included in the author's analysis of the 2007 – 08 MPR.(1)

The project is recorded as now being six years behind schedule, which represents a significant part of the boat's life of type.

The operational capability of the Collins submarine depends upon the quality and reliability of its Combat System. One would thus expect everything possible would be done to select and commission the best system available. Unfortunately, for Australia's security, and the risk to those RAN members who will man and operate these boats, and be exposed to the hazards of war when required, the management of the Collins Combat System has to be condemned.

In response to the dilemma, DAO/DMO had reached in relation to the Combat system originally specified, an innovative South Australian SME accepted the risk and developed a combat system for the Collins submarine that was provided to Defence and has been installed on one of the boats for years.(2) This Australian designed combat system has never failed, can do more than the system selected, and costs a fraction of the very expensive American system. (3)

However, the locally designed system was ignored. Defence, DMO and Navy selected the American design because the US Navy threatened to cut off Australia's access to intelligence information if they did not commit to the American system. The American system has cost Australia hundreds of millions of dollars in addition to the hundreds of millions of dollars wasted on the original failed system. The system selected still fails to meet requirements, even after these were downgraded to 'help it across the bar'.

In the case of the Collins Combat System, Defence/DMO have weighed in their balance whether to accept a second rate combat system at remarkably high cost so as not to ruffle the feathers of our sister nation (or one of its Services), against accepting a locally-developed system that has proven to be far more capable and reliable than the US system, far less costly, and able to be developed further and supported in Australia. That they have selected the former alternative indicates clearly that the security of Australia and the safety of our Naval crews run a poor second on their scale of values.

References:

(1) E.J. Bushell, *Unsolicited Submissions Regarding ANAO Defence Materiel Organisation Major Projects Report 2007-08, 18th March 2009. Copies sent to ANAO and JPCAA.*
E.J. Bushell, Comments on the JPCAA Hearing of 19th March 2009 Into the ANAO Report Into DMO Major Projects, 15th April2009. Copies sent to ANAO and JPCAA.

(2) <http:/www.acres.com.au/favicon.ico>

(3) <http:/www.raytheon.com/business/rtnwcm/groups/public/documents/content/rtn_bus_ids_prod_anbygl_pdf.pdf>

COMMENTS ON 2009-10 MPR

Lessons Learned

These relate to:

- ***Ensure adequate staffing is available, particularly if DMO is to be the prime system integrator.***
- ***Ensure project dependencies are established before the schedule is established.***
- ***Identify requirements for technical data and technology as early as possible.***
- ***Project management, cost, schedule and schedule risk are introduced in a joint development project.***

All of these are project management functions, but DMO has given them Categories of Systemic Lessons of: Resourcing, Schedule Management, Requirements Management, and First of Type Equipment.

No further comments are deemed necessary as a result of the 2009-10 MPR.
The project is still assessed as being six years late, but the DMO Project Maturity Score is a perfect 100%!

COMMENTS ON 2010-11 MPR

The comments made above still apply to this project.

The project's history should be read against the Collins Class Sustainment Review, Phase 1, dated 4th November 2011. This identifies some of the major factors behind the mismanagement of this fleet over the past decade or more.

NEXT GENERATION SATCOM
(2009-10 Major Projects Report)

General

This project started well, as it was done in partnership with a US program. However, difficulties have now arisen in relation to the ADF's access to satellite communications technology and matters associated with mutual liability and disclosure of information.

The project struck significant delay when engineering, test and certification tasks were encountered, relating to:

- ***Managing the program within the constraints defined in the Joint Production Operations and Support Memorandum of Understanding that Defence has entered into.***
- ***The risk shared by the Commonwealth for satellite failures and schedule overruns.***
- ***Management of the technical and commercial complexities to ensure necessay insight into the WGS program.***
- ***The development of project management documentation.***
- ***Management of the engineering and testing required for WGS certification.***

In general, this project demonstrates the difficulties that arise when firm project and engineering baselines have not been established before contract committal. It is a good example of the adage that 'it is far better to stay out of trouble than get out of it'.

Lessons Learned

These relate to:

- ***Ensuring local SME Companies do not underestimate the technical and resource requirements of a project.***
- ***The need for strengthening the governance process.***

While given Categories of Systemic Lessons of Resourcing and Governance, both fall into simple project planning tasks under project management procedures.

At present, the project is assessed as having a risk consequence of Major with the potential to become Severe/Catastrophic.

