

The Auditor-General
Audit Report No.27 2008–09
Performance Audit

Management of the M113 Armoured Personnel Carrier Upgrade Project

Department of Defence

Australian National Audit Office

© Commonwealth
of Australia 2009

ISSN 1036-7632

ISBN 0 642 81058 3

COPYRIGHT INFORMATION

This work is copyright. Apart from any use as permitted under the *Copyright Act 1968*, no part may be reproduced by any process without prior written permission from the Commonwealth.

Requests and inquiries concerning reproduction and rights should be addressed to the Commonwealth Copyright Administration,
Attorney-General's Department,
Robert Garran Offices,
National Circuit
Barton ACT 2600

<http://www.ag.gov.au/cca>



Canberra ACT
27 March 2009

Dear Mr President
Dear Mr Speaker

The Australian National Audit Office has undertaken a performance audit in the *Department of Defence* 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 M113 Armoured Personnel Carrier Upgrade Project*.

Following its tabling in Parliament, the report will be placed on the Australian National Audit Office's Homepage—<http://www.anao.gov.au>.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Ian McPhee', is positioned above the printed name.

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

The Auditor-General is head of the Australian National Audit Office. The ANAO assists the Auditor-General to carry out his duties under the *Auditor-General Act 1997* to undertake performance audits and financial statement audits of Commonwealth public sector bodies and to provide independent reports and advice for the Parliament, the Government and the community. The aim is to improve Commonwealth public sector administration and accountability.

For further information contact:

The Publications Manager
Australian National Audit Office
GPO Box 707
Canberra ACT 2601

Telephone: (02) 6203 7505
Fax: (02) 6203 7519
Email: webmaster@anao.gov.au

ANAO audit reports and information about the ANAO are available at our internet address:

<http://www.anao.gov.au>

[Audit Team](#)

Kim Bond
Stewart Ashe
Zoe Pleasants
Fran Holbert

Contents

| | |
|--|-----------|
| Abbreviations..... | 7 |
| Summary and Recommendations | 11 |
| Summary | 13 |
| Introduction | 13 |
| Audit objectives and scope | 14 |
| Conclusion | 14 |
| Key findings by chapter..... | 16 |
| Agency response | 20 |
| Recommendations | 21 |
| Audit Findings and Conclusions | 23 |
| 1. Introduction | 25 |
| Introduction | 25 |
| M113 fleet | 26 |
| Evolution of the M113 major upgrade project..... | 29 |
| Scope and progress of work | 37 |
| Previous ANAO audit and Parliamentary oversight..... | 41 |
| Project budget and expenditure | 45 |
| Audit objectives and criteria | 47 |
| 2. Progress in addressing the recommendations and findings of the previous audit..... | 49 |
| Introduction | 49 |
| Managing project scope | 49 |
| Contract prices | 58 |
| Mobilisation payments..... | 61 |
| Management of liquidated damages..... | 65 |
| Other issues raised in the 2005–06 audit | 69 |
| 3. Global Settlement..... | 76 |
| Introduction | 76 |
| Key events leading to negotiations | 76 |
| Global Settlement framework..... | 84 |
| Negotiation outcomes | 87 |
| 4. Production and capability | 93 |
| Production process | 93 |
| Vehicle delivery schedule | 96 |
| M113 capability | 107 |
| Future rollout and contingency planning..... | 114 |

Appendix 117

| | |
|--|-----|
| Appendix 1: Defence's detailed comments in response to the audit's recommendations | 119 |
| Recommendation No.1 | 119 |
| Recommendation No.2 | 119 |
| Recommendation No.3 | 121 |
| Series Titles..... | 122 |
| Current Better Practice Guides | 125 |

Tables

| | | |
|-----------|---|-----|
| Table 1.1 | Variants comprising Australia's M113 fleet, March 2009 | 28 |
| Table 1.2 | Evolution of the M113 major upgrade | 30 |
| Table 1.3 | Progress of each stage of the M113 upgrade project | 39 |
| Table 1.4 | M113 Major Upgrade expenditure and estimates, 2002–03 to 2011–12 (\$m) | 46 |
| Table 2.1 | Approval necessary for changes to Defence projects | 51 |
| Table 2.2 | Price variation indices applicable to milestone payments under the M113 Upgrade Contract | 59 |
| Table 2.3 | Items purchased for the minimum upgrade | 74 |
| Table 3.1 | Summary of key events leading to Global Settlement negotiations | 77 |
| Table 3.2 | Commonwealth position on issues to be resolved in Global Settlement negotiations, December 2006 | 86 |
| Table 3.3 | Outcomes of Global Settlement negotiations | 92 |
| Table 4.1 | Key risks to the schedule for the M113 upgrade project, June 2008 | 100 |
| Table 4.2 | Recovering the M113 Major Upgrade production schedule | 106 |
| Table 4.3 | Capability milestones for the first delivery of upgraded M113s | 110 |

Figures

| | | |
|------------|---|-----|
| Figure 1.1 | Assembled upgraded M113, prior to fitment of armament | 26 |
| Figure 1.2 | Upgraded M113 braking from speed | 45 |
| Figure 4.1 | M113 hull in the welding jig, after extension | 94 |
| Figure 4.2 | M113 interior fit-out on the major upgrade assembly line | 95 |
| Figure 4.3 | Schedule compression at Global Settlement, September 2007 | 98 |
| Figure 4.4 | Stripped M113 hulls awaiting extension | 103 |
| Figure 4.5 | Fundamental inputs to capability | 109 |

Abbreviations

| | |
|--------|---|
| AA | Armoured Ambulance |
| ABS | Australian Bureau of Statistics |
| ACV | Armoured Command Vehicle |
| ADF | Australian Defence Force |
| AEA | Army Engineering Agency |
| AF | Armoured Fitter |
| AFVSPO | Armoured Fighting Vehicles Systems Program Office |
| AGS | Australian Government Solicitor |
| AII | Australian Industry Involvement |
| AIS | Acceptance into Service |
| ALV | Armoured Logistics Vehicle |
| AM | Armoured Mortar |
| ANAO | Australian National Audit Office |
| APC | Armoured Personnel Carrier |
| APMP | Acquisition Project Management Plan |
| ARVL | Armoured Recovery Vehicle Light |
| ASLAV | Australian Light Armoured Vehicle |
| CCP | Contract Change Proposal |
| CDG | Capability Development Group |
| CEI | Chief Executive Instruction |

| | |
|-------|--|
| CNC | Computer Numeric Control |
| CPOC | Current Personnel and Operating Costs |
| CSP | Commercial Support Program |
| CSS | Capability Systems Statement |
| DMO | Defence Materiel Organisation |
| DPPM | Defence Procurement Policy Manual |
| DSTO | Defence Science and Technology Organisation |
| EAS | Equipment Acquisition Strategy |
| ELF | Enhance Land Forces initiative |
| FIC | Fundamental Inputs to Capability |
| GFE | Government Furnished Equipment |
| GST | Goods and Services Tax |
| HNA | Hardened and Networked Army |
| IPV | Initial Production Vehicle |
| JCPAA | Joint Committee of Public Accounts and Audit |
| LEA | Land Engineering Agency |
| LMS | Land Manoeuvre Systems |
| MAA | Materiel Acquisition Agreement |
| OT&E | Operational Test and Evaluation |
| PRR | Production Readiness Review |
| RAR | Royal Australian Regiment |

| | |
|-------|--|
| RGVM | Recommended Gross Vehicle Mass |
| RODUM | Report of Defective or Unsatisfactory Materiel |
| TMSPO | Tracked Manoeuvre Systems Program Office |

Summary and Recommendations

Summary

Introduction

1. M113s are the only tracked vehicle in the Australian Defence Force's (ADF's) fleet of armoured troop transports used for transporting and supporting infantry in a battlefield. M113s first saw service with the ADF during the Vietnam War and are undergoing a major upgrade to improve protection, lethality, mobility and habitability.
2. Currently, 431 upgraded M113s are on order for delivery by the end of 2011 under Project Land 106: Upgrade of M113 Armoured Vehicles. The initial purchase in July 2002 of 350 upgraded vehicles for delivery by December 2010 was extended in December 2008 to include an additional 81 upgraded M113s as part of the Enhanced Land Force (ELF) initiative.¹
3. With total anticipated expenditure in the order of \$1 billion,² the upgrade is one of Defence's top 30 projects by forecast 2008–09 expenditure, with some \$100 million in expenditure under Project Land 106 forecast for this financial year.³
4. Upgraded M113s are to be a core component of the ADF's capability. They are fundamental equipment for Army's two mechanised battalions, the 5th and 7th Royal Australian Regiments (7 RAR and 5 RAR), and are currently forecast to be in service until 2020.⁴

¹ See the Hon Joel Fitzgibbon MP, Minister for Defence (2008), *Government approves additional armoured personnel carriers*, Media Release 148/2008, 28 October. In December 2008, the Government purchased the additional vehicles as part of the ELF initiative, announced in 2006 at a total approximate cost of \$4.1 billion. ELF is intended to provide Army with a range of additional equipment, among which are additional upgraded M113s.

² Expressed in January 2009 prices. The estimate comprises the approved budget of \$648 million for the first 350 vehicles, an additional \$241 million for the 81 ELF vehicles, along with estimates of the additional costs of preparing and extending the vehicle hulls prior to upgrade, and those of Defence project staff. The breakdown of costs for the first 350 vehicles is shown in Table 1.4 and estimates for the additional costs of the ELF vehicles were provided by Defence in March 2009 (see paragraph 471.60).

³ Department of Defence (2008), *Portfolio Budget Statements 2008–09*, p. 166.

⁴ The 81 additional ELF vehicles will allow these two mechanised battalions (established under the Hardened and Networked Army initiative announced in 2005 at a cost of approximately \$1.5 billion) to operate M113s exclusively rather than mixed fleets of M113s and Bushmasters. See Department of Defence (2007), *Australia's National Security: A Defence Update 2007*, p. 51.

5. The Australian National Audit Office (ANAO) previously examined the Department of Defence's (Defence's) progress in delivering this project in Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*. Given the continuing significance of this project and developments since the 2005–06 audit, the ANAO scheduled this audit to provide updates on the progress against Project Land 106's stated schedule, cost and technical performance objectives, and on Defence's implementation of the recommendations and findings of the previous audit.

Audit objectives and scope

6. The objectives of this audit were to assess:

- the progress of the M113 Armoured Personnel Carrier Upgrade Project against stated schedule, cost and technical performance objectives; and
- Defence Materiel Organisation's (DMO's) progress in implementing the recommendations and addressing the findings of ANAO Audit Report No. 3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*.

7. The audit covers significant developments since the previous audit, including contract negotiations and outcomes, the commencement of final production, and the initial introduction into service of the upgraded vehicles. The ANAO visited production facilities to examine the arrangements for final production of the upgraded M113s, and 7 RAR at 1 Brigade in Darwin to examine vehicle logs, reports of defects and faults, and the current state of the upgraded M113 capability.

Conclusion

8. The M113 Major Upgrade Project commenced in July 2002 and has suffered a series of delays. Army has so far received 42 of the vehicles to be upgraded (see Table 1.3). Of these, 16 are in service with 7 RAR, five are awaiting issue to units and the remaining 21 are allocated primarily to driver and crew training units.

9. Many of the initial technical difficulties with the Project were resolved by the end of 2007, at which time extensive negotiations with the Prime Contractor were successfully concluded. Those negotiations enabled final production to get underway and reaffirmed the December 2010 delivery date.

10. Subsequently, however, production has been slow. In July 2008, the Prime Contractor informed Defence that the existing production facilities at Bandiana, Victoria, were not adequate to the task and, at December 2008, there was a potential shortfall of around 100 upgraded vehicles by December 2010.

11. Defence is currently working with the Prime Contractor on measures to improve and expand the M113 production facilities and recover the anticipated production shortfall. On 28 October 2008, the Minister for Defence announced that additional production will occur at Williamstown, Victoria, and Wingfield, South Australia. ANAO notes that recovering the production schedule will be challenging.

12. Defence advised that the upgraded M113s achieved a limited Initial Operational Capability as of December 2007 and could, if circumstances required, be deployed. However, Defence has yet to complete the Operational Testing and Evaluation of the upgraded vehicles, which is necessary to achieve Operational Release. In light of increasing threats, Defence is considering additional protection for its M113s, at a potential additional cost of up to \$0.2 million per vehicle, if they are deployed on more hazardous missions.

13. As of September 2008, the 16 upgraded M113s delivered to 7 RAR had travelled less than 1000 kilometres. They were first used in a training exercise in November 2008 and, by December 2008, had travelled almost 9 000 kilometres. Defence advised ANAO in December 2008 that, notwithstanding delays in the delivery of the upgraded M113s, demands on capability had been manageable. This was due, in part, to Defence's ability to use alternative armoured troop transports, and because troops who would otherwise have been assigned to M113s were necessarily deployed elsewhere on operations. Defence advised ANAO in December 2008 that:

The development of the [*upgraded M113*] capability is adversely impacted by support to operations. This cost has been assessed and accepted by Chief of Army as Capability Manager. Indeed, the cost is manageable within Army's wider priorities and strategic guidance.

14. Until it receives all its upgraded vehicles, Defence will continue to operate its fleet of original M113s, many of which are over 35 years old. At the time of this audit, Defence's assessment was that there were no viable alternatives to the upgraded M113.

Previous audit

15. In respect of the recommendations and findings of the previous audit, Defence has made significant progress. To control scope changes, Defence has specified and applied financial thresholds for the approval of changes to capital acquisition projects. To complement these arrangements, ANAO has recommended Defence develop additional guidance to ensure that appropriate levels of approval are sought for scope changes that affect capability.

16. Defence has successfully recovered against deliverables outstanding prepayments identified in the previous audit. However, it was difficult to establish with certainty the financial and other benefits accruing to the Commonwealth by making substantial prepayments under the Major Upgrade Contract. Consequently, ANAO has recommended that Defence develop clear policy guidance on the circumstances in which prepayments will be considered for inclusion in future major acquisition contracts.

17. Defence has put in place a suite of guidance and instructions to staff responsible for administering liquidated damages. In the case of the Major Upgrade Contract, administration was hampered by complex arrangements that applied liquidated damages to approximately 3100 contract milestones. ANAO has recommended that liquidated damages arrangements in future major acquisition contracts apply to clearly identified, key contract milestones.

18. Defence provided evidence of its effective oversight of technical issues in the development of the upgraded M113s.

Key findings by chapter

Chapter 2 – Progress in addressing the recommendations and findings of the previous audit

19. In July 2005, ANAO reported to Parliament on the management of the M113 upgrade project,⁵ concluding that that the initial minimum upgrade phase of the Project suffered from poor project management practices; ineffective project planning; inadequately defined project objectives; and technical problems.⁶

⁵ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*.

⁶ *ibid.*, p. 14.

20. ANAO made three recommendations to DMO, the first of which was that DMO 'put in place control mechanisms to ensure that changes in project scope are approved at the appropriate level.' ANAO found that this had occurred, with the issue of Defence Material Instruction 7/2005 (DMI 7/2005), which prescribes progressively higher levels of approval corresponding to higher levels of financial impact. However, ANAO found that there were varying views on what constituted a scope change and, hence, when to apply DMI 7/2005. Consequently, ANAO has recommended in this audit that, to remove uncertainty, Defence set suitable threshold criteria for the approval of scope changes affecting capability.

21. ANAO's second recommendation from 2005 was that DMO 'recover against deliverables, the outstanding amount of the May 1997 mobilisation payment remaining from the Phase 1(a) M113 Upgrade Contract at the earliest opportunity.' Defence provided ANAO with evidence that this occurred.

22. This audit also examined subsequent mobilisation payments of \$80 million made under the Major Upgrade Contract. These advance payments are recovered gradually over the full life of the contract. Defence advised ANAO that the costs of these advance payments, estimated by ANAO to be over \$10 million to September 2008, had been offset by a reduction in contract price during contract negotiations in 2002. However, the basis of Defence's statement was not clear and ANAO has recommended that Defence develop clear policy guidance on the circumstances in which prepayments will be considered for inclusion in future major acquisition contracts.

23. In response to ANAO's third recommendation from 2005 that DMO 'review contracting policy and its application of the collection of liquidated damages, to be received either by way of financial or agreed compensation, to ensure that they are collected in a timely manner,'⁷ ANAO has confirmed that Defence has put in place a suitable suite of guidance, templates and instructions.

24. ANAO's examinations in the course of this audit extended to DMO's administration of liquidated damages under the M113 Major Upgrade Contract. ANAO observed that effective administration was hindered by complexity and uncertainty in the relevant contract provisions, to the extent that Defence had not been able to apply the Commonwealth's standard

⁷ *ibid.*, p. 20.

position.⁸ Settling the amount of liquidated damages was central to Defence's 2007 contract negotiations with the Prime Contractor.

Chapter 3 – Global Settlement

25. To overcome a range of technical, production and contractual issues and to enable final production to commence, in October 2007 Defence successfully negotiated a Global Settlement with the Prime Contractor. The negotiations were triggered by substantial delays in delivery, by uncertainty as to the responsibilities of the parties, and by the perceived underperformance of the Prime Contractor. At the time of the negotiations, Defence considered alternatives to the M113 and concluded that the upgraded vehicles remained the best solution. In May 2007, Defence advised Parliament that:

Defence has reviewed the capability requirement and confirmed the continued suitability and need for this family of vehicles. The option of cancelling the [M113 upgrade] project would leave a significant gap in the ADF's capability and is not being considered at this stage.⁹

26. Over the course of the negotiations, Defence and the Prime Contractor continued work to remedy major technical defects in the design and construction of the upgraded armoured personnel carrier (APC), armoured fitter (AF) and armoured recovery vehicle (ARVL). At the conclusion of negotiations, Defence was in a position to authorise the start of the final production of these variants. The negotiations also settled other important matters, such as:

- a commitment by the Prime Contractor to deliver the first 350 upgraded vehicles by December 2010 under a compressed delivery schedule;
- a process for designing and building the remaining four variants of the upgraded M113s;¹⁰ and

⁸ Defence's General Counsel advised DMO in July 2006 that the Commonwealth's standard position is to allow 90 days grace to rectify a default, after which liquidated damages are calculated from day 1, rather than from day 91 as has been the case for this project.

⁹ Department of Defence (2007), responses to questions taken on notice from Senate Committee on Foreign Affairs, Defence and Trade, *Budget estimates 2007–2008*, W31 questions I and o.

¹⁰ The other four variants are the Armoured Command Vehicles (ACV), the Armoured Logistics Vehicle (ALV) the Armoured Ambulance (AA) and the Armoured Mortar (AM). The numbers and roles of each are summarised in Table 1.1.

- compensation to the Commonwealth for shortfalls in vehicle performance and the recovery of liquidated damages, both taken in the form of work-in-kind.

27. Given the state of the Major Upgrade Contract and the Prime Contractor's position, the negotiated outcome was reasonable in the circumstances.

Chapter 4 – Production and Capability

28. Defence and the Prime Contractor have successfully established M113 production facilities at Bandiana, Victoria. At these facilities, original M113s are stripped, cut and extended under a separate maintenance contract held by the Prime Contractor for the M113 upgrade.

29. Under the Major Upgrade Contract, the extended hull then enters an assembly line, where it is progressively fitted with new or refurbished equipment, including a new engine and gearbox and a turret to carry a 50 calibre machine gun. Defence personnel are on-site to inspect and accept or reject the work of the Prime Contractor.

30. Meeting the compressed delivery schedule agreed at Global Settlement depends on a smooth flow of hulls and vehicles through the Bandiana facilities. However, during a visit to Bandiana in August 2008, ANAO observed a backlog of work, indicating that schedule risks previously identified by Defence had been realised. The backlog is caused chiefly by delays in extending the hulls. This is proving to be more complex than anticipated, and is taking longer than expected.

31. In July 2008, the Prime Contractor notified Defence that it would not be able to meet the required level of production at Bandiana and that it would not be able to deliver 350 upgraded vehicles by December 2010. Defence is currently negotiating arrangements with the Prime Contractor on measures to recover the delivery schedule. On 28 October 2008, the Minister for Defence stated that production would be extended to Wingfield in South Australia and Williamstown in Melbourne, Victoria. The expansion of production facilities is part of the Government's decision to purchase 81 additional upgraded M113s at an additional cost of at least \$221 million.

Capability

32. ANAO visited Robertson Barracks, Darwin, in September 2008 to examine the 16 upgraded M113s in service with 1 Brigade, 7 RAR. At this time,

the re-designed brakes were demonstrated and ANAO was advised that the vehicles were a marked improvement over the original M113s.

33. However, 7 RAR had been able to make only very limited use of the 16 upgraded vehicles, which had travelled a combined total of less than 1 000 kilometres since their delivery in November 2007. Defence advised ANAO that 7 RAR first used the upgraded vehicles in a training exercise in November 2008. To date, the major users of upgraded M113s have been training teams, which have travelled over 60 000 kilometres training M113 drivers and crew.

