The Auditor-General
Audit Report No.36 2005–06
Performance Audit

Management of the Tiger Armed Reconnaissance Helicopter Project – Air 87

Department of Defence

Defence Materiel Organisation

Australian National Audit Office

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Australian National
Audit Office

Canberra ACT
2 May 2006

Dear Mr President
Dear Mr Speaker

The Australian National Audit Office has undertaken a performance audit in the Department of Defence and Defence Materiel Organisation in accordance with the authority contained in the *Auditor-General Act 1997*. Pursuant to Senate Standing Order 166 relating to the presentation of documents when the Senate is not sitting, I present the report of this audit and the accompanying brochure. The report is titled *Management of the Tiger Armed Reconnaissance Helicopter Project–Air 87.*

Following its presentation and receipt, the report will be placed on the Australian National Audit Office's Homepage—http://www.anao.gov.au.

Yours sincerely

Ian McPhee
Auditor-General

The Honourable the President of the Senate
The Honourable the Speaker of the House of Representatives
Parliament House
Canberra ACT

AUDITING FOR AUSTRALIA

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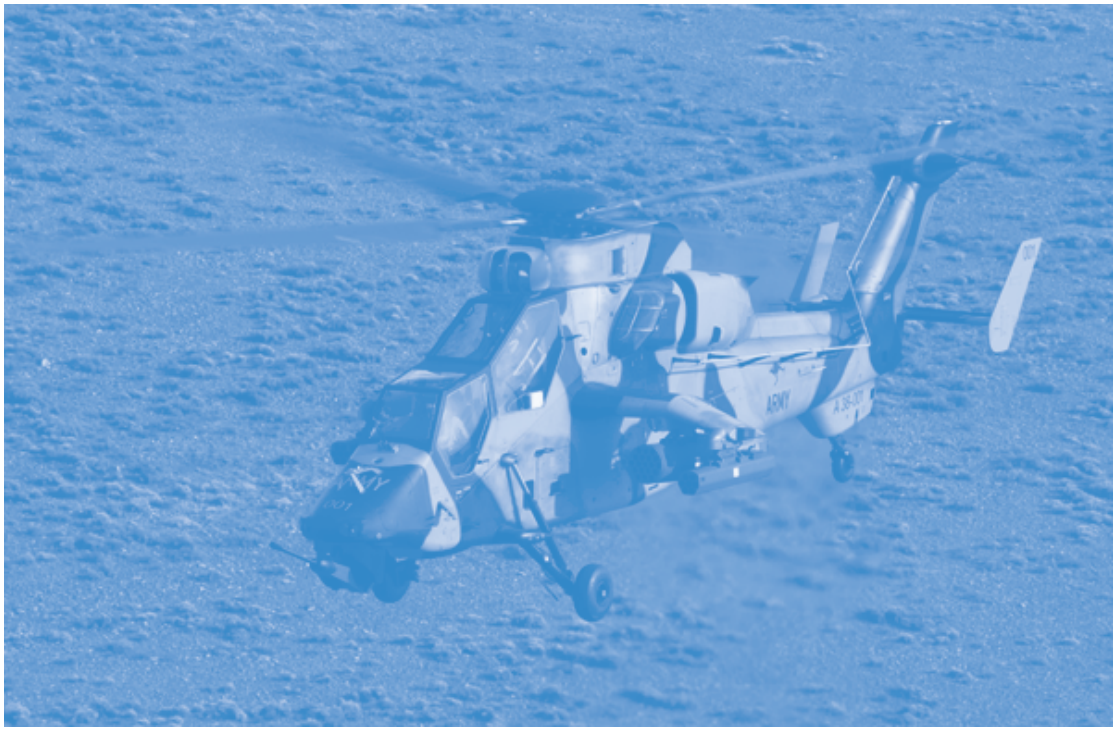
Abbreviations

ADF	Australian Defence Force
AEO	Authorised Engineering Organisation
ANAO	Australian National Audit Office
ARH	Armed Reconnaissance Helicopter
ARDU	Aircraft Research and Development Unit
DGA	Delegation General Pour l'Armament
DMO	Defence Materiel Organisation
EVMS	Earned Value Management System
ILS	Integrated Logistic Support
RFP	Request for Proposal
RFT	Request for Tender
SFP	Special Flight Permit
SMP	Software Management Plan

Summary, Key Findings and Recommendations

The Twin Engine Tiger Armed Reconnaissance Helicopter



Source: Defence

Summary

Background

1. The Tiger Armed Reconnaissance Helicopter (ARH) Project Air 87 (the Project) was approved to provide for a new, and significant all-weather reconnaissance and fire support capability for the Australian Defence Force (ADF). The Project has contracted for delivery of 22 aircraft, with supporting stores, facilities, ammunition and training equipment. The first four aircraft are being manufactured in, and delivered from France; the remaining 18 aircraft are being manufactured in France, and assembled in Brisbane. Australianisation of the weapons and communications systems is a differentiating characteristic of the Australian Tiger ARH, compared to the French Tiger Variant.

2. Major Capital Equipment Projects, such as Project Air 87 require considerable planning to successfully transition a capability from acquisition to in-service operation. This includes integration of training, logistics and operational requirements using available staff and resources. Forward consideration of these issues in administering the acquisition phase, in cooperation with the ADF, leads to the commissioning of a reliable and supportable capability, as complex as the ARH. The Defence Materiel Organisation (DMO)[1] is required to manage a high level of risk, using calculated assessments, mitigated where appropriate, and in all cases, managed and monitored on an ongoing basis. Inevitably, in some circumstances, the DMO may not fully meet the outputs required of it. The DMO advised the ANAO that if there were no shortfalls, the DMO might rightly be criticised for having an insufficient risk appetite.

3. This acquisition of helicopters was to be based on an 'off-the-shelf'[2] procurement, representing a low risk to Defence. It was intended that the Australian Tiger ARH Project would follow the French and German programs,

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1 The DMO was appropriated $7.1 billion in 2005–06 to deliver Defence capability and sustainment outcomes. Project Air 87 has a current approved budget of $1.96 billion, and is scheduled to have a capital expenditure of $440 million in 2005–06.

2 The Defence Capability Development Manual 2005 defines 'off-the-shelf' as a product that will be available for purchase, and will have been delivered to another Military or Government body or Commercial enterprise in a similar form to that being purchased at the time of the approval being sought (first or second pass).

which the DMO[3] advise were, at the time of making the choice to procure Tiger aircraft, 18 months in advance of the Australian program.

4. The DMO advised that, flying Tiger helicopter prototypes had been demonstrated prior to the award of the Australian Acquisition Contract in December 2001, although full certification, and design acceptance by the French Government, had not then been accomplished. In 2003, the DMO became aware of production and acceptance delays with supplying Tiger helicopters to France and Germany. The French Government accepted its first production aircraft in March 2005, four months after the DMO.

5. The lead Australian Tiger ARH aircraft (ARH 1 and 2) are the first of this type of aircraft to undergo production acceptance by any nation's Defence Force, and are being delivered into service as an aircraft type more developmental than that which was originally intended by the initial requirement.[4] Consequently, the DMO has been obligated to make its own assessment of over 71 unresolved design issues.[5]

6. The 1998 Defence Equipment Acquisition Strategy requirement for the capability stipulated that first prototype aircraft should be accepted by January 2003, with the first production aircraft delivered in May 2003. The original aim was to provide for one operational squadron by July 2006, with a second operational squadron by December 2007. In finalising the Defence 2000 White Paper,[6] the Government decided that the In-Service Date for the helicopters for Army should be December 2004. To advance the approval process, Government considered the Project in August 2001 for contract signature later that year.

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3 The DMO manages major capital acquisition projects through 46 System Program Offices around Australia, and was established as a prescribed agency within the Defence portfolio on 1 July 2005.

4 The DMO advised the ANAO that, of the 900 design requirements associated with the Tiger aircraft, there were 14 changes required for the Australian Tiger ARH.

5 Defence has since advised the ANAO that it has resolved these issues under the ADF Airworthiness System. At the time the recommendation was made in August 2005 for award of the Australian Military Type Certificate, of the 356 items comprising the ARH Certification Basis Description, 227 were established as acceptable, 54 were established as unacceptable, 68 had not been established (of which 63 related to aircraft stores clearance), and seven had been superseded. The Project Office assured the Airworthiness Board that all the Certification Basis Description Items not established, or deemed unacceptable were being managed via Airworthiness Issue Papers and or limitations.

6 Defence recognised that the existing light observation helicopters deployed in Timor at that time were inadequate for conducting reconnaissance missions and escorting the Black Hawk troop lift and utility helicopters.

Acquisition and Through-Life-Support Contracts

7. In 2005–06, this Project is budgeted to have the largest capital expenditure (totalling $440 million) of all DMO's 240 projects. The current total Project budget is $1.96 billion. In March 1999, the Government approved the Project with a budget of $1.58 billion. Since then, the Project budget has increased by $275.92 million as a result of price index variations; $186.46 million as a result of currency exchange rate variations; and decreased by $90.96 million, as a result of the transfer of funds to other requirements.

8. In December 2001, Defence negotiated, and signed both an Acquisition Contract of $1.1 billion, and a Through-Life-Support Contract, with a fixed price element of $410.9 million, with Eurocopter International Pacific (now called Australian Aerospace Limited, and referred to in this report as the Contractor). Through-Life-Support covers a three year pre-implementation phase (prior to In-Service Date[7] in December 2004), and a 15 year In-Service period, which took effect in December 2004, coinciding with delivery of the first two helicopters. Project funding from Air 87 caters for the first five and a half years of the Through-Life-Support period (which includes the pre-implementation phase), up until 2006–07. Defence advised the ANAO that funding to the value of $310.32 million is to be provided through capability sustainment funds for the Through-Life-Support Contract after 2006–07.

9. The Acquisition Contract comprises 126 milestone payments, and monthly progress payments based on the Contractor's Earned Value Management System (EVMS). The milestone payments, which are paid upon completion of a significant Project achievement, account for 60 per cent of the total sum. The remaining 40 per cent of payments are to be made following the DMO assessment of completed work scope in the manner of earned value payments.

Technical and Operational Airworthiness

10. The two limbs of the Airworthiness Regulatory System are:

- Technical Airworthiness: which relates to regulation, design, production and maintenance operations to assess suitability for their intended operational roles; and

[7] The Acquisition Contract defines In-Service Date as: *That date on which sufficient equipment (possessing an airworthiness related service release, if applicable), individually trained personnel and ADF and contractor support measures are in place to enable use of the specified deliverable by the ADF for the intended purpose.*

- Operational Airworthiness: which relates to regulation of flying operations and the overall assessment of risk in those roles through adequate management of issues such as operational procedures, operational risk, crew qualifications and currency, flight authorisation and aircrew training.[8]

11. The delivered Tiger ARH system is required to attain compliance, and remain compliant with the Defence Technical and Operational Airworthiness Regulations. The nature of the ARH Acquisition Contract provides for the incremental delivery, and acceptance by Defence of the aircraft to progress development of the capability into full service under a Special Flight Permit.[9] The Special Flight Permit granted to the first six ARH aircraft was approved in December 2004. The Special Flight Permit enabled these aircraft to operate with constrained operations to progress development of the delivered capability, until the award of an Australian Military Type Certificate.[10]

12. The Tiger ARH system was awarded an Australian Military Type Certificate and Service Release on 26 October 2005, with limitations, certifying the system's compliance with the airworthiness and support requirements documented in the Defence Technical and Operational Airworthiness Regulations.[11] This compliance takes into consideration the ability of the training and support systems to support the Tiger ARH system for its intended activities.

13. The ADF Instruction, relating to airworthiness management, defines the process associated with certifying a military aircraft for flight under the

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[8] In September 2003, the DMO reported that, from an operational airworthiness perspective, the transition into service of the ARH will be a particular challenge for Army, in that it was not yet in service with any other nation, and therefore lacked established and validated operating documentation, doctrine, standard procedures, and training systems. The DMO also noted that completion of the technical certification activity to a satisfactory standard was a complex and high-risk issue.

[9] A Special Flight Permit is issued for the purpose of developmental, production or type acceptance test and evaluation flights, proof of concept or demonstration flights, or ferry flights, prior to the issue of an Australian Military Type Certificate.

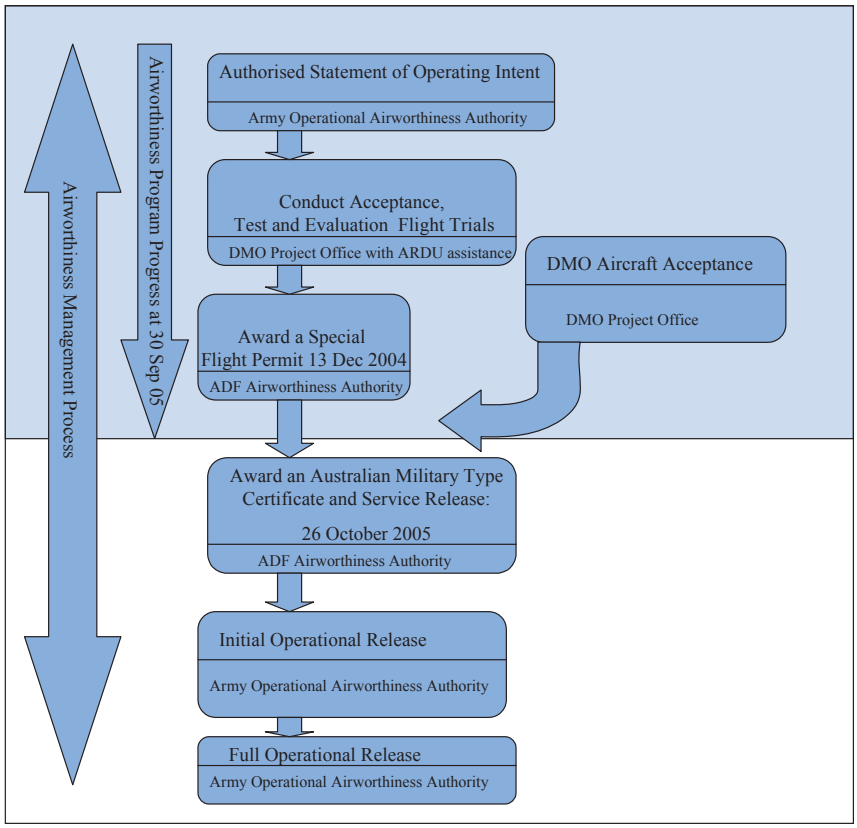
[10] The Defence Airworthiness Authority awards an Australian Military Type Certificate to aircraft, on the recommendation of the Airworthiness Board. It is the certification required before Service release is authorised, and normal flight operations with appropriate limitations can commence.

[11] The ADF Operational Airworthiness Regulation 3.2 states that: *airworthiness management and oversight of the introduction of a new aircraft or major change assures safety of flight through rigorous examination of the aircraft's suitability to operate in the intended roles and environment.*

rules governing State registered aircraft.[12] The airworthiness certification process that was followed is shown in Figure 1.[13]

Figure 1

Airworthiness Management Process adopted for the Tiger ARH: October 2005



Source: ANAO analysis of Defence and DMO documentation.

Audit approach

14. The objective of the audit was to assess the effectiveness of management of the procurement of a major, new capability for the ADF by the DMO and Defence. The audit reviewed the initial capability requirements and

[12] The ADF is responsible for self-regulation of its aviation practices but it is implicit under International Civil Aviation Organisation regulations, and hence the *Civil Aviation Act 1988*, that the ADF airworthiness regulatory system should be no less effective than the civil system.

[13] An application for award of the Australian Military Type Certificate was presented to the Airworthiness Authority, following Airworthiness Board recommendation on 29 August 2005, and subsequently, the Australian Military Type Certificate was awarded on 26 October 2005.

approval process; analysed the contract negotiation process; and examined management of the Acquisition and Through-Life-Support Contracts. Coverage of the audit extended from development of the concept for the requirement, to acceptance of deliverables in the period prior to the award of the Australian Military Type Certificate (see shaded area of Figure 1). The audit fieldwork was undertaken during the delivery phase of the Project, following delivery of ARH numbers 1, 2 and 5.

Overall audit conclusions

15. Defence had intended that the ARH aircraft was to have been an 'off-the-shelf' delivery of proven, operational technology, lowering the risk of schedule, cost and performance shortfalls. The ARH acquisition transitioned to become a more developmental program for the ADF, which has resulted in heightened exposure to schedule, cost and capability risks, both for acquisition of the capability, and delivery of through-life support services. The lack of operational experience in maintaining this capability in other Defence Forces has meant that original cost estimates associated with the through-life support were immature, and exposed Defence to significant future budgetary risks.

16. As at October 2005, the DMO had expended $855.45 million on the Project, representing: payment for four aircraft out of the 22 aircraft to be delivered; design work; and a proportion of: external stores; facilities; training deliverables; and the required support equipment. Of this expenditure, $731 million has been expended on the Acquisition Contract in accordance with the Acquisition Contract's Milestone Payment and Earned Value Management System, representing expenditure in the order of 60 per cent of the total value of the Acquisition Contract.

17. The ADF has not had an effective Tiger ARH capability and has had a limited ability to train aircrews, 12 months after accepting the first two production aircraft (ARH 1 and 2) in December 2004. At the time of acceptance of ARH 5 in June 2005, the aircraft was not fit for purpose against all the Contracted requirements (as was also the case with ARH 1 and 2).[14] The DMO accepted the first three aircraft in a state that did not meet contractual specifications. However, the DMO did not withhold part payment from the

[14] In June 2005, the DMO made milestone payments of $9.1 million for ARH 5, and $20.7 million in Earned Value payments. The ANAO was advised that the full milestone payments totalling $11.45 million were made for delivery of ARH 4 in September 2005.

corresponding milestone payments for production acceptance, even though the Acquisition Contract allows for this arrangement.[15]

18. The DMO advised the ANAO that, at the time of Contract signature on 21 December 2001, it was accepted that the ARH delivered at In-Service Date (15 December 2004), and a number of subsequent ARH, would not meet the fully contracted specification. In February 2006, the DMO also advised the ANAO that negotiations commenced with the Contractor in 2002, which resulted in the DMO agreeing to a lesser capability at the In-Service and acceptance dates of the first three aircraft than that specified in the December 2001 Contract.[16] The ANAO observed that the negotiation for a fundamental change to the Acquisition Contract to cater for the resulting remediation plan that impacted on available operational capability, was not formalised through agreed Contract Change Proposals.

19. The first three aircraft accepted by the DMO carried configuration deficiencies that did not meet contractual specifications. These included capabilities associated with: maximum all-up weight; weapons operability; navigation system operability for instrument rated flight conditions; software integration; an emergency locator beacon; a compliant voice flight data recorder operable in high 'G' environments; proven crash resistance; an ability to undertake protracted flight over water (for the first two aircraft); an operable ground management system to task and communicate with the aircraft; and the required spares and support and test equipment.

20. The DMO agreed that specific contractual capabilities were not required at the respective In-Service and acceptance dates of December 2004, and June 2005. The DMO advised that deeper level maintenance and the retrofit activity to ameliorate deficiencies with ARH 1, started in February 2006, and is to be completed in November 2006.

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[15] The DMO did withhold 50 per cent of payments associated with the award of the Type Certification at the time delivery of ARH 1 was achieved for overall system deficiencies, but did not withhold milestone payment for the aspects associated with contractual deficiencies with the performance of the aircraft itself. The DMO advised that the design process is considered to be the area of highest risk. The Contractor is unable to claim for earned value packages associated with delivery of the aircraft that have not been completed. This included ferry tanks, and roof mounted sights. The DMO withheld 5 per cent ($2.3 million) of the Earned Value payments associated with delivery of ARH 1 and 2. The withheld amount associated with the Type Certification was paid in full on award of the Australian Military Type Certificate (with limitations) in October 2005, even though some of the design issues remain unresolved.

[16] The Acquisition Contract (Attachment C, Part 1) provided for the Project Authority to determine the configuration of the ARH required to meet the In-Service Date milestone. The DMO advise that all helicopters delivered in such a configuration are to be retrofitted at the Contractor's expense to meet the final configuration required by the Acquisition Contract.

21. The ANAO noted that, at the time the Project Director accepted ARH 5 one month ahead of schedule, the subordinate Operational Airworthiness Authority delegation had expired five months earlier, in December 2004. There was no valid Operational Airworthiness Authority delegation that allowed the DMO's Project Director to accept ARH 5. Defence advised the ANAO in February 2006 that the intention had always been to ensure that this authority was valid throughout the period for which it had lapsed, to allow the Project Authority to undertake acceptance activities.

Key findings

Contract tendering (Chapter 2)

22. In an effort to reduce the ADF's costs of ownership, the tendering process was required to deliver a capability with a high level of commonality with other Defence resources. The ANAO considers that, with the exception of some of the onboard communications capabilities, at the time of contract signature, the Tiger ARH provided limited opportunities to leverage from commonality with any of the existing systems in service with the ADF. The DMO advised the ANAO in November 2005 that developmental equipment is procured where it represents value for money, and that in this case, the argument for more commonality than provided did not provide for cost savings.