COMMENTS ON 2010-11 MPR

This project continues to meet problems, especially with the increased engineering effort and the certification testing involved.

The Test Readiness Review and Acceptance Milestones continued to slip over 2010-11, mainly because the configuration of the twp Anchor Platforms were sufficiently different to require separate certification, thus needing a more extensive and demanding level of engineering effort. In addition, IAS West acceptance was delayed 11 months because of certification and acceptance problems.

This project would have benefited from more robust Project and Systems Engineering effort before contracts were let.

OVERLANDER VEHICLES AND TRAILERS
(2009-10 Major Projects Report)

General

The critical design baselines for the various LLC (Light Vehicle) configurations are progressing, with delays of one to 13 months. No baseline has been established for the MHC (Heavy Vehicles) at this stage. The Readiness Reviews and Functional Configuration Audits are also showing delays of up to 13 months. Despite this, the IOC and FOC are unchanged. These areas are covered in the Major Project Risks. These risks state that 'the MHC Initial Operational Capability required by the Acquisition Agreement has been affected by the MHC resubmission activity process leading to an impact on schedule'.

Lessons Learned

These identify:

- ***Costly and time consuming Contract Change Proposals due to requirements variations.***
- ***The time required to negotiate contracts for the project.***
- ***Pressures to compress the Schedule require key decisions to be taken to achieve the aim.***

While each of these comes under project management, they have been given Category of Systemic Lessons of: Contract Management, Schedule Management and Resourcing.

In regard to the problems of changes in requirements and the resulting costly and time consuming Contract Change Proposals CCPs), such changes have to be scoped under standard project engineering procedures before contract changes can be identified, but they seem to be coming solely under contract management processes, with unsurprising consequences.

This project will encounter many challenges that will require a level of sound and tightly integrated operational, project and engineering management that appears not to exist.

The project is reported to be on schedule, but achieving full capabilities on schedule will present considerable challenges.

The report gives this project a 100% green 'Traffic Light', which seems optimistic at this stage.

COMMENTS ON 2010-11 MPR.

This project has encountered problems similar to those faced by most DMO Major Projects that require any degree of project/systems engineering management competencies (See Page 236).

Project LAND 121 Phase 3 was added to the Projects of Concern List in 2010-11.

The Major Project Risks now recorded (Page 243) include:

- ***MHC Seven factors are identified, including C4Icomputer requirements integration difficulties, changes to the specification arising from design/development changes, increases in introduction into service costs, compliance with regulatory requirements, equipment and personnel shortages hindering training.***

- ***LLC Eleven factors are recorded, including air drop capability uncertain, absence of Technical Publications, cost increases, parts supply, compliance with regulatory requirements, achieving specification requirements, and integration of new capabilities.***

Key Lessons Learned:

These have expanded from three to six, adding:

- ***The need to include training staff in early project planning.***
- ***The interface requirements between the vehicle and the trailer were not recognised.***
- ***Despite pressures to rush the project, manufacturer's claims must be verified before contracts are let – especially as equipment becomes more complex, with computers, electronic control systems, and on-board diagnostic capability equipment.***

All six Lessons Learned indicate inadequate project and systems engineering management applied throughout the project. In short, the DMO has neither identified nor learned the real lessons that the PDSS highlights.

ANZAC SHIP MISSILE DEFENCE 2B
(2009-10 Major Projects Report)

General

This project has encountered major problems, all indicative of DMO's entrenched difficulties in the management of projects having any degree of complexity, especially where system integration is involved. Considerable delay has resulted from difficulties arising from decisions surrounding the choice of the Phased Array Radar. This may have been avoided had a robust engineering evaluation and risk analysis of this system been conducted.

Lessons Learned

These relate to:

- ***Technically complex and risky developmental projects, especially with integration requirements, require a prototype to be developed for proving the capability before acceptance.***
- ***Adequate communications between those involved is needed to ensure that a common understanding of project status is maintained.***

While both lessons both go the heart of Systems and Project Engineering Management, they have been given Categories of Systemic Lessons of First of Type Equipment and Governance.

Capability Status

Major capability risks still face this project, but DMO"s Measures of Effectiveness is scored at 100%.

While this project has been reduced from an eight ship program to a single ship program, the IOC is 18 months late and the FOC over four years late, meaning that it has a Risk Consequence of Severe/Catastrophic.

COMMENTS ON 2010-11 MPR

The Final Operational Capability for this project has slipped further to become 57 months late, due to "movement from an eight ship program to a single ship program" (Page 414). The project has been a Project of Concern since June 2008.