34. Defence advised ANAO in December 2008 that a limited Initial Operating Capability for the upgraded M113s was achieved late in 2007 and that the vehicles could be deployed if circumstances required. ANAO found that Operational Testing and Evaluation of the upgraded vehicles was yet to occur and there was still some way to go before Operational Release would be achieved.

35. While Defence has found delays in delivery to be manageable to date, prolonged delays in achieving full development of the upgraded M113 capability will raise other issues. These include the logistic problems of running mixed fleets of old M113s alongside upgraded vehicles that share few common parts and require some different crew training.

Agency response

36. The Department of Defence provided a response to this report on behalf of Defence and the Defence Materiel Organisation (DMO):

The M113 Armoured Personnel Carrier vehicle fleet is undergoing a major upgrade under Project Land 106 which will realise a significant capability improvement over its current design. The Defence Materiel Organisation is charged with managing the \$850 million Project and will deliver 350 upgraded M113 vehicles by December 2010 and additional 81 upgraded vehicles under the Enhanced Land Force initiative by 2011.

Defence welcomes the Australian National Audit Office (ANAO) report on the Project and agrees to all three recommendations made in the report. ANAO notes in the report that “significant progress” has been made to improve key elements of the Project’s management since the previous ANAO audit in 2005 including: the introduction of a new approval process for controlling scope changes in capital acquisition projects; successful recovery of prepayments against outstanding deliverables; and the introduction of a suite of guidance and instructions for administering liquidated damages.

Recommendations

Recommendation No.1

Paragraph 2.31

ANAO *recommends* that Defence and DMO set suitable threshold criteria for determining changes in scope to acquisition projects and promulgate advice to staff to allow decision-makers to be provided with sufficient, consistent and appropriate information and advice on potential scope changes.

Defence response: *Agreed*

Recommendation No.2

Paragraph 2.52

ANAO *recommends* that Defence develop clear policy guidance on the circumstances in which prepayments will be considered for inclusion in future major acquisition contracts, and maintain an appropriate record of the basis for agreeing to advance payments as part of contract negotiations.

Defence response: *Agreed*

Recommendation No.3

Paragraph 3.47

ANAO *recommends* that Defence ensure that liquidated damages arrangements in future major acquisition contracts apply to clearly identified, key contract milestones.

Defence response: *Agreed*

Audit Findings and Conclusions

1. Introduction

This chapter discusses the evolution of upgrades to the M113 armoured vehicle fleet since 1993. It describes the current M113 fleet, reports important developments leading to the current upgrade project, summarises the previous M113 audit report and subsequent parliamentary review, and sets out the audit objectives and criteria.

Introduction

1.1 M113s are the only tracked vehicle in the ADF's fleet of armoured troop transports used for transporting and supporting infantry in a battlefield. Designed in the late 1950s, they first saw service with the ADF during the Vietnam War. Most recently, Australian M113s were deployed in Timor-Leste.¹¹

1.2 Vehicles from the Australian Army's (Army's) fleet of M113s are currently undergoing a major upgrade to improve protection, lethality, mobility and habitability. Project Land 106: Upgrade of M113 Armoured Vehicles, is one of Defence's top 30 projects by forecast 2008–09 expenditure, with some \$100 million in expenditure forecast for this financial year.¹²

1.3 The ANAO previously examined Defence's progress in delivering this project in ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project* (see paragraphs 1.47 - 1.48). Given the continuing significance of this project and developments since the 2005–06 audit, the ANAO considered it timely to provide an update on Defence's progress in implementing the recommendations of the previous audit and also to report on the progress of the M113 Armoured Personnel Carrier Upgrade Project against stated schedule, cost and technical performance objectives.

¹¹ 'The M113 was developed from the M59 and M75 Armoured Personnel Carrier which were designed by Ford Machinery Corp. and Kaiser Aluminium and Chemical Co. in the late 1950s.' Worldwide, there are estimated to be 80 000 M113s in army inventories, among them those of the United States, Canada, Germany, Israel and Norway. See <http://en.wikipedia.org/wiki/M113_Armored_Personnel_Carrier> [accessed 13 March 2009].

¹² Department of Defence (2008), *Portfolio Budget Statements 2008–09*, p. 166.

Figure 1.1

Assembled upgraded M113, prior to fitment of armament



Source: ANAO fieldwork at Bandiana production facility, 13 August 2008.

M113 fleet

1.4 As noted in paragraph 1.1, M113s are the only tracked vehicle in the ADF's fleet of armoured troop transports. The other armoured troop transports in the ADF's fleet, Australian Light Armoured Vehicles (ASLAVs) and Bushmasters, run on wheels and provide superior long distance mobility on roads.¹³

1.5 Of necessity, the underhulls of tracked vehicles like the M113 have flat sides and bellies and are lower to the ground than wheeled vehicles. ASLAVs and Bushmasters are higher off the ground and offer better mine protection, as their narrower bellies and angled flanks are more effective at deflecting mine blasts. However, in difficult terrain, M113s are more mobile than either ASLAVs or the Bushmasters and can manoeuvre faster and more effectively

¹³ Bushmasters are used mainly for long distance troop transport. ASLAVs, like M113s, are fighting vehicles and are equipped with weapons and sensors.

than wheeled vehicles, while offering protection and supporting fire. M113s can travel cross-country to avoid hazards and can be used for a wide variety of missions. Operating in concert with infantry and tanks, M113s combine to increase the effectiveness of, and reduce the risks to, each fighting element.

1.6 Defence's aim was to achieve a major upgrade of the M113, as the 'capability to be provided by the M113 Upgrade Project is long overdue for meeting Army's current requirements':

[*The Project*] aims to upgrade a portion of the Army's fleet of M113 vehicles to enable them to continue to provide effective service to around 2020, when a new common family of vehicles can be procured. Although the M113 upgrade is an interim or bridging capability, the vehicle should have some growth potential in order to meet changing situations until 2020, or in the event that the procurement of the new family of vehicles is delayed.¹⁴

1.7 The M113 Major Upgrade Project is intended to improve protection, through additional external armour, external fuel tanks, a fire suppression system and a spall curtain; firepower, by acquiring a new turret; mobility, with improved suspension, a more powerful engine, a new transmission and a new separated braking/steering system; and habitability, through various measures such as climate control.

1.8 In March 2009, Defence advised that an additional 81 Armoured Personnel Carriers (APCs) were to be upgraded, bringing to 431 the total number of vehicles to be upgraded under Project Land 106. Table 1.1 lists these, along with all the other M113 versions (or 'variants') that can be used in combination to carry out missions and the numbers of each of these variants to be upgraded under the major upgrade project.

¹⁴ Department of Defence, *M113 Capability Systems Statement*, January 2001, p. 3.

Table 1.1

Variants comprising Australia's M113 fleet, March 2009

| Variant | Role | Fleet numbers | | |
|--|--|-------------------------------|-----------------------------|---|
| | | Original un-upgraded vehicles | Vehicles currently upgraded | Number of vehicles remaining to be upgraded |
| Armoured Personnel Carrier (APC) | Carry troops and their equipment | 527 ^A | 40 ^B | 212 ^C |
| Armoured Fitter (AF) | Repair vehicles in the field | 41 | 1 | 37 |
| Armoured Recovery Vehicle Light (ARVL) | Recover vehicles from the field | 19 | 1 | 11 |
| Armoured Logistics Vehicle (ALV) | Transport equipment and supplies | 100 ^D | 0 | 50 |
| Armoured Ambulance (AA) | Transport wounded troops | 0 | 0 | 15 ^E |
| Armoured Command Vehicle (ACV) | Field command post, communications hub | 58 | 0 | 43 ^F |
| Armoured Mortar (AM) | Transport and support a 81 mm mortar | 22 ^G | 0 | 21 |
| Totals | | 767 | 42 | 389 |

Notes:

- A. Includes up to 100 APC hulls prepared, stockpiled and set aside at Bandiana, awaiting extension by the contractor before entering the upgrade production line, a number of APCs upgraded to a lower standard prior to the commencement of the major upgrade project, and 46 M113 Fire Support Vehicles (a variant armed with the Saladin armoured car turret, retired in the mid-1970s) which are not included in the upgrade program.
- B. These comprise 14 APCs issued to 7th Battalion the Royal Australian Regiment, 5 upgraded vehicles at Bandiana awaiting issue and 21 issued to the School of Armour for training crews.
- C. The total Includes the additional 81 APCs to be upgraded following the Government's October 2008 decision.
- D. The 50 Armoured Logistics Vehicles are to be extended from the stock of APC hulls, rather than the 100 M113 Tracked Load Carriers, none of which are included in the upgrade program.
- E. In November 2008, DMO advised ANAO that it will extend 15 existing APC hulls to build the Armoured Ambulances.
- F. In November 2008, DMO advised ANAO that 43 existing APC hulls will be extended to build the Armoured Command Vehicles, rather than using any of the 58 existing ACV hulls.
- G. In March 2009, Defence advised it is considering a proposal to extend 21 existing APC hulls to upgrade the Armoured Mortars, rather than use any of the 22 existing armoured mortar hulls.

Source: ANAO analysis of data provided by the Defence Materiel Organisation (DMO).

Evolution of the M113 major upgrade project

1.9 As noted in the 2005–06 audit report on the management of the upgrade project, the Australian M113 fleet has been in service since the mid 1960s without previous significant improvement on the original model. Throughout the life of the fleet, operational deficiencies have been identified and the need to either upgrade or procure a new fleet recognised.¹⁵ Between 1993 and 2002, the requirement to upgrade the fleet evolved substantially, from a minimal upgrade of over 766 vehicles at a cost of \$50 million¹⁶ to a major upgrade of 350 vehicles at a cost of more than \$624 million.¹⁷

1.10 The developments leading to current state of the M113 Major Upgrade Project are summarised in Table 1.2 and briefly described in the paragraphs below.¹⁸ The history of this project is important in understanding the contractual arrangements for the delivery of upgraded M113s, how the project has progressed and its current status as we approach the December 2010 deadline for delivery of the 350 M113s to be upgraded under the project.¹⁹

From minimal to major upgrade, November 1993 to June 2002

1.11 A minimal upgrade to extend the life of the M113 fleet to 2010 was approved in November 1993. The aim was to improve firepower, night vision, fighting, habitability and survivability.²⁰ The intention was to upgrade 537 M113s by the end of 1998 at a cost of \$39.9 million. The remaining 229 vehicles were to be upgraded by October 2000 at an additional cost of \$10.2 million.

¹⁵ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, p. 11.

¹⁶ April 1993 prices.

¹⁷ Budget prices 2006–07.

¹⁸ They were extensively reported in the previous audit, ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*.

¹⁹ On page 181 of the Department of Defence *Portfolio Budget Statements 2008–09*, DMO reports ‘the contractor forecasts that the project will be completed in December 2010, in accordance with the contract schedule’. The additional 81 vehicles approved in October 2008 are scheduled to be delivered by the end of 2011.

²⁰ The proposal involved improvements to the suspension and the engine cooling systems, and a new turret with new weapons with day/night sights (for APCs). For the vehicle occupants, it included cooled drinking water and, for their protection, spall curtains (ballistic curtains attached inside the vehicle to protect the occupants from metal spall fragments).

Table 1.2

Evolution of the M113 major upgrade

| Upgrade | Vehicles | Approval | Planned completion | Planned Project Budget (rounded to nearest \$ million) | Average budgeted cost per vehicle (\$) |
|--------------------------------|-------------------------|-------------------------|--------------------|--|--|
| Minimal upgrade | 766 (Phases 1 and 2) | November 1993 | October 2000 | 50 ^A | 65 000 |
| Revised minimal upgrade | 518 (Phases 1 and 2) | April 1995 (Phase 1) | March 2000 | 50 (Phase 1) | 137 000 (Phase 1) |
| Expanded upgrade | Up to 347 | February 1999 | March 2004 | 335 ^B | 965 000 |
| Major upgrade | 350 | June 2002 | December 2010 | 594 ^C | 1 697 000 |
| Major upgrade, renegotiated | 350 | October 2007 | December 2010 | 624 ^D | 1 783 000 |
| Additional vehicles for ELF | 81 | October 2008 | End of 2011 | 221 ^E | 2 742 000 |

Notes:

- A. The minimal upgrade was to have two phases. Phase 1 would upgrade 537 vehicles at a cost of \$50 million by the end of 1998, with a further 229 vehicles upgraded in Phase 2 at a cost of \$10 million (all April 1993 prices). In the event, Phase 2 was not approved.
- B. December 2001 prices. The sizeable increase in planned cost was based on the Government approving an expansion to work in May 1998 at a cost of up to \$250 million (December 1998 prices). The intention was to upgrade 347 vehicles to a significantly higher standard (after the minimal upgrade of 364 M113s). Because the contractor's proposal for a significant upgrade was subsequently more expensive than first thought, in May 2000, the project scope was changed to a significant upgrade of approximately 160 M113s, with a minimal upgrade to approximately 190.
- C. 2002/03 budget prices. Government approval was for 259 M113s upgraded and the hull extended, with the remaining upgraded without extending the hull.
- D. Budget prices, 2006–07, for 329 M113s upgraded with the hull extended, with the remaining 21 upgraded without the hull extended.
- E. Budget prices, 2008–09.

Source: ANAO analysis of data provided by DMO.

1.12 In April 1995, Ministers increased the budget for the first phase from \$39.9 million to \$50.0 million.²¹ By June 1995, the scope of the first phase was reduced from 537 to 364 vehicles, effectively increasing the unit cost of the minimal upgrade by almost 50 per cent.²² Likewise, the scope of the planned second phase was reduced from 229 to 154 vehicles. In all, a total of 518 vehicles (or some 68 per cent of the fleet) were to get the minimal upgrade.

1.13 It was on this basis that the Commonwealth signed six contracts in May 1997 with the Prime Contractor,²³ setting in motion the first phase of the minimal upgrade of the M113.²⁴

Maintenance contract

1.14 Also in 1997, the Prime Contractor and the Commonwealth negotiated a separate, though related, Commercial Support Program (CSP) contract. Signed in December 1997, the CSP contract covered the maintenance of ADF vehicles, including armoured vehicles and the maintenance and rebuild of M113s. The work is carried out at Defence's purpose built facilities at Bandiana, Victoria. Under the CSP contract, the Commonwealth provides these facilities free-in-aid to the Prime Contractor, who offers favourable labour rates in return.

1.15 By October 1997, Defence was considering substantial additional improvements to the minimal upgrade of the M113. These included adding amour protection to the APC turrets and installing climate control and inertial navigation systems to a total of 347 M113s at an estimated cost of \$226 million (or approximately \$600 000 per vehicle).

1.16 In November 1997, the Prime Contractor gave the Commonwealth an unsolicited proposal to rebuild existing M113s under the CSP contract, undertake their minimal upgrade and then perform additional upgrades to the higher level envisaged by Defence.

²¹ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, p. 31.

²² *ibid.*

²³ At that date, the Prime Contractor was Transfield Defence Systems, which was subsequently re-named Tenix Defence Systems from November 1997. BAE Systems purchased Tenix Defence Systems in June 2008 and is now the Prime Contractor for the M113 major upgrade project. For simplicity, the term 'Prime Contractor' is used throughout this report, rather than the name of the relevant commercial entity.

²⁴ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, p. 32.

1.17 Defence's view was that combining the minimal and additional upgrades and using the lower labour rates of the CSP contract offered savings in time and money. As the Prime Contractor had only recently won both the minimal upgrade and CSP contracts, Defence concluded that an open tender would not be cost effective and the Prime Contractor would offer superior value for money, notwithstanding the substantial increase in estimated total contract value.²⁵

Developing the Major Upgrade Contract

1.18 In June 1998, the then Minister for Defence announced his decision to sole-source the improved upgrade of the M113 to the Prime Contractor, for which the then Government approved additional funds of \$250 million early in 1999. Defence merged the upgrade phases in February 1999 and invited the Prime Contractor to submit a sole-source proposal.

1.19 From March to November 1999, Defence and the Prime Contractor worked together, at the Commonwealth's expense,²⁶ to consider possible upgrade options within the \$250 million funding cap set by Government. While the joint work saved time, it meant that the overall upgrade specification that would have been necessary to support an open tender process was not developed for the improved upgrade of the M113.

1.20 By November 1999, it was clear to Defence that combining the upgrades was riskier and more expensive than first thought. The Prime Contractor's proposal for combining the upgrade stages cost an additional \$145 million and the anticipated savings fell from the initial estimate of \$30 million to around \$11.5 million.

1.21 With the benefit of hindsight, Defence saw that its original cost estimate of sole sourcing with the Prime Contractor, made without the benefit of tender quality data, had been very optimistic. It considered the revised and more fully developed estimates to be reasonable but, as they exceeded the available funds approved by Government, the contractor's proposal was formally declined in

²⁵ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, pp. 34-35.

²⁶ The additional costs were approved through Contract Change Proposals (CCPs) to the Prime Contractor's existing contracts, at a cost of \$3.34 million. The Prime Contractor also claimed and was paid \$1.28 million for postponement costs, as it undertook work for the improved upgrade proposal while maintaining the team it had employed in anticipation of working on the improved upgrade.

October 2000, as was a subsequent proposal to develop two initial production vehicles to test the design.²⁷

1.22 Defence sought approval for the additional funds for a major upgrade as part of the December 2000 Defence White Paper. The White Paper subsequently endorsed a 'major upgrade of 350 of our M113 Armoured Personnel Carrier fleet, with the upgraded vehicles planned to enter service from around 2005'.²⁸ The Defence Capability Plan 2001–10 included \$500 million to fund the upgrade.

1.23 Subsequently, the M113 project Equipment Acquisition Strategy (EAS) was developed. First approved in May 2001 and updated in October 2007, the EAS provides an overview of the different stages of the project, the procurement strategy and approvals process, and the project's schedule and cost. The M113 project EAS is complemented by Army's January 2001 Capability Systems Statement (CSS), which outlines the required technical and operational requirements of the system.

Project definition

1.24 In light of the Defence Capability Plan 2001-10, in November 2001 the Prime Contractor provided a more developed upgrade proposal to Defence for consideration.²⁹ After assessing it, Defence worked with the Prime Contractor to develop an achievable draft statement of the work to be undertaken that reflected Defence's requirements and redressed deficiencies in the proposal.³⁰ By June 2002, Defence reported to the then Minister for Defence that it was now confident in the future of the project, having undertaken:

reviews by [our] own cost investigators, technical engineering evaluations, and review by external lawyers and Defence contracting staff. Value for money

²⁷ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, pp. 41–44.

²⁸ Department of Defence (2000), *Defence 2000: Our Future Defence Force*, p. 83.

²⁹ The Prime Contractor was paid \$1.4 million for this work, under Contract Change Proposal 14 agreed with Defence.

³⁰ The deficiencies identified included a lack of contractor responsibility for the performance of the system as a whole and a high-risk schedule: getting the vehicles into service by 2005 was thought to be overly optimistic. The initial proposal also omitted key Commonwealth requirements, including those that the vehicles be transportable on Defence's existing fleet of transports, the provision of full technical documentation and the inclusion of full life-cycle-costs.

was also checked through Defence [*being able to inspect*] the [*Prime Contractor's*] bids from its potential sub-contractors.³¹

1.25 Defence advised the Minister that it had made clear to the Prime Contractor the need to control the total weight of the upgraded vehicle. It would be up to the Prime Contractor to select its own sub-contractors for the heavier upgrade components, notably the engine, gearbox and the parts to extend the M113 hull.

Project approval and contract formation

1.26 Defence weighed the potential improvements to capability from a major upgrade against its risks. The department concluded that upgraded M113s were so fundamental to the ADF's operational effectiveness that the upgrade should go ahead without delay. To mitigate risks to schedule and capability, Defence proposed introducing the upgraded vehicles into service in mid to late 2006, rather than 2005, as anticipated by the Defence White Paper.³²

1.27 To allow seamless production through all phases of the upgrade, Defence aimed to link the CSP and M113 Upgrade Contracts and extend the CSP contract until 2010 to cover the anticipated duration of the M113 upgrade.

1.28 To manage the contractual risks, Defence proposed a contract that would continue only if the Prime Contractor's progress was satisfactory. Satisfactory progress meant the Prime Contractor achieving 'critical milestones', to be specified in the contract:

- Stage 1, culminating in the provision of two demonstration vehicles, to be achieved by January 2004 after expending approximately 12 per cent of the project funding; and
- Stage 2, culminating in the provision of 14 initial production vehicles, to be achieved by November 2005 after expending approximately 34 per cent of the project funding (an additional 22 per cent on Stage 1).

1.29 If these stages were not satisfactorily achieved, the Commonwealth could exit the contract after having spent (at most) 12 or 34 per cent of the total project funds. With this approach, Defence was confident that the major technical and design issues would be resolved before proceeding to Stage 3, the final production phase, in November 2005, during which the bulk of the

³¹ Quoted from a June 2002 brief to the then Minister for Defence.

³² Army agreed that it could accept the delay in delivering the vehicles.

project budget (approximately 66 per cent) would be spent. If the vehicles met Stage 1 and Stage 2 standards, Defence could have high confidence that production could proceed successfully.