23. A Tender Evaluation Plan for the Request for Tender (RFT) incorporating the requirement to prepare an evaluation report (Source Selection Report) was approved for use by Defence in May 2001. The DMO did not develop a Source Selection Report to summarise and record the outcomes of the tender evaluation process, and to assist the Tender Evaluation Board form its recommendation in favour of a preferred tenderer, opting instead for a briefing that combined the exclusion reports[17] of unsuccessful tenders. The Source Selection Report is normally required to assist the Tender Evaluation Board form its recommendation in favour of a preferred tenderer.[18] In the ANAO's view, the record of deliberations of the Tender Evaluation Board

[17] An exclusion (or screening) report states the reasons for elimination of tenderers, and confirms that remaining tenderers meet the screening criteria. This report is prepared for consideration by the Tender Evaluation Board, and subsequent to their recommendation, to the Delegate.

[18] Defence also advised the ANAO that: *Project Air 87 was the lead project to considerable reform, where tender evaluation for a very complex project was done in six weeks (compared to the traditional six months, compressed three months and the finally permitted six weeks) and the negotiation in two weeks when simpler projects have taken about six months.*

would have been considerably enhanced by adherence to the Tender Evaluation Plan, and the extant DMO policy guidance. Defence advised the ANAO in September 2005 that, with the approval of the then Under Secretary Defence Materiel and the Air 87 Tender Evaluation Board, the exclusion report for the non-successful tenders was an accepted alternative to a formal Source Selection Report.

24. The DMO advised the ANAO in August 2005 that, at the time, the reasons underpinning the low through-life-support cost estimates provided by the winning Contractor were attributed to the more modern design of the Tiger ARH, compared to the tender competitors. The ANAO found that prior to the Through-Life-Support Contract signature, the DMO analysed of the offers received from the RFT using three separate models, and subsequently did not expect that the Contractor would apply for a significant real increase to the costs for support of the capability. In September 2004, the Contractor sought to substantially increase the costs associated with supporting the capability, which the DMO calculated would add in the order of $625 million to the whole-of-capability costs required to support the capability over the life of the Through-Life-Support Contract.[19] In July 2005, the DMO rejected the claim as being unjustified, and invited the Contractor to submit a new Contract Change Proposal clarifying a number of issues. At the time of preparing this audit report, the DMO had not received a revised Through-Life-Support Contract Change Proposal from the Contractor.

Acquisition Contract (Chapter 3)

25. The reliance on certification of the French Tiger variant was critical to the Australian design acceptance program. The DMO's ability to leverage from the French program was adversely impacted, because the French program had not achieved design approval outcomes, at the rate the DMO had anticipated at the time of contract signature. Staffing levels in the DMO had been predicated on the expectation that the French certification program was to

[19] The Contractor advised the ANAO in January 2006 that the proposed cost increase to the Through-Life-Support Contract contains some scope changes, introduced by the DMO, and that since December 2001, a number of scheduled contract review meetings have been held, where the DMO acknowledged that some contract changes (with the associated cost increase) were required, and that the costs associated with providing the required Support and Test Equipment should be included in the Through-Life-Support Contract in this way. The Contractor advised the ANAO that the additional cost to the Through-Life-Support Contract value, over 15 years, amounted to an increase of $365 million, representing 70 per cent of the original value. The DMO analysis includes this $365 million, and adds the non Contractor provided support requirements arising as a result of the requested changes, to arrive at an increased cost in the order of $625 million. The DMO has advised the ANAO that there have been only minor scope changes and the rest has been rejected by the DMO as unjustified.

have been more advanced than realised.[20] The ANAO observed that DMO, and Defence staff work levels were markedly increased because of the delays associated with the French certification program.

26. The Acquisition and Through-Life-Support Contracts require the Contractor and sub-contractors to maintain Intellectual Property in a state that can be used by Defence, as required. The ANAO considers that the DMO would benefit from an Intellectual Property review, with the aim of ensuring Contractor, and sub-contractor Intellectual Property is being maintained in a state that can be used as and when required to support the capability.

Delivery performance (Chapter 4)

27. Many of the elements associated with modifying the standard aircraft design for the ADF were not contractually required by the DMO to be functional at the time the aircraft was accepted by the DMO at the In-Service Date (December 2004). However, contract underperformance associated with the delivery of modified, and standard elements of the aircraft increased the risk that there would be a delay associated with awarding an unrestricted Australian Military Type Certificate for the Tiger ARH type. The DMO accepted ARH 1, 2 and 5 with contractual shortfalls and significant capability limitations, including deficient elements of the weapons, engine and software systems.

28. The DMO accepted the first two of the four French built aircraft (ARH 1 and 2) using a draft procedure. These aircraft were accepted from the Contractor on schedule in December 2004, with known technical, operational, and managed airworthiness limitations. The ANAO was informed that, *it is the DMO's practice to accept deliverables with contractual shortfalls, and operational limitations, on a risk managed basis, to progress Defence specific training, and testing activities, to deliver the required operational capability*.[21] The DMO withheld 50 per cent of the Type Certification milestone payment associated with acceptance of the first two aircraft, until the conditions for the recommendation of an award of an Australian Military Type Certificate had been met. The DMO

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[20] Defence reported in September 2003 that: *the delay in French and German certification activity for the earlier variant of the Tiger, and the current pace of design and test activity proposed by the Contractor, is complicating the work required of the Project Office to achieve certification in time for the December 2004 In-Service Date.*

[21] Defence advised the ANAO that it is normal for an aircraft to be delivered prior to receiving a full Australian Military Type Certificate, and be developed and tested under a Special Flight Permit to progress the acceptance and training arrangements in place to deliver a full capability within a predetermined timeframe. These aircraft are not flown, however, unless they meet strict airworthiness standards.

advised the ANAO that the withheld funds were intended to address design risks, but not production shortfalls.[22] The Tiger ARH system is not required to achieve initial operational capability comprising one squadron of six aircraft until June 2007.

29. The DMO accepted the first of the 18 Australian assembled aircraft on 1 June 2005, on the basis of the draft acceptance procedure. Acceptance followed a Production Acceptance Test and Evaluation Report compiled by the Defence Aircraft Research and Development Unit (ARDU) Test Team[23] on 30 May 2005 that recommended the DMO should not accept the aircraft in its delivered state (see Figure 2). On completion of scheduled delivery testing in late May 2005, a series of tests relating to the airborne systems were not undertaken as part of the Production Acceptance Test and Evaluation phase. It had been agreed between the DMO and the Contractor that the tests that had not been undertaken were for systems and equipment not required to be delivered at that stage. These included systems and equipment associated with managed airworthiness issues[24] and significant[25] operational capability limitations.[26]

30. The ANAO found that the DMO Project Authority, acting as a subordinate Operational Airworthiness Authority representative (the DMO ARH Project Director), did not liaise with the Capability Manager (who is the Army Operational Airworthiness Authority) prior to accepting ARH 5 (see Figure 2). The DMO Project Authority advised the ANAO that the risk associated with accepting ARH 5 was considered to be 'MEDIUM' or LESS, and had the delegation not already expired in December 2004, the acceptance of ARH 5 would have fallen within the Project Authority's subordinate

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[22] The DMO advised the ANAO that payment of the remaining 50 per cent of this milestone was authorised for payment in October 2005, even though some of the design issues had not been finalised.

[23] The Defence ARDU Test Team constitutes a qualified test pilot, and a flight test engineer.

[24] Defence manages airworthiness issues via a series of Issues Papers, which identify and treat possible airworthiness risks to provide for safe operational activity. In addition to the 30 significant issues with which the aircraft was accepted, 42 less significant issues also remained outstanding. Less significant issues relate to build finish, and defects that do not directly affect aircraft safety.

[25] Defence advised the ANAO in October 2005 that: *the split of the issues into significant and non-significant was proposed by industry in an effort to try to minimise the appearance that there were a large number of important problems. Defence did not disagree that the list of 'significant' issues may be of more importance, but they are definitely not a list of airworthiness or safety related issues.*

[26] Defence advised the ANAO, in October 2005, that it is managing the shortfall in contracted capabilities that were known at the time of acceptance.

Operational Airworthiness delegation, issued by the Operational Airworthiness Authority.[27]

31. The Defence ARDU Test Team assessment stated that, *ARH 5 exhibited neither high quality nor mature system performance, and a number of issues would directly affect safe and efficient operation of the aircraft, especially in the training environment*. The Design Acceptance Representative,[28] made the assessment that there were no safety limitations that would prevent the Project Authority from accepting ARH 5. The DMO advised that this assessment was for operations under a Special Flight Permit.[29] The DMO Project Office has detailed processes directed at accepting issues associated with design of the delivered products, although the processes applied to acceptance of delivered aircraft were less definitive, and were in draft form, up to and including the third aircraft, which was delivered in June 2005 (ARH 5).[30]

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[27] The DMO advised the ANAO that there is no specific DMO or Defence requirement that mandates liaison between the DMO and the Capability Manager prior to the DMO accepting goods and services from Contractors on behalf of Defence.

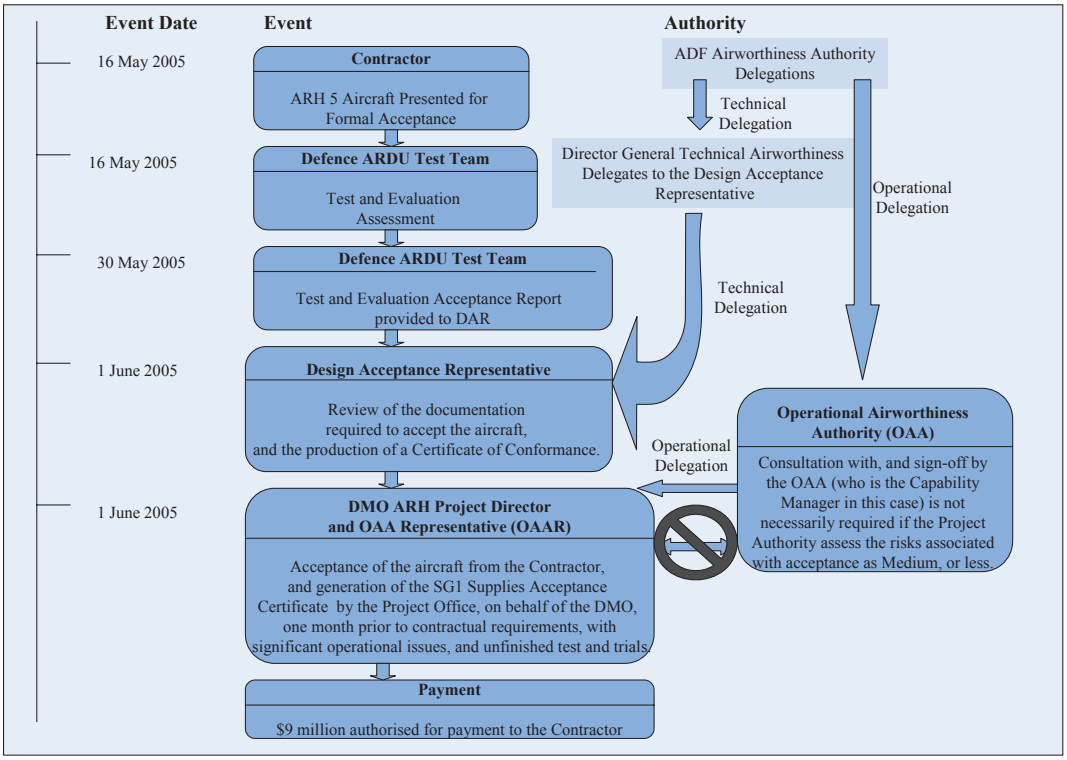
[28] The Design Acceptance Representative is an appointed delegate of the Defence Director General of Technical Airworthiness.

[29] The ARH Project Authority accepted the risk that the delivered aircraft may not have been in a state that was fit for purpose for the limited scope of operations authorised by the Special Flight Permit, and intended use by the Capability Manager at the time of delivery. The Capability Manager advised the ANAO in February 2006 that the risks associated with accepting ARH 5 were no different to those for ARH 1 and 2.

[30] The ANAO was advised by ARDU that their main concern regarding the whole ARH situation is that: *DMO have attempted to conduct Production Acceptance prior to the aircraft design being sufficiently mature. Ideally, the Type Design would be fully functional and specification compliant at the conclusion of Type Acceptance Testing. Production Acceptance Test and Evaluation then becomes simply confirming that each delivered aircraft is consistent with the accepted type design. If this ideal situation cannot be achieved then a staged acceptance can be justified albeit with increased resource overheads due to the need for multiple acceptance testing campaigns. At each stage, the contractually required configuration must be well defined.*

Figure 2

ARH 5 Production Acceptance Process



Source: ANAO analysis of acceptance documentation.

32. The ANAO notes that following contractual acceptance, ARH 5 was not able to be operated for a period of three weeks because residual software certification activities had not been completed, and had not been approved for use. Defence advised the ANAO that under the Special Flight Permit extant at that time, no aircraft were used for flying training in Australia until September 2005. During the time between acceptance of ARH 5 and September 2005, 28.5 hours of flight test and evaluation was undertaken using ARH 5.

33. The DMO accepted ARH 4 in September 2005, some five months behind schedule. The DMO advised the ANAO that four of the five months constituted delays associated with holding ARH 4 in France to progress instructor training activities in the absence of French aircraft and a delayed Air Crew Training Simulator. As at October 2005, the third French built Tiger ARH had been delivered to the Contractor's facility in Brisbane, but not yet contractually accepted by the DMO, some 10 months following the original contract requirement for delivery of the aircraft, owing to structural deficiencies, and training commitments in France.

34. The main aircraft engines for the Tiger ARH are contractually deficient because they are unable to deliver the required power output at the maximum operational requirement. The Contractor is currently trialling engineering improvements that may address the power shortfall. This increase in power, however, may come at the cost of an increased rate of fuel usage, and thus a loss in capability in terms of achievable range under the maximum requirements. The DMO advised the ANAO that the Contractor is required to deliver a contractually compliant engine at no additional cost to Defence.

35. Defence advised the ANAO that the DMO and the Contractor have not resolved the issues associated with engine performance, and the DMO position is that the performance test results on the Tiger ARH demonstrate a performance deficiency.[31] The DMO advise that the actual performance of the engines is not yet clear, and testing of the engines is ongoing.

36. In addition to trials associated with modifications to the existing system, the Contractor has offered a future engine upgrade to Defence, at cost, which may result in a significant improvement in power, at a lesser capability cost in fuel usage, in an attempt to address the shortfall in the delivered engine power. The current list price for an existing main engine is in the order of $2.5 million. The option to replace the existing engines may exceed $110 million. The DMO's position is that they expect a contractually compliant engine to be delivered within the existing project cost.

Through-Life Support (Chapter 5)

37. The Contractor submitted a contract change proposal in September 2004 to the DMO stating that, to deliver the required services against the 15-year Through-Life-Support Contract, a significant real cost increase is required. Defence advised the ANAO that the Department estimated that the proposed change represented an increased cost to Defence to maintain the ARH capability in the order of an additional 84 per cent. In July 2005, the DMO

[31] The Acquisition Contract includes a 10.5 per cent margin on power/engine performance for the required manoeuvres (to allow for pilot error). There is currently a three per cent shortfall against that 110.5 per cent (that is, about 107 per cent). The DMO advised the ANAO that the Contractor has agreed to remediate this, in order to meet its contractual obligations and at no cost to the Commonwealth of Australia.

advised the Contractor that their claim was rejected, and the Contractor was asked to provide a new proposal.[32]

38. The development, and delivery of training equipment and courseware has been delayed against the originally contracted delivery dates by up to 15 months.[33] The Contractor advised the ANAO that the aircrew training simulators may not be available for use in Australia before mid 2006. The ANAO found that a prime cause of the delay to the delivery of aircrew training device simulators,[34] in addition to the change in requirements, has been the efficacy of the integration of aircraft software, which is continually being modified as part of the Tiger ARH test program. This delay has added to Defence's costs,[35] for which Defence is entitled to make a claim under the terms of the Acquisition Contract, against the Contractor, for liquidated damages. The Project Office has advised the Contractor that there will be a claim made for liquidated damages for late delivery of the training related milestones.

39. A decision to incorporate changes to the specifications associated with the air training device simulators, following Contract signature, contributed to a subsequent delay in delivery of major elements of supporting infrastructure to the Oakey Army Aviation Centre, and the Darwin based 1st Aviation Regiment. The cost of this delay has been assessed as $10.8 million. In addition, the DMO agreed with the Contractor that the change in requirement would result in an additional five month delay to the delivery schedule, whilst the simulator equipment was redesigned.

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[32] The Contractor was asked to provide a proposal that considered: clarification of the objectives of the proposal; justification of the changes in the Through-Life-Support Contract; identification of any increased staff requirements; increases in sub-contractor costs; and an explanation of how existing, approved Through-Life-Support plans might be affected. The DMO had not received the new proposal at the time of the audit.

[33] The DMO accepted a contract change proposal that subsequently amended the agreed acceptance date for the aircrew training device simulators to July 2005. Defence advised the ANAO that the simulators are now not expected to be accepted before July 2006.

[34] Defence accepted the training courseware in June 2005, some seven months late.

[35] In addition, the delay in delivering the simulator equipment has contributed to what the ADF Airworthiness Board noted as a fragile ARH manning situation.

Agency response

40. Defence agreed with all five recommendations made in this report. Defence's full response, on behalf of the DMO, is at Appendix 1 of the report. The Defence response states that:

> AIR 87 has been impacted by two main factors: slippage in progress of the Franco-German Type Design Acceptance program and a delay in delivery of the full flight simulator. The DMO has been required to deal with the complexity of responding to a changing commercial and technological environment. These factors have required the DMO to amend its Acceptance strategy, undertake additional design certification workload, and implement a revised aircrew training program in order to mitigate the overall impact on delivery of the Australian capability.

Recommendations

Set out below are the ANAO's recommendations, with report paragraph reference. The recommendations are discussed at the relevant parts of this report. The ANAO considers that the DMO, and Defence, should give priority to Recommendation No[s]. 1, 4 and 5.

Recommendation No.1
Para. 2.28

The ANAO recommends that, for future complex and strategic, high value capital acquisition projects, the Defence Materiel Organisation ensures that one of the key outcomes following tender evaluations is a formal report of the deliberations and decision of the Tender Evaluation Board, in forming its recommendation in favour of the preferred tenderer.

Defence and DMO response: **Agreed.**

Recommendation No.2
Para. 3.29

The ANAO recommends that, the Defence Materiel Organisation undertakes periodic audits of all Intellectual Property holdings associated with the Tiger ARH aircraft and systems, with the aim of ensuring Contractor, and Sub-Contractor Intellectual Property is being maintained as required by contractual requirements.

Defence and DMO response: **Agreed.**

Recommendation No.3
Para. 4.46

The ANAO recommends that, prior to accepting aircraft against specified capability, technical and operational airworthiness standards, the Defence Materiel Organisation completes the required testing activities, unless there is a demonstrable case for not doing so.

Defence and DMO response: **Agreed.**

Recommendation No.4 Para. 4.56

The ANAO recommends that, Project Authorities liaise and consult closely with Capability Managers in Defence prior to finalising product acceptance, where significant operational capability issues exist.

Defence and DMO response: **Agreed.**

Recommendation No.5 Para. 4.79

The ANAO recommends that, the Defence Materiel Organisation incorporates into final contract documentation unambiguous specifications, including required configurations for airborne weapon systems, so that the impact on the platform is fully understood.

Defence and DMO response: **Agreed.**

Audit Findings and Conclusions

1. Introduction

This chapter provides an overview of Defence Project Air 87 and sets out the scope and objectives of the audit.

Background

1.1 The Armed Reconnaissance Helicopter (ARH) Project was initiated in two phases, following an identified need to replace the capability offered by the 43 Bell 206B-1 (Kiowa) helicopters and 25 UH1-H (Iroquois) helicopters with a new, reconnaissance and fire support capability.[36] The original capability proposal was endorsed in February 1994, followed by a Project Definition Study which was conducted at a cost to Defence of $2 million (Phase 1), followed by a Request For Proposal (RFP), issued in May 1998 (Phase 2).

1.2 In April 1999, three of the six respondents to the RFP were selected to proceed to the next phase of tendering. Defence used the information gained during evaluation of the proposals to refine the acquisition specifications in the areas of aircraft performance, weapons fit, operational availability and aircraft numbers. The second stage of the tendering process involved release of a Request for Tender (RFT) in December 2000, with a nominated price cap for the Project of $1.2 billion.[37]

1.3 Defence advised the ANAO that the Project was considered by Government in August 2001, following consideration by the Defence Capability, and Force Structure Committees in 1998. Defence note that following Ministerial direction, the then Under Secretary Defence Materiel used projects like Air 87 to create rapid change, and test innovative procedures.

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[36] The method of procurement Defence undertook included:

- Limiting essential requirements of the helicopter to those offered by a range of available systems,
- Use of an open RFP to select a panel of suppliers to respond to a Request for Tender, and
- Statements of work and specifications that were functionally based.

[37] An internal Defence report in 2001 found that there were inconsistencies associated with how individual respondents were treated during the RFP process. Noting these inconsistencies, Defence undertook to conduct an invited RFT process where all the original RFP respondents were invited to submit tenders.