This project is another case study of what will inevitably go wrong when project and systems engineering management are not used to drive the project.

FOLLOW-ON STAND OFF WEAPON
(2009-10 Major Projects Report)

General

This project is now two years late and still has to overcome risks associated with:

- ***The ability to conduct OT & E in Australia.***
- ***Certification being affected by not meeting airworthiness requirements.***
- ***Failure to achieve acceptable capabilities.***
- ***Integration into the Hercules.***
- ***Non or partial release of USN/USAF data.***

Lessons Learned

- ***These relate to Integration complexity due to interfaces in ageing platforms.***
- ***Incorrect Interface Control Documents.***
- ***Host platform upgrades required.***
- ***Inadequate project staff.***
- ***Problems when the US capability is still being developed, while Australia is the the integrator.***

These all identify inadequate or absent project and engineering management. However, DMO sees them as arising from First of Type Equipment (3), Requirements Management (1), and Resourcing (1).

The project IOC and FOC are both two years late, which gives a Risk Consequence of Severe/Catastrophic. DMO, however, gives itself a Measure of Effectiveness Score of 100%!

COMMENTS ON 2010-11 MPR

Both the IOR and FOC remain two years late, but the materiel releases are as originally planned and show no delay, which makes the Materiel Release and Capability Milestones difficult to reconcile. The project was added to the Projects of Concern List on 26th November 2010.

This MPR includes a further seven Major Risks and Issues:

- ***Delay in obtaining approval to conduct Operational Test & Evaluation in Australia.***
- ***JASSM certification being affected by software/data testing.***
- ***Lack of skilled and experienced staff.***
- ***Integration difficulties.***
- ***JASSM test difficulties.***
- ***Lack of mission planning infrastructure.***
- ***Software incompatibilities.***

Difficulties were also encountered with USAF JASSM test firings during January 2011 (Major Issues, Page 484).

Despite this, the DMO awards itself a Project Maturity Score of 58 against a benchmark of 57, and a Materiel Capability Performance of 100%! This project demonstrates all the hallmarks

associated with the absence of any proper project and systems engineering management effort.

ANZAC ANTI-SHIP MISSILE DEFENCE 2A

(2009-10 Major Projects Report)

General

Major risks and issues being encountered include:

- ***The radar may not meet performance requirements.***
- ***Operational requirements may not be achieved.***
- ***The system supplied may reach obsolescence before additional ships are modified.***
- ***Technical problems have delayed factory testing for six months.***

Lessons Learned

These identify:

- ***"Adequate implementation of Project Systems Engineering processes. In light of this, the ASMD Project has rigidly followed a disciplined systems engineering process that has ensured the complete traceability from requirements through to final acceptance testing".***
- ***"Ensuring that Stakeholder engagement at all levels (Engineering and strategic) is culturally embedded within the Project Team."***

These are only parts of a Project and Systems Management approach, but have been given a Systemic Lesson Category of 'Requirements Management' and 'Contract Management', with no mention of project/engineering management as a lesson category. The 'rigid and disciplined systems engineering process promised by DMO are merely words without substance and will never eventuate under current contract-centric management processes. The need is for professional project/engineering management, not contract administrative process.

Capability Status

The IOC for this project is now 39 months late and the FOC 64 months late. The project has thus been at a Risk Consequence of Severe/Catastrophic for over three years. However, DMO gives it a Project Maturity Score of 55 against a benchmark of 55, and a Measure of Effectiveness of 100%!

COMMENTS ON 2010-11 MPR

This project continues to slip, but the reasons behind the current IOC delay of 40 months and the FOC of 72 months, indicate problems in a number of areas:

- ***The affects of linking Phases 2A and 2B.***
- ***Government/Defence approving a change in acquisition strategy for Phase 2B.***
- ***DMO functions.***
- ***The time taken by the ANZAC Systems Support Centre to conduct acceptance testing.***

However, the specific impacts in each area are not possible to identify and measure. In particular, the DMO's statement that it "...*has rigidly followed a disciplined systems engineering process..."* ***needs to be evaluated in terms of:***

- ***What "systems engineering process" was followed?***
- ***How was it implemented and managed, and by whom?***
- ***To what effect?***

COLLINS CLASS SUBMARINE
RELIABILITY AND SUSTAINABILITY
(2009-10 Major Projects Report)

General

The deficiencies in Collins boat capability, reliability and sustainment did not arise overnight, but have accumulated over more than a decade. The central question is why they were seemingly not identified, qualified and quantified under a disciplined Defect and Failure Reporting System and made the subject of a planned rectification programme, tightly coordinated with operational plans – the manner in which naval systems were managed when Navy possessed a Chief of Naval Technical Services?