1.30 On this basis, in June 2002 the then Government approved total project budget funding of \$531.82 million (2001–02 Budget prices) for the upgrade of some 350 M113s, bringing total approved spending on the upgrade to \$593.95 million (including previous approvals totalling \$62.13 million). Neither the total number of vehicles to be upgraded, nor the date for their final delivery, were specified in the Government’s decision.

1.31 In July 2002, the Commonwealth signed the \$388 million (October 2001 prices) M113 Major Upgrade Contract with the Prime Contractor, to undertake the major upgrade of 350 M113s.³³ Contract payments escalate in accordance with rises in labour costs and material costs, as measured by specified indices published by the Australian Bureau of Statistics (ABS). Accordingly, as at April 2008, the current value of the major upgrade was estimated at approximately \$401.4 million out of a total project budget of \$624 million, of which an estimated \$272 million (or 44 percent) had been spent.³⁴

1.32 In addition to expenditure under the Major Upgrade Contract, the total project budget also meets certain Defence costs, such as the purchase of equipment to be furnished to the Prime Contractor, and Defence costs relating to the administration of the contract and, the cost of inspecting and extending the hulls, performed under the CSP contract.

1.33 In October 2008, the Government agreed to the purchase of 81 additional upgraded M113s as part of a wider Enhanced Land Forces (ELF) initiative, increasing the project budget by \$222.1 million to a total of \$846.3 million.³⁵

³³ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, p. 28.

³⁴ Department of Defence (2008), *Portfolio Budget Statements 2008–09*, p. 166.

³⁵ The initiative was announced by the Minister for Defence, Mr Joel Fitzgibbon MP in Media Release 148/2008 of 28 October 2008, *Government Approves Additional Armoured Personnel Carriers*. The Enhanced Land Force initiative is a component of the Hardened and Networked Army initiatives, summarised in Chapter 4 at paragraph 4.41. Prices are expressed in 2008–09 Budget terms. Defence advised that, on 19 December 2008, Contract Change Proposal LND188, providing for an additional 81 APCs at a cost of approximately \$125 million (December 2008 prices, GST exclusive) was approved and signed by the Prime Contractor.

Scope and progress of work

1.34 As of September 2008, Defence intends all upgraded vehicles, except the recovery vehicle (ARVL), to be based on existing M113 APC hulls³⁶. Only the hatches, rear door, vehicle intercommunication system³⁷ and the forward portions of the hull are retained. The upgraded vehicles are to be fitted with new components common to all variants, chiefly:

- add-on armour kit,³⁸ internal spall curtains and external fuel tanks, intended to improve protection and survivability;
- a new, more powerful engine and drive train, with improved suspension and brakes;³⁹ and
- extra room in the extended vehicles, with new seats, better cooling and more stowage for equipment.⁴⁰

1.35 Individual variants are to be fitted with new specialised equipment. The APC is to have a new Australian designed and built electrically powered armoured turret, fitted with a night sight and re-furbished guns. The armoured fitter (AF) is to have a new crane capable of lifting the heavier engine and gearbox of the upgraded M113 variants, and the armoured recovery vehicle (ARVL) a powerful new winch. The armoured mortar (AM) is to be fitted with a dedicated mortar base plate, the armoured ambulance (AM) with medical equipment, and the armoured command vehicle (ACV) with communications and command equipment.

³⁶ The ARVL will be extended based on its M806 hull. Defence advised in March 2009 that it is proposing to base the upgraded Armoured Mortar (AM) on the APC rather than the existing AM hull.

³⁷ Enabling communication between the commander and other vehicles, as well as between the commander and driver. Other passengers can receive but not transmit.

³⁸ The add-on armour can be taken on and off the vehicle as required. A Defence working group, including representatives from the Defence Science and Technology Organisation (DSTO), examined armour options and determined that a steel, rather than ceramic, armour solution would provide the appropriate level of protection at a lower cost.

³⁹ These features provide the upgraded vehicle with superiority mobility over the un-upgraded vehicle. One key mobility improvement with the upgraded vehicles is the ability to perform a true pivot turn. To undertake a 180 degree turn, an un-upgraded M113 would lock one track and rotate around this locked track. This means that the vehicle would swing around on the other track, requiring room on the turning side equivalent to approximately the width of the vehicle. The upgraded vehicles undertake a true pivot turn on the spot.

The upgraded vehicles also provide greater control (through gear ratios) when driving uphill and during descents.

⁴⁰ Both internal and external stowage features are to be added to the vehicles.

Extended vehicles

1.36 The July 2002 contract was to extend 259 M113s, comprising 171 armoured personnel carriers, 38 armoured fitter vehicles and 50 armoured logistics vehicles. Without extending, the additional weight of armour and the upgraded engine and gearbox would have substantially reduced their effective payloads.

1.37 Initially, the other four variants of the M113 in service with the ADF were not to be extended. However, in 2003, DMO in consultation with Army determined that the 12 armoured recovery vehicles also needed to be extended to address deficiencies identified with their performance during design testing.⁴¹ The contract was subsequently amended in July 2005 to reflect this.

1.38 Similarly, in 2006, following the design reviews for the armoured command vehicle (ACV) and armoured ambulance variants (AA), DMO in consultation with Army determined that these too would need to be extended.⁴² The contract was amended in November 2007 to include these changes. In November 2008, Defence advised ANAO that it was undertaking a feasibility study for the extension of the remaining variant, the 21 armoured mortar vehicles.

Progress of the Project

1.39 Progress toward major stages of the project has been delayed, as shown in Table 1.3. Stage 1 involved the production of two demonstration vehicles (an armoured personnel carrier and an armoured logistics vehicle) for DMO to test the design concept. Testing and delivery were delayed by three months.

1.40 Stage 2 was to be the production of 14 initial production vehicles, including at least one of all seven variants, to be used by DMO to undertake more rigorous testing of their design and verify that the Prime Contractor was ready to commence full-scale production. Technical and contractual difficulties delayed production by 17 months and only eight of the 14 vehicles were produced, for only three of the seven variants. At that time, a negotiated

⁴¹ The performance deficiencies identified included the marginal stability of the ARVL during some winching operations, and a limited capacity to recover vehicles (particularly other extended M113 variants) in more difficult situations.

⁴² The original designs for the AA and ACV variants would have produced a vehicle that exceeded the Recommended Gross Vehicle Mass. The excess weight resulted from heavier than anticipated armour, a power-pack heavier than the Prime Contractor originally estimated, and the use of heavier, more robust vehicle fittings to improve the durability of the vehicles.

Global Settlement of contractual issues rescheduled the date for the delivery of the initial production vehicles for the four remaining variants.

Table 1.3

Progress of each stage of the M113 upgrade project

| Project Stage | Contracted Deliverables | Progress |
|--|--|--|
| Stage 1 <i>Demonstration Vehicles</i> | Deliver 2 demonstration vehicles, an APC and an ALV by June 2003 | Both vehicles were received by DMO in September 2003. |
| Stage 2 <i>Initial Production Vehicles</i> | <p>Deliver 14 initial production vehicles between February 2004 and October 2005 comprising:</p> <ul style="list-style-type: none"> • 4 APC • 2 ARVL • 2 AF • 2 ALV • 2 ACV • 1 AA • 1 AM | <p>By December 2007 DMO had received 8 initial production vehicles: 4 APCs, 2 ARVLs, and 2 AFs.</p> <p>In October 2007, DMO and the Prime Contractor agreed contract amendments re-scheduling delivery of the remaining initial production vehicles to the period December 2008 to March 2009.</p> <p>In March 2009, Defence advised that the ALV initial production vehicle had been delivered in February 2009, and that the AA and ACV initial production vehicles were to be received in April 2009. The armoured mortar initial production vehicle has been re-scheduled to allow completion of the Feasibility Study into its extension.</p> |
| Stage 3 <i>Production Vehicles</i> | Deliver the remaining 336 vehicles between March 2006 and December 2010 | <p>In November and December 2007 DMO received, and handed over to Army, the first 16 production vehicles (14 APCs, an AF and an ARVL)</p> <p>At March 2009, another 21 production vehicles had been issued to the Puckapunyal School of Armour for training. Five other production vehicles were at Bandiana in Victoria, awaiting issue to units.</p> |

Source: ANAO analysis of DMO data.

1.41 The two armoured logistics initial production vehicles (ALVs) were scheduled to be delivered in December 2008; the armoured mortar (AM) vehicle in January 2009; and the Armoured Ambulance (AA) vehicle in February 2009. In March 2009, Defence advised that the Prime Contractor provided two initial production ALVs on 18 February 2009 for the Test Readiness Review, with the remaining variants scheduled as follows:

The [*Prime Contractor*] has advised [*Defence*] that the armoured ambulance and armoured command vehicles are to be delivered following detailed design reviews scheduled between 6 April and 9 April 2009. The armoured mortar initial production vehicle has been re-scheduled to allow completion of the Feasibility Study into [*extending*] this variant prior to commitment of resources to the [*current*] version.

1.42 The technical problems relating to the development of the eight initial production vehicles delivered to DMO included engine overheating, drive train vibration, transmission pump failure and brake failure. Engineering and design solutions have been necessary to solve each of these problems. These technical problems delayed the delivery of the initial production vehicles for three of the variants, ruled out the development of initial production vehicles for four of the variants until these problems could be resolved, and set back the start of final production.

Global Settlement Negotiations

1.43 The project difficulties and delays on the M113 Upgrade Project were such that, in December 2006, DMO sought to engage the Prime Contractor in negotiating significant amendments to the contract. Completed in October 2007, the Global Settlement negotiations established the parties' responsibilities for a range of contractual issues and settled a position on which Stage 3 final production could begin. Among the major issues negotiated were:

- timing of the second \$40 million mobilisation payment,⁴³ which would accompany a shift to final production (Stage 3);

⁴³ A mobilisation payment is a form of advance payment provided in order to assist a contractor commence production. Usually provided to purchase long lead time items, it is accounted for as an asset of the Commonwealth, and a liability for the contractor until defrayed by contract payments. The first \$40 million mobilisation payment was made at contract signature.

- a division of responsibility between the parties for the additional costs and schedule slippage arising from the need to extend the armoured ambulance (AA) and command vehicles (ACV);
- the failure of the eight Stage 2 initial production vehicles provided to DMO at that point in time to meet some vehicle performance specifications;
- the issue of liquidated damages; and
- adherence to the final deadline for delivery of all 350 vehicles by December 2010.

1.44 The result of the Global Settlement negotiations was a series of contract amendments that implemented the negotiated outcomes, including a revised delivery schedule. Chapter 3 examines the Global Settlement negotiations.

1.45 By the time of the Global Settlement, the Prime Contractor had resolved the outstanding major technical problems that had arisen in the development of the initial production APC, AF and ARVL variants, including the braking system. In November 2007 DMO approved the commencement of final production under Stage 3.

1.46 Defence advised in March 2009 that final production for all 431 upgraded vehicles is scheduled to run until the end of 2011, including the retrofitting of all 14 Stage 2 initial production vehicles to meet production vehicle standards. At March 2009, 42 production vehicles had been built and 37 delivered, compared to the 125 vehicles scheduled for delivery by March 2009 under the October 2007 Global Settlement.

Previous ANAO audit and Parliamentary oversight

1.47 In July 2005, ANAO reported to Parliament on the management of the M113 upgrade project.⁴⁴ ANAO concluded that the initial minimum upgrade phase of the Project suffered from poor project management practices; ineffective project planning; inadequately defined project objectives; and technical problems.⁴⁵

⁴⁴ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*.

⁴⁵ *ibid.*, p. 14.

1.48 ANAO considered that the major upgrade phase of the project, covered by a new contract, provided an improved framework for DMO to progress the project. However, the ANAO had concerns about whether the initial upgraded vehicles would be delivered by the scheduled date of late 2006 and recommended that DMO:

- put in place control mechanisms to ensure that changes in project scope are approved at the appropriate level;
- recover against deliverables, the outstanding amount of the May 1997 mobilisation payment remaining from the Phase 1(a) M113 Upgrade Contract at the earliest opportunity; and
- review contracting policy and its application of the collection of liquidated damages, to be received either by way of financial or agreed compensation, to ensure that they are collected in a timely manner.⁴⁶

1.49 DMO advised a Senate Estimates Committee of the Parliament in November 2005 that delivery of the first upgraded vehicles would be delayed due to technical problems with the initial production vehicles, notably overheating, vibration, and braking problems. At that time, Defence advised the Committee that ‘project expenditure is \$187 million to date’ of the \$587 million project cost.⁴⁷

1.50 Expecting the technical problems to be solved, DMO advised the Committee that the first M113s could be delivered into service in December 2006 rather than April 2006, as first planned,⁴⁸ advice reiterated in February and March 2006.⁴⁹

⁴⁶ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, p. 20.

⁴⁷ The total approved project cost of \$587 million advised to the Committee is in 2005 prices. The upgrade budget is the total allocated cost for the M113 upgrade project (excluding M113 work performed under the Commercial Support Program contract), with the bulk being for the Prime Contract with the Prime Contractor. See Commonwealth Parliamentary Debates (2005), Senate Foreign Affairs, Defence and Trade committee, *Budget supplementary estimates 2005-2006*, 2 November, p. 113.

⁴⁸ Commonwealth Parliamentary Debates (2005), Senate Foreign Affairs, Defence and Trade committee, *Budget supplementary estimates 2005-2006*, 2 November, pp. 111-119.

⁴⁹ In February 2006, Parliament was advised that the overheating problems had been rectified (see Commonwealth Parliamentary Debates (2006), House of Representatives, *Questions on Notice*, Question No. 2748, 9 February, pp. 190-191). Similar advice was provided in March 2006 (see Commonwealth Parliamentary Debates (2006), Joint Standing Foreign Affairs, Defence and Trade Committee, *Review of the Defence Annual Report 2004-2005*, 3 March, pp. 14-15).

1.51 By June 2006, however, DMO advised Parliament that problems with the M113's brakes would delay the first delivery until June or July in 2007.⁵⁰ DMO explained that the additional six month delay arose, in part, from 'knock-on' effects, such as the need to re-schedule the training of Army personnel that will operate the upgraded vehicles. At this time, DMO advised that it had not made any further payments to the contractor and that there were potential claims of liquidated damages against the Prime Contractor totalling \$1.483 million.⁵¹

1.52 In response to questioning from the Joint Committee on Public Accounts and Audit (JCPAA) in February 2006, DMO stated that upgrading the M113s represented better value for money than purchasing new alternative vehicles.⁵² Questioned during Budget Estimates hearings in May 2007 on whether Defence had considered acquiring the US Bradley Fighting Vehicle, Defence stated that the Bradley was considered in late 2006 but was deemed not suitable because of higher acquisition and operational costs, limited passenger capacity, limited support variants, training implications and, at almost twice the weight of an M113, 'limited deployability'.⁵³

1.53 DMO also reported that the mobilisation payment debt of \$3.3 million reported by ANAO in its 2005–06 performance audit report had been recovered, and that liquidated damages relating to the current contract were 'claimed and being exercised'.⁵⁴

⁵⁰ The problems were first made public in the *Weekend Australian*, 26–27 May 2006. See Commonwealth Parliamentary Debates (2006), Senate Foreign Affairs, Defence and Trade Committee, *Budget estimates 2006–2007*, 1 June, pp. 101–102.

⁵¹ *ibid.*, p. 105. Defence advised the Committee that the potential claims for liquidated damages comprised \$23 000 due to the delayed delivery of the integrated logistics support package and \$1.46 million for accumulated missed milestones.

⁵² Department of Defence (2006), responses to written questions on notice from Joint Committee of Public Accounts and Audit inquiry *Review of Auditor-General's Reports Nos. 43 (2004–05) to No.6 (2005–06)*, Management of the M113 Armoured Personnel Carrier Upgrade Project question 16.

⁵³ Department of Defence (2007), responses to questions taken on notice from Senate Committee on Foreign Affairs, Defence and Trade *Budget estimates 2007–2008*, W31 question q.

⁵⁴ Commonwealth Parliamentary Debates (2006), Joint Committee of Public Accounts and Audit, *Review of Auditor-General's Reports Nos. 43 (2004–05) to 6 (2005–06)*, 9 February, p. 17.

1.54 The Senate was advised in June 2006 that DMO had applied \$23 000 liquidated damages to the delayed delivery of the integrated logistics support package and \$1.46 million for accumulated missed milestones.⁵⁵ Defence also informed the Senate in May 2007 that liquidated damages had been claimed and paid.⁵⁶

1.55 In June 2007, Parliament was advised that some \$77 million of planned expenditure on the M113 project was deferred because of project delays.⁵⁷ While the total cost of the upgrade had not increased in real terms since July 2002,⁵⁸ in dollar terms it was now estimated to be \$603 million in January 2007 prices. At that time, the then Minister for Defence advised Parliament that no fully operational upgraded M113s had yet been delivered by the Prime Contractor, due to unresolved problems with the brakes.⁵⁹ In February 2008, DMO advised Parliament that the brake problem had been resolved and the project was on track.⁶⁰

1.56 Defence reported, in the May 2008 Budget, that although the production schedule remained a high risk, 'the contractor remains committed to the delivery of the last vehicle as contracted in December 2010'.⁶¹

1.57 In May 2008, the Parliamentary Secretary for Defence Procurement announced that technical problems with the project had been resolved and the project 'was back on track and estimated to meet its original schedule and specifications within budget'.⁶²

⁵⁵ Commonwealth Parliamentary Debates (2005), Senate Foreign Affairs, Defence and Trade Committee, *Budget estimates 2005-2006*, 1 June, pp. 105-106.

⁵⁶ Department of Defence (2007), responses to questions taken on notice from Senate Committee on Foreign Affairs, Defence and Trade *Budget estimates 2007-2008*, W31 question j.

⁵⁷ Commonwealth Parliamentary Debates (2007), House of Representatives (Main Committee), *Appropriation Bill (No. 1) 2007-08 consideration in detail*, 13 June, p. 249.

⁵⁸ The approved project budget at July 2002 was \$593.95 million (Budget 02/03 prices).

⁵⁹ Commonwealth Parliamentary Debates (2007), House of Representatives, *Questions on Notice*, Question 5589, 12 June, pp. 190-191.

⁶⁰ Commonwealth Parliamentary Debates (2008), Senate Foreign Affairs, Defence and Trade Committee, *Additional estimates 2007-2008*, 20 February, p. 71.

⁶¹ Department of Defence (2008), *Portfolio Budget Statements 2008-09*, p. 181.

⁶² The Hon Greg Combet MP, Parliamentary Secretary for Defence Procurement (2008), *M113 Upgrade Project back on track*, Media Release 021/2008, 22 May.

Figure 1.2**Upgraded M113 braking from speed**

Source: ANAO fieldwork at Robertson Barracks, Darwin, 3 September 2008.

Project budget and expenditure

1.58 Table 1.4 provides annual estimates of the actual and projected total anticipated costs of upgrading the 350 M113s purchased in July 2002. The estimates include expenditure under the CSP and the M113 Major Upgrade Contracts, along with Defence's own expenditure from the approved project budget, and estimates of Defence's Current Personnel and Operating Costs (CPOC).

1.59 Defence funds CPOC, which includes the costs of maintaining the M113 fleet, from outside the M113 upgrade project's approved budget. Defence advised in November 2008 that a substantial amount of CPOC applies to the M113 Upgrade Project and the upgraded vehicles. While the exact amount cannot be quantified, in March 2009 Defence estimated the M113 upgrade component to be approximately \$35 million.

Table 1.4**M113 Major Upgrade expenditure and estimates, 2002–03 to 2011–12 (\$m)**

| Year | Major upgrade ^A | Defence ^B | Sub-total | Project Budget ^C | CSP ^D | CPOC ^E | Annual Total |
|---------------|----------------------------|----------------------|--------------|-----------------------------|------------------|-------------------|--------------|
| 2002–03 | 101.8 | 5.1 | 106.9 | 549.9 | 0.0 | 18.8 | 125.7 |
| 2003–04 | 27.0 | 3.3 | 30.3 | 556.4 | 0.0 | 15.3 | 45.6 |
| 2004–05 | 44.5 | –0.2 | 44.3 | 588.7 | 0.4 | 13.7 | 58.4 |
| 2005–06 | 11.9 | 1.0 | 12.9 | 593.8 | 1.4 | 12.6 | 26.9 |
| 2006–07 | 10.5 | 2.7 | 13.2 | 617.4 | 0.3 | 17.0 | 30.5 |
| 2007–08 | 103.9 | 5.3 | 109.2 | 624.2 | 1.9 | 19.0 | 130.1 |
| 2008–09 | 74.4 | 25.8 | 100.2 | 624.2 | 5.6 | 22.8 | 128.6 |
| 2009–10 | 84.0 | 41.0 | 125.0 | | 9.4 | 24.7 | 159.1 |
| 2010–11 | 12.6 | 10.2 | 22.8 | | 4.1 | 29.5 | 56.4 |
| 2011–12 | 0.0 | 59.2 | 59.2 | | 0.0 | 29.5 | 88.7 |
| TOTALS | 470.6 | 153.4 | 624.0 | | 23.1 | 202.9 | 850.0 |

Columns may not add to totals, due to rounding.