1.4 In an effort to compress the anticipated schedule associated with delivering the capability, Government was afforded the opportunity to review the outcomes of the RFT, and endorse the selection of the successful tenderer, based on advice from Defence, in what is now termed as 'Second Pass' approval.

1.5 The RFT responses were required by 30 April 2001. Of the four tenderers considered, Defence announced that the Eurocopter Tiger had been selected as the aircraft against which the tender development stage was to be pursued.

1.6 Defence signed an Acquisition Contract with the Contractor to the value of $1.1 billion on 21 December 2001, with an effective date of 1 February 2002.[38] Also signed at this time was a Through-Life-Support Contract, (incorporating three years of pre delivery support, which was to be funded by the allocated acquisition funds, two and a half years post delivery support using acquisition funds, and 13 years of post delivery support, funded by Defence), the fixed price for which was $410.9 million. The Through-Life-Support Contract includes an option to extend the existing contract by periods of up to five years, to the life-of-type of the ARH capability. In June 2005, the budgeted allocation associated with each element of the Project, excluding supporting facilities projects associated with redeveloping the Defence bases in Darwin and Oakey, were $1.96 billion (Table 1.1).[39]

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[38] The Acquisition Contract's main deliverables are: 22 Tiger Helicopters, modified for Australian conditions by the inclusion of the Hellfire missile system, avionics and communications suite, as well as flight data and cockpit voice recorders; an instrumented Tiger helicopter taken from the attrition fleet and associated ground based test equipment, noting that the attrition and training fleet account for six of the 22 aircraft being procured; an operational ground support segment that includes ground based mission management functions, ground based communications functions, operational support equipment and operational maintenance support equipment; an electronic warfare self protection support capability, to be located at the Royal Australian Air Force Base in Edinburgh, South Australia; all the required support and test equipment, and technical information to sustain the capability through its full life-cycle; operational maintenance of attrition and training aircraft, noting that the Army is providing Operational Maintenance support for the 16 operational aircraft, which are based in two squadrons; deeper maintenance support; a comprehensive training system offering a full flight mission simulator, mission trainers and a number of maintenance training devices; and a software support facility which provides an autonomous capability to develop the system.

[39] The majority of the real cost decreases within the current budget constitute reallocation of funds to cater for facilities development activities. In June 2005, $4.5 million of the total real cost decrease was levied from the project capital budget to assist with funding the DMO Skilling Australia's Defence Industries Program. The Skilling Australia's Defence Industries Program was approved by the Minister for Defence in February 2005, and draws up to 0.5 per cent of the Defence Materiel Organisation's major capital equipment budget to generate additional skilled positions in industry.

Table 1.1

Project Air 87 Budgeted Costs – 30 June 2005

Project Cost Elements	Approved Costs $ million	Actual Expenditure $ million
Prime Equipment	1 239.40	693.43
Modifications	142.1	0.46
Ammunition	69.15	33.63
Government Furnished Equipment	13.60	12.06
Facilities	4.20	0
System Engineering	25.19	10.79
Repairable Items and Support & Test Equipment	187.04	17.93
Training	17.05	0.76
Test & Evaluation	22.71	0.31
Travel	7.89	6.38
Legal	0.27	0.15
Maintenance	225.77	29.83
Research and Development - DSTO	0	0
Overseas Employee Expenses	1.06	0.79
Total	1 955.43	806.52

Note: (a) The Project Costs extend to the first five and a half years of provisioning and material support for the delivered aircraft. The support elements are shaded. Contingency amounts are spread across the Project cost elements, and are managed as part of the uncommitted out year budget allocations.

Source: ANAO analysis of DMO documents.

1.7 The Tiger helicopter variants being procured are based on the French and German aircraft of the same type.[40] The intention was to use the French Tiger HAP variant aircraft as a basis for certification, and to that end, Defence put in place a Memorandum of Understanding with the French and German Governments, and a Technical Agreement with the French Government, for provision of technical information and support. This was done in an effort to allow the ADF an opportunity to leverage off foreign certification efforts, to significantly reduce technical risk. The Australian variant of the Tiger Helicopter is now the lead aircraft being delivered and tested by the Contractor. However, this has not prevented the DMO from leveraging off foreign certification efforts.

1.8 Table 1.2 provides a history of the key activities associated with approval, and management of the delivery of the new, ARH capability.

[40] The Australian variant includes modifications for the Hellfire missile weapons system, avionics and communications suite, and flight data and cockpit voice recorders, and is envisaged to fulfil different tasks than the French, and German variants. Defence notes that the majority of flying tasks will be the same for all three countries, using the same flight techniques, and most of those missions that are different will still be flown using the same flying techniques.

Table 1.2

Approval and Delivery History for the Tiger ARH Capability: November 2005

Planned Date	Achieved Date	Activity
Project Approval and Tender Phase		
February 1994	February 1994	Defence Capability Proposal Endorsement
	September 1996	Draft Equipment Acquisition Strategy Approved
	21 April 1998	Endorsed Equipment Acquisition Strategy Approved
May 1998	May 1998	Request for Proposals Issued
August 1998	August 1998	Request for Proposals Closed
	26 October 2000	$200 million Currency Exchange Rate Increase to Approved Project Funding
	18 November 1999	Revised Capability Summary Endorsement
August 1999	December 2000	Request for Tender Issued
December 1999	30 April 2001	Tenders Closed
	1 May 2001	Tender Evaluation Plan Approved
	15 June 2001	Tender Evaluation Board Recommendation
July 2000	August 2001	Project Approval by Government
November 2000	21 December 2001	Contract Signature
	February 2002	Contract Effective Date
Build, Deliver and Support		
September 2002[(a)]	October 2002	Award of Authorised Engineering Organisation (AEO) Status
April 2004[(a)]	September 2004	Successful Hellfire Weapons Integration
December 2004[(a)]	December 2004	Contractual Acceptance Date of First Aircraft
March 2005[(a)]	Not Yet Achieved	Training System Readiness (including simulators)
March 2005[(a)]	26 October 2005	Award of an Australian Military Type Certificate with limitations [(b)]
	June 2004	Real Cost decrease of $4.5 million to fund the Skilling Australian Defence Industry program
June 2007[(a)]	Not yet due	Required delivery of an Initial Operational Capability[(c)]
December 2008[(a)]	Not yet due	Required Full Operational Capability[(d)]

Notes: (a) These dates have been taken from the signed contract delivery schedule, and not the approved Equipment Acquisition Strategy.

(b) An application for the award of an Australian Military Type Certificate was submitted to the Defence Airworthiness Board on 29 August 2005.

(c) Initial Operational Capability is the term associated with the capability achieved when one Tiger Squadron of six aircraft is fully equipped, and capable of armed reconnaissance operations.

(d) Full Operational Capability is the term associated with the capability achieved when two Tiger Squadrons of six aircraft are fully equipped, and capable of armed reconnaissance operations.

Source: ANAO analysis of Defence documentation.

Audit approach

1.9 The DMO manages some 240 major capital equipment projects which have a total estimated cost in excess of $50 billion. The approved funding for delivery of the Tiger ARH capability amounts to four per cent of the estimated cost of DMO's major capital projects. This audit represents the fourth ANAO performance audit in 2005–06 of Defence's and DMO's management of major capital acquisition projects. The first such audit, *Management of the M113 Armoured Personnel Carrier Upgrade Project*,[41] examined the effectiveness of the management of the upgrade of the M113 fleet for the ADF for an approved cost of $566 million. The second such audit, *Upgrade of the Orion Maritime Patrol Aircraft Fleet*,[42] examined the adequacy of Defence's and DMO's management of the Project, which had been afforded an approved cost of $962 million. The third audit of this type assessed the effectiveness of DMO's management of the $1.24 billion Jindalee Operational Radar Network and the Jindalee Facility Alice Springs[43] maintenance and support arrangements.

1.10 The objective of the audit was to assess the effectiveness of the management of the procurement of a major, new capability for the ADF by the DMO, and Defence. The audit reviewed the initial capability requirements and approval process; analysed the contract negotiation process; and examined management of the Acquisition and Through-Life-Support Contracts. The coverage of the audit extended from development of the concept for the requirement, to acceptance of deliverables in the period prior to the award of the Australian Military Type Certificate (see shaded area of Figure 1 in the Summary). The audit was undertaken during the delivery phase of the Project, following delivery of ARH 1, 2 and 5. [44] This was not an audit of contractor performance; rather it was of Defence's and the DMO's management of the Project.

1.11 Audit field work was conducted from April 2005 to September 2005. The audit team met with areas within Defence, including: the Project Office; Army Headquarters; Army Force Structure; Infrastructure Division; Capability Systems Division; the ADF Airworthiness Coordination and Policy Agency;

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41 ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*.

42 ANAO Audit Report No.10 2005–06, *Upgrade of the Orion Maritime Patrol Aircraft Fleet*.

43 ANAO Audit Report No.24 2005–06, *Acceptance, Maintenance and Support Management of the JORN System*.

44 The DMO accepted ARH 4 on 23 September 2005.

Army Training Command; as well as deployed Defence staff at the build site, and simulator development site. The ANAO provided Issues Papers to Defence and the DMO in June 2005, followed by a series of five Discussion Papers between July and November 2005. A draft audit report was issued in December 2005, following which Defence provided a response in January 2006. Subsequent to the response in January 2006, a series of draft reports were discussed with the DMO, and a revised draft audit report was issued in March 2006.

1.12 The ANAO examined documentation relating to concept development and subsequent phases of the Project, as well as preparation, development, and subsequent management of the Acquisition Contract, the Through-Life-Support Contract, workforce planning, and facility development activities.

1.13 The audit was conducted in accordance with ANAO auditing standards, at a cost to the ANAO of $340,000.

Report structure

1.14 The remainder of this report is structured into four chapters. Chapter 2 outlines the source selection and considerations made during the award of the Acquisition, and Through-Life-Support Contract. Chapter 3 discusses the management structures governing the acquisition of the ARH capability. Chapter 4 reviews the practices undertaken to deliver the capability. The final chapter examines the contractual, and management arrangements in place to deliver through-life-support for the capability, following contractual delivery.

2. Contract Tendering

This chapter examines the capability requirement and the management of tenders to supply the required capability.

Background

2.1 In February 1994, the Defence Force Capability Proposal for Project Air 87 was reviewed with the intent of delivering an ARH capability. In September 1994, Defence considered and endorsed the Equipment Acquisition Strategy for Air 87 Phase 1 Project Definition Study. The Project Definition Study was considered by the Defence Force Structure Policy and Programming Committee in November 1995, following which approval was given to develop a Major Capability Submission.

2.2 In November 1997, Defence again reviewed Project Air 87, and decided to acquire two squadrons each with six on-line ARHs, at a cost cap in August 1997 prices of $1.2 billion. At the time of the consideration, significant doubt existed as to the accuracy of the initial Project estimate costs, primarily because there was limited industry response to requests for information. An RFP strategy was adopted to ensure Defence was afforded more accurate cost data.

2.3 Throughout the Project development phase, Defence advocated that an 'off-the-shelf' acquisition strategy should be adopted for the Project. Defence considered that the 'off-the-shelf' solution would reduce the costs of integration and development, reduce technical and schedule risk, improve interoperability with overseas forces and reduce the overall cost of acquisition. The ANAO notes that, in an effort to meet this requirement, the DMO has chosen a design that is a modified version of the French and German variants of the Tiger helicopters, which, at the time of contract signature, were not accepted by either the French, or German Defence Forces, though at contract signature, the French and German delivery schedule was 18 months in advance of the proposed Australian program, and the French had accepted the Type Design of the French Tiger variant.

2.4 Defence advised the ANAO that the Tiger ARH has been developed under the North Atlantic Treaty Organisation Standardisation Agreement, and that both the Hellfire missile system, and the communication systems, when delivered and accepted, will provide for interoperability between the ARH capability, and North Atlantic Treaty Organisation forces. The procurement of the Tiger ARH represents the purchase of an aircraft, which was more

developmental than anticipated, where 14 of the 900 core requirements of the selected aircraft type required modification. The DMO advised the ANAO in November 2005 that developmental equipment is procured where it represents value for money.

Defence capability requirements

2.5 ADF aerial reconnaissance and fire support for land defence is currently conducted using Bell 206B-1 (Kiowa) and UH-1H (Iroquois gunship) helicopters. Both of these aircraft are reported to have low capability levels, and are approaching their end of life-of-type. Project Air 87 aims to deliver a weapons system, which will replace the existing systems with a significantly enhanced capability.

2.6 Defence anticipated that the ARH would be required to undertake: airmobile escort missions; support to covering force missions; deliberate massed helicopter attack missions; support to a special recovery mission; and a scenario centred on defeating attacks on Australia by detecting and responding to that attack.

2.7 Defence stipulated in 1999 that the ARH should be able to perform their full mission capabilities within the operating environment of Australia, and the environments that encompass the defence of regional and global interests. Specifically, Army stated that the capability needs to operate in terrain ranging from low-lying desert to tropical mountains, urban and rural areas and climates typical of temperate through to monsoonal coastal areas, day and night, in adverse weather. As a minimum, the ARH was to be suitably protected for continuous basing in coastal areas, and operations to and from Royal Australian Navy vessels, such as HMAS KANIMBLA, in seas up to and including sea state five.[45]

Equipment Acquisition Strategy

2.8 The Equipment Acquisition Strategy, approved in April 1998, defined the approved strategy for acquiring the ARH capability. The basis of the

[45] The contracted statement of requirement for the Tiger Helicopters specifies that they are to enable the conduct of amphibious operations, primarily from Royal Australian Navy Amphibious class ships, and in doing so, the design of the aircraft is required to enable the recovery of two ARHs for a mission from one Amphibious Transport Ship in conditions up to and including sea state five, and support flight operations from an Amphibious Transport Ship in conditions up to and including sea state five. Sea state five is defined as seas with wave heights of four meters, a wave period of 12.3 seconds. Defence advised the ANAO that it is unlikely that they will ever operate aircraft from an Amphibious Transport Ship in sea state five.

strategy was to acquire an off-the-shelf system with a focus on through-life-support, particularly the ability to enhance, maintain, modify and adapt the equipment for future needs. The Equipment Acquisition Strategy states that any development or refinement of potential solutions for all elements of the acquisition should be minimised to reduce risk.

2.9 The Equipment Acquisition Strategy proposed use of a single prime contractor to deliver all the elements associated with acquiring the capability. The strategy was adopted to reduce the risks associated with supply and transfer of intellectual property between contractors, and was to aid in realising an early commencement date for simulator production.

2.10 The simulator equipment required for pilot training has not been delivered as required. The Contractor advised the ANAO that the aircrew training device simulators are to be delivered to Defence in mid 2006, some 15 months after the originally specified requirement.[46]

2.11 The Equipment Acquisition Strategy stated that a goal of the Project was to achieve a degree of weapon and support equipment commonality in order to benefit from the potential life cycle cost savings. The ANAO found that at the time of contract signature, the gun system, the missile system, the electronic warfare system, the rocket system and associated ground support system had minimal commonality with any systems currently in use within the ADF, although the gun system was common with the system to be operated by the French Tiger aircraft. [47]

Tendering processes

2.12 Defence sought to mitigate risks in tendering by conducting a two-phase approach to tendering. Phase One sought to mitigate risks through the conduct of project definition, market surveys and an RFP by providing budgetary pricing and information to be used in developing an RFT. Phase Two sought to use the information gained in Phase One to ensure Defence could act as an informed customer, and thus reduce the cost to industry associated with tendering.

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[46] The Contractor advised the ANAO that delays associated with rehosting the aircraft software for use with the simulators was delaying delivery of the Air Training Device simulators. Defence advised that the rehosting of software is but one element of the delay, which can also be attributed to a misunderstanding of the Australian accreditation requirements, and statements of work between the Contractor and their sub-contractors that differed from the statement of work between the DMO and the Contractor.

[47] The gun system incorporates an ADF unique 30mm calibre gun common with the French Tiger aircraft, sourced from a French company, using ammunition not manufactured in Australia.

Request for Proposal

2.13 The RFP was issued in May 1998. The RFP closed in August 1998, following receipt of six responses from industry.

2.14 Based on the findings of the RFP, an augmented Defence Source Selection Board met and recommended that three of the RFP respondents be shortlisted, with the aim of inviting those shortlisted to tender to supply Defence with the required capability, via the RFT process, in early 2000. The outcome of the RFP decision was made known to the respondents in April 1999, following Ministerial approval for Defence to announce that there would be an issue of an RFT to the three most successful RFP respondents.

2.15 In May, June and August 1999, following the announcement of the proposed RFT shortlist, Defence received challenges to the outcomes of the RFP from one of the original RFP respondents who had been left out of the RFT invitation list. The challenges included 80 allegations relating to the evaluation process.[48]

2.16 A joint review team, comprising senior officers from the Defence Inspector General and the Defence Acquisition Organisation, subsequently reviewed the allegations and undertook an investigation. Defence found that, of the 80 specific claims made, 14 were only partially substantiated, which required expert legal advice. In addition, the review found no evidence of bias, unfair, or unethical behaviour associated with the probity and propriety regarding the actions and behaviour of staff directly involved in the tender assessment.

Request for Tender

2.17 Defence opened the RFT process to the original six companies, four of which indicated their intention to tender. The RFT was released on 18 December 2000, and closed on 30 April 2001. Tenderers were advised that, whilst the bid decision would be based on value for money, the anticipated cost of the acquisition, and the first three years of through-life-support, should not exceed $1.2 billion.

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[48] Defence noted that: *the augmented Defence Source Selection Board determined a shortlist based on the information submitted by respondents and using the selection criteria provided in the Request For Proposals. The Challenger's proposal was considered to be compliant, but expensive, and very high risk because of the degree of development yet to be completed and the reliance of the program on a United States Marine Corps acquisition program. As there was no significant advantage to this proposal, it was considered not competitive and was not short listed.*

2.18 A Tender Evaluation Plan was approved for use by the Defence Head of Air Systems Division in May 2001 (see Figure 2.1).[49] Submitted tenders were evaluated in three stages: screening, where one tender response was excluded because it was judged to be incomplete; initial evaluation, where the commercial and operational aspects of the remaining tenders were assessed in an effort to determine a relative assessment of value for money against derived configurations that used information provided by the tenderers; and detailed evaluation, where the preferred tenderer's option was negotiated to achieve a signed contract. The evaluation was initially planned to last for a period of six months (see Table 1.2), however, Defence compressed the review of tenders timetable to six weeks.

Figure 2.1

Project Air 87 Source Selection Report Requirements

Source Selection

- Source selection involves the final consideration of the value for money presented by each negotiated and price validated final offer and the selection of the preferred contractor.
- Methodology. On receiving the final offer(s), Tender Evaluation Working Groups will check the respective aspects of the contracts to ensure the negotiated position is correctly reflected. Tender Evaluation Working Groups will also finalise their evaluation reports. After considering the final Tender Evaluation Working Group reports, the Tender Evaluation Working Group Leaders Group will finalise the value for money summary.
- Source Selection Report. A Source Selection Report is to be raised by the Tender Evaluation Working Group Leaders Group for consideration by the Tender Evaluation Board in forming its recommendation in favour of the preferred source. The report will comprise:
  a. Tender Evaluation Working Group Reports covering an evaluation of the proposals as they exist at the point the contracts have been negotiated and then validated by the tenderers;
  b. The value for money summary which compares the negotiated and validated contracts presented by tenderers and addresses contract price, Probable Project Costs and Life Cycle Cost issues;
  c. An executive summary which includes reference to any exclusion reports,discussion of the value for money provided by the negotiated contracts, a range of options for consideration by the Tender Evaluation Board including further actions required before the contract can be signed;and
  d. Written comments provided by project assurance as required.

Source: Extract from Project Air 87 ARH Tender Evaluation Plan 1 May 2001 (paragraphs 100 to 102).

[49] The Defence Procurement Policy Manual states that a tender evaluation plan is a mandatory requirement for, inter alia, all militarily significant procurements as part of a major, or minor project, and sets out responsibilities, evaluation requirements, reporting requirements, and the processes and principles to be followed when evaluating responses to RFP and RFT documentation.

2.19 One respondent was screened out of the selection process in June 2001; one was excluded in July 2001, and advised accordingly.

2.20 The offer put forward by Bell Helicopter Textron, for supply of the *AH-1Z Viper,* was found to have been the second most preferred option. It was found to be less competitive in terms of acquisition and through-life costs, and could not be delivered to meet the Defence schedule. This offer was set aside,[50] in case negotiations with the successful contractor should fail, and was later excluded.[51]

2.21 In July 2001, Defence reported to the then Minister for Defence, that evaluation of the submitted tenders was primarily based on their affordability, in terms of acquisition and through-life-support costs, against 11 separate criteria. The ANAO reviewed the Defence tender analysis documentation, and found that the winning, normalised Contractor's bid, exhibited better value for money across both the acquisition element, and the through-life-support element of the tender.[52] The wining bid's largest comparative advantage on cost, was found to be in the through-life-support element, from years 4 to 15, where it was nearly one-third less than the nearest competitive bid.

2.22 Defence advised the ANAO that the outcomes of the modelling of low through-life-support cost estimates tendered by the successful tenderer were underpinned by an expectation that the more modern design of the Tiger ARH would be less prone to failure, and more cost effectively operated when in service than its competitors.