The current situation confirms, very expensively, that the Defence Reform Program and the Commercial Support Program have left Navy without the engineering and maintenance skills and competencies required to operate and sustain its maritime capabilities. It also confirms the failure of the Australian Submarine Corporation's Through-Life Support Agreement to provide timely, efficient and effective support of one of Australia's primary military capabilities. It also raises serious concerns that similar support contracts being entered into by DMO have the potential to go the same way under current Defence/DMO management.

Project Context

This notes that in 1999 Government sponsored the 'McIntosh and Prescott Report' into submarine capability, which was followed by a review by the Head, Submarine Capability Team. Given the parlous situation that developed unchecked over the following decade, this Government, Defence, and DMO approach must be assessed as a serious failure.

The scope of work under this project covers 24 system upgrades, two of which will be new capabilities, the remaining 22 being engineering 'enhancements'. Such a challenge would suggest that a robust project and engineering management approach was required, whereas the project proceeded under the DMO's usual contract centric approach - with the usual results.

Lessons Learned

These identified:

- ***A lack of clarity of capability requirements and proper funding before planning started.***
- ***A lack of submarine maintenance schedule coordination with the project.***
- ***Problems with long-term, sole-source, cost-plus contracts.***

These in turn have been given Categories of Systemic Lessons of Requirements Management, Schedule Management, and Contract Management. In fact, all fall within the role and function of Project Management.

Capability Planning

The IOC for this project is currently 14 months late and the FOC 8 ½ years late, meaning that the Risk Consequence for the project (if FOC is achieved as planned) will have been Severe/Catastrophic for 6 ½ years. Despite this, DMO has awarded itself a Measure of Effectiveness of 100%!

The project can be classed only as an expensive failure with horrendous consequences for Navy as well as Australia's security and international reputation.

COMMENTS ON 2010-11 MPR

This project continues to track with a Final Operational Capability of up to 72 months late, reflecting the inevitable consequences from having inadequate project and systems engineering management, a lack of relevant technical expertise and effort, and an absence of good governance.

The project can be described only as a disaster for Defence, the DMO, Navy, and for Australia's maritime security, yet it still awards itself a Project Maturity Score of 53 against a benchmark of 50, and a Materiel Capability Performance of 100%!

This report must be read against the Collins Class Sustainment Review released on 4th November 2011, which identifies some of the major underlying factors involved.

This project provides another good case study of the ineffectiveness of Defence's 'business' model for the management of Australia's Military Services, as well as their capability requirements and sustainment. It also provides a good case study of the inevitable affects of inadequate or absent project and systems engineering management, a lack of required technical expertise and effort, and the absence of good governance, all of which may be traced back to the use of Commercial processes to manage projects that demand robust and continuing project and systems engineering management before any commercial considerations should ever arise.

REPLACEMENT HEAVYWEIGHT TORPEDO
(2009-10 Major Projects Report

General

This project reports a three month delay in IOC and a two month delay in FOC depending upon obtaining timely response from external agencies

Lessons Learned

These point to:

- ***A lack of adequate staffing at project commencement.***
- ***All project dependencies should be established before the Schedule is established.***
- ***Identify Technical Data and technology requirements are identified early to ensure deliver in time.***
- ***Joint development projects introduce project management, cost, technology and schedule risk.***

DMO allocates these to the Systemic Category Lessons of Resourcing, Schedule Management, Requirements Management, and First of Type Equipment. , whereas all come under the umbrella of Project Management, which was clearly missing.

History

This project status should be read in conjunction with ANAO's Lightweight Torpedo Replacement Report No 37, 2008-09, which found:

- ***"Initial costing of Phase 2 of the JP2070 was not sufficiently rigorous or subject to adequate scrutiny.***
- ***Project planning and management was inadequate, and in some instances key documents were either not developed or were not developed on a timely basis.***
- ***The decision to use alliance contracting arrangements... was not based on structured analysis of contractual options, and once implemented was not adequately supported.***
- ***An inadequate understanding of the weapon and its developmental status ...contributed to an underestimation of project risk.***
- ***The risk involved in integrating the weapon into multiple platforms was acknowledged, but not fully appreciated at the outset. The cost to integrate was underestimated significantly.***
- ***The planning of testing and acceptance, and the resolution of testing and acceptance issues ...has been inadequate."***

All of these are symptomatic of a lack of core skills and competencies in project and systems engineering management, and the use of commercial-centric processes as the primary management focus.