Notes:

- A: Funds expended on developing, testing and assembling upgraded M113s, under the Major Upgrade Contract.
- B: Funds expended on facilities, purchases of Government furnished equipment, spare parts, support equipment, legal expenses, research and development costs, travel and some staff costs, counted under the project budget (but not the Major Upgrade Contract).
- C: Project budget approved at each financial year.
- D: Funds expended on extending M113 hulls through Army's sustainment budget, not counted as part of the project budget.
- E: In November 2008, Defence provided Current Personnel and Operating Cost (CPOC) estimates for maintaining the M113 fleet. These costs include the Defence staffing and related costs for the M113 Upgrade Project, and the M113 Project Office. Defence advised that these costs, estimated at approximately \$35 million in March 2009, could not be further disaggregated from the total CPOC estimates.

Source: Defence advice to ANAO.

1.60 The estimates in Table 1.4 *exclude* the budgeted \$221 million additional funding approved by the Government in October 2008 to purchase a further 81 upgraded M113s under the ELF initiative. A further estimated \$99 million in personnel and operating costs will be expended over the life of these additional 81 vehicles, for an estimated average total cost of \$3.96 million per vehicle.⁶³ In March 2009, Defence advised that:

The key differences in unit costs are that the ELF vehicles will all come with vehicle armour kits (only 151 vehicle armour kits were to be bought under the [Major Upgrade Contract]), and all ELF vehicles are the APC variant, which is the most expensive variant due to the cost of the powered turret and the crew commander's night sight (for example, the contract rate for the APC is approximately 40 per cent more expensive than the 21 armoured mortar vehicles, and approximately 30 per cent more expensive than the 43 armoured command vehicles).

1.61 Under the current arrangements, the total cost of upgrading and maintaining the M113 fleet is at least \$947 million⁶⁴ and is likely to be in the order of \$1 billion, depending on the allocation of personnel and operating costs.

Audit objectives and criteria

1.62 The objectives of this audit were to assess:

- the progress of the M113 Armoured Personnel Carrier Upgrade Project against stated schedule, cost and technical performance objectives; and
- Defence Materiel Organisation's (DMO's) progress in implementing the recommendations and addressing the findings of ANAO Audit Report No. 3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*.

1.63 Audit fieldwork was conducted at the Armoured Fighting Vehicle Systems Program Office⁶⁵ at Victoria Barracks in Melbourne, the M113 production facilities at Bandiana and 7 RAR at Robertson Barracks in Darwin.

⁶³ Budgeted cost is \$222.1 million in Budget 2008–09 prices, along with an estimated additional \$99 million in Current Personnel and Operating Costs over the life of the vehicles.

⁶⁴ Minimum total cost in January 2009 prices, including ELF vehicles, advised by Defence in March 2009.

⁶⁵ The office, previously known as the Tracked Manoeuvre Systems Program Office, underwent a name change in December 2007.

1.64 The audit criteria related to Defence's progress toward resolving issues raised during the previous ANAO performance audit, Defence's management of recent contract negotiations intended to put the project back on schedule, and its subsequent management of the revised M113 production schedule and introduction into service. In respect of the findings of the previous audit, this audit assessed Defence's:

- implementation of controls over changes in project scope;
- administration of liquidated damages;
- retrenchment of contract prepayments; and
- management of technical issues.

1.65 To assess significant developments since the previous audit, Defence's approach to and management of Global Settlement contract negotiations was examined, and the negotiation outcomes assessed against Defence's stated aims.

1.66 The audit assessed progress with the final production of the vehicles against the renegotiated production schedule, and evaluated the use of the upgraded M113s delivered to date. The evaluation included an examination of vehicle logs, reports of defects and faults, and the state of current upgraded M113 capability.

1.67 This audit was conducted in accordance with ANAO auditing standards at a cost to the ANAO of \$385 000.

1.68 The remainder of the report is organised into three chapters:

- Chapter 2 reviews Defence's actions addressing the issues identified in the previous ANAO audit report;
- Chapter 3 discusses the origin and outcome of the Global Settlement negotiated between Defence and the Prime Contractor in 2007; and
- Chapter 4 outlines the current production process and schedule, Army's use of the upgraded vehicles to date and the current status of upgraded M113 capability.

2. Progress in addressing the recommendations and findings of the previous audit

This chapter reviews Defence's actions addressing the issues raised in ANAO Audit Report No.3 2005–06 of July 2005, including the three recommendations included in the audit report.

Introduction

2.1 The issues that were the subject of audit recommendations in ANAO Audit Report No.3 2005–06 of July 2005, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, related to the need for Defence to implement appropriate controls over changes to project scope; recover outstanding mobilisation payments; and collect liquidated damages. Defence's actions in addressing these recommendations are set out in the sections below. This chapter also updates progress on other issues raised in the previous audit report relating to technical feasibility of the hull extension, the closing of Phase 1(a) of the contract (and the disposition of Government Furnished Equipment⁶⁶ thus acquired), and project management arrangements for the M113 Upgrade Project.

Managing project scope

2.2 The scope of the upgrade project was defined in broad terms by the then Government's approval (see paragraph 1.30). The scope is set out in detail in the CSP contract and the Upgrade Contract subsequently negotiated and signed with the Prime Contractor. Under these contracts, Defence and the Prime Contractor may agree only very minor changes in the upgrade project without recourse to a formal process of proposal and approval. Once significant scope changes are approved and accepted by both parties, the changes are incorporated into the contracts.

2.3 ANAO Audit Report No.3 2005–06 found that a real cost increase to the minimum upgrade project of \$9.71 million (2001 prices) in 2001 to undertake a

⁶⁶ Government Furnished Equipment (GFE) is materiel provided by Defence to the contractor. This incorporates equipment that Defence have purchased and parts from un-upgraded M113s that are being used on the upgraded vehicles.

Project Definition Study represented a change to the scope of the project and should have been treated as such by Defence. According to Defence's procurement policy at the time, this scope change should have been approved by the Minister of Defence with the concurrence of the Minister for Finance and Administration. The audit found that the Minister of Defence noted the likely cost, however no approval was sought for the change in project scope from the Minister for Defence and Minister for Finance and Administration.⁶⁷ In response to this situation, the Audit Report recommended that:

Defence Materiel Organisation put in place control mechanisms to ensure that changes in scope are approved at the appropriate level.⁶⁸

2.4 Defence agreed with the recommendation and reported that it was taking steps to regularise changes to the scope of all Defence projects. In particular, Defence reported that it had adopted the first and second pass acquisition business cases in response to the recommendations of the *Defence Procurement Review 2003* (the Kinnaird Review).⁶⁹

2.5 Subsequently, on 30 September 2005, Defence issued *Defence Materiel Instruction (FIN) 7/2005: Governance of Projects in DMO*, setting out the level of authority required to approve changes in the funding and/or scope of any of DMO's projects.⁷⁰ The Instruction prescribes higher levels of authority for the approval of changes with correspondingly higher financial impact (cost or scope). Defence Materiel Instruction (FIN) 7/2005 advises that the hierarchy of approval for changes in scope 'reflects the effective cost impact on the budget if the capability change were not made...In considering the scope of a project, the reference is the document agreed by the approval authority'.⁷¹ The Instruction acknowledges that deciding changes to capability is a matter judgement.⁷² As shown in Table 2.1, changes in scope with lesser financial

⁶⁷ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, pp. 45–47.

⁶⁸ Ibid., p.50.

⁶⁹ Ibid.

⁷⁰ Defence Materiel Organisation (2005), *Defence Materiel Instruction (FIN) 7/2005: Governance of Projects in the DMO*, 30 September.

⁷¹ For example, if the scope of a \$100 million project was reduced by half (for example by acquiring half the number of vehicles originally proposed, or reducing \$50 million worth of the vehicles capability) then approval from an authority authorised to approve a change in funding of \$50 million would be required.

⁷² Defence Materiel Organisation (2005), *Defence Materiel Instruction (FIN) 7/2005: Governance of Projects in the DMO*, 30 September, p. 5.

impact can be approved within Defence, while the largest changes need the agreement of Cabinet.

Table 2.1

Approval necessary for changes to Defence projects

| Anticipated change in Funding Level | Approval Authority |
|--|--|
| Less than \$5 million | Department of Defence (usually the Chief of Capability Development Group or a Service Chief) |
| \$5 million - \$8 million | Minister for Defence |
| \$8 million - \$20 million | Minister for Defence and Minister for Finance and Deregulation ^A |
| \$20 million - \$50 million | Minister for Defence and Minister for Finance and Deregulation, ^A with advice to the Prime Minister and the Treasurer |
| Over \$50 million | Cabinet |
| Notes: | |
| A. Previously the Minister for Finance and Administration. | |

Source: Defence Materiel Instruction 7/2005, *Governance of Projects in the DMO*, pp. 3,7.

2.6 The same hierarchy outlined in Table 2.1 applies to the level of approval required to authorise the use of a project's *contingency fund* to fund a change to the project scope.⁷³

2.7 Contingency funds are quarantined within the approved project budget. They are allocated to high risk areas to ensure the project is completed on time and to budget. For the M113 upgrade project, the contingency fund is intended to cater for unexpected tasks arising in the course of the project, risks identified through the project's risk planning process, inherent inaccuracies in estimating costs, and unforeseen changes in development requirements.

2.8 Within Defence, Capability Development Group (CDG) is the arbiter of changes to project scope. CDG decides whether a proposed project change

⁷³ Defence Materiel Organisation (2005), *Defence Materiel Instruction (FIN) 5/2005: Management of Contingency Budgets in Major Capital Equipment Projects*, 28 November, p. 9. Such approvals are not required where contingency funds are used to 'achieve the scope agreed by the project approval authority', provided such use is consistent with *FMA* requirements.

affects its scope. Established in February 2004 in response to recommendations of the Kinnaird Review, CDG is the Defence sponsor of the capital investment projects managed by DMO and is the point within Defence that is accountable for assessing and defining new capabilities that the ADF requires now and in the future. CDG develops capability proposals consistent with strategic priorities, funding guidance, legislation and policy, for consideration and approval by Government.⁷⁴

2.9 One of CDG's roles is to ensure that the capability delivered by DMO during the acquisition phase of a capital investment project is in accordance with the direction provided by Government during the approval process.⁷⁵ CDG monitors DMO's progress by attending the regular meetings of the project's stakeholders within Defence, in the course of which DMO can raise with CDG potential changes to project scope.⁷⁶

Changes to scope since July 2002

2.10 There have been two changes in scope of the M113 upgrade project since July 2002. The first change was the August 2005 decision to extend the Armoured Recovery Vehicle (ARVL, originally not to be extended) at a total additional cost of \$3.69 million, (October 2001 prices, GST exclusive).⁷⁷ This decision was *not* treated as a scope change. The relevant change to the contract, negotiated after the Kinnaird review, illustrates Defence's practices prior to the issue of Defence Materiel Instruction (FIN) 7/2005 in September 2005.

2.11 The second scope change was the November 2007 decision to extend the Armoured Ambulance (AA) (\$3.338 million) and Armoured Command Vehicle (ACV) (\$6.897 million) for an additional cost of \$10.235 million (October 2001 prices, GST exclusive).⁷⁸ This decision was treated as a scope change and its management illustrates improvements in Defence's practices since the issue of Defence Materiel Instruction (FIN) 7/2005.

⁷⁴ Department of Defence (2004), *Annual Report 2003–04*, p. 204; Department of Defence (2006), *Defence Capability Development Manual*, p. 9.

⁷⁵ Department of Defence (2006), *Defence Capability Development Manual*, p. 70.

⁷⁶ *ibid.*, p. 71.

⁷⁷ This comprised \$2.595 million for the extension; \$0.107 million for upgrading the ARVL Winch; and \$0.988 for upgrading the ARVL earthmoving blades and stabilising spades, which are used to anchor the vehicle during recovery operations.

⁷⁸ Or \$12.487 million December 2007 prices (GST exclusive).

2.12 In March 2009, Defence advised that it was intending to seek a further scope change to allow the extending of the Armoured Mortar (AM) variant.

Extending the ARVL

2.13 At the time of ANAO Audit Report No.3 2005–06, Defence was negotiating a proposal with the Prime Contractor to extend the 12 ARVLs to be upgraded under the project.⁷⁹ The proposal arose from DMO's 2003 assessment that the ARVL variant needed to be changed to rectify deficiencies in its performance.⁸⁰

2.14 DMO discussed these deficiencies with CDG in December 2003 and recommended changing the variant's design to an extended hull. DMO's view was that the extended version would be able to perform most of its required roles. CDG and DMO noted that the ARVL was scoped as non-extended and formally endorsed its extending in December 2003. Funding the extension was discussed by DMO and CDG in June 2004, again without consideration of whether the extension was a change in the project's scope. ANAO found no evidence that CDG considered the issue outside of the Defence stakeholder meetings.

2.15 The funding for the ARVL extension was required to come from savings to be found within the project, as there was no contingency covering this issue. In the event, the savings came from selecting cheaper armour (see footnote 38, page 37), which saved the project \$9.998 million (October 2001 prices, GST exclusive). As the total cost of extending the ARVL was \$3.69 million, the remaining savings from armour selection were \$6.308 million, which were returned to the project contingency budget.⁸¹ In July 2005, DMO approved the contract change requiring the ARVL to be extended.

2.16 Under the arrangements in place in Defence prior to the issue of Defence Materiel Instruction (FIN) 7/2005 in September 2005, there was no formalised process for the automatic higher level consideration of scope changes. In this case, the question was whether the proposed change to the

⁷⁹ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, p. 5.

⁸⁰ The performance deficiencies identified included the marginal stability of the ARVL during some winching operations and a limited capacity to recover vehicles, particularly other extended M113 variants, in more difficult situations.

⁸¹ Less approximately \$10 000, that Defence advised was the cost paid to the contractor for preparing the relevant contract change proposals (CCPs).

contract to allow for the extension of the 12 ARVLs constituted a change in scope.

2.17 CDG and DMO acknowledged at the time that the change represented a departure from the Government's original approval of an unextended ARVL. However, there is no record of consideration as to whether this constituted a change in scope. In this circumstance, and given the additional cost involved, the basis for Defence's August 2005 decision that the extension of the ARVL was not a change in scope is not clear.⁸²

Treating the AA and ACV extension as changes to the project scope

2.18 The process followed by Defence for approving the extension of the ambulance (AA) and command vehicle (ACV) variants highlights the significant changes in Defence's management of project scope changes following the promulgation of DMI (FIN) 7/2005 in September 2005.

2.19 In late 2005, following reviews of both variants, DMO confirmed that the original designs for the AA and the ACV would exceed the vehicles' Recommended Gross Vehicle Mass (RGVM) of 15 tonnes by 1.1 tonnes. The excess weight resulted from DMO's selection of heavier armour; a power-pack heavier than the Prime Contractor originally estimated; and the use of heavier, more robust fittings to improve the vehicles' durability.

2.20 DMO raised this problem at a meeting of Defence stakeholders in March 2006, recommending that the design of the ACV and AA variants be changed to one based on an extended M113 hull, in common with the armoured personnel carrier (APC), armoured fitter (AF) and armoured logistics (ALV) variants. The proposed change in design would mean an increase in the RGVM of all these variants to 18 tonnes in order to maintain an effective payload while accommodating the extra weight of armour, power pack and fittings.⁸³

⁸² ANAO notes that this decision was made at a time when lower levels of authority for approval were in place than would later be necessary under *Defence Materiel Instruction (FIN) 7/2005: Governance of Projects in the DMO*.

⁸³ The final weight of the upgraded AA and ACV variants was not known at this time. However, the weight of a fully loaded APC vehicle is less than the RGVM of 18 tonnes, and the extended ACV and AA variants will not have a turret nor are they required to carry as many passengers as the APC variant. On this basis, it is Defence's assessment that it is unlikely the RGVM of either the AA or ACV variants will exceed 18 tonnes.

2.21 DMO's initial view was that extending the AA and ACV variants was within the scope of the project. Nonetheless, DMO identified the proposal to extend these variants as 'a significant departure' from the original plans and so sought further direction from CDG in July 2006. In turn, CDG sought the advice of Army on the proposal. Army confirmed that basing the AA and ACV on an extended APC hull 'was reasonable, workable and acceptable'.⁸⁴

2.22 DMO advised the then Minister for Defence in March 2007 that extending the AA and ACV variants using an APC hull did 'not represent a change in the functional capability specified by CDG and Army or the approved project scope, but it is a significant variation to the initially envisaged solution'. DMO also advised the Minister in the same brief that CDG and Army endorsed the operational acceptability of the option.

2.23 Subsequently, in July 2007, DMO further advised the Minister for Defence that the original Government approval:

did not identify the ACV and AA to be [extended]. Defence is determining whether [extending] the ACV and AA constitutes a change of project scope, and subject to the results, will submit a separate submission for your noting or for approval.

2.24 DMO proposed funding the extension of the AA and ACV variants from the project's contingency budget. The use of a project's contingency budget for any purpose requires the endorsement of the relevant DMO Division Head, in agreement with Head, Capability Systems and First Assistant Secretary, Capability Investment Review in consultation with CEO DMO, where appropriate.⁸⁵ If a project's contingency budget is to be used to fund a change to a project's scope without any change to the overall level of funding for the project, then approval from an authority identified in DMI (FIN) 7/2005 (outlined in Table 2.1)⁸⁶ is required according to the value of the scope change.⁸⁷

⁸⁴ Army did not accept options to reduce the armour on the un-extended M577 hull and extend the M577 hull.

⁸⁵ Defence Materiel Organisation (2005) *Defence Materiel Instruction (FIN) 5/2005: Management of Contingency Budgets in Major Capital Equipment Projects*, 28 November, p. 9.

⁸⁶ In accordance with Defence Materiel Organisation (2005) *Defence Materiel Instruction (FIN) 7/2005: Governance of Projects in the DMO*, 30 September, pp. 3, 7.

⁸⁷ *ibid*, p. 9.

2.25 In August 2007 CDG advised that extending the ACV and AA constituted a change in project scope. The Minister for Defence described the proposal as a scope change, 'different to the project method as described to Cabinet in 2002', and sought the then Minister for Finance and Administration's agreement in accordance with the approval hierarchy in Table 2.1. In September 2007 the Ministers approved the estimated \$14.71 million (2007–08 prices) increase in the project's price to extend the AA and ACV variants. The costs for extending the ACV and AA were finalised during Global Settlement negotiations (discussed in Chapter 3), increasing the project cost by \$10.235 million (expressed in October 2001 prices, GST exclusive),⁸⁸ which was within the total approved by the Ministers. The funding increase was drawn from the project's contingency budget.

Extending the Armoured Mortar

2.26 In November 2008, Defence advised ANAO that it was undertaking a feasibility study for the extension of the 21 Armoured Mortar (AM) vehicles, presently the only variant not being extended. Defence advised ANAO that extending the AM variant will deliver better performance and handling, tactical advantages and capability.

2.27 Defence advised ANAO that it estimated that the additional cost of extending the AM is \$9.5 million (2007–08 prices), offset to some extent by longer term cost savings from building an M113 fleet with common driver and maintainer training; repair parts; appliqué armour components; transport and fleet management. The additional funds are to come from project contingency funding available once key technical, cost and schedule risks are reduced.⁸⁹

Defining scope change

2.28 On the basis of our examination of the above cases, the hierarchy of approvals applying to scope changes to Defence capital acquisition projects, based on the anticipated costs of the scope change involved, is now well defined and has been applied by Defence during the recent management of the M113 upgrade project. However, the approach to be taken in determining whether a contract change proposal represents a change to the scope of a project, and therefore requires approval in accordance with the hierarchy set out in DMI (FIN) 7/2005, is less clear. In respect of recent change proposals

⁸⁸ Or \$12.487 million, December 2007 prices, GST exclusive.

⁸⁹ Defence advice to ANAO, November 2008.

relating to the M113 upgrade project, stakeholders' interpretations of scope change appear to have depended on:

- whether proposed changes are compared to the original project approval, which may be quite broad, or the more detailed project scope developed after initial approval;
- whether there is an effect on capability; and
- Defence stakeholders' views as to the magnitude of the change.

2.29 In November 2008, Defence advised ANAO that:

The concept of capability threshold is unclear...[DMO's] key responsibility is to deliver to the agreed scope and that where better value for money solutions are identified by industry or DMO or CDG, then all stakeholders and delegates should be properly informed. DMO believes this should be the principal regardless of scope change magnitude or cost.

2.30 Notwithstanding the conceptual difficulties involved, ANAO notes that determining scope change is of key importance for major capital procurement projects. This is particularly evident where contract change proposals involving scope changes trigger specific requirements for the level of approval and senior involvement required in project decision-making. ANAO considers there is merit in Defence more closely identifying and promulgating advice to its staff on what constitutes scope change, especially when it involves changes to capability.