2.23 The Contractor has subsequently reviewed the tendered, and now contracted through-life-support costs, which has given rise to a request for Defence to increase the through-life-support payments by an additional

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[50] An offer that is set aside, yet not declined, can be pursued further if negotiations with the preferred tenderer break down. Defence use this construct to improve bargaining leverage.

[51] Defence specified that the ARH capability was required to be in service by December 2004. The outcome of the RFT was that Bell, as the second preference, could not deliver their offer to meet the December 2004 schedule requirement. In an adhoc offer, Bell suggested that they arrange for Defence to lease six of their AH-1 W helicopters from the United States Marine Corps for the period prior to their achievable delivery date of mid 2005. Defence assessed the AH-1 W Super Cobra helicopter offer and, following a brief to the then Minister for Defence in July 2001, advised Bell Helicopter Textron that their offer did not meet the capability requirements sought under Project Air 87, and consequently the offer was not taken up.

[52] The Project undertook, at this stage, to fund the first three years of support from project funding. Following this initial funding, the project undertook to contract for 10 years follow-on support from the time of In-Service Date. This 10-year period was reviewed subsequent to the receipt of the RFT responses, whereupon the DMO extrapolated the values received in the RFT responses to form a derived, 15-year Through-Life-Support Contract value for each RFT respondent.

$365 million for the life of the Through-Life-Support Contract.[53] Defence analysed the whole-of-capability costs, and found that this increase, if applied over 15 years, would result in an increased cost of ownership for the capability to the order of $625 million.[54] The DMO rejected the Contractor's claim for an increase to the Through-Life-Support Contract value in July 2005, whereupon the Contractor was invited to resubmit the claim, with detailed consideration of a number of issues.

2.24 In August 2001, the Government noted selection of Eurocopter International Pacific (now known as Australian Aerospace Ltd.) as the only tenderer to progress into the detailed evaluation stage of Project Air 87, as their tender was the only one that met the capability objectives, within the approved budget.

2.25 Project funding estimates had been, up until the evaluation of the RFT respondents, predominantly denominated in United States Dollars.[55] The Australian Dollar depreciated significantly against the United States Dollar over the next two years, leading to a $200 million foreign currency adjustment, increasing the Project approval to $1.82 billion (which includes $33.25 million of price adjustments for inflation). In October 2001, in recognition that the preferred tenderer was a wholly owned subsidiary of a European company, the basis for the approved project budget was adjusted from 91 per cent United States Dollars and nine per cent Australian Dollars; to 41 per cent in Australian Dollars, 7.6 per cent in United States Dollars, 0.4 per cent in British Pounds, and 51 per cent in Euros.[56]

2.26 The DMO did not develop a Source Selection Report to summarise and record the outcomes of the tender evaluation process, and to assist the Tender Evaluation Board form its recommendation in favour of a preferred tenderer. The DMO advised the ANAO in October 2005 that exclusion reports[57] were used to reduce the number of tenderers to a compliant tenderer, ready for contract negotiation, and that this new approach was a trial of a new process to

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53 This value has been calculated using a March 2001 price basis.

54 The Defence analysis is based on a December 2001 price basis, which, to convert to a December 2005 price basis, needs to be inflated by approximately 19 per cent.

55 In December 1999, 91 per cent of the Project's approved budget was being held in United States Dollars.

56 The 26 October 2001 Reserve Bank of Australia exchange rate for transferring Australian Dollars to United States Dollars was 0.5034.

57 An exclusion (or screening) report states the reasons for the elimination of tenderers, and confirms that remaining tenderers meet the screening criteria. This report is prepared for consideration by the Tender Evaluation Board, and subsequent to their recommendation, to the Delegate.

reduce the time from tender delivery to contract signature. The DMO advised the ANAO that the compilation of individual exclusion reports plus a Proposal and Liability approval submission (dated 21 December 2001)[58] equated to a Source Selection Report. The ANAO was advised that, *there was more than sufficient documentation for accountability purposes and for tender board documentation.* The ANAO notes, however, that this approach was not documented in the initial, or any subsequently approved Tender Evaluation Plan. Source selection represents final consideration of the value for money presented by each negotiated price and validated final offer, and selection of the preferred contractor.

2.27 The ANAO considers that sound tendering management for major capital equipment acquisition activities requires a Source Selection Report to be prepared,[59] summarising the deliberations of the Tender Evaluation Board, to explain the decisions made in forming its recommendation in favour of the preferred source, and to provide for the required accountability and transparency to meet the requirements of the Commonwealth Procurement Guidelines.[60]

Recommendation No.1

2.28 The ANAO recommends that, for future complex and strategic, high value capital acquisition projects, the Defence Materiel Organisation ensures that one of the key outcomes following tender evaluations is a formal report of the deliberations and decision of the Tender Evaluation Board, in forming its recommendation in favour of the preferred tenderer.

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[58] The ANAO notes that the Proposal and Liability approval submission is dated on the same day the Acquisition Contract was signed.

[59] The Defence Procurement Policy Manual applicable at the time the tenders were being considered (Version 2.1 dated July 1999) states that for high value Complex and Strategic procurements a more structured evaluation report is usually used to advise the Liability Approver of the outcome of the tender evaluation process, via written submission. In addition, the Defence Capital Equipment Procurement Manual, First Edition, Amendment 16, dated 25 September 1998, Part 4, Chapter 5, paragraphs 522 to 542, deals with the requirement for the Project Manager to prepare a Source Evaluation Report.

[60] The July 1997 Commonwealth Procurement Guidelines state that: *Agencies should document all their reasons for the selection of suppliers. These must be publicly defensible. Documenting these decisions will also help those responsible for monitoring and managing the final contract* (Section 11, paragraph 3.5).

Agency Response

2.29 *Defence and DMO response:* **Agreed.** DMO will apply the extant Commonwealth Procurement Guidelines to future tenders, but considers that the processes and documentation used by the AIR 87 project met accountability and transparency requirements.

Contract award

2.30 In August 2001, the Government approved a Project cap, and authorised Defence to enter into contract negotiations with the preferred bidder. Prior to ascertaining Government approval, the DMO would ordinarily be required to provide a series of plans to assure Government that the necessary planning, prior to contract award, had been undertaken. The ANAO found that the DMO did develop a Project Management and Acquisition Plan prior to contract award, albeit some elements were in draft form, and required input from the selected contractor, post contract signature.

2.31 Defence negotiated, and signed an Acquisition Contract in December 2001 with the Contractor, for delivery of the required aircraft and supporting systems, with a contracted effective date of 1 February 2002.[61] In addition, a Through-Life-Support Contract was concurrently signed, spanning 15 years, which took effect following delivery of the first two helicopters in December 2004.[62] Prior to the Through-Life-Support Contract, the Project Office funded a 3 year pre-implementation through-life-support period.

2.32 A mobilisation payment of $115.79 million, (approximately 10 per cent of the total Acquisition Contract amount) was made to the Contractor immediately following contract signature, which was secured by a bank guarantee. Further progressive pre-implementation payments, amounting to $39.81 million, which approximates 10 per cent of the as signed contract value, have been made against the Through-Life-Support Contract.

2.33 The contracted delivery schedule for the first five Tiger ARH aircraft is represented at Table 2.1, along with any slippage realised from the original contracted delivery dates. The final aircraft is scheduled to be delivered in July

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[61] Currency conversions used for monthly cost performance reporting are to be provided for in single currencies, with Contract Base Date exchange rates as: one Australian Dollar equals 0.5533 Euros; one Australian Dollar equals 0.4921 US Dollars; one Australian Dollar equals 0.3425 Great Britain Pounds; one Euro equals 0.8894 US Dollars; and, one Euro equals 0.6190 Great Britain Pounds.

[62] The first two and a half years of support are being funded by the Project Office from project funding. The subsequent 12.5 years of support are to be funded through Defence in-service support funding.

2008. Defence agreed with the Contractor that ARH 3 and ARH 4 should be retained in France to complete residual ARH French based testing, and to provide additional capacity for Australian Qualified Flying Instructor training. These aircraft arrived in Australia in May 2005.

Table 2.1

Contracted Aircraft Delivery Dates as at November 2005

Aircraft	Contracted Delivery Date	Achieved Delivery Date	Schedule Slip (months)
1	December 2004	December 2004	0
2	December 2004	December 2004	0
3	January 2005	Not yet accepted [(a)]	11 plus
4	April 2005	23 September 2005 [(a)]	5
5	July 2005	1 June 2005	(1) [(b)]

Notes:

(a) Defence agreed that these aircraft should be retained in France to complete residual ARH French based testing, and to provide additional capacity for Australian Qualified Flying Instructor training. The aircraft arrived in Australia in May 2005.

(b) Defence accepted ARH 5 one month prior to the required contractual delivery date.

Source: DMO documentation.

2.34 The DMO did not buy an off-the-shelf aircraft solution, as it was originally planned. The Australian variant of the Tiger ARH is largely modified to cater for Australian safety requirements, communications, avionics, and weapons configurations. The Australian Tiger ARH is more developmental than anticipated, with 14 of 900 modified core requirements.

2.35 The ANAO noted that, even though competition was retained until Defence was satisfied that an acceptable Contract had been agreed, subsequent review of the Through-Life-Support Contract by the Contractor has highlighted a potential increase of approximately 84 per cent[63] in addition to the contracted annual through-life-support costs.[64] This claim was rejected by the DMO, and the Contractor was asked to provide a new proposal, which considered: clarification of the objectives of the proposal; justification of the changes in the Through-Life-Support Contract; identification of any increased staff requirements; increases in sub-contractor costs; and an explanation of how existing, approved Through-Life-Support plans might be affected.

[63] This value has been calculated by the DMO.

[64] Defence advised that the proposed cost increases, calculated in 2005 prices to be representative of 84 per cent of the Through-Life-Support Contract value, have not been agreed for implementation.

3. Acquisition Contract

This chapter outlines the nature of the Acquisition Contract, and the management of payments associated with work undertaken against the requirements of that Contract.

Background

3.1 The Acquisition Contract, as signed, was a fixed price contract for $1 087 million, comprising 126 milestone payments and monthly progress payments based on the Contractor's EVMS. The Acquisition Contract was structured to include milestone payments for 60 per cent of the total sum, with the remaining 40 per cent being made available for earned value payments.

3.2 The EVMS is being reported using the Defence Cost, Schedule Status Reporting System. The Contractor had originally based its production line on some 170 milestones per Tiger helicopter, and subsequently agreed to implement and convert the existing milestone method to a work package method that would be compatible with the Defence contract specification for an EVMS. As at January 2005, the acquisition payment schedule indicated that actual payments lagged the updated contracted cash flow baseline, by at least $150 million, which represented an overall four month schedule lag. Defence advised the ANAO in October 2005 that by the end of the 2004-05 financial year, the Project Office had achieved its net plan.

3.3 The Contractor is to deliver claims for 'Progress Achievement' (in respect of achievement claimed in the form of earned value towards milestones), 'Provisional Acceptance' (in respect of supplies); and 'Acceptance' (in respect of supplies), against specified contractual requirements. In order to receive payment for these claims, the Contractor is required to provide Certificates and Supplies Release Notes, which are subsequently approved by the Project Authority, if the claims are accepted.

Earned value management system certification

3.4 A key project management responsibility includes the requirement to ensure that the EVMS accurately tracks contractor costs, and provides sufficient and reliable schedule progress data, over the life of the Project. The Acquisition Contract provides for the Contractor's EVMS to be accredited to DEF (AUST) 5658 *Cost Schedule Status Reporting Specification and Implementation Guide; Standard,* prior to payment of any earned value claims.

3.5 The Contractor was required to have achieved accreditation within 18 months of the Acquisition Contract's effective date (February 2002).[65] This, in turn, required the EVMS to be accredited by Defence by August 2003. Following extensive testing for conformance to the required standards, Defence accredited the Contractor's EVMS in November 2003.

3.6 An Integrated Master Schedule[66] is required to ensure Defence is capable of accurately assessing schedule performance. Uncertainty results from an inability to map physical progress against a stated plan, and precludes the ability to accurately assess EVMS progress. Defence advised the ANAO that it continually sought a contractually acceptable Integrated Master Schedule, however did not accept the Integrated Master Schedule from the Contractor until July 2003, some 15 months late.

3.7 The delivery of an Integrated Master Schedule 15 months later than originally contracted exposed the DMO to schedule and cost risks. In the absence of an Integrated Master Schedule, the DMO, and the Contractor, were exposed to the risk that they could have been unable to accurately predict cost and schedule variance within an EVMS management environment. Defence advised the ANAO that the Contractor exhibited significant difficulty in integrating its schedules for the number of dispersed sub-contractors, and this became a significant issue for certification of their EVMS. The Contractor advised the ANAO that progressive versions of the Integrated Master Schedule were delivered at each Project Management Review, and that several versions of the Integrated Master Schedule were delivered, prior to acceptance of the final version.

3.8 The first earned value payment to the Contractor of $70.6 million, for earned value performance between February 2002 to October 2003, was approved in December 2003.

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[65] The Contractor was also to demonstrate to Defence that sub-contractors complied with EVMS requirements as stipulated by Defence and Australian standards. As part of the EVMS accreditation process, it was a contractual requirement for sub-contractors to be subject of an Integrated Baseline Review within 10-12 months of the effective date. The Integrated Baseline Reviews of sub-contractors were mainly undertaken during December 2002.

[66] The Integrated Master Schedule is the primary schedule used to manage the Acquisition Contract. The DMO had contracted for its delivery in April 2002, four months following Contract signature, and prior to the conduct of the first scheduled Program Management Review. Defence advise that component level schedules were used to partially mitigate the risk associated with the absence of an Integrated Master Schedule.

3.9 The Project Office and the Contractor are jointly responsible for conducting EVMS surveillance reviews to ensure the EVMS remains compliant with the system description at the time of accreditation.[67] Defence documentation indicates the Project Office planned for surveillance reviews at six-monthly intervals following system accreditation for the duration of the Project.[68] Defence conducted a surveillance review of the Contractor's EVMS in October 2004, and surveillance reviews of the sub-contractors systems in mid-2004. The ANAO found that, with the exception of one surveillance review of one sub-contractor, surveillance reviews due in early 2005 have not been conducted. The Contractor and sub-contractors are subject to monthly verification of claims of performance under the EVMS arrangements and discrepancies raised at surveillance reviews are monitored by the Project Office for resolution.

3.10 Financial payments made by Defence as of October 2005, specific to the Acquisition Contract, are outlined at Table 3.1.

Table 3.1

Acquisition Contract Payments as at October 2005

	2001–02 $ million	2002–03 (b) $ million	2003–04 $ million	2004–05 $ million	2005–06 $ million	Totals $ million
Mobilisation payments	115.79	-	-	-		115.79
Milestone payments(a)	-	2.88	110.52	181.33	20.06	314.79
Earned Value payments	-	-	142.02	140.75	18.37	301.14
Incentive payments	-	-	-	-	-	-
Total	115.79	2.88	252.54	322.08	38.43	731.72

Notes: (a) Including price variations.

(b) During 2002-03, the Contractor was drawing down on the mobilisation payment, during which time the EVMS was not endorsed.

Source: ANAO analysis of DMO documentation.

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[67] To verify earned value performance under the contract, Defence reviews cost performance reports submitted monthly by the Contractor and subcontractors, conducts meetings with control account managers from the Contractor and subcontractors, with the aim of achieving 90 per cent level of confidence of claim to performance. The Project Office produces a monthly report with recommendation for the claim for performance. Verification activity is conducted on work packages that are completed in the reporting period, valued at more than $10 000 in the budgeted cost for work performed, or assessed as high risk.

[68] The Acquisition Contract provides for EVMS Surveillance activities to be conducted in accordance with DEF (AUST) 5658 *Cost Schedule Status Reporting Specification and Implementation Guide; Standard*. Defence advise that nominated sub-contractors use DEF (AUST) 5657 as the appropriate standard, as this standard requires much more earned value data to accredit an EVMS.

3.11 The Acquisition Contract provides for Defence to be able to withhold payments in the event of the Contractor's failure to achieve any one or more of 34 Critical Milestones. These milestones are categorised as: critical to a segment, such as the training system, in which case payments can be withheld for that segment only; and critical to the capability as a whole, in which case all payments can be withheld.

3.12 Provision has also been made in the Acquisition Contract to provide for a performance incentive fee of $34.2 million, in the event that superior performance is demonstrated in terms of schedule, technical, operational, managerial and Australian Industry Involvement activities.

3.13 The ANAO notes that as of completion of audit fieldwork in September 2005, no performance incentive fee has been paid to the Contractor.

Liquidated damages

3.14 Liquidated damages are available to Defence under the Acquisition Contract to cover the costs incurred if the Contractor is unable to achieve the contracted milestone delivery schedule.[69] Similarly, the Through-Life-Support Contract provides for Defence to recover damages for specified unsatisfactory performance, at daily rates.[70] The amounts are recoverable as a debt or as compensation equivalent to the maximum liquidated damages attributed to the milestone or event. For the Acquisition Contract, liquidated damages are applicable to 34 milestones overall, and of these, four are critical.[71]

3.15 In the Acquisition Contract, liquidated damages were capped at a value of approximately one per cent of the total Contract worth per month, and a total cap of five per cent of Contract worth.

3.16 At the time of the audit fieldwork, in accordance with its entitlements, Defence had made two claims for liquidated damages against milestones for which it was eligible to claim for late achievement of contracted deliverables. The claims, which amounted to $258 000, were associated with late delivery of

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[69] Defence may elect to pursue liquidated damages four months following the period of delay. The maximum amount of liquidated damages claimable for Acquisition Contract milestones is A$ 8.8 million and Euro 26.7 million (or A$ 56.8 million in contract base date prices).

[70] Liquidated damages for through-life-support are uncapped, and mainly relate to late completion of training deliverables.

[71] The Acquisition Contract holds the provision to stop all payments in accordance with the Contract clauses if a critical milestone is missed.

critical design and test readiness reviews, and were recovered as an offset against the cost of a number of contract change proposals.[72]

Regulatory environment

3.17 Technical regulation of the build program is undertaken under the auspices of the ADF Technical Airworthiness Manual.[73] Under the ADF Airworthiness system, the Contractor is required to be certified by the ADF to specific airworthiness standards. At the time of the Acquisition Contract signature, the Contractor's Engineering Management System was not suitable for accreditation, and thus the Contractor could not qualify as an Authorised Engineering Organisation (AEO). A Defence audit found that the Contractor's Quality Management System was not aligned to the scope of work under the Contract.

3.18 From February 2002 until October 2002,[74] all design work by the Contractor was undertaken without the Contractor holding an AEO qualification. Defence advised that additional oversight by the DMO was necessary during this period to compensate for the Contractor not being an AEO.[75]

3.19 Following the award of an AEO qualification for the design and production of the ARH Tiger variants in October 2002, design work undertaken by the Contractor has been approved, in an airworthiness sense, by

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[72] Defence notes that, whilst the Project Office had not drawn down on all Liquidated Damages Claims to which they were entitled, they had made their intentions to draw down on the claims known to the Contractor.

[73] Airworthiness in the ADF is administered under two closely related technical and operational domains. The Chief of Air Force is the ADF Airworthiness Authority, and regulates the standards and processes under which these two domains are managed, and is the authority for certification and service release of ADF aircraft. Operational Airworthiness relates to the safe operation of a weapon system through adequate management of issues such as operational procedures, operational risk, crew qualifications and currency, flight authorisation and aircrew training. For the Tiger ARH, the Commander of 16 Brigade retains responsibility for Operational Airworthiness, and provided an Operational Airworthiness Delegation to the Project Authority to be exercised in accepting aircraft from the Contractor, which was to expire on the issue of the first Australian Military Type Certificate, or the Special Flight Permit, as applicable. The ANAO notes that the Special Flight Permit was awarded in December 2004, six months prior to the acceptance of ARH 5. This delegation limited the ability for the Project Authority to accept aircraft with a risk index rating of no greater than MEDIUM, and required a documented case for doing so.

[74] By not achieving AEO status ahead of schedule, the Contractor was not paid an incentive fee to the value of $2.7 million.

[75] The Acquisition Contract allowed the Contractor the period from signature in December 2001 until September 2002 to develop an acceptable Engineering Management System, and achieve AEO status.

the Contractor, and subsequently assessed, and if appropriate, accepted by Defence.[76]

3.20 In December 2002, Defence wrote to the Contractor, advising them that, a year into the contract, the indications were that the expected performance was not being delivered. Defence noted that two emerging trends were of concern: the quality and timeliness of contract data deliverables (a large number of very important planning documents remained undelivered or incomplete past their due date); and the growing number of open action items arising from various programmed technical reviews that were not receiving sufficient attention to resolve them.[77]

3.21 In an effort to reduce the workload associated with certifying the Tiger ARH capability under the ADF system, the ADF Technical Airworthiness Authority planned to utilise, and subsequently recognised the French acquisition agency (Delegation General Pour l'Armament - DGA)[78] as a competent certification agency. In doing so, the DGA certification of the French Tiger variant became an integral part of the ADF certification plan. Defence expected the French Tiger variant to have been accepted by the French DGA by June 2003.[79] Contractual acceptance of the first French Tiger variant did not occur until March 2005. Prior to this contractual acceptance, the French Tiger variant had achieved the first of a two level DGA airworthiness certification process in April 2004.