COMMENTS ON 2010-11 MPR

While this appears to have been a straight forward project, two additional Major Project Risks have arisen:

- ***The FOC may be affected by non-compliance with the Certification Basis.***
- ***Transition to in-service support may be more complicated than planned.***

Even these seemingly straight forward projects demand sound project and systems engineering management from the earliest stages.

NEW AIR COMBAT CAPABILITY (JSF)

(2010-11 Major Projects Report)

General

This project covers the acquisition of not less than 74 aircraft. Stage 1, Phase 2A/B introduces the first batch of 14 aircraft – 10 to remain in the US for flying and maintenance training, and two to go to Australia for operational test and evaluation.

Major Risks (Pages 266-267).

These include:

- **Insufficient pilots and technicians for initial training and acceptance into service.**
- **Technical risks.**
- **US 'Programmatics'.**
- **Production Costs.**
- **System Integration.**
- **Logistics Support.**
- **US Government Release Approvals.**

Key Lessons Learned (Page 269).

These refer to the need to establish a robust requirements management regime, identifying three processes aimed at achieving this, as well as effective risk management mitigation.

Management Approach.

Since the inception of this project, Defence has accepted, seemingly without question, the marketing that has been generated by the manufacturer and the US Project Office. Despite a series of increasingly critical reports coming from various US Governance authorities, Australia's commitment to the JSF has been unwavering and unquestioning. As the pressures from such reports increased, both US and Australian Defence and Military bureaucrats have retreated to the defence of '*The project is too big to fail*', and '*There is no alternative*', neither of which is true.

The outcome of the JSF Project will be determined by the laws of physics, not by any political/commercial/bureaucratic imperatives. The A12 Avenger Project was also 'too big to fail', but it did, and for much the same reasons that now threaten the JSF Project. Furthermore, both Defence and the DMO have been provided with independent and robust analyses of the JSF Project, but these seem to have all fallen within the Major JSF Project Challenge of "*Appropriately manage JSF misinformation in the media*". Certainly, all attempts to raise questions about the project have been ignored or rebuffed.

The JSF Project demanded competent and robust project and systems engineering analysis and management from its inception, much along the lines that the Air Member for Technical Services at the time provided for the F-111 Project. His independent evaluation of that project and the critical problems that beset it enabled the early identification and successful management of the risks involved. Because that capability was stripped from the RAAF under the DRP/CSP, the risks associated with the JSF project are now all maturing.

FFG UPGRADE

SM-1 MISSILE REPLACEMENT.

(2010 – 2011 Major Projects Report)

This project has not attracted the same difficulties as those that embody any engineering and/or integration challenges.

However, the MPR warns (Page 381) that:

- ***The installation and test program may be affected by the availability of upgraded FFGs and Target/Range services in Australia.***
- ***Project delivery and timing will not be met if appropriately qualified and experienced project staffs are not recruited.***

The project also highlights the considerable effort and expertise (Page 383) needed to assess adequately contract performance under Earned Value Contracts.

As with other projects, Contingency funding has had to be used to 'manage' project risks not identified due to the absence of project and systems engineering management.

This project would have benefited from proper project and systems engineering management before any commercial (contracting) activity took place. This would have enabled project and technical risks to be identified early and managed appropriately.

ADDITIONAL MEDIUM LIFT HELICOPTERS

(2010-2011 Major Projects Report)

Although in the early stages, and a project type handled successfully by RAAF pre- DRP/CSP, the MPR identifies eleven Major Project Risks (Pages 390, 391).

The Key Lessons Learned (page 393) point to:

- ***The transfer of the majority of project management to the US Government agency increases exposure to a level of risk and complexity, technical, schedule and cost, often understated.***
- ***The level of Commonwealth contract management is relatively low. A robust project contract management interface with the US Government agency is essential.***
- ***The early presence of adequate project staff (before second pass approval) is necessary.***
- ***The project workforce is impacted by Service posting cycles and delays in filling vacancies.***
- ***Much can be achieved by combining/co-locating the project acquisition team with the in-service support organisation.***

This project attests to an absence of timely and appropriate project and systems engineering management

INDIAN OCEAN REGION SATCOM

(2010-11 Major Projects Report)

While seemingly straightforward, the MPR identifies 15 Major Risks and Issues, so the success of the project is not possible to measure at this time. Such projects tend to encounter serious problems as technical, integration and certification stages arrive.