Recommendation No.1

2.31 ANAO *recommends* that Defence and DMO set suitable threshold criteria for determining changes in scope to acquisition projects and promulgate advice to staff to allow decision-makers to be provided with sufficient, consistent and appropriate information and advice on potential scope changes.

Defence's summary response

Agreed

2.32 DMO agrees to consider whether the Defence Procurement Policy Manual should be reviewed to provide additional guidance on an appropriate threshold for determining changes in scope to acquisition projects or whether this additional guidance is more appropriately located in the Defence or DMO

Chief Executive Instructions. See Appendix 1 for Defence's detailed response to the recommendation.

Contract prices

2.33 Between the signing of the Upgrade Contract in July 2002 and July 2008, there were 25 amendments to the Upgrade Contract, arising from some 166 Contract Change Proposals (CCPs). In total, these changes have increased the price of the contract by \$13.4 million (from \$388 million to \$401.4 million expressed in December 2001 dollars) with this additional funding coming from within the project budget approved by government.⁹⁰

2.34 The terms of the Upgrade Contract effectively require the Prime Contractor to manage price increases within the agreed contract costs. This is done on the basis that labour and materials are the chief inputs, and the assumption that the prices of both will vary over the life of the contract. The contract therefore provides for increases to contract milestone payments by indexing them to changes in the prices of labour and materials.

2.35 This is achieved by applying contract formulae to the value of each project milestone, the amount of which is specified in December 2001 dollars. When Defence accepts from the Prime Contractor the goods or services for a contract milestone, it increases the milestone amount in accordance with increases in statistical indices that measure the changes in the prices of labour and materials. The amount of the increase is determined by calculating the change in specified official statistical indices over the period between the date of the milestone and a base date, both set out in the contract and shown in Table 2.2.

⁹⁰ Since the Government approved the upgrade project budget in July 2002, it has been subject to regular review in the annual fiscal cycle. This has resulted in total increases to the project budget amounting to \$71.9 million in budget terms, comprising \$92.636 million for increases in prices, less \$19.152 million in foreign exchange adjustments and less \$1.582 million in real variations to the project budget. Defence advised ANAO that none of these changes to the upgrade project budget reflect changes in its scope.

Table 2.2

Price variation indices applicable to milestone payments under the M113 Upgrade Contract

| Proportion of milestone | Australian dollar amounts | | Subcontract No.1 ^A , Euro amounts | | Subcontract No.2 ^B , Euro amounts | |
|--|--|--|---|---|---|---|
| | Labour 48 per cent | Materials 52 per cent | Labour 60 per cent | Materials 40 per cent | Labour 75 per cent | Materials 25 per cent |
| Index to be applied | ABS Cat No 6302, Average Weekly Earnings, Male, Full Time Adults, Ordinary Time Earnings | ABS Cat No 6427, Output of General Construction Industry - Non Building Construction | Wages Series 16, Column 2.1, No 841 (Baden-Wuerttemberg), Statistisches Bundesamt | Prices Series 17, Column 2, No 640 (type materials) Statistisches Bundesamt | Fascherie 16, Reihe 4.1, Tariff 231.9, Lohngruppe 12, Statistisches Bundesamt | Fascherie 17, Reihe 2, GP-No 332, Statistisches Bundesamt |
| Base date | August 2001 | September 2001 | August 2001 | September 2001 | August 2001 | August 2001 |
| Base date index | 888.3 | 106.7 | 16.04 | 107.50 | 29.45 | 107.8 |
| Index at end of 2007 | 1175.4 | 146.2 | 18.47 | 111.2 | 17.68 | 107.9 |
| Percentage increase | 32.32 | 37.02 | 15.15 | 3.44 | -39.97 | 0.09 |
| Notes: A This subcontract is primarily for the hull extension kit, drive trains and vehicle brakes. B This subcontract is primarily for the turret control systems. | | | | | | |

Source: ANAO analysis of provisions of the M113 Upgrade Contract.

2.36 As noted in Audit Report No. 3 2005–2006 of July 2005, the Prime Contractor cannot receive the benefit of labour and material price increases that accrue after the milestone due date.⁹¹ This arrangement imposes upon the Prime Contractor an incentive to manage timeliness if they are to maintain their anticipated levels of profit.⁹²

2.37 The result is that the final cost of the contract to the Commonwealth changes in line with the indices set out in the agreed formulae in the contract. It also changes in accordance with foreign exchange rates, as the Upgrade Contract specifies that the payment of numerous milestone amounts is to be made in Euros. Defence purchases the necessary currency at the rate available on the date the payment is to be made. The value of many contract payments therefore depends on exchange rates that vary over time.⁹³

2.38 As a consequence, at any point in time prior to the last scheduled milestone payment in December 2010, the Commonwealth can only estimate the final amount to be paid under the contract by projecting forward likely future movements of indices and exchange rates and applying them to the remaining milestones.

2.39 DMO has advised Government and Parliament that the M113 Upgrade Contract is for fixed prices.⁹⁴ This terminology may have been intended to reflect the fact that all contract milestone amounts are set amounts expressed in

⁹¹ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, p. 63. ANAO notes that, while this may result in a windfall gain to the non-contract project budget, the value of the windfall is likely to be offset, at least in part, by the lower rate of indexation applied to the project budget by the Department of Finance and Deregulation, which applies Treasury's forward estimates of the non-farm GDP implicit price deflator. ANAO notes, up until late 2008, the relevant contract indices shown in Table 2.2 increased at a faster rate than the budget cycle indices applied to the approved project budget, which rose by 24.6 per cent over the same period.

⁹² The Major Upgrade Contract makes reference to set rates of Prime Contractor profit on labour components.

⁹³ Under the *Australian Government Foreign Exchange Risk Management Guidelines* (September 2006), Government agencies are not able to employ any arrangements that attempt to reduce foreign exchange risk (hedging). The Department of Defence (together with the Department of Foreign Affairs and Trade and the Australian Trade Commission) is exempt from this general policy, falling into a category where the Government may adjust the departmental appropriations to offset any foreign exchange gains or losses. This presents a 'no win, no loss' situation in regards to the Department of Defence's management of Foreign Exchange Risk. See Department of Finance and Administration (2006), *Australian Government Foreign Exchange Risk Management Guidelines*, September, pp. 4,14; see also Department of Defence (2008), *Portfolio Budget Statements 2008–09*, p. 163.

⁹⁴ DMO advised Senate Budget estimates that: '[the Upgrade Contract] is a fixed-price contract and so the financial risk on [brake testing] belongs with the contractor'. Commonwealth Parliamentary Debates (2006) Senate Foreign Affairs, Defence and Trade Committee, *Budget estimates 2006–2007*, 1 June, p. 102.

December 2001 values, increased to preserve the real value of contract payments up until the due date of each milestone. This is achieved by inflating milestone payments according to indexed increases in the cost of production, notably labour and material costs.

2.40 In November 2008, Defence advised ANAO that the term ‘fixed price’ reflected terminology formerly used in Defence. In accordance with DMO’s 2006 *Defence Procurement Policy Manual*, the M113 Upgrade Contract is now considered to be ‘variable price’:

[This allows] for specific contract costs to be varied during the contract period in accordance with agreed price variation formula and indices. In the past, variable price contracts have been referred to as ‘fixed price’ contracts. Variable price contracts may allow for variation in: exchange rates; and labour and/or material costs.⁹⁵

Mobilisation payments

2.41 Advance payments by the Commonwealth to the Prime Contractor are provided for in the 1997 Minimum Upgrade Contract, the 2002 Major Upgrade Contract and the 2008 contract extension to purchase an additional 81 APCs.⁹⁶ Under the Major Upgrade Contract and the 2008 contract extension, these advances, or prepayments, are called mobilisation payments.

2.42 Prepayments are commonly made to a prime contractor so that they have the cash to purchase items and to pay subcontractors to produce items necessary for a project. Prepayments reduce the Prime Contractor’s costs of financing such purchases by (for instance) raising a loan on its own account. Where a prime contractor bears the financing costs, these are usually passed on to the purchaser as an increase in contract price.

⁹⁵ Defence Material Organisation (2006) *Defence Procurement Policy Manual*, Version 6, p. 2.2.2.

⁹⁶ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, pp. 65-67.

May 1997 mobilisation payment

2.43 ANAO Audit Report No.3 2005–06 recommended that:

The Defence Materiel Organisation recover against deliverables, the outstanding amount of the May 1997 mobilisation payment remaining from the Phase 1(a) M113 Upgrade Contract at the earliest opportunity.⁹⁷

2.44 Defence agreed to the recommendation and advised in response that ‘The contract change requirement to achieve this has now been agreed with the Contractor and Defence expects to finalise this issue by September 2005.’⁹⁸ On 30 June 2005, the Prime Contractor issued a credit note to DMO for \$3.36 million (the credit note) and by November 2005 DMO considered that it had recovered the full amount of \$3.36 million against the credit note. DMO subsequently informed the JCPAA in February 2006 that the mobilisation payment debt of \$3.3 million had been recovered.⁹⁹

2.45 During this audit, ANAO examined DMO’s relevant financial records and found receipts recorded against the credit note amounting to \$1.28 million. DMO provided the ANAO with additional receipts, which it advised related to the credit note and amounted to the balance of the mobilisation payment owed to the Commonwealth. However, these receipts were not closely linked to the credit note related to the mobilisation payment.¹⁰⁰

2.46 Nonetheless, on the basis of DMO’s advice, DMO has recovered from the Prime Contractor the outstanding amount of the May 1997 mobilisation payment remaining from Phase 1(a) of the original M113 upgrade project. However, DMO could improve its processes for recording information in

⁹⁷ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, recommendation 2, p. 52.

⁹⁸ The previous audit reported that a contract was signed with the Prime Contractor on 5 May 1997 for \$29.19 million (Dec 1996 prices). This included an advance payment of \$4.21 million (14.4 per cent of the Contract price). Of the \$4.21 million advance payment made in 1997, only \$970 000 was offset against deliverables in the Contract. The remaining amount of \$3.24 million was a debt owing to Defence. ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, pp. 33, 51.

ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, p. 51.

⁹⁹ Commonwealth Parliamentary Debates (2006), Joint Committee of Public Accounts and Audit, *Review of Auditor-General’s Reports Nos. 43 (2004–05) to 6 (2005–06)*, 9 February, p. 17.

¹⁰⁰ ANAO found more than one credit note recorded in the project’s accounting system during the period that the mobilisation payment credit note was active.

projects' accounting systems to ensure that the recovery of funds against credit notes can be readily verified.

Mobilisation payments under the Major Upgrade Contract

2.47 The M113 Major Upgrade Project involves the payment of two \$40 million mobilisation payments to the contractor. The first payment was made at contract signature in July 2002 and the second payment was made after successful completion of the Production Readiness Review (PRR) in November 2007.¹⁰¹ The mobilisation payments are offset against deliverables right up until the final contract milestone is due in December 2010. As discussed in paragraph 2.50, Defence advised ANAO that the cost to the Commonwealth of making these advance payments had been 'offset by the reduction of contract price achieved during contract negotiations'.¹⁰²

2.48 Unlike other milestone payments under the Major Upgrade Contract (as discussed from paragraph 2.34), the mobilisation payments do not increase with changes in the prices of, for instance, labour and materials. They are fixed at \$40 million each and are appropriately recorded as a Commonwealth asset in the audited financial statements of the Department of Defence.¹⁰³

2.49 When the Prime Contractor invoices the Commonwealth for a milestone payment under the Upgrade Contract, a portion is offset against the balance of the mobilisation payment and the Commonwealth pays the remainder. In this way, the last Upgrade Contract milestone payment, scheduled for December 2010, will acquit the mobilisation payments. At June 2008, ANAO estimated the revenue forgone by the Commonwealth due to the mobilisation payments to be over \$10 million by the scheduled end of the contract in December 2010.¹⁰⁴

¹⁰¹ The second mobilisation payment was made on 20 November 2007 and comprised 2 separate payments: AUD\$10.449 million and €17.491 million (equal to AUD\$29.550 million at the contracted exchange rate of AUD\$1 = €0.5919).

¹⁰² ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, p. 67.

¹⁰³ At June 2008, Defence's financial records showed a mobilisation payment asset of \$48.4 million remaining to be defrayed against milestone payments.

¹⁰⁴ ANAO estimated the revenue forgone by applying the Reserve Bank of Australia's overnight cash rate to the outstanding balance of the mobilisation payments. The outstanding balance was estimated according to the milestone payments specified in the Major Upgrade Contract.

2.50 From Defence's perspective, it is important that the reduction in contract prices achieved by offering advance payments be considered alongside other costs and benefits. These include the opportunity and interest costs incurred by the Commonwealth in making advance payments, and the benefits of supporting industry development for current and future Defence capability.

2.51 In the case of the Major Upgrade Contract, Defence advised ANAO that the Commonwealth's costs had been 'offset by the reduction of contract price achieved during contract negotiations' in 2002.¹⁰⁵ However, Defence was not able to demonstrate to ANAO that the financial impact of making the advance payments was weighed appropriately during the negotiations and balanced against other benefits. When entering into such arrangements to make advance payments, it is important that appropriate records are maintained of the assessment of the likely benefits, including an assessment of value for money.¹⁰⁶

Recommendation No.2

2.52 ANAO *recommends* that Defence develop clear policy guidance on the circumstances in which prepayments will be considered for inclusion in future major acquisition contracts, and maintain an appropriate record of the basis for agreeing to advance payments as part of contract negotiations.

Defence's summary response

Agreed

2.53 DMO shall consider inclusion in the Defence Procurement Policy Manual of a requirement in submissions for Contract Approval, for contracts using mobilisation payments, that a value for money justification be included for the delegate's review (including, where available, a value for money assessment by Financial Investigation Services) and additional guidance on the

¹⁰⁵ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, p. 67.

¹⁰⁶ In March 2009, Defence advised that, after review and negotiation with the Prime Contractor, the December 2008 contract extension for the purchase of the 81 additional APCs under ELF provided for a mobilisation payment of \$16.98 million. At that time, Defence advised that it had yet to receive an invoice for this prepayment from the Prime Contractor.

timing of repayment - i.e. at the earliest opportunity. See Appendix 1 for Defence's detailed response to the recommendation.

Management of liquidated damages

2.54 Liquidated damages are amounts, agreed by the parties during the formation of a contract, that the injured party may receive as compensation for a specific breach, such as late delivery of a contract milestone.¹⁰⁷ They are more flexible than other methods of managing contractor performance, such as withholding payment. As previously reported by ANAO in the 2005–06 audit report:

Liquidated damages clauses are included in Defence acquisition contracts as part of a wider contract management strategy to enhance contractor performance. In determining whether to apply liquidated damages provisions, consideration needs to be given to Section 44 of the FMA Act.¹⁰⁸ Should Defence be entitled to claim liquidated damages, and the provisions are invoked,¹⁰⁹ the amount will be considered a debt owed to Defence under Section 47 of the FMA Act.¹¹⁰

2.55 In accordance with accepted legal principles, Defence's 2006 *Defence Procurement Policy Manual* (DPPM) advises that liquidated damages should not be used as an incentive or a penalty, although their inclusion may have an incidental effect on contractor performance.¹¹¹ Under the M113 Upgrade Contract, damages can either be recovered as a debt or as an equivalent amount of agreed compensation. The practice within the M113 project office

¹⁰⁷ Defence Materiel Organisation (2006) *Defence Procurement Policy Manual*, Version 6.0, pp. 6.5.1-6.5.2.

¹⁰⁸ This section requires an agency Chief Executive to manage the affairs of the agency in a way that promotes the proper use of resources.

¹⁰⁹ As reflected in the Contract and current Defence contracting templates, no amount is owing until Defence elects to recover liquidated damages.

¹¹⁰ Under this section a Chief Executive must pursue recovery of each debt for which the Chief Executive is responsible unless: the debt has been written off or; the Chief Executive is satisfied that the debt is not legally recoverable; or considers that it is not economical to pursue recovery of the debt. ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, pp. 67-68.

¹¹¹ To be enforceable by the courts, liquidated damages must reflect a genuine pre-estimate of the likely loss that will be suffered by Defence as a result of a contractor failing to fulfil nominated events. If the courts consider that the liquidated damages claimed are not a genuine pre-estimate the provisions may be inoperative. Defence Materiel Organisation (2006) *Defence Procurement Policy Manual*, Version 6.0, pp. 6.5.1-6.5.2.

has been to obtain liquidated damages through 'work-in-kind' (compensation in lieu instead of recovering liquidated damages as a debt).¹¹²

2.56 Audit Report No. 3 2005–2006 of July 1995 found delays by Defence in claiming and recovering liquidated damages under the M113 Upgrade Contract. ANAO recommended that:

The Defence Materiel Organisation review contracting policy and its application of the collection of liquidated damages, to be received either by way or financial or agreed compensation, to ensure that they are collected in a timely manner.¹¹³

2.57 Defence agreed to the recommendation and advised ANAO in response that it had policies in place that comprehensively covered the recommendation through:

the ASDEFCON Suite of Contracting Templates (covering standardisation of tendering and contracting documentation), Defence Procurement Policy Manual, Defence Procurement Policy Instructions, relevant Defence Materiel Organisation Finance Instructions and Chief Executive Instructions.

2.58 During this audit, ANAO examined the materials referred to by Defence and found that both the *ASDEFCON Suite of Contracting Templates* (ASDEFCON) and *DMO's Chief Executive Instructions* (CEIs) refer to procedures for claiming and recovering liquidated damages. ASDEFCON provides specific guidance for the formation of contracts, setting out timeframes for electing to recover liquidated damages and procedures for recovering debts, such as deductions on claims for payment; providing written notice to pay in 30 days; and deducting damages from financial securities.¹¹⁴

¹¹² Under the M113 Upgrade Contract, liquidated damages are recoverable at a rate of 0.1 per cent of the milestone's value for each week it is late, unless delays are beyond the control of the contractor and could not have been reasonably contemplated or allowed for before entering the contract.

¹¹³ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, recommendation 3, p. 68. The previous audit found that in September 2004, Defence had written to the Prime Contractor advising the company of Defence's intention to negotiate an agreement to receive agreed compensation in lieu of liquidated damages (in accordance with the Contract). The letter stated that in the event compensation in lieu of damages could not be agreed, Defence reserved the right to claim the amount of liquidated damages as a debt to the Australian Government.

¹¹⁴ Defence Materiel Organisation (2004) *ASDEFCON Suite of Contracting Templates (Complex Materiel Volume 2 and Strategic Materiel)*, <http://www.defence.gov.au/dmo/DMO/function.cfm?function_id=45> [accessed 13 March 2009]. See also Defence Materiel Organisation (2007) *Defence Materiel Organisation Chief Executive Instructions*. CEI 8.7 alerts staff to the fact that liquidated damages due under a contract constitute a debt and are to be managed in accordance with CEI 5.1, which covers debt management.

2.59 DMO CEI 8.7 alerts staff to the fact that liquidated damages due under a contract constitute a debt and are to be managed in accordance with CEI 5.1, which covers debt management. CEI 5.1 states that DMO Officials ‘must ensure those public moneys are brought to account promptly in DMO’s accounting records and recovery is actively pursued’.¹¹⁵

Collecting liquidated damages identified in the previous audit

2.60 As noted above (see footnote 113 in paragraph 2.56), the previous audit reported liquidated damages calculated but not collected that amounted to \$23 255 as at September 2004. Nine months after the event, Defence had yet to claim liquidated damages.¹¹⁶ Defence’s initial calculation of liquidated damages amounted to \$50 501 up until 13 September 2004. Defence subsequently agreed with the Prime Contractor that some of this amount should be waived on the basis of agreed changes to the contract schedule and Defence formally claimed this revised amount, \$23 255, in July 2005.

2.61 The Prime Contractor provided a credit note for this amount in late August 2005, which was subsequently held against the company’s September 2005 claim for payment for costs involved in preparing an unrelated Contract Change Proposal (CCP). DMO advised the Joint Committee on Public Accounts and Audit (JCPAA) in February 2006 that liquidated damages had been claimed¹¹⁷ and advised the Senate in May 2007 that liquidated damages had been claimed and paid.¹¹⁸

Applying the liquidated damages provisions in the M113 Upgrade Contract

2.62 ANAO notes that the M113 Upgrade Contract applies liquidated damages to *all* of the approximately 3100 milestones involving payment to the Prime Contractor. Damages can be applied in the event of late delivery or for

¹¹⁵ Defence Materiel Organisation (2007) *Defence Materiel Organisation Chief Executive Instructions*, CEI 5.1 – ‘Debt Management’.

¹¹⁶ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, p. 68.

¹¹⁷ Commonwealth Parliamentary Debates (2006), Joint Committee of Public Accounts and Audit, *Review of Auditor-General’s Reports Nos. 43 (2004–05) to 6 (2005–06)*, 9 February, p. 17.