3.22 The ANAO notes that delays associated with DGA certification of the French Tiger Variant, coupled with the added work associated with managing the certification of Australianised elements of the Australian Tiger ARH, placed an unusually high level of demand upon Project Office staff located in France, in an effort to meet the In-Service Date in December 2004.

3.23 Reliance on the certification of the French Tiger variant was critical to the Australian design acceptance program. The DMO's ability to leverage from

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[76] The Project Governance Board noted in October 2002 that, of the issues associated with the Project's engineering activity, the Project Office had underestimated the effort involved with the Contractor achieving AEO status, and noted that the Project was set up to receive documents from a Contractor that was already an AEO.

[77] Defence noted that the indications were that the resources being applied by the Contractor, particularly the number of skilled engineers, was insufficient for the level of activity required.

[78] The DGA performs the procurement activities for the French Defence Force, and is similar to the DMO in Australia.

[79] Defence advised the ANAO that the use of DGA as a certification agency was always planned to assist in the certification effort for the Australian Tiger variant.

the French program was adversely impacted, because the French program had not achieved design approval outcomes, at the rate the DMO had anticipated, at the time of contract signature. Staffing levels in the DMO had been predicated on the expectation that the French certification program was to have been more advanced than realised.[80] The ANAO observed that staff work levels were markedly increased by the delays associated with the French certification program.

Aircraft support documentation fidelity management

3.24 Defence advised the ANAO that, under Australian Flight Rules, the Aircraft Flight Manual takes precedence as the prime document that describes the operability of the aircraft. This differs from the French approach, whereby the aircraft electronic alerts and advice notes are taken as the primary guide for aircraft operability. The processes initially employed by the aircraft builder did not serve to deliver a Flight Manual that was sufficiently accurate to serve as being immediately acceptable for Defence use. The Aircraft Flight Manual therefore required significant review to ensure it could be used as the pre-eminent document describing the operability of the aircraft. This was done in consultation with the European on-site element of the Defence Project team to ensure an acceptable, albeit limited, Flight Manual was available at aircraft acceptance.

3.25 The ANAO found that the on-site element of the DMO Project Office in France contributed to the acceptance and delivery of the aircraft by assuring deliverables met Australian design standards. Defence advised the ANAO that the effort associated with improving the usability of documentation in support of flight operations of the aircraft was an ongoing development process.

Management of intellectual property

3.26 The Contractor is required to provide all Foreground and Background Intellectual Property, and Third Party Intellectual Property, as well as access to Technical Information to enable Defence, or persons acting on Defence's behalf, to be able to operate and maintain the supplies and services throughout the life-of-type of the ARH Tiger capability.

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[80] Defence reported in September 2003 that: *the delay in French and German certification activity for the earlier variant of the Tiger, and the current pace of design and test activity proposed by the Contractor, is complicating the work required of the Project Office to achieve certification in time for the December 2004 In-Service Date.*

3.27 Under the terms of the Acquisition, and Through-Life-Support Contracts, the Contractor is also required to indemnify Defence in respect of any cost, loss, damage or other expense incurred by Defence as a consequence of Defence not having rights to sub-contactor Intellectual Property that it requires. Defence is also to be granted a licence to exercise rights in Third Party Intellectual Property, on the best available commercial terms.

3.28 The Acquisition and Through-Life-Support Contracts require the Contractor, and sub-contractors maintain Intellectual Property in a state that can be used by Defence, as required. The DMO has not mandated a comprehensive audit of the Intellectual Property holdings managed by the Contractor and sub-contractors on their behalf.[81]

Recommendation No.2

3.29 The ANAO recommends that, the Defence Materiel Organisation undertakes periodic audits of all Intellectual Property holdings associated with the Tiger ARH aircraft and systems, with the aim of ensuring Contractor, and Sub-Contractor Intellectual Property is being maintained as required by contractual requirements.

Agency Response

3.30 *Defence and DMO response:* **Agreed.** DMO plans to conduct an audit of the IP Plan and Register prior to the interim operational capability milestone.

[81] Under the terms of the Acquisition Contract, the Contractor is responsible for establishing, maintaining and delivering an Intellectual Property Register of all Intellectual Property relating to the Australian Tiger Variant, and its related systems.

4. Delivery Performance

This chapter outlines the status of the Contractor's delivery performance.

In-Service Date acceptance

4.1 The In-Service Date represents a milestone in the acquisition process whereby Defence took formal delivery of the first two Tiger aircraft,[82] in preparation for the development of training and systems that would prepare them for the future award of an Australian Military Type Certificate[83] and Service Release.[84]

4.2 Many of the elements associated with the Australianisation of the standard aircraft design were not functioning as required at the time the DMO accepted the aircraft from the Contractor at the In-Service Date, in December 2004. Continued non-delivery associated with Australianised elements, contributed to the delay associated with the award of an Australian Military Type Certificate.

4.3 At the In-Service Date, the DMO accepted the first two aircraft from the Contractor, without completing 25 of the Production Test and Evaluation test procedures. These 25 procedures were not required at the time of acceptance, because the delivery dates for the corresponding systems and equipments were contractually required to be delivered after the In-Service Date. The aircraft were accepted with a number of known and agreed deviations annotated in the supplies acceptance certificate.

4.4 The configuration of ARH 1 and 2 at In-Service Date delivery contained the deficiencies as shown in Table 4.1, for which the DMO advised part milestone payment was withheld against ARH 1 Type Acceptance (for outstanding design issues), to the value of $7.1 million (50 per cent).

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[82] The Tiger ARH flew in France, under local flight clearance issued by the DGA. Following this flight clearance, the Project Office applied for, and was awarded a Special Flight Permit to conduct the In-Service Date demonstration, Test and Evaluation activities, and limited training activities in Australian airspace, prior to the award of an Australian Military Type Certificate and Service Release.

[83] An Australian Military Type Certificate is awarded to aircraft by the Defence Airworthiness Authority, on the recommendation of the Airworthiness Board. It is the certification required before normal flight operations, with appropriate limitations, can commence.

[84] Service Release is a declaration that the necessary operational and logistic support systems are in place to support the airworthiness of the type and model when operated as described in the Statement of Operating Intent.

Table 4.1

Unscheduled Deficiencies at In-Service Date Delivery of the First Two Tiger ARH Aircraft – December 2004

System	Deficiency
30mm turreted cannon.	Testing on the 30mm turreted cannon was not completed. Defence advised the ANAO that, as of November 2005, testing has been completed, and the results are being analysed.
70mm rocket system.	Testing on the 70mm rockets was not completed. Defence advise that as of November 2005, testing has been completed, and the results are being analysed.
Maximum all-up weight.	The maximum all-up weight of the ARH was be limited to 6.1 tonnes (the current limit of the French Tiger variant), not the 6.4 tonnes required for the ARH
Main engine performance.	ARH was not proven to meet the maximum contracted engine performance requirements.
Software.	A number of software problem reports remained outstanding on the delivered software build.
Direction Finder.	The Direction Finder was not fully integrated. Defence advise that as of November 2005, the Direction Finder was integrated, but not yet accepted.
Maintenance Management System.	An interim Maintenance Management System was to be used until the final system can be delivered.
Electronic Warfare Mission Support System.	Defence expect this system to be delivered in late 2005. Defence advised the ANAO that the design was accepted in August 2005, however the capability has not been fully delivered.
Ground Mission Management System.	The Ground Mission Management System Software was an interim configuration, albeit it was considered appropriate for use by Defence for training purposes.
Spares and Support and Test Equipment.	The required suite of spares and support and test equipment to support ISD will be delivered progressively.

Source: ANAO analysis of Defence trials reports.

Earned Value Management Payments

4.5 The extent of Earned Value Management payments available to the Contractor for delivery of the first two aircraft at the In-Service Date amounted to $42.8 million. Of this sum, the Project Office withheld $2.3 million, amounting to 5 per cent of the available Earned Value payments (see Table 4.2).

4.6 The DMO advised that the risks of not achieving certification are higher in the design phase, and withheld payments respectively. Milestone payments associated with delivery and acceptance of ARH 1 and ARH 2 aircraft were $15.8 million and $7.8 million respectively.

Table 4.2

Earned Value Payments at Acceptance of ARH 1, 2 and 5

Aircraft	Available Earned Value Payments ($ million)	Earned Value Payments made ($ million)	Unclaimed Earned Value ($ million)	Unclaimed Earned Value (per cent)
ARH 1	21.6	20.5	1.1	5
ARH 2	21.2	20.0	1.2	6
ARH 5	21.1	20.7	0.4	2

Source: DMO

Milestone Payments

4.7 As at completion of audit fieldwork, not all the deficiencies identified at Table 4.1 had been rectified. The DMO paid the withheld $7.1 million element of the Type Acceptance payments at the time the Airworthiness Board recommended the award of an Australian Military Type Certificate.

4.8 The Project Office also delayed the $14.1 million payment for the Milestone associated with the award of the Australian Military Type Certificate from March 2005, until October 2005, corresponding to when the Airworthiness Board recommended the award of the Australian Military Type Certificate. This sum has now been authorised for payment to the Contractor, following the ADF Airworthiness Board recommendation that an Australian Airworthiness Certificate (with limitations) be awarded to the Tiger ARH Type.

4.9 The DMO did not withhold milestone payments specifically associated with identified production deficiencies of the aircraft at the time of contractual acceptance, even though the Acquisition Contract allowed for part payment of the corresponding milestone payments.

4.10 The ANAO found that the DMO accepted ARH 1, 2 and 5 with contractual shortfalls and significant capability limitations at the date of acceptance, including elements of the weapons, engine, and software systems. Even though airworthiness limitations were imposed to ensure these aircraft were not operated under risk conditions that Defence assessed as unacceptable,[85] a large proportion of the available payments were made for these aircraft at their acceptance from the Contractor, in a state where they were not fully fit for purpose against the contracted specifications.

Special Flight Permit

4.11 Under the ADF State System, the first six Tiger ARH aircraft were awarded a Special Flight Permit in December 2004, based on the demonstrated performance of the aircraft tested in France, which included acceptance of a number of deficiencies, [86] prior to the In-Service Date acceptance. The original Special Flight Permit expired on 2 September 2005, and was subsequently extended to 31 October 2005, or upon issue of an Australian Military Type Certificate.[87]

4.12 The Special Flight Permit authorised ADF and Contractor aircrew[88] to operate the Tiger ARH aircraft to undertake an In-Service Date demonstration and production acceptance flights, in-country flight tests, and initial instructor training flights.

4.13 Specified contractual payments to the Contractor are linked to the ability of delivered aircraft to meet specified technical and operational airworthiness regulations. In March 2005, the then Chief of Air Force requested that the DMO ensured significant milestone payments were not solely linked

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85 The ANAO was advised that: *it is the DMO's practice to accept deliverables with contractual shortfalls, and operational limitations, on a risk managed basis, to progress Defence specific training, and testing activities, to deliver the required operational capability*.

86 The DMO tracks and manages aircraft defects following delivery, in the Special Flight Permit phase of aircraft assessment, in part as an effort to comply with future requirements to achieve Australian Military Type Certification, and Service Release.

87 The ADF policy states that to operate as State aircraft (outside the Civil Aviation System), either an Australian Military Type Certificate and Service Release, which in themselves, are not an assessment of operational suitability or effectiveness of a new or modified ADF aviation system, for the aircraft system, or a Special Flight Permit must be issued under the authority of the ADF Airworthiness Authority, who, in this case, is the Chief of Air Force. Defence advised the ANAO in October 2005 that the award of the Australian Military Type Certificate was delayed past its planned implementation date, and the Special Flight Permit was extended to 31 October 2005 as a risk reduction measure to account for the time required by the Australian Military Type Certificate Board to complete administrative actions associated with drafting the required documents and instruments.

88 Contractor aircrew are authorised to fly the ARH by the Commander of 16 Brigade (Aviation) in accordance with ADF Operational Airworthiness Regulations.

to the issue of Airworthiness Instruments, as the practice potentially undermines the airworthiness process, which is aimed at achieving operational capability within an acceptable risk level.[89]

4.14 The ANAO notes that irrespective of the direction associated with decoupling milestone payments from Airworthiness Instruments, the DMO should require contractors delivering aircraft for acceptance to meet specified airworthiness standards, to ensure delivered aircraft are presented in a state that is 'fit for purpose'.

Airworthiness

4.15 In December 2004, the Technical and Operational members of the Airworthiness Board wrote to the then ADF Airworthiness Authority, who, on the basis of this recommendation, subsequently approved the issue of a Special Flight Permit for the Australian Tiger ARH aircraft type.[90]

4.16 To progress the schedule, and in an effort to expedite the compliance finding process, the DMO adopted a number of risk managed Provisional Compliance Findings, which were authorised by the Project Office Design Acceptance Representative. Defence advised that the inability of the Contractor to provide the data required by the DGA to react in the time required to meet the Contractor's delivery schedule meant that, of the 182 Airworthiness Requirements for which DGA advice was to be received, the DMO Project Office was obliged to make 71 airworthiness compliance findings, from a total of 356 compliance findings, without input from the DGA. The Design Acceptance Representative nominated a Design Acceptance Freeze on 27 October 2004, against which the ARH was assessed for certification and compliance in preparation for the award of the Special Flight Permit.

4.17 Defence advised the ANAO that the process of conducting formal compliance findings has revealed airworthiness issues, which have been

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[89] The Chief of Air Force noted in March 2005 that the Airworthiness Board members had advised that, in some cases, including the Tiger ARH Project, the DMO had placed significant pressure on the airworthiness delegates and the board itself to make positive recommendations for a broad scope of operations to support acceptance of the delivered capability and achieve industry objectives, which potentially undermines the integrity of the airworthiness process.

[90] In making the recommendation, the Airworthiness Board noted that:

The original Certification Strategy relied significantly on the independent airworthiness advice from the French National Airworthiness Authority (DGA). However, due to project scheduling issues, DGA were not able to provide all of the information that was originally planned within the necessary time frames. The Airworthiness Board advised the ADF Airworthiness Authority that DGA have provided assurance that the ARH has the same basis level of certification as the HAP (French variant). Where DGA certification input was unavailable, ARHPO has amended the certification strategy and made the necessary compliance findings for certification.

subsequently addressed, and that by uncovering these airworthiness issues, the airworthiness system has highlighted the residual risks within the certification program.

Australian Military Type Certificate and Service Release

4.18 The Australian Military Type Certificate[91] and Service Release are issued using a phased approach that is aimed at resolving limitations identified during the Special Flight Permit period, leading to acceptance by the ADF Airworthiness Authority.[92]

4.19 In April 2005, the ANAO reviewed the ARH Tiger Type Acceptance Test and Evaluation Report, which is based on integration rig, ground, and flight test activities. The report identified a significant number of deficiencies associated with the first two aircraft that needed to be resolved,[93] and reflect many of those that were observed when award of the Special Flight Permit was made in December 2004 (see also Table 4.1). In addition, the ANAO reviewed the deficiencies that prevailed when ARH 5 was accepted from the Contractor, which are also represented at Table 4.3.

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[91] The Australian Military Type Certificate is awarded to certify that the design of the aircraft is compliant with the approved Certification Basis Description, and incorporates all proposed management solutions to any departures from the approved Certification Basis Description.

[92] The Australian Military Type Certificate requires authorisation by the ADF Airworthiness Authority, following a recommendation from the ADF Airworthiness Board, and certifies that: all Type Certification activities are complete; appropriate manufacturing and quality standards were and are being applied during manufacture and assembly; availability of a competent Design Authority to provide continued airworthiness support is assured; there is a suitable preliminary maintenance plan to provide, as a minimum, a set of instructions to assure continued airworthiness in the interim period until full service release is achieved; a statement of operating intent and suitable operating procedures have been accepted and authorised by the Operational Airworthiness Authority; test reports providing evidence that the aircraft has been comprehensively tested and qualified against design requirements, can be safely operated in all approved roles across the defined operating spectrum, and that these reports have been accepted by the Operational, and Technical Airworthiness Authorities; and the Type Record and Accomplishment Summaries have been accepted by the Technical Airworthiness Authority prior to the issue of a recommendation.

[93] The Report relates to the testing conducted for the In-Service Date configuration as at the Type Acceptance Review of 11-12 October 2004, and does not include Hellfire, satellite or secure communications, data link, laser spot tracker, multi target tracking or ground mission equipment evaluations.

Table 4.3

ARH Managed Airworthiness Issues and Deficiencies at In-Service Date and Acceptance (based on December 2001 contracted requirements).

Capability	Aircraft		
	Managed Airworthiness Issue	Aircraft Number 1&2 December 2004	Aircraft Number 5 June 2005
Maximum all-up weight	Yes	X	X
Main engine performance	Yes	X	X
Software Integration [(b)]	Yes	X	X
Emergency Locator Beacon [(c)]	Yes	X	X
Voice Flight Data Recorder Operability in High 'G' Environments [(d)]	Yes	X	X
Crash Resistance [(e)]	Yes	X	X
Flight Over water [(f)]	Yes	X	X
Basic Avionics System Excessive warnings	Yes	X	X
Radio Navigation and Altimeter Equipment	Yes	X	X
30mm turreted cannon	-	X	X
70mm rocket system	-	X	X
Maintenance Management System	-	X	X
Electronic Warfare Mission Support System	-	X	X
Ground Mission Management System	-	X	X
Spares and Support & Test Equipment	-	✓	✓

Notes:

(a) **X** indicates a non-compliance with contractual requirements; whereas ✓ indicates compliance with the contractual requirements.

(b) At In-Service-Date, the version of aircraft software installed had a number of known and managed issues that the Contractor was attempting to rectify in the next software release.

(c) The Contractor was yet to prove compliance with the Military Standard temperature environment of 69 degrees Celsius. The Emergency Locator Beacon was certified and compliant with the civilian FAR temperature environment of 55 degrees Celsius.

(d) The Contractor was unable to prove compliance against all aspects of the required specifications. The non-compliances have been agreed as minor and accepted by the Defence Technical and Operational Airworthiness Authorities as well as the ADF Flight Safety Organisation. Defence state that all ARH were fitted with operating, yet non compliant Voice Flight Data Recorder at the time of acceptance.

(e) Defence has noted that this deviation from the contracted standard is an approved, permanent type deviation.

(f) The ARH flight over water restrictions are imposed because there are unresolved issues related to underwater egress. Defence had not been satisfied that all issues related to underwater egress had been tested and analysed by the Contractor, and therefore imposed this flight restriction.

Source: DMO and Defence

Changes to contracted specifications

4.20 The December 2001 Acquisition Contract was specific with respect to the requirements to be delivered at In-Service Date. For example, the Acquisition Contract requires that, inter alia, the Contractor is to deliver two Accepted ARH Tiger aircraft, sufficient trained crews, and Contractor support measures. This aligned with a Critical Milestone payment of $23.2 million[94] in December 2004.

4.21 Negotiations between the Contractor and the DMO, commenced at the third Project Management Review meeting in November 2002 for the acceptance of a lesser capability at the In-Service and acceptance dates of the first six aircraft than those specified in the December 2001 Contract.[95] The ANAO found that the negotiation for a fundamental change to the Acquisition Contract to cater for the resulting remediation plan, which impacted on available operational capability, was not, and has not been formalised through agreed Contract Change Proposals.

4.22 An ARH In-Service Date configuration plan was prepared by the Contractor in February 2004, and approved by the DMO in March 2004. The plan provided for the retrofit of the first five ARH Tiger aircraft during deeper maintenance activities, which, at that time, was to be agreed. The DMO advised the then Minister for Defence in December 2004 that the recovery plan should be completed by the end of 2005. The DMO advised the ANAO in February 2006 that the retrofit activity to ameliorate deficiencies with ARH 1 only started in February 2006, and is not now scheduled to be completed until October 2006. Table 4.4 illustrates the revised contractual requirements for In-Service and Acceptance Dates for ARH 1, 2 and 5.

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[94] This amount is on a December 2001 price basis, and was increased through a price variation in December 2004 by an additional $1.9 million (excluding Goods and Services Tax).

[95] The Acquisition Contract (Attachment C, Part 1) provided for the Project Authority to determine the configuration of the ARH required to meet the In-Service Date milestone. The DMO advise that all helicopters delivered in such a configuration are to be retrofitted at the Contractor's expense to meet the final configuration required by the Acquisition Contract.

Table 4.4

DMO Revised Contractual Requirements for In-Service and Acceptance Date Delivery: ARH 1, 2 and 5

Capability	Aircraft	
Deliverables	**Aircraft Number 1&2 (December 2004) Revised Contractual Requirement**	**Aircraft Number 5 (June 2005) Revised Contractual Requirement**
Maximum all-up weight operability	✓	✓
Main engine performance	X	X
Software Integration [(b)]	✓	✓
Emergency Locator Beacon [(c)]	✓	✓
Voice Flight Data Recorder Operability in High 'G' Environments [(d)]	✓	✓
Crash Resistance [(e)]	✓	✓
Flight Over water [(f)]	X	✓
Basic Avionics System Excessive warnings	X	X
Radio Navigation and Altimeter Equipment	X	X
30mm turreted cannon	X	X
70mm rocket system	X	X
Maintenance Management System	X	X
Electronic Warfare Mission Support System	X	X
Ground Mission Management System	✓	✓

Notes:

(a) **X** indicates a non-compliance with the revised contractual requirements, whereas ✓ indicates compliance with the revised contractual requirements.