ARTILLERY REPLACEMENT PROJECT

(2010-11 Major Projects Report)

Despite being a straight forward procurement, the DMO foresees a range of Major Challenges related to:

- ***Mission System Architecture interoperability.***
- ***Integration and interoperability with:***
  - ***Army vehicles, and ADF aircraft and Navy vessels (Technical).***
  - ***ADF systems using different platforms, standards, and protocols(Technical).***
  - ***Intellectual property restrictions.***
  - ***Test and certification scheduling.***
  - ***Hardware and software sustainment over the life of type.***

The MPR also lists five Major Project Risks and three Major Project Issues.

Although seemingly straight forward, the need for tight and continuing project and systems engineering management is clearly evident.

BATTLEFIELD COMMAND SYSTEM

(2010-11 Major Projects Report)

This is another seemingly straight forward project, but is still likely to face problems with:

- ***The contractor accessing Government Furnished Equipment (GFE), when required, both in the US and Australia.***
- ***Achieving design approval due to the number of platform design authorities involved.***
- ***Integration of the BMS with external systems.***

The project also records eleven Major Project Risks and four Major Project Issues (Pages 505-506), which will require an effective project and systems engineering management organisation to handle.

PROJECT RISK CONSEQUENCES ***ATTACHMENT 1 TO ANNEX C***

(BASED UPON DMO MPR 2008-09, UPDATED TO REFLECT DMO MPR 2009-10)

As with other Australian and International Standards, DMO has re-invented those Standards relating to risk. For example, the Australian and International Standards define the highest level of consequence as '***Catastrophic***', while DMO defines it, euphemistically, as '***Severe***'. At this risk level, the consequences are defined by DMO as:

- Causing loss of life,
- Supplies functionally unfit for their intended purpose.
- Supplies are unsupportable.
- Defence attracts media attention, or a commission of inquiry is launched.
- Would cause the specified in-service date (of the **IOC) to be missed by more than twelve months**.
- Would cause the in-service date for **the FOC to be missed by two or more years.**
- Would cause the total actual contract costs, taking into account liabilities incurred by the Commonwealth, to exceed currently approved cost provisions by >10%.

DMO then defines the next lower level of consequence as '***Major***', the consequences being as follows:

- Would cause serious casualties resulting in the long-term physical impairment of personnel.
- Would cause the supplies to be only partly functionally fit for purpose (i.e. degraded ability to perform some core missions or essential tasks or unable to perform non-core missions or tasks, and there are no known workarounds).
- Would cause the supplies to be unsupportable in low-tempo operations or for short periods of time due to a deficiency in a fundamental input to capability. There are no known workarounds.
- Defence attracts adverse media attention or an investigation is launched.
- Would cause the specified in-service date **(IOC) to be missed by 6 – 12 months**.
- Would cause the date for the **FOC to be missed by between one and two years.**
- Would cause the total actual contract costs, taking into account liabilities incurred by the Commonwealth, to exceed currently approved cost provisions by 5-10%.

The inclusion of media criticism as a risk consequence leaves the whole risk management process open to bureaucratic distortion/misinformation on the grounds that the truth may 'damage' the Department's reputation. For example, the manner in which late/over-costly/ capability deficient projects might be managed.

Within both Major Projects Reports to date, no reference is made to any actual risk levels and consequences in accordance with any Risk Standard.