¹¹⁸ Department of Defence (2007), responses to questions taken on notice from Senate Committee on Foreign Affairs, Defence and Trade, *Budget estimates 2007-2008*, W31 question j.

not meeting Australian Industry Involvement (AII) requirements.¹¹⁹ This is unusual in such a large contract, in which liquidated damages typically apply only to 'critical milestones' such as testing, acceptance and delivery.

2.63 Applying this blanket approach involves a significant amount of effort in order to monitor the Prime Contractor's progress against milestones and negotiate the company's claims of excusable delay and related matters when milestones are delivered late. Additional work also arises from assessing and processing Contract Change Proposals submitted by the Prime Contractor to deal with delayed milestones.

2.64 It is likely that these complications reduced administrative efficiency and contributed to delays in collecting liquidated damages. There are also difficulties inherent in the relevant provisions of the M113 Upgrade Contract:

- no damages are owed until such the Commonwealth elects to apply them.¹²⁰ However, no effective provision in the M113 Upgrade Contract stipulates a time period within which the Commonwealth should or must make such an election;¹²¹
- the liquidated damages provisions in the original contract referred to two different sources of due dates, resulting in uncertainty as to when a milestone was due and when liquidated damages might be claimed; and
- the contract provision allowing the Prime Contractor a period of grace of 90 days in which to rectify a contract breach has sometimes been

¹¹⁹ The contract sets out that 52.6% worth of the total contract price must be carried out by Australian Industry. The contract states that: 'Local Content has been agreed as being calculated by taking the total Contract value for each [*deliverable under the contract*] less the amount of Imported Content. This Local Content will be the amount used for Australian Industry Involvement'.

¹²⁰ The contract provides that the Commonwealth may make this election at any time prior to 'System Acceptance', which is the final milestone under the Contract. However, ANAO found that this milestone was not identified in the relevant part of the contract. Defence advised ANAO that the 'System Acceptance' milestone is not in use in the contract. The Defence contracting template in use at the time the Major Upgrade Contract was developed (SMART 2000) notes that the System Acceptance milestone is a mechanism to notify the Contractor that it has fulfilled all of its obligations. SMART 2000 notes that it usually triggers a final payment of between 5 per cent and 15 per cent of the contract amount that may be withheld if any obligations are outstanding.

¹²¹ For examples of such provisions in the current ASDEFCON contract templates see Defence Materiel Organisation, *ASDEFCON Suite of Tendering and Contracting Templates: ASDEFCON (Strategic Materiel) Draft Conditions of Contract (V2.1), clause 7.14.4; ASDEFCON (Complex Materiel) Volume 2, Draft Conditions of Contract (V2.0), clause 7.11.4*

interpreted by Defence or the Prime Contractor as setting back by 90 days the date from which liquidated damages started to accrue.

2.65 By 2006, in the face of mounting delays in achieving the contract schedule, the administration, estimation and payment of an estimated \$1.46 million¹²² in liquidated damages had become a focus of disagreement between Defence and the Prime Contractor. The resolution of these issues was considered an important component of the Global Settlement subsequently negotiated (see Chapter 3).

Other issues raised in the 2005–06 audit

Technical feasibility of the hull extension

2.66 M113 hulls are built from aluminium, providing a strong, light vehicle which is, however, inherently subject to fatigue cracking. Fatigue cracking is an important limitation of all aluminium alloys, which will eventually fail under even very small repeated loads, though failure can take a very long time.¹²³ Fatigue cracking of M113 hulls, many of which are over 30 years old, is a problem recognised and managed by Defence through inspection and maintenance.¹²⁴

2.67 ANAO Audit Report No.3 2005–06 noted that by November 2000, Defence decided that there was no reason to believe that upgrading the fleet was not the best value for money and that, ‘provided that the issue of hull cracking is not dropped during the project definition process, it will not be a show stopper’.¹²⁵

2.68 Defence sought a technical report on hull cracking and, early in 2000, the Army Engineering Agency (AEA) reported on the strength of the M113

¹²² In March 2009, Defence advised that this was the estimate reported to the Senate – see Commonwealth Parliamentary Debates (2005), Senate Foreign Affairs, Defence and Trade Committee, *Budget estimates 2005-2006*, 1 June, pp. 105-106.

¹²³ The aluminium alloy used in M113 hulls is BS 5083, up to 42 mm thick. While not as strong as some other aluminium alloys, BS 5083 is ductile, durable and relatively easy to machine and weld. These properties can reduce both the incidence of fatigue cracking (compared to some other aluminium alloys) and the level of stress remaining after manufacture. By comparison with aluminium, steel has a high fatigue stress limit and can theoretically withstand an infinite number of cyclical loadings at its fatigue stress limit.

¹²⁴ Army Engineering Agency (2000), *The M113 Upgrade Assessment Report*, MV Report Number MV 06/00, 18 April.

¹²⁵ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, p. 44.

hulls. To assess the risk to upgraded vehicles, AEA applied data on hull cracking compiled from M113 maintenance records to an extended, upgraded M113 design known as the Mobile Tactical Vehicle Light (MTVL).¹²⁶

2.69 The MTVL is built by replacing large parts of the existing hull with new aluminium, including many areas known to be subject to cracking. In these parts of the hull, the ‘fatigue clock’ is reset, though cracks can still appear in older material at other points, depending on the loads borne by the original vehicle during service.¹²⁷

2.70 AEA concluded that extending the M113 hull or adding to its load with a heavier, more powerful engine could increase the risk of hull cracking. As neither the original M113 design calculations nor the loading history of the M113 fleet were available, AEA recommended that to improve the reliability and durability of upgraded vehicles:

[MTVLs] should not be continually operated at a gross combat mass that approaches the Registered Gross Vehicle Mass (ie 1 000 kg below the Registered Gross Vehicle Mass).¹²⁸

2.71 In September 2001, DMO assembled all available hull data and analysis. It concluded that: the MTVL design renewed the aluminium at some places on the hull where cracking had been observed; hull cracking was unlikely to affect ballistic protection; and experience had shown that hull cracking was manageable through inspection and maintenance.

2.72 In the light of this assessment and from its position of oversight, Defence was able to analyse the bids the Prime Contractor received from major potential sub-contractors. For extending the hulls, the two potential sub-contractors proposed different methods. The unsuccessful bidder proposed the MTVL design, replacing the entire lower hull. The alternative, successful bidder proposed cutting the hull at the point of least stress and welding in an extension. Defence’s assessment was that:

¹²⁶ The MTVL design is subject to US Patent 5 490 314 of 13 February 1996 (expires 2016). The original licensee was purchased by BAE Systems in 2005.

¹²⁷ As noted in DMO’s *M113 Hull Cracking Technical Report* of 6 September 2001, page 9, ‘There is a certain incubation period associated with fatigue cracking and its onset is impossible to predict, given the uncertain loading history of the [original M113s]. While the vehicle has already been in-service for around 35 years, it is still possible for a new structural cracking problem to develop, particularly if there is a major change in ... [weight]’.

¹²⁸ *ibid.*, p. 8.

The [MTVL extension] technology is acknowledged as superior to the [alternative] solution; however the [alternative] solution is judged to be viable. There are some risks with the production and durability of the [alternative] solution, but these are considered by our engineering advisors and [the Prime Contractor] to be manageable.

The [MTVL extension] kit would ... provide greater protection from blast penetration than would the [alternative]. However, the shock wave and overturning of the vehicle by such a significant charge under the flat belly [of the vehicle] would cause major casualties even if there were no blast protection.¹²⁹

2.73 It was Defence's view that the alternative extension solution was less sophisticated and expensive than the MTVL proposal but not unreasonably risky, and that the Prime Contractor's selection of the alternative solution was based on overall value for money, providing an acceptable technical solution at a lower cost.¹³⁰ In Defence's view:

Advice from Land Engineering Systems and the Defence Science and Technology Organisation in 2001 was that [the Prime Contractor's choice] is manageable and an acceptable risk in order to achieve a cheap and cheerful upgrade.¹³¹

2.74 Since May 2002, Defence's assessment has been that there is little chance that the hull extension method would adversely affect the integrity of the hulls, though it recognised that any such occurrence would have major consequences for all the upgraded vehicles. Defence proposed addressing these risks through:

- seeking assurance from the Prime Contractor that the design of the hull for each variant will ensure their integrity over their intended life;
- adopting a stringent process for accepting hulls into production, including inspections of critical parts of the hulls intended for upgrade;

¹²⁹ Defence's contemporaneous assessment of the power packs (comprising engine and transmission, the heaviest upgrade component) offered by the potential sub-contractors was that each had advantages and disadvantages that tended to balance out, and that both were acceptable.

¹³⁰ Defence advised ANAO in November 2008 that the MTVL extension methodology would replace material in approximately 40 per cent of areas known to be subject to hull cracking, whereas the alternative method did not directly replace any material identified to be in the high risk areas of the hull. Defence advised that it had reviewed the Prime Contractor's design notes (numbers 1334/05 and 1349/05) dealing with the stress analysis of the alternative extension methodology and assessed them as 'approved and appropriate'.

¹³¹ Email correspondence, DMO to Defence, 15 September 2004.

- monitoring the quality of the extended hulls, including inspections of critical welds and auditing the qualifications of welders;
- analysing likely type and frequency of hull failures; and
- developing a hull monitoring program.

2.75 Defence advised ANAO in November 2008 that, due to the relatively small number of upgraded vehicles currently in service, there had been no reported problems to date. Defence further advised that there is no specific hull monitoring program in place and ‘the routine time and distance based servicing regimes provide the currently required general inspections.’

Closing Phase 1(a) of contract and GFE

2.76 As discussed in the previous audit, under the original proposal for a minimum upgrade of the M113 fleet, the Commonwealth purchased \$9.78 million worth of equipment for the Prime Contractor. In November 2008, Defence advised ANAO that this figure should be increased to \$21.51 million to include \$11.73 million in tracks purchased for the minimum upgrade but unsuitable for the major upgrade. Defence advised that the tracks are now being used in the maintenance of the existing M113 fleet.

2.77 In a similar fashion, when the decision was taken to instead proceed with a major upgrade of the M113s, 12.7 millimetre machine guns originally purchased for the minimum upgrade were issued to the existing M113 fleets and are available to be fitted to upgraded vehicles. Other M113 suspension kits and engine cooling kits were placed in storage at Bandiana and are recorded on Defence’s Supply System database.

2.78 Some spall curtains were transferred to the ASLAV project to meet operational requirements, with the ASLAV project to provide new spall curtains for the M113 project.¹³² In May 2008, Defence commenced procurement action to replace the spall curtains, with 200 spall curtain kits and 200 installation kits to be purchased at an estimated cost of \$5 million (2008–09 prices, GST exclusive) from the 2008–09 ASLAV and Bushmaster fleet budgets,

¹³² ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, pp. 15-16, 33.

with \$3.18 million coming from the Bushmaster fleet budget and \$1.8 coming from the ASLAV fleet budget.¹³³

2.79 Defence advised during the previous ANAO M113 audit that although the list of Government furnished equipment was not yet finalised, it was likely that 72 complete suspension kits purchased were to be used on upgraded vehicles not being extended, with some parts to be used on vehicles being extended. Defence advised ANAO in November 2008 that of the 236 suspension kits remaining in stock, which were purchased for vehicles not being extended, 50 were to be retained for the unextended Armoured Mortar¹³⁴ while the remaining kits were to be disposed of as scrap metal.

2.80 The previous ANAO audit also noted that, while much of the previously purchased engine cooling kits could not be used, the fan (the most expensive part of the kit) was likely to be able to be used for the major upgrade.¹³⁵ Defence advised ANAO in November 2008 that the 286 A2 Cooling Kits in stock were to be disposed of as scrap, although the fan is to be retained. Table 2.3 summarises the status of equipment procured for the minimum upgrade.

¹³³ The Bushmaster fleet also used the M113 spill curtains to enhance their survivability when deployed to the Middle East.

¹³⁴ Although Defence is currently conducting a feasibility study to extend the Armoured Mortar variant (see paragraph 2.26).

¹³⁵ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, pp. 56-57.

Table 2.3**Items purchased for the minimum upgrade**

| Item | Total cost (\$ million) | Quantity purchased | Current Status |
|---|-------------------------|--------------------|--|
| Machine guns | \$1.28 | 343 | Issued to A1 fleet and available to be used on upgraded vehicles |
| Suspension kits | \$3.15 | 366 | Disposed of as scrap |
| Spall curtains | \$2.20 | 212 | \$5 million to be expended in 2008–09 to purchase 200 spall curtains for M113 fleet coming from the ASLAV & Bushmaster fleet budgets |
| Engine cooling kits | \$3.42 | 366 | Disposed of as scrap, fan retained for major upgrade ^A |
| Diehl Tracks | \$11.73 | 350 ^B | Used in A1 fleet |
| Notes: A. Defence was unable to advise the value of the fan. B. Defence estimated that sufficient track was procured for 350 vehicles (approximately 45 000 track links). | | | |

Source: ANAO analysis of Defence documentation.

Project management arrangements

2.81 In response to the previous audit's findings that improvements could be made to DMO's control of project scope (see paragraphs 2.3 and 2.4 above), Defence noted that it had implemented various control mechanisms, including Materiel Acquisition Agreements (MAAs) and processes to amend MAAs.¹³⁶

2.82 Since the previous audit, DMO has formalised its arrangements for managing the delivery of upgraded M113s to Army. In the course of the 2005–06 audit, in July 2005, Defence advised ANAO that it was developing an MAA between DMO and CDG:

¹³⁶ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, p. 48.

An MAA defines what the DMO (as supplier) will deliver to CDG (as customer) for how much and when. It also provides a means by which performance will be monitored over the course of the project. There are a number of other project management documents, tools and processes that cover how the project is managed. The MAA is about the high-level outputs that DMO has undertaken to deliver.¹³⁷

2.83 An MAA for the M113 major upgrade was approved in July 2005. DMO updated the project's MAA in April 2008, to account for a new rollout schedule and the extension of the Recovery, Ambulance and Command Vehicle variants. The MAA was further updated in November 2008 to take into account the additional 81 vehicles to be purchased under ELF.

2.84 To govern its own management of the project, DMO put in place an Acquisition Project Management Plan (APMP) in September 2007. It identifies the key 'Defence dependencies' external to the DMO M113 Project Management Team, such as Capability Development Group (the project sponsor); the Land Engineering Agency (for engineering support and vehicle test programs); the Joint Logistics Unit (JLU - managers of the M113 production facilities at Bandiana); and the DSTO (for advice on landmine and ballistic protection). The APMP outlines the relationship between DMO and each dependency, including the day-to-day and advisory contacts within each.

2.85 In addition to outlining the main subsidiary plans within the project plan, the APMP includes the anticipated project schedule and a summary of the main deliverables defining the work to be undertaken as part of the project, and identifying key decision and review points in managing the project.¹³⁸ For the reference of users, the September 2007 APMP includes the May 2001 M113 Upgrade Project Equipment Acquisition Strategy, and strategies for monitoring and managing risks to the production and delivery schedules.

¹³⁷ Department of Defence (2006), *Defence Capability Development Manual*, p. 40.

¹³⁸ *The M113 Upgrade Project Acquisition Project Management Plan*, September 2007, p. 1.

3. Global Settlement

This chapter discusses the origin and outcome of a Global Settlement between Defence and the Prime Contractor, agreed in October 2007.

Introduction

3.1 This chapter outlines the key events and project difficulties that led to Defence and the Prime Contractor deciding to negotiate a Global Settlement of outstanding contract issues. It describes the basis on which Defence entered the negotiations as well as the outcomes. As a result of the negotiations, there was a significant amendment to the M113 Upgrade Contract, effective from November 2007.

Key events leading to negotiations

3.2 By May 2006, the emerging difficulties with the M113 Upgrade Project that had been apparent at the conclusion of Stage 1 developed to an extent that the project's progress had stalled and Defence had ceased paying the Prime Contractor for the invoices it submitted in respect of project milestones.

3.3 The Prime Contractor was in the process of resolving significant technical difficulties while attempting to maintain production momentum. Defence used non-payment and the prospect of the delays in progress from Stage 2 to Stage 3 to maintain commercial tension with the Prime Contractor. Table 3.1 summarises the key events of the M113 upgrade project from contract signature in July 2002 through the process of negotiation and the acceptance of the first production vehicles in November 2007.

Table 3.1**Summary of key events leading to Global Settlement negotiations**

| Date | Key Event |
|----------------------------|--|
| December 2003 | Stage 1 of project completed three months late. Prime Contractor delivers two demonstration vehicles to DMO for testing. DMO approves commencement of Stage 2 of the project to deliver the Initial Production Vehicles, despite the demonstration vehicles overheating and vibrating |
| November 2004 – March 2005 | Prime Contractor delivers four APC Initial Production Vehicles to DMO. Testing shows that engine overheating and vibration problems had not been resolved |
| April 2005 | Defence seeks legal advice on terminating contract |
| July 2005 | Prime Contractor assures then Minister for Defence that the project schedule will be met |
| January 2006 | DMO commences further testing of the APC Initial Production Vehicles |
| February 2006 | DMO informs Prime Contractor that it will reject any claim for payment for work on milestones relating to Stage 3 of the project until contractual obligations are met |
| February 2006 | Parliament advised that project schedule is on track |
| March 2006 | DMO vehicle testing identifies problems with the vehicles' brakes and other systems. Testing is halted |
| May 2006 | Defence ceases contract payments |
| May – June 2006 | Prime Contractor delivers ARVL and AF Initial Production Vehicles to DMO |
| August – September 2006 | Minister for Defence and Prime Contractor correspond, with Prime Contractor requesting advance payment for Stage 3 |
| October 2006 | DMO and Prime Contractor commence Global Settlement negotiations to resolve a number of contractual issues |
| January – June 2007 | DMO resumes vehicle testing |
| August 2007 | Additional DMO vehicle testing confirms the reliability of the vehicles |
| October 2007 | Global Settlement negotiations conclude. New project schedule agreed, contract cost increased by \$10.235 million and Defence receives credit note for \$5.163 million 'work in kind' as compensation from Prime Contractor for liquidated damages, future price escalation and extended testing |
| November 2007 | Production Readiness Review for APC variant completed. DMO approves commencement of Stage 3 of project – full-scale production |
| November 2007 | Army accepts first 4 upgraded vehicles into service |

Source: ANAO analysis of DMO documentation.

Schedule slippage

3.4 In December 2003, Defence advised the Prime Contractor that Stage 1 of the M113 Upgrade Contract was complete and that Stage 2 could commence, on the proviso that the Prime Contractor confirmed in writing:

The provision of the required Integrated Logistic Support data, the heat issues and the remainder of the issues [*identified in the design reviews*] can be properly addressed to [*Defence's*] satisfaction within the current Contract Price and schedule.

3.5 Defence gave approval for the commencement of Stage 2 notwithstanding that problems with the demonstration vehicles had not been resolved.¹³⁹ Moving from Stage 1 into Stage 2 of the contract represented one of two 'exit points' where Defence could terminate the contract.¹⁴⁰ The contract allowed Defence to cancel the project if testing revealed 'one or more significant design failures,' and Defence was not 'fully satisfied' that remedies proposed by the Prime Contractor would fix the problems.

3.6 A meeting of Defence project stakeholders in December 2003 considered developing a contingency plan should Stage 1 not be completed. However:

[*the director of TMSPO*] informed that this action was not required as failure to progress past Stage 1 was equivalent to project cancellation, thus [*the project manager of the M113 upgrade*] did not pursue this action.

3.7 At the same meeting, the Director General of Land Manoeuvre Systems (LMS) in DMO and the Director of Tracked Manoeuvre Systems Program Office (TMSPO)¹⁴¹ provided a briefing on the Stage One exit opportunity. The Director General of LMS stated that he had 'challenged' the project manager over previous months as to why the project should not be cancelled on the grounds of the heat and other issues. The Director General advised the meeting that:

The Project Authority had gained sufficient confidence that [*the Prime Contractor*] could fix these issues. He pointed out that part of the process was

¹³⁹ ANAO Audit Report No.3 2005–06, *Management of the M113 Armoured Personnel Carrier Upgrade Project*, pp. 53–54.

¹⁴⁰ The other exit point being progression from Stage 2 to Stage 3.

¹⁴¹ In December 2007 TMSPO was renamed Armoured Fighting Vehicles Systems Program Office (AFVSPPO).

to establish 'hooks' through formal acknowledgement by [*the Prime Contractor*] to address these issue[s] should the[y] arise again.

3.8 Other participants at the project stakeholders meeting expressed confidence that the Prime Contractor would overcome these problems, and the meeting was informed that progression through Stage One would be approved. A day after this meeting, the Prime Contractor was notified by Defence that it could progress to Stage 2, provided that the company confirmed in writing that the outstanding issues would be satisfactorily addressed within current price and schedule.

3.9 Late in 2004, however, the Prime Contractor advised Defence that it would be necessary to make minor revisions to its project schedule in order to resolve the problems of excessive heat from the engine and excessive vehicle vibration from the engine, gearbox and suspension. These were the problems previously identified at the end of Stage 1.