(b) Refer to the notes of Table 4.3 for a description of the notes (b) to (f) pertaining to elements of the Deficient Deliverables represented by this Table.

Source: DMO February 2006 advice.

4.23 The DMO advised the ANAO in November 2005 that close management of the differences between aircraft and the Contractual requirements will continue until the first fully contractually compliant ARH (anticipated to be ARH 7, which was to have been delivered in November 2005, however this has been delayed) is delivered. The DMO advise that the retrofit action, for the first six aircraft, which commenced in January 2006, is to be completed at the Contractor's cost.

4.24 The ANAO was informed by resident ADF test pilots in France that the absence of an operable, compliant avionics system does not permit the Tiger ARH to operate in non-visual conditions in Civil Aviation Airspace in Australia,[96] and presents operational commanders with operating restrictions. This operational deficiency may require a substantive effort associated with redesigning, and testing the avionics system for the Tiger ARH aircraft, or otherwise provision of stand-alone support systems for use in degraded visual flight conditions at the Contractor's expense. As of August 2005, delivery of a system that will be acceptable for Instrument Flight Rules certification had not been achieved, and is reliant upon the next iteration of certification of the French Tiger Variant, which was expected to occur in December 2005.[97]

4.25 The DMO advised the ANAO in February 2006 that:

> the ARH has shortfalls against the contract requirement. Initial non-compliance is not unique to the Tiger. The Project Office raised an issues paper, which includes the manufacturer's proposed approach to demonstrating that the Tiger is capable of safe flight in civilian IFR airspace. The Director General Technical Airworthiness assesses this approach will provide us with appropriate confidence that the aircraft will exhibit equivalent level of civilian rotorcraft. This will provide the Australian Defence Force Airworthiness Authority with a sound basis for assessing ARH as suitable for IFR flight in civilian airspace.

4.26 In March 2005, Defence assessed that the award of an Australian Military Type Certificate for the Tiger ARH would be delayed by four months, until 2 September 2005. Defence noted that the initial delay would impact on the training program, particularly for new pilots, and increase the risk that Army will not achieve the required capability within the required time frame. In September 2005, Defence advised the ANAO that the further delay of the award of an Australian Military Type Certificate and Service Release had no impact on the progression of the capability, and that the highest risk to the

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[96] The absence of operable, compliant avionics navigational aids required for Instrument Flight Rules flights within Australian Civil airspace, may require software and hardware redevelopment activities to integrate the required capabilities to the integrated avionics busline, unless a standalone supplementary system is provided that will permit flights within Australian Civil airspace under Instrument Flight Rules conditions. The Civil Aviation Safety Authority defines Instrument flight rules, and define the environment in which an aircraft may not operate without the support of specified aeronautical instruments, which are non visual flight conditions– for example, in fog, cloud or mist.

[97] Subsequent to the completion of fieldwork, Defence has advised that the Contractor has provided a new radio altimeter and software package for installation, pending certification and acceptance by the Operational Airworthiness Authority, and Design Acceptance Representative, to the Tiger ARH that meets Defence's requirements, although this system has not been certified or accepted by the Operational Airworthiness Authority, and Design Acceptance Representative.

Tiger ARH training continuum and effective capability is the lack of synthetic training devices.

4.27 As of June 2005, the status of 1093 certifiable aircraft requirements (Contractor Statements of Compliance), as reported to the Project Director on a weekly basis, included 350 specific airworthiness requirements. Of the 1093 requirements, 45 per cent had not been accepted, and remained at risk, even though three aircraft had been accepted from the Contractor.

Airworthiness Board Acceptance

4.28 The target date of 2 September 2005 for the award of the Australian Military Type Certificate was not met. The ANAO note that the Special Flight Permit was extended until 31 October 2005.[98] The DMO advised the ANAO that:

> the Australian Military Type Certificate Board met on 29 August 2005 and recommended issue of the Australian Military Type Certificate. The clearance / sign-off by the delegate, plus paperwork, took a little longer.

4.29 An Australian Military Type Certificate was awarded on 26 October 2005, which limited operations of in-service aircraft to flights where: there are no icing conditions; the maximum all-up weight is limited to 6100 kilograms; there are no shipborne operations; and the weather permits operations under visual meteorological flight conditions.

4.30 In addition, the Service Release, which was also issued on 26 October 2005, limited the aircraft to test activities, instructor training, and demonstration and ferry flights. The Service Release limits operations involved in these activities to: no prolonged flights over water; no flights with sand filters fitted; no night flights using night vision devices; no flights where the radar altimeter is to be relied upon, and; no take-off, landing or operations close to the ground above 5000 foot pressure altitude. The Service Release document specifies that all engineering decisions or configuration changes associated with the in-service aircraft must be endorsed by the aircraft builder, until the Contractor achieves AEO status for in-service activities, and the DMO Project Office Design Acceptance Representative is to retain all responsibilities for Design Acceptance until the Contractor achieves AEO status for in-service activities.

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[98] A Certification Data Package underwrites the award of the Australian Military Type Certificate, and Service Release. It comprises the Type Record, aircrew and maintainer training packages, operational and maintenance publications, and associated in-service logistics support documentation.

4.31 In mid August 2005, the ADF Technical Airworthiness Authority stipulated that the Australian Military Type Certificate elements of the ADF Technical Airworthiness Management Manual had been adequately assured for the Tiger ARH, except for those limitations as represented in Table 4.5, which require further Project Office management for resolution. The originally contracted delivery date for the Australian Military Type Certificate of 1 March 2005, for which payment of $13.8 million was due to the Contractor, has now been slipped in excess of six months, and payment was authorised following the ADF Airworthiness Board recommendation in August 2005 that an Australian Military Type Certificate, with limitations, should be awarded.

4.32 In addition, the ADF Technical Airworthiness Authority noted that in relation to Service Release, the Tiger ARH was compliant, except for those elements also identified as deficient in Table 4.5. Significantly, the ADF Technical Airworthiness Authority confirmed that the recommendation for Service Release did not confirm the adequacy of operational, logistics and maintenance support arrangements for the Tiger ARH capability.

Table 4.5

Summary of Tiger ARH Australian Military Type Certificate and Service Release limitations - October 2005

Limitations and Restrictions	Australian Military Type Certificate limitation	Service Release limitation
No flight other than Visual Flight Conditions.	X	
No flight in icing conditions.	X	
Maximum all-up weight limited to 6100 kilograms.	X	
No shipborne operations.	X	
Aircraft operations are limited to testing, training instructors, test and experienced aircrew, as well as demonstration and ferry flights.		X
No deliberate flight in Instrument Meteorological Conditions.		X
No prolonged flight over water.		X
No flight with sand filters fitted.		X
No night flying using night vision devices.		X
Radar altimeter not to be relied upon during operations.		X
No take-off, landing or operations close to the ground above 5000 feet pressure altitude.		X
All engineering decisions or configuration changes must be endorsed by the aircraft manufacturer until the Contractor achieves AEO status for in-service activities.		X
The ARH Design Acceptance Representative is to retain all Design Acceptance responsibilities (that is, the Contractor is not to be given any level of assumed Design Acceptance) until the Contractor achieves AEO status for in-service activities.		X

Notes:

(a) **X** indicates a managed limitation or restriction.

(b) Flight Manual limitations and Special Flying Instruction limitations have also been imposed to manage residual risk elements, which include limitations on night flying operations, aerobatics, and instrument navigation, amongst others.

Source: Defence.

Tiger ARH 3, 4 and 6

4.33 ARH 3 and ARH 4 were built and assembled in France, and shipped to Australia in late May 2005. The DMO advised the ANAO that the delay associated with delivering ARH 3 and ARH 4 was associated with the requirement to undertake residual testing of the ARH systems in France. In addition, ARH 3 and 4 were used for training Australian military and

Contractor flying instructors. Defence advised the ANAO that delays associated with the French Defence Force accepting French Tiger HAP aircraft, which were required to undertake the necessary Australian Instructor Training, have created consequential problems that have contributed to the delays in delivering ARH 3 and 4.

4.34 Defence accepted ARH 4 from the Contractor on 23 September 2005, some five months following the contractually required delivery date, because it had been retained in France to facilitate Australian military training, due to the shortfalls associated with the contract acceptance of French aircraft, and the delay of the Australian simulator equipment. Following the acceptance, it was added to the State Aircraft Register.[99] In October 2005, the DMO advised the ANAO that ARH 3 was undergoing acceptance from the Contractor, and that ARH 4 was accepted prior to ARH 3, because ARH 3 had some unserviceabilities that required rectification prior to commencing the specified Production and Acceptance Test and Evaluation program.

4.35 The DMO advised the ANAO in October 2005 that ARH 6 is now scheduled for acceptance in December 2005, some three months later than contractually required.

Contractual acceptance of ARH 5

4.36 The DMO Project Office accepted Tiger ARH 5 on 1 June 2005, prior to the contracted delivery date in July 2005, and two days after receipt of a report from the Defence Production, Acceptance, Test and Evaluation Team, which recommended that ARH 5 should not be accepted until all the issues raised in the test program had been rectified.

4.37 A milestone payment of $5.9 million was made to the Contractor for delivering an aircraft that conformed to specified requirements, and a further $1.9 million was paid for acceptance. A further $1 million in price variation costs brought the milestone payment for acceptance to approximately $9 million. In addition, Earned Value payments to the value of $20.7 million were made by acceptance. This represents 98 per cent of available Earned Value payments for ARH 5 (see Table 4.2). The ANAO found that the DMO did not withhold milestone payments commensurate with the deficiencies

[99] The ANAO notes that safety issues associated with operating, maintaining and servicing the Tiger ARH aircraft, when they occur in service, are recorded in the Defence Aviation Hazard Reporting and Tracking System.

associated with the delivered aircraft, as allowed for in the Acquisition Contract.[100]

4.38 On completion of scheduled delivery testing in late May 2005, there was a series of tests relating to the airborne systems that were not undertaken as part of the Production Acceptance Test and Evaluation phase, and had been contractually agreed by the DMO with the Contractor that they were not required to be delivered at that stage.[101] These included navigation system elements, computer system management elements, as well as communications system elements. In addition, tests associated with night flying and different modes of management system operations were not conducted, and are yet to be conducted by Defence. Systems that were not yet 'type accepted', such as the secure communications system, were also not tested.

4.39 The Defence ARDU Test Team noted that the extent and impact of identified deficiencies provided evidence that ARH 5 exhibited neither high quality nor mature system performance.[102] The Test Team identified a number of issues that were contractually required for delivery at the time the DMO

[100] The ANAO notes that an incentive payment of $1.72 million was available for payment to the Contractor in the event of early delivery of ARH 5 on 1 June 2005, however it could only be made available if the Contractor had not missed delivering any milestones in the reporting period immediately prior to the occasion for which the incentive was payable. On this occasion, the Contractor was not eligible for payment of the incentive, through not meeting the qualifying conditions associated with timely milestone completion. The DMO advised that 50 per cent of the milestone associated with the recommendation that type certification should be awarded, which is approximately $7 million, was withheld for system related deficiencies that were not yet delivered.

[101] The DMO advised the ANAO that three tests relating to navigation equipment functionality were not carried out, and were required to have been conducted. The DMO advised the ANAO that the risks associated with accepting aircraft with these incomplete tests were considered to be low and could be completed post-acceptance, once the required functionality for testing for 'P-Code' operation had been restored to the Global Positioning System. 'P-Code' functionality is usually provided to Global Positioning Systems via an encoded signal to provide for the ability of a Global Positioning System receiver to reduce positional errors from approximately 15 meters, to less than 5 meters. At the time of testing ARH 5, 'P-Code' functionality was not provided for via the encoded signal method, and so the receiver that usually decodes the 'P-Code' system could not be tested.

[102] Following initial test outcomes, on 30 May 2005, and on being informed that the DMO intended to accept ARH 5 in the state delivered by the Contractor, against the Test Team's recommendation, the Defence Test Team issued a supplemental report of results which recommended that basic system tests be carried out before operating the aircraft for anything other than Production Acceptance Test and Evaluation.

accepted the aircraft, and would directly affect safe and efficient operation of ARH 5, especially in the training environment.[103]

4.40 Defence stated that, all Tiger ARH aircraft will be accepted with limitations until the final configuration of the Tiger ARH is in place in late 2006. Defence noted that, after detailed assessment and consideration of all acceptance documentation, including the ARDU report, in accordance with Defence technical and operational airworthiness processes, the DMO assessed ARH 5 as safe, and acceptable for delivery against the contractual requirements, and extant Special Flight Permit conditions.

4.41 The ANAO found that the DMO did not meet the requirements associated with the expired Airworthiness delegation under which the DMO Project Authority accepted ARH 5, in that the supporting justification required by the expired airworthiness delegation were not recorded and promulgated as required. In addition, the ANAO found that the Project Authority accepted ARH 5 without first consulting with the Operational Airworthiness Authority (Army), as was required in the absence of a subordinate Operational Airworthiness Delegation (see paras 4.51 and 4.55).

4.42 In September 2005, Army reported that the level of deficiencies of ARH 5 exceeded those of the first two aircraft and that it took three test serials to bring the aircraft to a standard suitable for Army acceptance and use.

4.43 Following the Production Test Acceptance and Evaluation testing, ARDU developed a set of 'lessons learnt', pertaining to the experiences associated with testing ARH 5 in Australia. Paramount of those lessons was

[103] The agreed, and managed airworthiness issues that were raised after receiving a test grading of unacceptable by the test crew included:

- Binding of the flight controls, which required the yaw trim actuator to be replaced prior to the next flight;
- Inconsistent operation of the pilot's Manual Engine Trim function;
- Deficient Flight Data Recording and Emergency Locator Beacon availability;
- Poor quality images caused by the lack of cleanliness, and some potential design and/or production faults associated with the helmet mounted Image Intensifier (II) Night Vision Devices (NVD);
- Differing information being displayed on the aircraft console to that in the helmet mounted display, relating to whether the True or Magnetic compass direction was being used, after transfer from True to Magnetic way-point data, which did not necessarily show the magnetic compass direction in the helmet mounted display, even though it had been selected; and
- Conflicting information was presented on navigation pages between Multifunction Displays one and three, and Multifunction Displays two and four, following the insertion of an additional way point, which meant contradictory flight routes may be displayed without indication as to which is actively being referenced by the autopilot or other navigation cues.

that the flight test team, comprising two qualified staff, required an estimated four weeks to complete the required Production Acceptance Test and Evaluation schedule for ARH 5, whereas the Project Office had allowed for only two weeks, even though the test team had advised the Project Office, on more than one occasion, that there were schedule and personnel fatigue issues that increased the risks associated with flight test operations.

4.44 The ANAO notes that there were at least four weeks available following the actual acceptance date until the agreed contractually required acceptance date that were not utilised by the DMO. The ANAO found that the DMO did not allocate sufficient time to fully conduct the test and evaluation program required to accept ARH 5 against the required standards, given the available personnel, even though the time was available.

4.45 Defence advised the ANAO that, under the existing Special Flight Permit, no aircraft were used for flying training in Australia until September 2005. During the time between acceptance of ARH 5 and September 2005, 28.5 hours of flight test and evaluation was undertaken by qualified test pilots using ARH 5. The DMO advised the ANAO that ARH 5 did not fly for an initial period of three weeks following acceptance, because the aircraft software version was at an advanced iteration, and had not yet been approved for use.

Recommendation No.3

4.46 The ANAO recommends that, prior to accepting aircraft against specified capability, technical and operational airworthiness standards, the Defence Materiel Organisation completes the required testing activities, unless there is a demonstrable case for not doing so.

Agency Response

4.47 ***Defence and DMO response:*** **Agreed.** Where appropriate and necessary, testing will be conducted under a phased certification and acceptance process.

Airworthiness Acceptance of ARH 5

4.48 The ANAO found that the DMO Project Office's Production, Acceptance, Test and Evaluation acceptance procedure, against which the

aircraft were being accepted, was in draft form, and had not been fully accepted by the Project Office or the Contractor.[104]

4.49 The ANAO reviewed the notes made by the Design Acceptance Representative using the Project Office Design Acceptance Process documentation used to brief the Project Authority on the airworthiness state of ARH 5. The report noted that, even though ARH 5 could be made safe for both operational and technical airworthiness issues, through the application of limitations and restrictions placed on operations for the aircraft, the issues associated with acceptance of ARH 5 were, however, significant for capability, and the aircraft was not in a fully contractually compliant configuration, which the DMO noted, was similar to ARH 1 and ARH 2.

4.50 The ANAO reviewed the requirements associated with accepting production aircraft from the Contractor, and found that prior to acceptance, the draft process used to accept the first three aircraft did not mandate consultation between the DMO and the Capability Manager.

4.51 In December 2003, the Operational Airworthiness Authority for Army Aviation (the Capability Manager), delegated the Operational Airworthiness Authority to the Air 87 Project Director, for flights in pre-accepted aircraft where the risks associated with operation are considered to be no greater than 'MEDIUM'. The period of the delegation expired upon issue of the Special Flight Permit in December 2004.

4.52 The Project Authority advised the ANAO in late 2005 that, prior to accepting ARH 5, the risks associated with operating the aircraft were considered to be less than 'MEDIUM',[105] and that acceptance of ARH 5 fell within the Project Authority's subordinate Operational Airworthiness Authority delegation.

4.53 Defence advised the ANAO in January 2006 that the same degree of engagement of the Capability Manager was not undertaken with ARH 5 and ARH 4, because the risk was not assessed as exceeding the delegation provided to the DMO Project Authority. The ANAO was advised by the Capability

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[104] Defence advised the ANAO in October 2005 that the reality is that developmental programs will have developmental procedures until those procedures have been validated through experience. The ANAO notes that this Project was intended to represent an 'Off-The-Shelf' purchase, and was not intended to be a developmental program.

[105] The assessment associated with accepting ARH 5 was made despite the recommendations from the ARDU Test Team not to accept ARH 5 in the state it was delivered. The Project Office Risk Management Plan notes that any safety related risks will not be tolerated.

Manager in February 2006 that, in relation to the acceptance of ARH 5 by the Project Authority:

> Considerable consultation with the Operational Airworthiness Authority occurred during the acceptance process of ARH 1 and 2, however no consultation occurred prior to acceptance of ARH 5 ahead of schedule, although it had deficiencies requiring Airworthiness management similar to ARH 1 and 2.

4.54 The ANAO was advised that the risk associated with accepting ARH 5, as noted by the ARDU Test Team, and the Operational Airworthiness Authority (the Capability Manager), was far from low, and the Project Authority should have consulted the Capability Manager prior to accepting ARH 5.

4.55 The ANAO found that, at the time the Project Director accepted ARH 5 in June 2005, ahead of schedule, the subordinate Operational Airworthiness Authority Delegation had expired in December 2004. There was no valid Operational Airworthiness Authority delegation that allowed the DMO's Project Director to accept ARH 5, five months after the delegation had expired. The Capability Manager advised the ANAO in February 2006 that it was his intent that the Project Authority continue to exercise Operational Airworthiness duties for the acceptance of ARH aircraft.

Recommendation No.4

4.56 The ANAO recommends that, Project Authorities liaise and consult closely with Capability Managers in Defence prior to finalising product acceptance, where significant operational capability issues exist.

Agency Response

4.57 ***Defence and DMO response:*** **Agreed.** The DMO accepts this recommendation, noting that the process in place directing this practice provided some discretion based on a risk assessment. Guidance has been clarified to ensure that the Capability Manager is involved in the Acceptance process of each new aircraft whenever significant deviations or waivers are involved.

Software management

4.58 The Acquisition Contract specifies minimum software development process standards to be applied, according to the safety and mission criticality

of each software item. The software metrics, and the audit and documentation requirements for software, are required to be documented in the Software Management Plan (SMP).[106]

4.59 The ANAO notes that a draft SMP was required as part of the tendering process. The DMO negotiated with the Contractor in an effort to better understand the plan delivered as part of the tendering process. The DMO was unable to satisfactorily gain a clear, and unambiguous description of the software development processes employed by the Contractor, prior to contract signature.[107]

4.60 The DMO conditionally approved the delivery of the SMP issued in October 2002, even though the SMP carried the following key deficiencies:

- the plan did not articulate a software metrics program;
- the plan lacked a description of the links between the system safety programs and the allocation of software criticality levels (which subsequently drives the development process requirements);
- the plan lacked specific safety critical software certification requirements for the Tiger helicopter (represented by a plan for software aspects for certification, as part of the safety software development requirements); and
- the plan lacked the required detail associated with mapping software development standards against the Acquisition Contract requirements.[108]

4.61 The DMO advised the ANAO that the SMP is a progressively updated document that was 'conditionally approved' in 2002 to allow the design approval process to progress, and that as a mitigating action, reviews and audits were conducted against the SMP, and the software certification basis.