PROJECT	TYPE OF CONTRACT	FORM OF CONTRACT	IOC PLANNED	IOC CURRENT	FOC PLANNED	FOC CURRENT	COMMENTS
AIR WARFARE DESTROYER - 3 AWDs + SUPPORT SYSTEMS - PLATFORM DESIGN - 3 AEGIS SYSTEMS	VARIABLE (Pain/Gain Share) FIXED (With Ind Escalation) FMS	ALLIANCE BASED (Raytheon/ASC AWD & Navantia) FMS	JUN 16	JUN 17	DEC 18	01/12/19	Currently 1 year late, risk consequence now **Major**, but has the potential to reach ***Severe/Catastrophic.***
BRIDGING AIR COMBAT CAPABILITY – F/A-18F	FMS	FMS	DEC 10	DEC 10	DEC 12	DEC 12	Currently shown as on schedule, but see PDS analysis for potential operational risks
MULTI ROLE HELICOPTER	VARIABLE	ASDEFCON (Strategic)	JUL 10 (N) APR 11 (A)	DEC 11 (N) OCT 12 (A)	DEC 12 (N) JUL 14 (A)	DEC 12 (N) JUL 14 (A)	IOC for both versions about 18 months late. IOC risk now at ***Severe/Catastrophic*** level**.**
AEW&C	VARIABLE	DEFPUR 101	DEC 07	JUN 12	DEC 08	DEC 12	FOC for limited capability now 4 yrs late. Risk consequence ***Severe/Catastrophic***
AMPHIBIOUS CAPABILITY	VARIABLE	ASDEFCON	JUN 15 NOV 16	JUN 15 NOV 16	NOV 16	NOV 16	Currently shown as on schedule, but inherent risks assessed at ***Major***, approaching ***Severe/Catastrophic*.**
ARMED RECCE HELICOPTER	VARIABLE	SMART 2000	JUN 07	APR 10	JUN 09	DEC 12	IOC currently 34 and FOC 42 months late. Risk consequence now ***Severe/Catastrophic***.
AIR TO AIR REFUELLING	VARIABLE	AUSDEFCON	DEC 09	Late 2010/ Early 2011 ***JUN 11 Now DEC 12***	MAR 11	LATE 2012 ***DEC 12 Now DEC 13***	IOC currently 36 and FOC 33 months late. Risk consequence ***Severe/Catastrophic***.

PROJECT	TYPE OF CONTRACT	FORM OF CONTRACT	IOC PLANNED	IOC CURRENT	FOC PLANNED	FOC CURRENT	COMMENTS
C-17 GLOBEMASTER	FMS	FMS	AUG 07	SEP 07	DEC 11	DEC 11	See PDSS Analysis for outstanding activities. FOC still to be achieved.
HORNET UPGRADE PHASE 2	FIRM/FIXED (5) TIME & MATERIALS & FIRM/FIXED (1)	DEFPUR 101 FMS ASDEFCON MIXED	APR 07 NOV 09	APR 07 AUG 11	DEC 07 AUG 11	DEC 07 JUN 12	Currently shown as on schedule, but see PDS analysis for risks. Ph 2.3 IOC now 21 months late. Ph 2.3 FOC now 10 months late. HACTS FOC now 55 months late. Risk consequence these elements now **Major/Severe/Catastrophic.**
GUIDED MISSILE FRIGATE UPDATE	VARIABLE	DEFPUR 101	MAY 03 JAN 04 JUL 04 JAN 05	JAN 10 JAN 10 JAN 10 JAN 10	JUL 04 DEC 04 JUN 05 DEC 05	JUL 11 JUL 11 JUL 11 JUL 11	The operational releases negotiated occurred 67 to 84 months late. Project risk consequence ***Severe/Catastrophic***.
HORNET STRUCTURAL PHASE 3.2	FIXED PRICE/TIME & MATERIALS (2) TIME & MATERIALS (2) FMS	ASDEFCON (3) DEFPUR (Hybrid) FMS	N/A	N/A	N/A	N/A	See comments at PDS analysis for potential fatigue risks.
BUSHMASTER	VARIABLE	DEFPUR 101	N/A JUL 07 JUL 08 OCT 11	DEC 04 MAR 08 NOV 08 OCT 11	OCT 07 APR 09 APR 12 ***APR 14***	NOV 10 NOV 10 MAR 13 ***APR 14***	Delays to PP1 to PP3 now vary from 11 to 37 months, with a risk consequence of ***Major to Severe/Catastrophic***.
HF MODERNISATION	VARIABLE	DEFPUR 101 v46	Core NOV 01	Core NOV 04	MAY 05	JUL 16	On current estimates, IOC Core is 36