3.10 In February 2005, Defence conducted analysis of the Prime Contractor's revised schedule which showed that important reliability and qualification tests would be delayed. In Defence's view the knock-on effect would be delays to completing Stage 2 and starting final production (Stage 3), so that the first vehicles would not be introduced into service until May 2006 (rather than December 2005) and final vehicles would not be received until September 2011 (rather than December 2010). In March 2005, the Prime Contractor advised Defence's Vehicle and Land Operations Materiel Governance Board that resolving the heat and vibration issues would delay the production schedule.

3.11 Subsequently, in April 2005, Defence sought general legal advice from the Australian Government Solicitor (AGS) on options to terminate the M113 Upgrade Contract. AGS advised that the Commonwealth might terminate under the terms of the contract (for convenience,¹⁴² or in the case of default by the contractor), under common law, or by mutual agreement.¹⁴³ AGS drew

¹⁴² Clause 12.3 of the contract provides that the Commonwealth may at any time terminate the contract. If it did so, it would only be liable for payments under payment provisions of the contract for services rendered before effective date of termination, and any reasonable costs incurred by the contractor that were directly attributable to the termination.

¹⁴³ AGS advised that termination for convenience was probably not an unfettered right and 'should not be used to simply get out of a bad deal or whenever a contract has gone sour.' AGS also advised that, while certain Australian laws confer a right to terminate the contract in specific situations (for example, section 75A of the *Trade Practices Act 1974*), such rights are generally overlapped with other termination rights either under the contract or under common law.

attention to certain events that could enliven the Commonwealth's right to terminate the contract. Among these were failure by the contractor:

to progress at a rate to facilitate the due and proper completion of the Upgrade Contract within the timeframe specified in the contract, [*or a failure to*] obtain approval to proceed to Stage 3 of the contract.

3.12 AGS advised that the Commonwealth might then proceed to terminate the contract if it considered the contractor's default to be serious and if the contractor had no lawful excuse, noting however that 'the upgrade contract itself may provide excuses for non-performance.'

'Critical milestones' not defined in the Upgrade Contract

3.13 In May 2005, Defence sought further advice from AGS on its ability to withhold contract payments in the event that the contractor was unable to meet the critical requirement for proceeding to full production. The critical requirement was the satisfactory completion of the Production Readiness Review, an event stipulated in the M113 Upgrade Contract. Defence advised AGS that, in its view, the Prime Contractor was not going to be able to complete the PRR by 5 December 2005, the date required under the contract.¹⁴⁴

3.14 In this instance, AGS advised that although critical milestones were not clearly identified in the contract, it would be difficult for the Prime Contractor to argue that completion of the Production Readiness Review was not a critical milestone, given that the Prime Contractor could not proceed to full production unless it completed the Production Readiness Review.

3.15 AGS's view was that the Prime Contractor had until 5 December 2005 to successfully complete the PRR, after which date it would be in default under the terms of the contract. AGS advised that Defence would then be in a position to, if it wished, give the Prime Contractor a notice to remedy the default within 30 days. If the Prime Contractor was subsequently unable to do so, the Commonwealth would be able to immediately terminate the contract.¹⁴⁵

¹⁴⁴ The Prime Contractor advised Defence in April 2005 that the Reliability Qualification Test would be delayed. Successful completion of this test was the trigger for the PRR.

¹⁴⁵ In accordance with the specific terms of clause 12.2.1(1) of the contract, which provides that 'The Commonwealth may, in addition to any other right to remedy it may have, by notice in writing, immediately terminate the Contract ... in the event that the Contractor ... fails to ... obtain approval to proceed to Stage 3 of this Contract'.

3.16 In May 2005, Defence advised the then Minister that if the engineering issues (including emerging problems with the brakes) could not be solved, the contract may have to be terminated with subsequent disruption to the 2000 White Paper plans to restructure the Army. In the meantime, Defence undertook to analyse the Prime Contractor's proposed revised schedule of production, monitor the Prime Contractor's progress toward resolving the engineering problems, and pursue liquidated damages.

Persistent technical difficulties

3.17 By June 2005, Defence was concerned that solutions to the engineering problems were still to be found, leaving little time for their development and testing. With little flexibility left in the schedule for production, there was a high risk that the planned introduction of the M113 into service would not be achieved. In July 2005, Defence again confirmed the high risk to the project schedule. While solutions had been found to the suspension and vibration problems, more development and testing was necessary before heating and braking problems could be considered resolved.

3.18 In July 2005, the Prime Contractor's then Chief Executive Officer wrote to the then Minister advising that the company was confident of meeting the:

important In-Service-Date for the capability of November 2006. The work we have undertaken, at our cost (estimated to be in excess of \$6 million) will provide us both with the confidence that these vehicles will meet both the contracted performance and expectations of the end-user.

3.19 To maintain schedule for a November 2006 in-service-date, the Prime Contractor planned to buy, at its own risk, those items with long lead-times that would be necessary for full production (Stage 3).

3.20 In briefing the then Minister on the Chief Executive Officer's letter in August 2005, Defence recognised the Prime Contractor's high level of commitment to resolving the engineering problems and meeting the contracted initial in-service date, but noted that this remained a high risk until all design and testing work (planned for October 2005 through to May 2006) was completed. In anticipation of successful testing, Defence foreshadowed that the Prime Contractor may be able to move to full production (Stage 3) in May 2006, with the first vehicles accepted into service in December 2006.

3.21 Reliability Qualification Testing of three M113s commenced in January 2006 at Defence's proving grounds at Monegeetta. On 9 February 2006, Parliament was advised that the expected introduction into service and final

delivery dates of November 2006 and 2010 respectively were still achievable.¹⁴⁶ However, in March 2006, serious deficiencies in the hand brakes and the running brakes emerged during Reliability and Qualification Testing. The Prime Contractor requested the suspension of testing in order to find a solution.

3.22 Subsequently, Defence advised the then Minister that it was the department's view that, once the deficiencies in the brakes were rectified, it would still probably be necessary to repeat the Reliability Qualification Test. It would also be necessary to cancel scheduled training of the personnel necessary to introduce the new vehicles into service and to re-schedule the training for a later date. Introduction into service was thus estimated to be delayed until July 2007. In the meantime, Defence intended maintaining and operating its in-service fleet of M113A1s until the upgraded vehicles were delivered.

The Commonwealth halts further contract payments

3.23 On 14 February 2006, Defence rejected a claim for payment from the Prime Contractor on the basis that:

All milestones for payment from the period January 2006 on ... are Stage 3 deliverables and subject to Stage 2 approval prior to payment. ... [Defence] will reject any claim for payment of work carried out on Stage 3 milestones until [the Prime Contractor] has met its contractual obligations.¹⁴⁷

3.24 In addition to withholding payment, Defence continued to encourage the Prime Contractor to remedy the brake defects. In order to avoid delays in production once a solution was found, Defence also encouraged the contractor to undertake early production of the hulls (under the separate M113 maintenance contract) ahead of Defence production approval (under the M113 Upgrade Contract) and at the Prime Contractor's own commercial risk.

3.25 These actions placed pressure on the Prime Contractor to find solutions to the brake problems and satisfactorily complete testing on the upgraded

¹⁴⁶ Commonwealth Parliamentary Debates (2006), House of Representatives, *Questions on Notice*, Question No. 2748, 9 February, pp. 190-191.

¹⁴⁷ In May 2006, DMO's General Counsel Division reviewed the terms of the M113 Upgrade Contract on the basis that the Commonwealth had withheld payment to the contractor because it 'has failed to achieve the APC Production Readiness Review.'

M113s. Defence briefed the then Minister in August to 2006 that it was Defence's view:

While ever delays continue and [*the Prime Contractor*] undertakes preparation and production at risk, they become more financially exposed. Our levers on [*the Prime Contractor*] relate to the cost of continued delay. These comprise liquidated damages (about \$1 million per year) which we will continue to apply, the cost of inflation beyond the contracted milestone dates (about \$5 million per year), the increased cost of vehicle development (about \$6 million per year) and the cost of finance for development and production work (about \$6 million per year), together with increased liability for production work being undertaken at their risk. Ultimately, if [*the Prime Contractor*] reaches a point where this project becomes a loss maker for them, they could walk away, although they would be subject to Commonwealth litigation for doing so. Alternatively, they could defer production work until design acceptance and consequent payment by Defence, which would delay vehicle deliveries.

3.26 On 25 August 2006, the then Minister for Defence wrote to the Prime Contractor to express the Government's concern over the ongoing delays in the M113 Upgrade Project and to reinforce the importance of the project to the current and future capability of the ADF. The Prime Contractor's then Chief Executive Officer responded in September 2006 that they were fully committed to achieving the earliest possible delivery of an upgraded M113 platform that provided the contracted capability.

Requests for early Stage 3 payments

3.27 From late 2006, the Prime Contractor sought payment from Defence for the purchase of long lead time items required for production. The requests for payment related to items that would be delivered under Stage 3 of the contract. However, Defence insisted on successful completion of the Production Readiness Review and formal progression to Stage 3 before making any associated payments.

3.28 In September 2006, the Prime Contractor advised that, without early payment, production would be delayed and final deliveries would not occur until late 2012:

To date [*we have*] entered into forward ordering with [*our*] major suppliers that currently exposes [*us*] to in excess of \$20 million worth of orders to support the 'production at risk' program, which includes orders worth in excess of \$8 million with [*a major subcontractor*]. ... Suppliers are reluctant to enter into any production deliveries without a formal design approval from [*us*],

commitment to the full Stage 3 production quantities, and payment of mobilisation claims. Concerted efforts by us to get [subcontractors] to commit to production 'at risk' have been unsuccessful.

3.29 This represented a challenging issue for Defence, whose priority was the timely delivery of the upgraded vehicles. Defence's preference was to continue to withhold early payment for long lead time items before entering into a Global Settlement. In November 2006, Defence advised the then Minister that early payment would:

increase [the Commonwealth's] financial exposure and alter the risk mitigation strategy used as the basis for government approval of the project. Therefore additional government approval would be required to make these payments.

3.30 By this time, Defence was also aware that, in addition to those provisions governing 'critical milestones' (discussed at paragraph 3.14), other contractual provisions were proving difficult to administer. In particular:

- vehicle payloads had not been clearly specified;
- the relative importance of vehicle specifications (as essential, important or desirable) had not been specified; and
- the liquidated damages provisions were overly complex and difficult to apply and administer.

Global Settlement framework

3.31 During 2006, after a series of meetings with DMO, the Prime Contractor proposed the negotiation of a Global Settlement that would culminate in significant changes to the Major Upgrade Contract. Initially, the Prime Contractor had proposed settlement by early October 2006, though by that time, the Prime Contractor's view had changed in light of Defence's requirement that testing and acceptance of the vehicles was a requirement before any Stage 3 payments could be made:

[We are] disappointed that the Commonwealth's position has forced the company to conduct a re-plan. [We are] now re-planning the program based on the production of 19 vehicles by July 2007 and a Production Readiness Review date of around September 2007. Preliminary planning indicates that [we] may then be able to produce a further 14 vehicles by the end of 2007 after which there will be a hiatus in production - probably until around mid to late 2008. The re-plan will reflect the consequences of the parties abandoning the focus on working together to complete production by the end of 2010. Under this scenario, the completion date will now be very difficult to achieve.

3.32 Shortly after these developments, DMO appointed a negotiation team and formulated issues for negotiation with the Prime Contractor, summarised in Table 3.2. DMO's aims were to address future project risks; resolve contractual issues that were absorbing significant management resources; obtain value for money for the Commonwealth; ensure clearly understood and articulated outcomes within a reasonable financial structure; and ensure compliance with relevant Government policies.

3.33 To achieve these aims, DMO's negotiating team was authorised to consider certain trade offs as part of the negotiation process:

- the contract price could increase by up to \$14 million,¹⁴⁸ provided all Defence's concerns were satisfactorily addressed by the Prime Contractor;
- delays in progress could be accepted for some items under the contract, providing the first vehicles were introduced into service by November 2007 and 350 vehicles delivered by December 2010; and
- while no 'essential' vehicle requirements could be traded, other 'important' or 'desirable' requirements that the Prime Contractor was having trouble in meeting could be exchanged for 'additional capability, provided this capability did not fall outside the approved scope of the project'.¹⁴⁹

¹⁴⁸ December 2006 prices.

¹⁴⁹ Defence advised ANAO that: 'the "additional capability" may have for example included, a fuel efficiency device to provide additional vehicle fuel range, or use of an 18 tonne braking system in the unstretched armoured mortar variant. Such improvements provide benefits to the capability, but do not provide a new, un-scoped capability, such as fitting a Remote Weapon Station, which would clearly fall outside of the scope of the project'.

Table 3.2

Commonwealth position on issues to be resolved in Global Settlement negotiations, December 2006

| Issue | Position |
|---|---|
| Schedule for commencing final production | Essential , introduction into service November 2007, 350 vehicles by December 2010 |
| Cost and schedule for AA and ACV extension | Essential , negotiable for \$12 to \$14 million cost, less \$1.5 to \$0.5 million compensation |
| Cost and schedule for existing non-conformances | Essential , seek compensation of \$1 to \$2 million |
| Cost and schedule for upgrade of three training turrets | Essential , negotiable cost between \$0.8 and \$1 million |
| Incorporation of the Armoured Logistic Vehicle test profile | Essential |
| Loan of vehicles for training | Negotiable, at cost of between \$0.5 to \$1 million |
| Liquidated damages to date | Negotiable, seek \$1.7 to \$2.1 million |
| Future liquidated damages | Negotiable, with low likelihood of agreement |
| Price escalation to date and for future | Negotiable, seek compensation of \$0.5 to \$3.0 million |
| Incentives for agreed early deliveries | Negotiable, to limit of half of liquidated damages collected |
| Cost and schedule for common 18 tonne brake system | Negotiable, but at no cost |
| Cost and schedule for additional 80 to 150 vehicles | Negotiable, if significant financial benefit <i>and</i> dependent on Government approval |
| Development of Integrated Logistics Support package | Negotiable |
| Cost of Government Furnished Equipment | Negotiable, with some compensation |

Source: ANAO analysis of DMO documentation.

3.34 In February 2006, Defence advised the then Minister that it was negotiating critical cost and schedule issues with the Prime Contractor, including the extension of the Armoured Ambulance (AA) and Armoured Command Vehicle (ACV).

Negotiation leverage for Defence derives from [*the Prime Contractor's*] urgent need for waivers and for a number of minor deficiencies against the contracted and performance requirements. Defence plans to complete discussions and contract changes in conjunction with reliability testing by April 2007.

3.35 At that time, in response to Defence's advice and further representations from the Prime Contractor for payments in advance, the then Minister for Defence asked Defence whether the M113 Upgrade Contract could be renegotiated.

3.36 In March 2007, Defence advised the then Minister that AGS had undertaken a legal review of Defence's right to terminate the contract. The legal review had found that there were grounds for termination if schedule was not recovered 'to a satisfactory level' or if further delays to the first and final delivery dates to Army were encountered because of technical problems. However:

Termination is not being considered by Defence at this stage owing to the importance of this capability and the cost and schedule of viable alternatives.

Negotiation outcomes

3.37 Global settlement negotiations were concluded in October 2007. ANAO notes that DMO took positive steps to progress the Prime Contractor's proposal to negotiate and to include all outstanding matters in the negotiation process. In doing so, DMO applied commercial pressure in order to progress negotiations and achieve some satisfactory results for the Commonwealth. Given the state of the Major Upgrade Contract and the Prime Contractor's position, the negotiated outcome was reasonable in the circumstances.

3.38 The total increase in the value of the work to be done by the Prime Contractor as a result of the negotiations was settled as \$19.784 million, comprising an increase in the contract price of \$10.235 million and savings to the Commonwealth of \$9.549 million.¹⁵⁰ The increase in contract cost, which was within the parameters set by DMO, was funded from the project contingency fund¹⁵¹ through a series of contract amendments.

3.39 The Global Settlement was concluded when the Government was in Caretaker mode. Defence advised ANAO that, following the current Government's election, the new Ministers in the Defence portfolio were provided with an M113 Project brief in December 2007. At that time, Ministers were provided with an overview of the outcomes of the Global Settlement,

¹⁵⁰ GST exclusive, October 2001 prices.

¹⁵¹ The approval hierarchy for the project contingency fund is discussed at paragraph 2.6.

noting that \$5.163 million worth of work in kind had been received from the Prime Contractor, and the ACV and AA variants were to be extended.

AA and ACV extension

3.40 As discussed in Chapter 2, the original intention under the M113 Upgrade Contract was that the Armoured Ambulance (AA) and Armoured Command Vehicle (ACV) variants would be upgraded but would not be extended. However, by late 2005 Defence had established that the original designs for these variants would exceed their Recommended Gross Vehicle Mass (RGVM) of 15 tonnes by 1.1 tonnes. Defence's proposed solution was to extend both variants to accommodate the heavier than anticipated armour, power pack and other fittings, as well as a useful payload.

3.41 Defence's assessment was that the increase in weight was due to errors in mass budget estimates, with Defence and the Prime Contractor having joint responsibility for selecting heavier armour for the APC than originally planned without considering the weight impacts on the ACV and AA variants. Compounding the issue was the failure to clearly specify vehicle payloads in the Major Upgrade Contract.¹⁵²

3.42 It was important to resolve responsibility for the design problems and who should bear the additional costs of extending the variants. In the course of negotiations, Defence estimated that the total cost of extending both variants was \$14.621 million. As part of Global Settlement, the Prime Contractor accepted 30 per cent of the responsibility for the need to extend the variants and agreed that it would meet 30 per cent of the costs of the extension, a total of \$4.386 million. The remaining \$10.325 million was to be funded by Defence under a change to the contract increasing its overall cost.¹⁵³

Compensation and liquidated damages

3.43 Defence had previously received legal advice, in January 2007, that the M113 Major Upgrade Contract's liquidated damage provisions were difficult to interpret and apply, were open to interpretation, could lead to dispute with the Prime Contractor, and were in need of substantial revision. As liquidated damages applied to almost 3 100 separate contract deliverables, administering the provisions added considerably to the Defence's workload.

¹⁵² DMO advice to then Minister for Defence, February and March 2007.

¹⁵³ All estimates are in October 2001 prices. DMO's M113 *Project Management Plan* allocates \$15.2 million of project contingency for 'AA/ACV weight issues' (December 2007 prices).

3.44 Defence's aims during negotiations were to collect liquidated damages and to renegotiate the provisions to ensure that all references to due dates, deliverables, milestones, payments and price were clear and that the parties to the contract were in no doubt as to when liquidated damages apply.

3.45 While it was not possible to successfully renegotiate and clarify the contract provisions during Global Settlement negotiations, Defence received liquidated damages as part of an overall settlement of compensation. The \$5.163 million in compensation comprised \$2.716 million for liquidated damages; \$1.447 million as compensation for price escalation; and \$1.0 million as compensation for testing wear and tear. The liquidated damages and escalation costs were amounts owed to the Commonwealth, the former for schedule delays and the latter for originally unplanned escalation costs.

3.46 Rather than receiving compensation as cash, Defence received a credit note for \$5.163 million from the Prime Contractor as part of the settlement outcome. The credit note was offset against future claims for payment for a list of work to be undertaken by the Prime Contractor.

Recommendation No.3

3.47 ANAO *recommends* that Defence ensure that liquidated damages arrangements in future major acquisition contracts apply to clearly identified, key contract milestones.

Defence's summary response

Agreed

3.48 DMO has extensively updated (as of 17 December 2008) advice on Liquidated Damages in the DMO Chief Executive Instructions. DMO shall consider whether current DMO policy provides sufficient guidance regarding application of liquidated damages to individual milestones (i.e. clearly identified, key contract and critical project milestones). See Appendix 1 for Defence's detailed response to the recommendation.

Vehicle non-conformances

3.49 From the outset of negotiations for the Global Settlement, Defence maintained to the Prime Contractor that vehicle specification non-conformances were of great importance and that it was essential that the

specifications be satisfied.¹⁵⁴ However, in the absence of any contractual classification of the relative importance of the specifications, Defence could only seek to persuade the Prime Contractor of the need for a higher level of satisfaction of one vehicle performance requirement over another.¹⁵⁵

3.50 Defence characterised the Global Settlement outcomes for vehicle conformances as meeting a mix of its *aspirational* negotiating position (all non-conformances resolved) and its *sound* negotiating position (financial compensation in lieu of resolving the problems, up to a possible amount of \$1.35 million). The seven vehicle non-conformances addressed in the Global Settlement were:

- failure to achieve the specified maximum speed of 65 km/h;
- failure of the ARVL to achieve a maximum range over 500 kilometres;
- failure to reduce daily operational maintenance to 15 minutes;
- inability to prevent fuel draining from an undamaged fuel tank to a damaged tank;
- inability to manually traverse the turret within 60 seconds;
- inability to depress the machine gun barrel to ten degrees below the horizontal; and
- inability to remove the power pack (engine and gearbox) in under 60 minutes.