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[106] The SMP requires that the Contractor identifies the software criticality level of each software item; identifies the software development and safety assurance processes to be applied for each criticality level; identifies the products to be delivered that demonstrate the software has been developed with approved processes. The history of the SMP approval process to date is: SMP Issue I dated 18 October 2002, conditionally approved on 13 February 2003; and SMP Issue J dated 10 March 2005, approved on 4 May 2005.

[107] Defence advised the ANAO in July 2005 that each particular issue identified was covered through other avenues, such as action items at reviews, and audits.

[108] Certification audits conducted by Defence in 2003 found that there was no traceability matrix between the system level requirements, and the software specifications.

4.62 The ANAO notes that, in the period between Acquisition Contract signature in December 2001, and the March 2005 approval of the SMP, the DMO had not fully certified all the elements of the plan against which the software was being developed and delivered. The DMO did, however, approve the software certification plan and the specific critical software certification requirements prior to accepting any of the safety critical software from the Contractor.

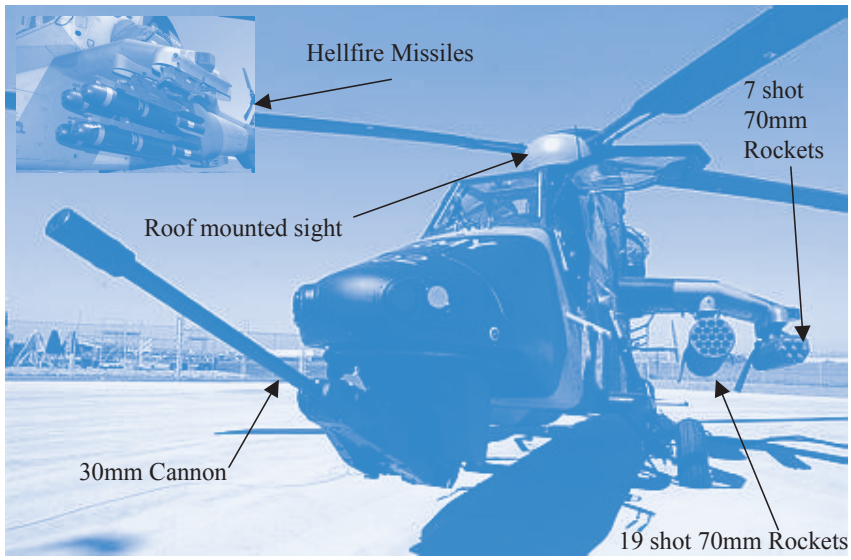
4.63 The Contractor's bid, in response to the RFT, would have benefited from incorporation of an acceptable proposed Software Management Plan, with an agreed software metrics and documentation program. In doing so, a fully agreed, compliant system could have been capable of being used to track, and assess the progress associated with software development activities, at the start of the build process.

Weapons systems

4.64 The Tiger ARH carries two primary weapons systems, the Hellfire missile system, and the 70mm rocket system, as well as a self-defence gun system, as illustrated in Figure 4.1.

Figure 4.1

Tiger ARH weapon systems



Source: Defence photographic archives.

4.65 Defence approved procurement of the initial operational war stock missiles, together with three years training requirements, and in so doing, noted that the entire Kiowa and Iroquois fleets should be withdrawn from service as the new capability was introduced, in order to offset some of the net operating and personnel cost impacts.[109] Defence also noted that the weapons component of the new capability should be funded from within the cost cap and provisioned on the basis of three years training and operations.

4.66 Subsequently, Defence undertook an ADF Explosive Ordnance Study, which recommended acquisition of more Hellfires to support the Army's requirements. In April 2003, following approval, the Project Office funded the purchase of Tactical Hellfire Missiles with associated support, training and test documentation and equipment.

4.67 The DMO Project Office utilises Program Management Reviews to openly discuss issues surrounding the acquisition of the Hellfire missile system via a Foreign Military Sales case mechanism from the United States Government. In April 2003, and then on a continuing basis until March 2004, at the second Hellfire Program Review, Defence alerted the United States Government representatives to the problems the DMO were encountering with acquiring the Hellfire missile system, brought about by the nature of the FMS process, and the lack of data required to fully integrate the Hellfire missile system to the Tiger ARH. Upon completion of ANAO fieldwork in November 2005, Defence had successfully fired a Hellfire missile from a Tiger ARH, in Australia.

4.68 Under a Deed of Indemnity and Substitution, Defence is eligible for royalty payments in the event that another government integrates the Hellfire capability into future Tigers and Tiger variants. Defence is entitled to an amount of up to $800 000 (per aircraft)[110] when the Contractor enters into contractual arrangements to supply a party, other than France and Spain, for full or partial Hellfire capability to a Tiger.[111]

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[109] Defence noted in their Tiger fielding plan that a residual Kiowa reconnaissance capability will be retained until the second squadron of Tiger helicopters commences individual training, and that a capability gap will then exist until the capability qualifies for Initial Operational Capability, planned for June 2007, where one Tiger squadron is fully equipped and capable of armed reconnaissance operations.

[110] The amount to be paid varies according to whether full or partial Hellfire capability is supplied.

[111] Where the Contractor enters into contractual arrangements with France or Spain for a Hellfire capability for the Tiger, Defence is entitled to a global amount of A$18 million, plus a sum of $200 000 for each aircraft in excess of 116. The arrangements provide for Defence to receive a reduced amount per aircraft, once an accumulated amount of $36 million is received. Payment per Tiger aircraft supplied with Hellfire capability is adjusted to A$500 000 per aircraft, once Defence has received payment of A$36 million.

Ground mission equipment

4.69 The Ground Mission Equipment has been developed with the aim of being able to plan, and pre-program the mission computers in the Tiger ARH prior to embarking on a specific mission. The Ground Mission Equipment forms the data link between the Eurogrid proprietary data link capability from the Tiger aircraft and ground forces. Even though it is a contractual requirement that the Ground Mission Equipment connects with the ADF's Battlefield Command Support System, and the Defence Secret Network, it does not currently feature this connectivity. Defence advise that the Variable Message Format, being developed under Project Air 9000 will be retrofitted to ARH.

4.70 The Ground Mission Equipment had not been presented by the Contractor for acceptance by the Project by the time audit fieldwork was completed. In November 2005, delivery of the Ground Mission Equipment was 17 months late, according to the original delivery schedule. The Contractor has attributed the delay to delays in finalising development of the aircraft platform avionics and electronics. Defence advised the ANAO in November 2005 that a December 2005 delivery of this equipment was anticipated.

Main engine performance

4.71 Defence structured the RFT to reflect specific, essential, functional operating criteria for the main engines. These criteria were linked to specific operating conditions, and anticipated aircraft payloads, under specified environmental conditions. Defence assess that the main engines, in the current form, are capable of meeting all performance requirements listed as 'Essential' in the RFT. Notwithstanding this level of performance, the main engines do not meet with the requirements associated with some specific single engine performance criteria, and some power margin requirements specified in the RFT that were not marked as 'Essential'.

4.72 The Contractor formally advised Defence in February 2003 that there were predicted shortfalls in the contracted engine performance. This advice coincided with Preliminary Design Reviews. The predicted outcomes were that the take off mass quoted for many of the envisaged reconnaissance and firepower missions would be greater than the capacity for the proposed engines to deliver under certain environmental conditions, hence the range,

weapons load, or time on station would need to be reduced. Each Tiger aircraft has two MTR 390 engines, rated at 958 kW.[112]

4.73 The ANAO notes that, in terms of the RFT, and the signed Acquisition Contract, Defence did not specify the absolute payload weight associated with specific aircraft payload configurations. The specifications that were provided were more generic in nature, specifying, inter alia, the numbers of rockets, and missiles, without specifying the specific payload weight of those rockets and missiles. There was an inferred weight profile that was left open to interpretation.

4.74 The DMO did not specify the weight and type of Hellfire missiles to be carried by the Tiger ARH as part of the required performance specifications. The Contractor had assumed that Defence was to use a lighter missile, and planned to produce an aircraft accordingly. The contracted design is not capable of providing the performance required under specified conditions with the heavier type of Hellfire missile required by Defence, and the engine has demonstrated a 3 per cent underperformance above an all-up weight of 5600 kg, and at speeds greater than 120 knots. A 3 per cent planning margin on power figures has been applied to calculations relating to operation performance.

4.75 Defence advised that contract negotiations were entered into, based on the tender response, with a clear understanding that the Contractor was compliant with the contract requirements. In addition, Defence noted that, based on the tender response from the Contractor, the model of Hellfire missile and rocket configurations would be constituted by the AGM-114M and FZ100 MPSM/HE respectively,[113] for which the weights are well known.[114]

4.76 The aircraft builder advised the ANAO in April 2005 that the shortfalls associated with the engine performance had been addressed, and that they would be presenting an argument to Defence that supported the claim that the

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[112] The main engines installed to the ARH are MTR390 Step 0 engines. The limitations caused by the assessed deficit in power during single engine operation activities includes single engine climb performance at or near the aircraft maximum all-up weight (as would be the case if an engine failed shortly after departure). Defence also noted that the issue of diminished engine performance in hot conditions in Northern Australia remains unresolved.

[113] The Defence RFT states that: The ARH will be fitted with a guided Air to Ground Missile Sub-System. In Response, the Contractor stated in their RFT response that the ARH will be fitted with the Hellfire II weapons system. The Hellfire weapons are comprised of the M299 Hellfire Launcher AGM-114K Hellfire II missile, the AGM-114M blast fragmentation missile, and the Hellfire II training missile.

[114] Subsequent to the Acquisition Contract, the Contractor issued engineering memos specifying the aircraft stores to be used in the certification plan, which included the rocket, and missile types desired by Defence for specified operations.

power output of the main engines now meets the contractual requirements.[115] The ANAO notes that this increase in power may have come at the cost of an increased rate of fuel usage, and thus a loss in capability, in terms of range that can be achieved if the maximum power is used. Defence stated in the Equipment Acquisition Strategy that the engine power, and thus manoeuvrability, is of a higher priority than the range of the aircraft.

4.77 Defence advised the ANAO in July 2005 that the issue of performance continues not to be agreed between Defence and the Contractor, and the Defence position is that the performance test results on the Tiger ARH demonstrate a performance deficiency.

4.78 The Contractor has written to the DMO, and has offered a future engine upgrade to Defence, at cost, which may result in a significant improvement in power at a lesser cost in fuel usage. The DMO has not yet accepted the offer, and advised the ANAO in October 2005 that this upgrade would require an upgrade to the entire power train to take the increased torque.

Recommendation No.5

4.79 The ANAO recommends that, the Defence Materiel Organisation incorporates into final contract documentation unambiguous specifications, including required configurations for airborne weapon systems, so that the impact on the platform is fully understood.

Agency Response

4.80 ***Defence and DMO response:*** **Agreed.** DMO notes that this was the intent and that the ambiguity only became evident following a dispute with the contractor.

[115] The Step 1 upgrade was offered in the Contractor's response to the RFT, and was envisaged to offer approximately seven per cent of power in excess of the Step 0 engine to the take-off rating. The Contractor offered the engine upgrade by way of software enhancements, and the tendered price for the upgrade was an additional $21.5 million. The DMO noted that the Tender Evaluation Board did not accept that the upgrade provide 'value for money' for such a small increase in power gain. The DMO also noted in September 2002 that future engine upgrades, with higher power increases will require modifications to the hot-end and the transmission, as well as software changes. The DMO estimates that, if adopted, the future upgrade will cost in excess of $100 million. The DMO has not committed to purchasing this modification.

5. Through-Life-Support

This chapter outlines the nature of the through-life-support requirements, and their management.

Background

5.1 The total Through-Life-Support Contract is a fixed price contract in two parts; the first part represents the pre-implementation stage, that is, the first three years of support, and the second part represents 15 years of operation and support, from the delivery to the DMO of the first aircraft in December 2004, with an option for extension for a further five years.

5.2 At signature, the fixed cost component of the Through-Life-Support Contract value was $410.9 million. The Project Office is funded to provide the first five years of the Through-Life-Support Contract total time span, as well as all the long-term spares and provisions to support the operation of the capability, which represents a budgeted cost of $94 million,[116] from which $23 million has been paid to the Contractor as a pre-implementation payment for through-life-support capabilities. There is a two per cent discretionary performance incentive fee attached to the Through-Life-Support Contract price. Actual financial payments specific to the Through-Life-Support Contract are outlined at Table 5.1.

Table 5.1

Through-Life-Support Contract payments as at November 2005

	2001–02 $ million	2002–03 $ million	2003–04 $ million	2004–05 $ million	2005–06 $ million	Totals $ million
Pre-implementation payments	3.38	7.04	7.75	4.84		23.01
Fixed price service payments[(a)]	-	-	-	6.83	6.2	13.03
Performance award fee	-	-	-	-		-
Total	3.38	7.04	7.75	11.67	6.2	36.04

Note : (a) Including price variations.

Source: ANAO analysis of Defence documents.

[116] This $94 million does not include an the costs of providing support and test equipment, or an estimated $27 million, which is required to provide for break-down spares.

5.3 The structure of the Acquisition Contract, and the Through-Life-Support Contract, provides for fixed price payments of through-life-support activities to be based on Contractor effort. In the absence of accurate time keeping, Contractor staff effort for single individuals could be notionally apportioned across the contracts for both acquisition, and through-life-support.

5.4 In an effort to avoid the situation whereby Contractor staff book their time to both contracts simultaneously, the DMO sought to verify that the Contractor had employed, and was appropriately claiming payment for staff associated with the through-life-support activities, on those activities, and not on Acquisition Contract tasks, or both at the same time. The first claim for fixed price payment in January 2005 was rejected, and personnel timesheets were subject to review to verify services provided. The DMO subsequently approved payment for the claim in March 2005.[117]

Integrated logistic support deliverables

5.5 The Special Flight Permit enabled the first two aircraft to fly in Australia from December 2004 until October 2005, and required a Design Acceptance Certificate to be issued. The Design Acceptance Certificate includes certification that specific Integrated Logistic Support (ILS) elements have been delivered as part of the Acquisition Contract.[118]

5.6 The DMO wrote to the Contractor in October 2004, expressing concerns about delays in delivery of acceptable ILS deliverables, and ongoing issues associated with those deliverables at the time of award of the Special Flight Permit.

5.7 At the time of audit fieldwork, DMO financial records indicated the DMO had withheld $7.54 million relating to two ILS related milestones. The DMO advised the ANAO in September 2005 that subsequent ILS deliverables related to ensuring technical airworthiness were reviewed and assessed as suitable to support Special Flight Permit operations.

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[117] Defence subsequently requested time sheets for March and April 2005, following similar concerns that the Contractor could duplicate claims for acquisition and through-life- support activities.

[118] The ILS deliverables required for the Special Flight Permit include those elements that support the instructions for continued airworthiness of the Tiger helicopters, under the conditions specified by the ADF Technical Airworthiness Manual. These include the Technical Maintenance Plan, Interactive Electronic Technical Publications, the Planned Servicing Schedule, and the Maintenance and Aircrew Operating Manuals.

5.8 The Contractor submitted a revised cost estimate for through-life-support in September 2004, which increased the originally contracted price for mature state support by what the DMO estimates to be an additional 84 per cent per year.[119] Major claims for increased costs include: an increase to the Training System Support costs, amounting to 21 per cent of the original total yearly support costs; an increase to System Software Support costs, amounting to 29 per cent of the original total yearly support costs; and an increase for third party support contracts, spares, and repairable item costs, amounting to 52 per cent of the original total yearly support costs.

5.9 As an output of the RFT, the Contractor was required to specify costs required to support specific, through-life-support elements, as was all other RFT respondents. Contractor staffing costs, as well as sub-contractor support costs, were included within the database cost estimates, as and where they were to be incurred. The DMO used three separate models to assess the tender submissions whereupon the successful bid Contractor was selected to supply, and support the required capability.[120]

5.10 At the time of the RFT in April 2001, other respondents to the RFT had higher whole-of-life cost elements than did the successful Contractor.[121] Defence advised the ANAO in November 2005 that the differences between the bid prices for through life support costs were significant, owing in large part to the newer design of the aircraft being offered. Notwithstanding these considerations, the ANAO notes that the addition of the costs associated with the contract change proposal to the originally tendered through-life-support price, as submitted by the Contractor in September 2004, would have significantly reduced the competitiveness of the original RFT response, as

[119] The cost increases were apportioned to six of the eight specified support areas against which Defence has reviewed fixed priced funding for support activities.

[120] Prior to September 2004, the Contractor had not advised the DMO that there would be third party, and sub-contactor growth costs associated with supporting the elements of the Through-Life-Support Contract, which now show cost growth.

[121] In effect, Defence noted that the successful Contractor's air platform solution was marginally less preferred than that of the nearest rival in cost, from a platform capability based perspective. However in terms of a complete package, Defence made the assessment that the ARH Tiger represented better value for money.

analysed by the DMO, against which the Acquisition, and Through-Life-Support Contracts were awarded.[122]

5.11 The Contractor advised the ANAO in May 2005 that, at the time of signing the Through-Life-Support Contract, development of that contract was immature, and that even though they were cognisant of the required level of maintenance to support the In-Service Concept,[123] they were unable to confidently predict the level of support required until the In-Service Plan was approved.

5.12 Table 5.2 illustrates a steady state element of the Contract Change Proposal forwarded by the Contractor in May 2005 (following the September 2004 notification), representing the costs associated with discharging the Through-Life-Support Contract in year five of its tenure.

Table 5.2

Proposed annual through-life-support costs – at year 5 (December 2001 price basis)

Cost Categories	Original Contracted Value ($ million)	Revised Estimate – April 2005 ($ million)	Difference ($ million)
Total Fixed Component	**25.89**	**42.65**	**16.76**
Total Reimbursable Component	**13.98**	**30.51**	**16.53**
Total	**39.87**	**73.16**	**33.29**

Source: Contract Change Proposal T008 dated 30 May 2005.

5.13 In July 2005, the DMO advised the Contractor that their claim was rejected, and the Contractor was asked to provide a new proposal, which considered: clarification of the objectives of the proposal; justification of the changes in the Through-Life-Support Contract; identification of any increased staff requirements; increases in sub-contractor costs; and an explanation of how existing, approved Through-Life-Support plans might be affected.

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[122] The ANAO has not taken into account the movement in currency exchange rates over the period from April 2001 until September 2004. Had these rates been considered, the variation in through life costs would be even more significant, noting the alternative RFT respondees considered as competitive were from tenderers in United States Dollars. Exchange rates with the United States Dollar have been favourable to the Australian Dollar in this regard, compared to the Euro. The exchange rate used by the Project Office for the United States Dollar on 30 March 2001 was 0.4921. The Reserve Bank of Australia exchange rate as at 30 March 2001 was 0.4890, which has changed in Australia's favour, and as at 30 September 2004, was 0.7147 Australian Dollars to the United States Dollar.

[123] The In-Service Concept preceded the In-Service Plan, which the DMO did not approve until 2003.

Repairable items and support and test equipment

5.14 Defence allocated an upper limit of expenditure of $125 million for Repairable Items and Defence Force owned Support and Test Equipment,[124] in support of the Tiger ARH.[125] The allocation of funds was made without a formal assessment on the part of the DMO, and relied upon representations by the Contractor. The Contractor advised the ANAO that the value of $125 million is applicable to Repairable Items only, and there is no agreed value set aside for Support and Test Equipment. Under the Through-Life-Support Contract, all Repairable Item repair and overhaul is billed to Defence as a reimbursable cost, on an as-occurrence basis, at no risk to the Contractor.

5.15 The Contractor was required to provide an Annual Repair Parts Unit Price List to the DMO by 1 March 2005. This price list was to be used by the DMO and Defence to estimate the costs associated with operating the fielded capability. The Contractor had not provided the Annual Repair Parts Unit Price List by mid November 2005, despite repeated requests by the DMO.

5.16 The Contractor delivered a Supply Support Plan to Defence in February 2004, which the DMO rejected as deficient in March 2004. This plan had not been re-submitted to the DMO at the close of fieldwork.

5.17 Despite repeated requests at the working level and formally from the DMO, the ILS delivery schedule was not presented to the DMO for acceptance until early July 2005. The DMO had not accepted the delivery schedule as of November 2005.

Software support environment

5.18 In August 2003, the Contractor advised DMO that some of the software support requirements associated with ensuring sufficient in-service support for the Tiger ARH systems were not contained in the contracted statement of work. The DMO notified the Contractor that all of the required elements associated with supporting software are implicit in the existing statement of work requirements. The DMO noted that the Software Support Management

[124] The Contractor advised the ANAO that the Repairable Item Limit provided to the DMO was an estimate, and subject to further analysis as required to meet the requirements of the Statement of Work. The analysis would then determine the number, and nature of Support and Test equipment items required by Defence to support the capability. The Contractor advised the ANAO that the DMO was advised that the costs associated with Support and Test Equipment would be influenced by further Logistic Support Analysis activities, which include Level of Repair Analysis, and Repairable Item Optimisation requirements stipulated by the DMO.

[125] The DMO advised the ANAO in August 2005 that the proposed support Repairable Items estimates for the first squadron of delivered aircraft had not yet been received from the Contractor.