PROJECT	TYPE OF CONTRACT	FORM OF CONTRACT	IOC PLANNED	IOC CURRENT	FOC PLANNED	FOC CURRENT	COMMENTS
			Final MAY 04	Final OCT 09			months and Final 65 months late. FOC now 134 months late, retaining a risk consequence of ***Severe/Catastrophic*****.**
ARMIDALE CLASS BOAT	VARIABLE	SMART 2000/ ASDEFCON	N/A	N/A	MAR 09	DEC 11 ***FEB 12***	FOC currently 3 years late, giving a risk consequence of **Severe/Catastrophic.**
COLLINS COMBAT SYSTEM	VARIABLE (4) FIRM PRICE (5) FIXED (6)	AUSDEFCOM (Strategic) (4) (Complex) (6) (Services) (1) FMS (3) Army Co-op Proj (1)	MAR 08	MAY 08	2010	2016	FOC currently 6 years late, so has been at a risk consequence of ***Severe/Catastrophic*** for many years. The operational capability being provided will remain questionable over the life of the Collins Class boats.
OVERLANDER VEHICLES	VARIABLE (4)	AUSDEFCON	DEC 13	DEC 13	DEC 19	DEC 19	Currently assessed as being on schedule, but full capabilities will present considerable challenges.
NEXT GENERATION SATCOM	FIRM FIXED (2)	MOU AGREEMENT AUSDEFCON (Complex)	IAS West JUL 09	IAS West JAN 11	IAS East JUL 09	IAS East DEC 11	IOC 19 months late and FOC is 29 months late which gives a Risk Consequence of ***Severe/Catastrophic.***
ANZAC ATI-SHIP MISSILE DEFENCE 2B	VARIABLE (2)	ALLIANCE AUSDEFCON	DEC 09	JUN 11	MAR 13	DEC 17	IOC is 19 months late. FOC 57 months late. Risk Consequence level of ***Severe/Catastrophic*** has existed for many

PROJECT	TYPE OF CONTRACT	FORM OF CONTRACT	IOC PLANNED	IOC CURRENT	FOC PLANNED	FOC CURRENT	COMMENTS
							years.
REPLACEMENT HEAVY WEIGHT TORPEDO	FIXED (2)	MOU AGREEMENT (2)	FEB 08 NOV 12	MAY 08 MAR 11	JAN 10 NOV 13	MAR 10 NOV 13	IOC is 3 months and FOC 2 months late. Project still faces risks.
COLLINS CLASS SUB - RELIABILITY AND SUSTAINABILITY	VARIABLE (COST PLUS)	STRATEGIC AGREEMENT	NOV 10 AUG 10 OCT 13 AUG 06	SEP 12 DEC 11 OCT 13 OCT 07	JUN 07 JUN 14 JUN 14 JUN 14 JUL 06	DEC 15 OCT 13 SEP 22 MAR 17 NOV 07	IOC is 14 to 22 months late. FOC delays vary from 16 to 102 months. The project has been at a Risk Consequence Level of ***Severe/Catastrophic*** for many years.
FOLLOW-ON STANDOFF WEAPON	FMS (2) FIRM FIXED	FMS (2) DCS	DEC 09	DEC 11	DEC 10	DEC 12	Both the IOC and FOC have been delayed for 24 months, which means that the project is now at a Risk Consequence Level of ***Severe/Catastrophic***.
ANZAC SHIP MISSILE DEFENCE 2A	VARIABLE	ALLIANCE AUSDEFCON	MAR 08	JUN 11	DEC 11	APR 17	IOC is 39 months and FOC 64 months late, which means that the project has been at a Risk Consequence Level of ***Severe/Catastrophic*** for nearly 3 ½ years.
NACC JSF	US GOVT	PSFD MoU	N/A	N/A	N/A	N/A	14 LRIP aircraft to be delivered from Sep 14

PROJECT	TYPE OF CONTRACT	FORM OF CONTRACT	IOC PLANNED	IOC CURRENT	FOC PLANNED	FOC CURRENT	COMMENTS
							to Dec 17.
FFG UPGRADE SM-1 MISSILE REPLACEMENT	FIRM FMS	AUSDEFCON FMS	AUG 10	AUG 10	DEC 12	DEC 12	See PDSS *comment.*
ADDITIONAL MEDIUM LIFT HELICOPTERS	FMS	FMS	JAN 16	JAN 16	JAN 17	JAN 17	See PDSS comment.
INDIAN OCEAN REGION UHF SATCOM	INTELSAT FIRM	AUSDEFCON (COMPLEX)	JUL 12	JUL 12	N/A	N/A	See PDSS comment.
ARTILLERY REPLACEMENT	FMS (US GOVT) FIXED Harris Corp Ltd	FMS AUSDEFCON	DEC 11	DEC 11	DEC 13	DEC 13	See PDSS comment.
BATTLEFIELS COMMAND SUPPORT	VARIABLE Elbit Systems Ltd	AUSDEFCON	JUL 11	JUL 11	APR 13	APR 13	See PDSS comments.