Plan, presented by the Contractor for assessment, as part of an AEO audit in September 2004, did not indicate that there were software support requirements in excess of those articulated in the existing statement of work. The Contractor has advised that the cost to the DMO of providing this support has risen from the Base Date Contract Price of $4.03 million, to $15.53 million.

5.19 In March 2005, the DMO reviewed the Contractor's Through-Life-Support Software Management Plan, as part of the Contractor's AEO accreditation audit. The DMO found that the Contractor's Software Support Management Plan, and the Through-Life-Support Software Configuration Management Plan were deficient, and could not be endorsed for acceptance by the DMO. Defence advised the ANAO in November 2005 that this plan was yet to be resubmitted.

5.20 The configuration and safety management of software associated with the whole Tiger ARH capability is critical to the ongoing serviceability of the capability. A deficient software support and configuration management system, as applied to training simulator software, or ground support management system software, will preclude the safe operation of the capability, and thereby undermine the viability of the capability.

Training and facilities

5.21 The Contractor is responsible for providing all aspects of the Tiger ARH training system, with the exception of tactical training. The system comprises four main components:

- aircrew training devices;[126]
- ground crew training devices;[127]

[126] The aircrew training device suite includes a full flight mission simulator, originally scheduled for delivery in February 2005; a cockpit procedural trainer, originally scheduled for delivery in September 2005; and a second cockpit procedural trainer, originally scheduled for delivery in July 2006. Post contractual scope changes to the proposed aircrew full flight mission simulator incurred additional costs to Defence of $10.8 million.

[127] The ground training devices were originally contracted for delivery in February 2005. The Project Office identified in July 2003 that limited visibility of the design and development of the ground training devices precluded any assessment of the risks to the production of these devices.

- courseware;[128] and
- conduct of training.

5.22 The specification of training devices, finalised at the time of contract signature, was subsequently reviewed and changed. The devices were to be aligned to the Franco-German Program. However, the Australian Aircrew Training Devices were initially contracted to be of a lesser fidelity than was ultimately required.

5.23 The devices required customisation to both the visual system and the motion systems following contract signature in order to account for capability deficiencies associated with the proposed simulator design.[129] The amended specifications returned the simulator capability to that of the Franco-German system, incorporating further enhancements that would serve to satisfy the stringent ADF Airworthiness Accreditation requirements.[130] The changes presented a subsequent schedule risk to Defence that was ostensibly unqualified at the time.[131]

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[128] The DMO noted in July 2003 that the courseware was divided into three main areas: technician, ground crew and aircrew training-ware. The completed, approved training management packages were to be delivered to the DMO in November 2004. In late 2002, Defence assessed the quality of the training management packages as being of low quality, and acted to mitigate the schedule slippage associated with inadequate training-ware delivery. The impact of the actions undertaken by Defence have been to assist the Contractor to deliver acceptable training-ware in all areas other than for aircrew training. The ADF subsequently provided subject matter experts, and training development staff to assist the Contractor with delivering a suitable training product.

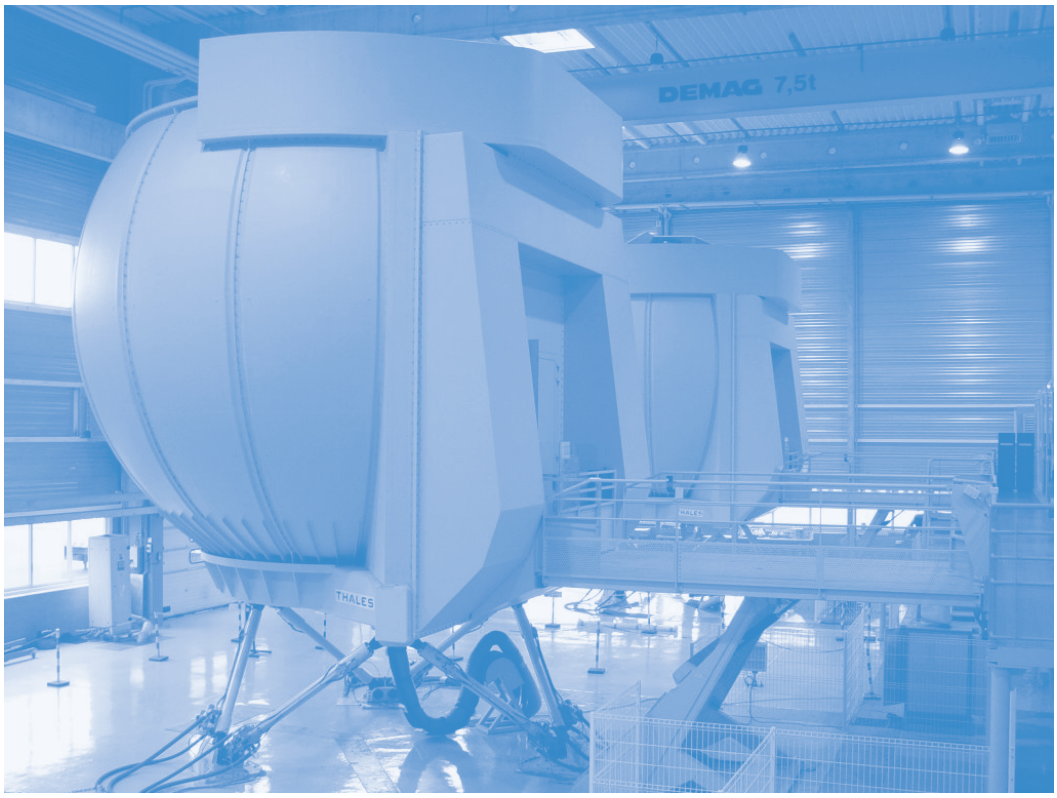
[129] The changes that were required were to the simulator visual fidelity specifications, as well as an improvement to the Battle Captain station allowing for six degrees of motion for the Battle Captain simulator. Defence advise that these changes were required to meet the requirements associated with accreditation under the ADF Airworthiness Regulations.

[130] The Army Training Authority found that the Franco-German Tiger aircrew training requirement was of a lesser fidelity than that required by the Australian Army, primarily because the Australian solution is much more reliant on simulation than that of the Franco-German aircraft. The Army Training Authority for Aviation advised the DMO that the simulator should not be accepted for training prior to full airworthiness accreditation.

[131] Defence has subsequently noted that one of the impacts associated with these delays will be the costs of training Australian aircrew in France for up to 12 months, from February 2005. The end costs associated with Aircrew Training Device scope changes amounted to $10.8 million.

Figure 5.1

Tiger ARH Air Training Devices – Pilot and Battle Captain Full Motion Simulators



Source: Defence.

5.24 The requirement changes for aircrew training devices made by Defence led to a five month delay in the delivery schedule. The DMO noted that this delay had also been preceded by an additional Contractor induced five month delay, whilst the Contractor negotiated sub-contracts with suppliers.

5.25 The simulators will not be ready for use prior to July 2006, which represents a 15 month delay in the delivery schedule from the originally contracted requirement. The Contactor advised the ANAO that the major cause of the delay can be attributed to the efficacy with which the software provided from the aircraft manufacturers test program, which is up to 18 months late, is being managed to produce a high fidelity simulator, which in turn will form part of the training system accreditation process.

5.26 The concurrent development of a high fidelity aircraft simulator with a prototype aircraft is not possible. The closest approximation to be

accomplished is to approve calculated, predicted aircraft performance data to develop the simulator, modifying and improving the performance of the simulator as and when the real performance specifications of flying aircraft are known. There are, however, inherent risks associated with this approach. The DMO, and the Contractor, did not adopt this philosophy at the time of Contract, as the Australian Tiger ARH was envisaged to be a variant of existing, accepted and operating Tiger aircraft. Consequently, the simulators have been delayed and aircrew were not able to use the simulators for emergency procedures as planned. The DMO advised the ANAO in November 2005 that Australian aircrew will be able to use the Aircrew Training Simulators in December 2005, in France.[132]

Training device deficiencies – recovery of liquidated damages

5.27 In June 2004, the DMO formally advised the Contractor that the DMO would be entitled to recover liquidated damages in respect of late achievement of two milestones associated with delivering training products. Liquidated damages for these milestones are in the order of $10 million.[133]

5.28 The DMO advised the Contractor that a claim for liquidated damages would be made for training now being undertaken at the French Helicopter Training School at Le Luc, that would have otherwise been conducted in Australia, had the required Air Training Devices been available. Of the delays in delivering the requirements associated with milestones 57 and 59, a five month delay was caused by Defence initiated changes associated with Field of View and Motion enhancements to the original specifications agreed between the DMO and the Contractor for the Air Training Devices.

5.29 The delay attributable incorporation of enhancements to the devices led to an agreement with the Contractor that liquidated damages for the applicable milestones would apply five months from the original required delivery dates.[134] As a result, liquidated damages applied from July 2005, for milestone 57, and August 2005 for milestone 59. At the time of audit fieldwork, the DMO

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[132] Defence advised the ANAO in January 2006 that emergency procedures were conducted in France in early December 2005 using the Aircrew Training Devices.

[133] Defence has interpreted the Acquisition Contract in such a way as to agree that liquidated damages are not payable during the grace period. However if the milestone is not met by the end of the grace period, liquidated damages will be payable from the original milestone date, and not just from the end of the grace period.

[134] Defence assessed that the six projector visual system proposed by the Contractor, and accepted within the signed Contract, may not deliver the required visual fidelity sought for the final training requirements, and changed the requirement to specify a nine projector solution for each full motion simulator in Contract Change Proposal 31. This change amounted to a five-month delay.

had not claimed for liquidated damages. The DMO does not claim liquidated damages as they accrue. In lieu, the ANAO was advised that the DMO waits until the eventual delivery of the milestone, and then calculates, and claims the liquidated damages owing.[135]

Operational training

5.30 Initial training associated with Defence Flying Instructors was dependent on delivery of French aircraft, which were delivered after the Australian aircraft. Training in France was constrained and was based on the availability of French HAP Tiger variants. The availability of the French HAP aircraft was out of the control of the Defence and DMO team. The delay to the simulator delivery, coupled with the delay to the French HAP delivery schedule, impacted adversely on the anticipated Army training schedule. The DMO accepted the Tiger ARH courseware, with some concessions, in June 2005. Concurrent approval from the DMO for the Contractor to claim for partial payment of the associated milestone (80 per cent) was agreed on acceptance of the courseware. The remaining $1.18 million (20 per cent) was to be withheld in recognition of the work effort still required to be completed.

Air-crew training

5.31 Initial flying instruction for Australian Army Flight Instructors is undertaken by the Contractor in France, at the facilities the French, and German crews will use, under the authority of a Special Flying Instruction, issued in July 2004.[136] Defence noted that the training delivered by the Contractor did not meet the competency based system endorsed for use within the ADF, and will be subsequently treated as Original Equipment Manufacturer operator training.

5.32 The delay associated with delivering the training devices, and associated courseware, resulted in the Contractor having to train the Australian Army Flight Instructors in the French HAP Tiger variant aircraft, which are different from the Australian aircraft in their configuration. Although not ideal, this training presented some opportunity to ensure the

[135] The Acquisition Contract provides for Defence to elect to pursue damages four months following the period of delay.

[136] The Special Flying Instruction approves the training syllabi provided by the Contractor, whilst noting that they do not meet the requirements of the Army Training System, and specifies the conditions and restrictions pertaining to training flights involving Army aircrew in France.

Australian Flight Instructors could be trained in time to deliver training to future pilots, and flying instructors, in Australia.

5.33 The Contractor-managed Aircraft Safety Management System, in place at the build site, did not adequately deliver safety incident reporting system reports to the Project. Critical incidents associated with test aircraft, prior to the DMO acceptance testing, were not passed on to the DMO. The ANAO noted that, on one occasion, the engine of the third Tiger aircraft shut itself down during the start sequence prior to a test flight. The Australian Defence Site Team subsequently learned that the incident had occurred on the same aircraft at least twice previously during factory tests. However, the resultant report of that incident had not been made available to the DMO.

5.34 Test flights are undertaken in controlled environments, one requirement of which is development of a risk management plan, whereby known risks are identified. The formal system in place (through the Acquisition Contract) that provided for the DMO to be automatically notified of critical incidents associated with Factory Tests did not function on the occasion when the engine shut down in April 2005. Consequently, the Defence flight staff did not have a specifically documented risk strategy in place to manage a potential recurrence of the incident.[137]

5.35 Defence advised the ANAO in July 2005 that the situation regarding the paucity of information relating to incident reports, associated with aircraft in build in France, has since been rectified, and the Contractor is to now formally deliver incident reports pertaining to Australian Tiger aircraft to the on-site DMO team.

5.36 The Special Flying Instruction issued by Army in July 2004 specified that all pilots are to complete an approved course in emergency and crew procedures, using an approved training device. Defence advised the ANAO that the training being conducted in France had not achieved a minimum acceptable standard for emergency training, however it is anticipated that by December 2005, it will meet the required standards, using the Full Flight Mission Simulator. In addition, the Flight Manual checklists being used by the Contractor for the training were deficient, and specific elements of the Australian Tiger Flight Manual were unacceptable to Defence in terms of content and procedures, and required rewriting prior to award of the Australian Military Type Certificate.

[137] Consequently, all further flights were cancelled at the build site, until all safety related incidents associated with pre-delivery aircraft checks were known by the Defence site team.

Infrastructure requirements

5.37 Defence intends basing the two active squadrons of Tiger ARH aircraft in Darwin, with support facilities in Darwin, Oakey (Queensland), Brisbane and Adelaide. Infrastructure facilities supporting delivery of various training, maintenance and storage activities are important to managing and sustaining the ARH capability. ARH infrastructure requirements, representing significant investment for Defence, includes the Oakey Base Redevelopment Project approved in September 2001 for $ 76.2 million[138] and the Darwin 1st Aviation Regiment Relocation Project approved in August 2003 for $ 75.1 million.[139]

5.38 Both the Oakey and Darwin facilities Projects include a mix of Major Capital Facilities Program funding and ARH Project Office Funding. Defence advised that ARH funding has been applied to those works elements that directly support introduction into service of the ARH. Defence note that in Oakey, the ARH elements have been added to the existing Major Capital Facilities Program redevelopment Project, while in Darwin, additional Army requirements to provide flexibility for helicopter types, other than the ARH, and non ARH specific infrastructure, is funded from the Major Capital Facilities Program.

Army Aviation Centre Oakey Redevelopment Project

5.39 The construction and refurbishment of facilities specific to supporting the ARH is part of a broader project of redevelopment at the Army Aviation Centre in Oakey.[140] The delivery of facilities under the Project was provided through a managing contractor and contracted project consultant. In Oakey, ARH dedicated facility requirements include those supporting aircrew training,[141] aircrew device maintenance training, ground crew training, operational maintenance of the training and instrumented fleet, and storage.

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[138] Funds approved by Project Air 87 amounted to $18.5 million, the Capital Facilities Program provided $57.7 million. An additional funding amount of $3.8 million was later approved, and the Public Works Committee was informed of the increase in project outturn costs.

[139] Funding provided for by the Project Air 87 budget amounted to $59.1 million, and the remainder came from the Major Capital Facilities Program. There has been an additional $7 million funding increase, $4 million of which was provided from the Project Air 87 budget, and $3 million from the Major Capital Facilities Program.

[140] The redevelopment also involves construction of facilities for relocating the ADF Helicopter School and general building upgrades to facilitate development of the Aviation Centre as the main base responsible for all Army pilot, ground crewman, loadmaster and aircraft maintenance training.

[141] Aircrew training devices to be housed at the Oakey Base include one trainer for the pilot, one trainer for the battle captain, and a Cockpit Procedural Trainer. Another Cockpit Procedural Trainer is to be located in Darwin. The Cockpit Procedural Trainers are similar to pilot and battle captain simulators, however possess no motion capacity, and have a reduced visual system.

5.40 Design of the simulator facility was halted in June 2003, pending reconsideration of the design requirements by Defence. The design activities recommenced in November 2003, after re-tendering for the design and construction of the simulator facility had occurred. The revised build cost was $8.4 million ($5 million was originally budgeted for the simulator facility). Additional funds of $3.8 million were provided from the Capital Facilities Budget to cater for the increased costs.

5.41 The Tiger ARH Simulator complex at Oakey has now been handed over to Defence, without the required simulator equipment, which is expected to be delivered in early January 2006**.**

5.42 The ANAO notes that the original simulator building financial estimates were made prior to Defence having a full understanding of the functional requirements of the simulator devices, and the way that training would be delivered by using the simulators.

Darwin 1st Aviation Regiment Relocation Project

5.43 The 1st Aviation Regiment Relocation Project involved construction of facilities and supporting infrastructure at Robertson Barracks, Darwin, to facilitate re-location and re-equipping of the 1st Aviation Regiment from sites in Darwin, Townsville and Oakey.[142] Defence advised the ANAO in November 2005 that the 1st Aviation Regiment commenced occupying the Roberson Barracks facility from October 2005.

[142] Facilities required to support the restructured regiment include office accommodation for command, operational and administrative functions, a logistics precinct, aircraft hangars, training facilities including instructional and a simulator facility, vehicle and aircraft workshops, stores holdings and maintenance facilities, domestic accommodation, security works, pavements, landscaping and associated engineering services.

5.44 Construction for early works was completed in December 2004, with forecast dates for other works to be completed by mid 2006. Design of the simulator building has been affected by the delayed specifications for building requirements. Completion for the Simulator Building is forecast for March 2006. Scope changes required by Defence, following the initial building contract, have increased the current estimate to complete the Darwin Cockpit Procedural Trainer Building to $3.9 million, which exceeds the budgeted amount by 160 per cent.

Ian McPhee
Auditor-General

Canberra ACT
2 May 2006

Appendix

Appendix 1: Agency Response

Australian Government
Department of Defence
Inspector-General Group

2004/1087438/8
IG 138/06

12 April 2006

Mr Colin Cronin 14/4/06
Executive Director
Performance Audit Services
Australian National Audit Office
GPO Box 707
Canberra ACT 2601

Dear Mr Cronin,

ANAO PERFORMANCE AUDIT ON THE MANAGEMENT OF THE TIGER ARMED RECONNAISSANCE HELICOPTER PROJECT – AIR 87

1. On 3 March 2006 you sought a revised Defence response to the section 19 draft report on the Management of the Tiger Armed Reconnaissance Helicopter Project – AIR 87. I now provide you with the whole of Defence and DMO response to the draft report to be included verbatim in the final report (see Annex A).

2. Defence and DMO agree with all 5 Recommendations.

3. My point of contact in this matter is Miss Elizabeth (Tel: (02) 6266 4192, Fax: (02) 6266 4592 or email: Elizabeth.giles@defence.gov.au).

Yours sincerely,

R.E. Wright
Acting Inspector General

Annex:
A. Defence comment for inclusion in the brochure and response to Recommendations.

DRAFT SECTION 19 RESPONSE

1. AIR 87 has been impacted by two main factors: slippage in progress of the Franco-German Type Design Acceptance program and a delay in delivery of the full flight simulator. The DMO has been required to deal with the complexity of responding to a changing commercial and technological environment. These factors have required the DMO to amend its Acceptance strategy, undertake additional design certification workload, and implement a revised aircrew training program in order to mitigate the overall impact on delivery of the Australian capability.

2. Defence and DMO accept the recommendations:

Recommendation No. 1 Para. 2.28

The ANAO recommends that, for future complex and strategic, high value capital acquisition projects, the Defence Materiel Organisation ensures that one of the key outcomes following tender evaluations is a formal report on the deliberations and decision of the Tender Evaluation Board, in forming its recommendation in favour of the preferred tenderer.

DMO Response: Agreed. DMO will apply the extant Commonwealth Procurement Guidelines to future tenders, but considers that the processes and documentation used by the AIR 87 project met accountability and transparency requirements.

Recommendation No. 2 Para. 3.29
The ANAO recommends that, the Defence Materiel Organisation undertakes periodic audits of all Intellectual Property holdings associated with the Tiger ARH aircraft and systems, with the aim of ensuring Contractor and Sub-Contractor Intellectual Property is being maintained as required by contractual requirements.

DMO Response: Agreed. DMO plans to conduct an audit of the IP Plan and Register prior to the interim operational capability milestone.

Recommendation No. 3 Para 4.47
The ANAO recommends that, prior to accepting aircraft against specified capability, technical and operational airworthiness standards, the Defence Materiel Organisation completes the required testing activities, unless there is a demonstrable case for not doing so.

DMO Response: Agreed. Where appropriate and necessary, testing will be conducted under a phased certification and acceptance process.

Recommendation No. 4 Para 4.56
The ANAO recommends that, Project Authorities liaise and consult closely with Capability Managers in Defence prior to finalising product acceptance, where significant operational capability issues exist.

DMO Response: Agreed. The DMO accepts this recommendation, noting that the process in place directing this practice provided some discretion based on a risk assessment. Guidance has been clarified to ensure that the Capability Manager is involved in the Acceptance process of each new aircraft whenever significant deviations or waivers are involved.

Recommendation No. 5 Para 4.78
The ANAO recommends that, the Defence Materiel Organisation incorporates into final contract documentation unambiguous specifications, including required configurations for airborne weapon systems, so that the impact on the platform is understood.

DMO Response: Agreed. DMO notes that this was the intent and that the ambiguity only became evident following a dispute with the contractor.

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