3.51 Of these, only the last (power pack removal time) was rectified by the Prime Contractor before Global Settlement was reached. Based on Defence's negotiation estimates, this would have reduced the compensation to be claimed by \$0.2 million to \$1.15 million. However, Defence did not receive any compensation for the remaining non-conformances as part of the Global Settlement. The vehicle non-conformances were traded in order to achieve agreement on other matters, including the need to maintain the schedule for

¹⁵⁴ For instance, in February 2007, Defence provided the Prime Contractor with a list of 18 vehicle non-conformances for rectification.

¹⁵⁵ The specifications for the upgraded M113 were included in Defence's January 2001 M113 *Capability Systems Statement* (CSS). The CSS established a hierarchy of requirements for vehicle performance rated (in descending order) as essential, very important, important or desirable. The CSS specifications were carried across into the M113 Upgrade Contract almost in their entirety, albeit without the corresponding classification as essential, very important, important or desirable.

delivering 350 vehicles by December 2010. DMO's Global Settlement negotiation report stated that:

[Vehicle non-conformances] provided the Commonwealth with the leverage to bring the *[Prime Contractor]* to the negotiation table and agree key ACV, AA, ALV and liquidated damages issues in order for the *[Prime Contractor]* to successfully complete the APC production readiness review and receive over \$80 million in payments then owing.

The Commonwealth opened discussions with the high cost in price and schedule to overcome these contracted specification shortfalls to ensure the leverage provided by them was not easily discounted.

This approach was extremely successful and was the key to a good outcome for the Commonwealth.

3.52 The Director General Land Development (within CDG) approved the corresponding reductions in vehicle specifications in September 2007.

Negotiation of delivery schedule

3.53 The Global Settlement was predicated upon the Prime Contractor's continuing commitment to satisfying Defence's requirement that 350 vehicles be delivered by December 2010. Consequently, the delivery schedules attached to the contract were amended (through a Contract Change Proposal) to move forward the due dates for the milestones that had been delayed, while retaining the final delivery date.

3.54 As a result of moving forward the due dates for the delayed milestones, the Prime Contractor stood to make a windfall gain on contract payments, due to the action of the price variation formulas (discussed in Chapter 2). To offset this, the Global Settlement included one-off compensation from the Prime Contractor amounting to \$1.447 million, which Defence was to receive as 'work in kind'.

3.55 As an incentive to achieve the compressed schedule for vehicle delivery agreed under the Global Settlement, the contract was amended to allow for a cash payment of \$2.716 million to the contractor (see Table 3.3) if 350 vehicles are delivered by December 2010. The incentive payment is for an amount equivalent to the liquidated damages collected by the Commonwealth as 'work in kind' under the Global Settlement.

3.56 Overall, the Settlement Negotiation Report to the Head of Land Systems concluded that Defence had achieved the best whole-of-life value for money outcomes for the Commonwealth and satisfactorily addressed the

future risks to the success of the project. On the basis of this report, the Head of Land Systems exercised his delegation to approve the Contract Change Proposals that gave effect to the Global Settlement, for the outcomes summarised in Table 3.3.¹⁵⁶

Table 3.3

Outcomes of Global Settlement negotiations

| Issue | Outcome | Value ^A (\$ million) |
|--|---|------------------------------------|
| 350 by December 2010 | Incentive provided to the Prime Contractor through a payment of \$2.716 million if 2010 deadline is met | \$2.716 |
| Price escalation (see paragraph 3.54) | Compensation received | \$1.447 |
| Responsibility for AA and ACV extension | Compensation received for 30 per cent of responsibility | \$4.386 |
| Liquidated Damages | Compensation of \$12.950 million, less \$10.234 million as Commonwealth's share of AA and ACV extension and Armoured Logistics Vehicle (ALV) delays | \$2.716 |
| Shortfalls in vehicle performance | Compensation traded to achieve agreement on other matters, including schedule (see paragraph 3.51) | - |
| Upgrade Armoured Mortar (AM) brakes to 18 tonnes | Defence pays extra \$1.377 million for brakes, saving an estimated \$1.5 million in through-life costs | \$0.123 |
| Cost of spares, wear and tear on test vehicles | Defence buys spares for \$2.821 million, discounted \$1 million for wear and tear | \$1.000 |
| Integrated Logistics Support | Commonwealth assistance provided to contractor, considered mutually beneficial | - |
| Loan of production vehicles for training | Resolved outside settlement process vehicles loaned to Defence at no cost | - |
| Upgrading three training turrets | Resolved outside settlement process, revised costings | - |
| ALV testing | Resolved outside settlement process, agreed to new testing regime | - |
| Notes: A: October 2001 prices. | | |

Source: ANAO analysis of DMO negotiation documents.

¹⁵⁶ The Government was, by that time, in Caretaker mode prior to the Federal Election of 24 November 2007.

4. Production and capability

This chapter outlines the current production process and schedule; Army's use of the upgraded M113s since their delivery in November 2007; and the current status of upgraded M113 capability.

Production process

4.1 At the time of this audit, upgraded M113s were being extended and assembled solely at Defence's facilities at the Albury-Wodonga Military Area at Bandiana, Victoria.¹⁵⁷ The facilities comprise offices, a warehouse, a purpose-built grit blasting shed, a staging area for hulls awaiting entry to the factory, a single large factory floor, and a test driving area. These facilities are used by the Prime Contractor, but remain under the overall management of Defence. Defence also uses the staging and test-driving areas.

4.2 The upgrade process starts with Defence selecting M113s to be stripped of their components and the hulls are then inspected for suitability. Many M113s have seen extensive use and some hulls have been damaged by mine blasts or other munitions. Defence advised ANAO that it was weeding out these hulls in order to increase the rate of selection for upgrade. The best hulls are being put into the upgrade program now, with unacceptable hulls set aside for additional preparation and re-work if required at a later date.

4.3 Many components and fittings are scrapped when the hulls are stripped, as they have passed their useful life. Some parts, such as hull hatches and doors and the internal communications set,¹⁵⁸ are put aside for refurbishing and re-fitting to the upgraded M113s. Other components, including hull extension kits and turret controls provided by sub-contractors along with most other upgrade components, are stored in and distributed from a warehouse, managed by the Prime Contractor, to feed the production line as needed.

¹⁵⁷ The upgraded turrets are produced at the Prime Contractor's factory in Wingfield, South Australia, where the initial production vehicles and some of the first production vehicles were built. Apart from turret production, no M113 vehicles were being produced at Wingfield at the time of this audit.

¹⁵⁸ Known as the VIC 3 communications harness.

4.4 Hulls that pass inspection are inducted into the production process and grit blasted.¹⁵⁹ After further inspections, the hulls enter the factory, the bulk of which is devoted to extending M113 hulls. Here, the stripped and grit-blasted hulls are fitted into a large steel jig (the yellow structure shown in Figure 4.1) where they are cut.

Figure 4.1

M113 hull in the welding jig, after extension



Source: ANAO fieldwork at Bandiana production facility, 13 August 2008.

4.5 The jig holds the bisected hull while it is braced and the hull extension kit is welded into place. The jig helps to hold the hull true during cutting and welding, reducing variations in the final dimensions of the extended hulls.¹⁶⁰ After they are extended, the hulls are fitted with brackets and other attachment

¹⁵⁹ Defence advised ANAO that parts of the M113 hull known to be subject to high stresses are x-rayed prior to induction into the upgrade process. ANAO observed x-ray post-inspection markings where the final drive bolts attach to the hull and on the rear sponson assemblies.

¹⁶⁰ Defence advised ANAO that the original M113 hulls (acquired between 1965 and 1979) varied in size. This includes differences in the size of hatches and doors. Defence attributed the variations to manufacturer's changes to design and production over the period the hulls were acquired.

points and the drive train surfaces are machined. The factory employs a computer-controlled hydraulically driven cutting machine to finish the drive surfaces to the necessary tolerances.¹⁶¹

Figure 4.2

M113 interior fit-out on the major upgrade assembly line



Source: ANAO fieldwork at Bandiana production facility, 13 August 2008.

4.6 After painting and inspection, extended hulls that meet specifications are delivered to Defence by the Prime Contractor. This concludes the M113 upgrade work performed under the CSP contract. Defence then inducts the extended hull into the assembly process, handing it back to the Prime Contractor to commence work under the M113 Major Upgrade Contract.

4.7 In reality, the conclusion of work under the CSP contract and commencement of work under the Major Upgrade Contract occurs under the main factory roof. The extended hull moves out of the hull extension bays and into the first of the Prime Contractor's five assembly bays.

¹⁶¹ Known as a computer numeric cutting machine or CNC machine.

4.8 As the extended hull moves through each successive assembly bay, it is fitted with suspension and road wheels; hydraulics, electrics and internal fittings; the engine and drive train; and, finally, the turret and tracks. Components of the upgraded M113, such as the engine and gearbox and the driver and the turret controls, are run and/or tested during assembly. The Prime Contractor 'road-tests' the vehicle after assembly is complete. Defence staff are on-site to inspect, review and sign-off on successive stages of construction, assembly and acceptance, and to draw the Prime Contractor's attention to defects or construction that is outside specifications.

Vehicle delivery schedule

4.9 Likely delays in the delivery of the upgraded vehicles were evident within eighteen months of the commencement of the Major Upgrade Contract. As discussed in Chapter 3 paragraph 3.10, from early 2005 the Prime Contractor was alerting Defence to the likelihood of delays in delivering 350 vehicles on time. In March 2006, the then Minister was advised that that the first vehicles would be introduced in to service in May 2006 (rather than December 2005) and that the final vehicles would not be received until September 2011 (rather than December 2010).

4.10 In November 2006, the Prime Contractor advised Defence that, without early payment for work under Stage 3, there would be further delays. In the circumstances, they had revised their planned production, which would now see 19 vehicles produced by July 2007 and formal movement into Stage 3 (final production) in September 2007:

[We] would then plan on producing a further 13 vehicles by the end of 2007 after which there will be a hiatus in production. Preliminary planning indicates that the disruption to production would be of the order of 12 to 14 months long and final production deliveries will not take place until late 2012.¹⁶²

4.11 The Chief of Army was first advised formally of potential schedule delays by CDG in February 2007. In March 2007, the Chief Executive Officer of DMO advised the Chief of Army of likely delays in the delivery of 350 vehicles from late 2010 to mid 2012.

¹⁶² Correspondence from the Prime Contractor to DMO, 13 November 2006.

4.12 As discussed in Chapter 3, recovering delays in the scheduled delivery of vehicles was one of the chief outcomes sought by Defence during Global Settlement negotiations.¹⁶³ While Defence had considered whether to negotiate a delayed schedule of deliveries,¹⁶⁴ it entered Global Settlement negotiations with the aim of ensuring that 350 vehicles would be delivered by December 2010, as provided for in the original 2002 M113 Major Upgrade Contract.

4.13 In September 2007, during Global Settlement negotiations, the Prime Contractor proposed revised schedules to extend the M113 hulls and assemble all the upgraded vehicles. The Prime Contractor proposed steadily increasing the rate of hull extension from an average of three per month in the first half of 2008 to ten per month by the beginning of 2009. Similarly, assembly of the upgraded vehicles was to rise from 3 per month in mid 2008 to 12 per month early in 2009. The last eight hulls were scheduled to be extended in November 2010, with the last seven upgraded vehicles assembled the next month.

4.14 At the close of Global Settlement negotiations in October 2007, Defence's negotiating team reported to the Head of Land Systems that draft amendments to the M113 Major Upgrade Contract had been agreed with the Prime Contractor and were ready for consideration. They included a revised schedule of milestones (corresponding to the schedule proposed by the Prime Contractor in September 2007) that met the 'trade-off limit on schedule, which was final delivery on or before December 2010'. The resulting compression of the vehicle delivery schedule is illustrated in Figure 4.3.

4.15 Meeting the schedule agreed under the Global Settlement requires the Prime Contractor to increase their rate of production by almost 70 per cent (from an average of six vehicles per month to an average of more than 10 vehicles per month) over the 30 months up to December 2010.

4.16 The sequence of production commences with all the recovery vehicles (the ARVLs) and the fitters vehicles (the AFs) in mid 2008, finishing by March 2009. Production was then to revert almost entirely to APCs until they are completed by January 2010. This would mark the final production of all the

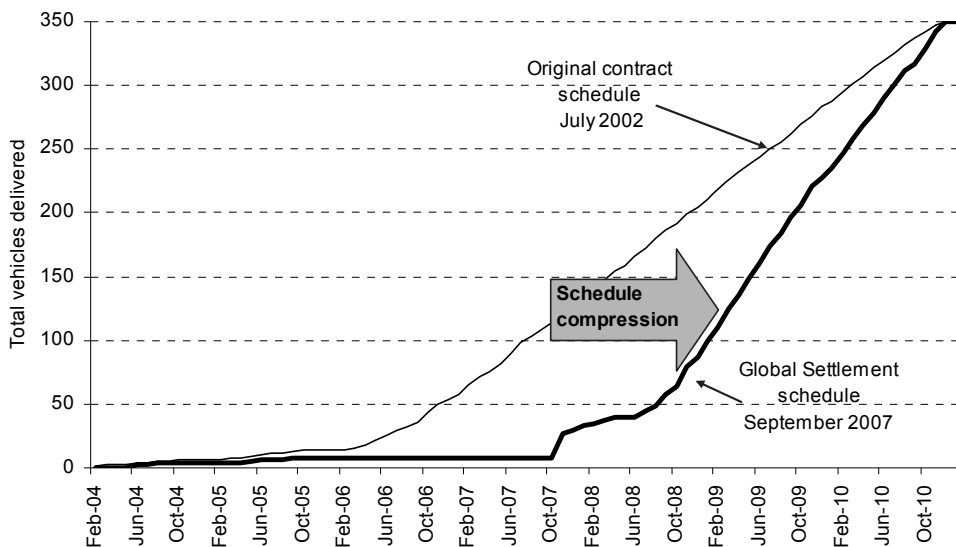
¹⁶³ Defence authorised its Global Settlement negotiators to 'negotiate schedule milestone changes that ensure that Introduction into Service is achievable by November 2007 and ensure that the last vehicle of the last variant [is] delivered by December 2010'.

¹⁶⁴ Defence advised ANAO that a December 2006 proposal, endorsed by DMO, to accept some schedule slippage as part of the negotiations was not acted on after encountering delays in the negotiations. Defence advised that subsequently, 'a delayed vehicle delivery schedule was not further contemplated'.

upgraded M113 variants accepted by Defence under the Production Readiness Reviews completed in November 2007, immediately after Global Settlement.

Figure 4.3

Schedule compression at Global Settlement, September 2007



Source: ANAO analysis of the work breakdown structure in M113 Major Upgrade Contracts.

4.17 Production of the remaining four variants (under development during APC production) would then commence, on the basis that their design acceptance and Production Readiness Reviews had been progressively completed. All but seven logistics vehicles (ALVs) would be produced between January and May 2010, all command vehicles (ACVs) by September 2010, with the remaining ALVs, ambulances (AAs) and mortars (AMs) produced by December 2010.

4.18 Defence was not able to provide ANAO with a contemporaneous analysis of the feasibility of the delivery schedule agreed as part of the Global Settlement. Defence advised Parliament in May 2008 that:

This is a high risk production schedule.¹⁶⁵

¹⁶⁵ Department of Defence (2008), *Portfolio Budget Statements 2008–09*, p. 181.

Managing schedule risks

4.19 DMO's M113 Project Office monitors the production schedule and regularly liaises with the Prime Contractor on schedule changes. These typically involve re-scheduling production entry or exit dates for hulls of particular variants, depending (for instance) on the availability of components or on the need to re-work hulls or assembled vehicles.

4.20 The M113 Project Office chairs regular meetings with Army, at which the production schedule is translated into an agreed Order of Issue¹⁶⁶ of upgraded vehicles to Army units. Capability Development Group is also represented at these meetings.

4.21 In April 2008, the M113 Project Office and Army met and agreed to bring forward the original schedule for producing the AF and ARVL variants, as the Prime Contractor advised that turrets for the APC would be delayed. They also agreed arrangements for withdrawing existing M113s from units so that they could enter the upgrade process, and arrangements for training personnel to operate the upgraded vehicles. Defence has documented and evaluated risks to the post-Global Settlement production schedule, such as:

- the successful development and acceptance of the four later variants (the ALV, ACV, AA and AM), without technical difficulties of the kind that delayed the first three variants (the APC, ARVL and AF);
- accelerating the rate of production, which is dependent on the Prime Contractor being able to attract, train and retain qualified workers, especially welders; and
- the early and effective introduction of any additional facilities needed to accelerate the production process.

4.22 Table 4.1 summarises the documented M113 upgrade project risks with the potential to adversely affect the schedule of delivery, as at mid-2008. In keeping with good risk management practice, Defence has identified the steps it can take to mitigate each risk and a fall-back position if mitigation is less than optimal.

¹⁶⁶ The Order of Issue sets out the schedule for the delivery of the upgraded M113s to Army units. It is agreed between DMO and Army, based on the most current production schedule.

Table 4.1

Key risks to the schedule for the M113 upgrade project, June 2008

| | Risk | Mitigation | Fall-back | Assessment |
|------------|---|---|---|--|
| Design | AA design may not satisfy Army requirements | Defence to have significant input into the design | Re-prioritise requirements, work around shortfalls | Possible , severe impact on cost, severe impacts on schedule |
| | Problems with the ALV due to extra length of hull extension | Defence to have significant input into the design | Defence to conduct extensive reliability testing | Possible , moderate impact on cost, severe impact on schedule |
| | ACV design may not satisfy Army requirements | Defence to have significant input into the design | Re-prioritise requirements, work around shortfalls | Unlikely , moderate impact on cost, severe impact on schedule |
| Production | Prime Contractor can't attract, retain qualified workers, welders | Defence to assist, financial incentives for employees | Delay end of project until after 2010 | Likely , major impact on cost, major impact on schedule |
| | Bandiana unable to support higher rates of production | Upgrade facilities | Delay end of project until 2012 | Possible , major impact on costs |
| | Prime Contractor's schedule is overly optimistic, unworkable | Defence and Prime Contractor work out a realistic schedule | Defence explores other options for completion | Unlikely , insignificant impact on costs, severe impact on schedule |
| Logistics | Defence does not have enough communications harnesses | Defence locates all harnesses, orders more (approx 12 months) | Delay issuing vehicles to units until orders received | Unlikely , severe impact on cost, severe impacts on schedule |
| | Not enough upgraded vehicles to train operators | Ensure spares for repair, new vehicles to School of Armour | Continue utilising Initial Production Vehicles for training | Possible , moderate impact on cost, major impact on schedule |

Source: ANAO analysis of Defence's M113 Upgrade Risk Log, June 2008.

4.23 Table 4.1 also reports Defence's assessment of the likelihood and potential impact of each risk *after* mitigation, showing that, at June 2008, there remained major or severe risks to schedule arising from the design of the remaining variants, the ability of the Prime Contractor and the facilities to accommodate the compressed delivery schedule, and logistics issues.

4.24 The risks to the project schedule logged by Defence are congruent with the advice given to Parliament in the course of the 2008-09 Budget:

The logistic vehicle [ALV] encompasses a new hull design and will be the most technically challenging of the remaining vehicle variants. A comprehensive development test program has been scheduled to continue through to early 2009.

The contractor is to commence a second shift at the production facility in mid-2008. The contractor remains committed to the delivery of the last vehicle as contracted in December 2010. Defence assesses that this is a high risk production schedule as the required number of production personnel to support a second shift will be difficult for the contract to recruit.

[The Prime Contractor] has established specialist training to qualify non-tradespersons in the required production line tasks. The contractor forecasts that the project will be completed in December 2010, in accordance with the contract schedule.¹⁶⁷

4.25 At the time of the 2008-09 Budget, Defence advised the Parliamentary Secretary for Defence Procurement that:

In order to achieve the Full Operational Capability milestone¹⁶⁸ by December 2010, the [Prime Contractor] is ramping up deliveries through dual production lines.¹⁶⁹ Short term schedule delays are likely to occur at various times due to skills shortages and component delays. These short delays are being accommodated within normal tolerances and, with active project office attention should not delay the Full Operational Capability milestone.

In summary, the delivered vehicles are performing well. There is sufficient funding to deliver the full scope of work and the schedule is re-established

¹⁶⁷ Department of Defence (2008), *Portfolio Budget Statements 2008-09*, p. 181.

¹⁶⁸ ANAO notes that 'Full Operational Capability' is not a milestone in the M113 Major Upgrade Contract.

¹⁶⁹ This appears to be a reference to the Prime Contractor employing a second shift on the hull extension production line, rather than the physical establishment of a second production line for hull extension or for vehicle assembly. ANAO confirmed with Defence during its August 2008 site visit to the Bandiana production facilities that there was a single assembly line, and Defence advised that the hull extension area was running both a morning shift and an afternoon shift.

with the [*Prime Contractor*] to deliver all vehicles by December 2010. Defence assesses that the residual project risks are now sufficiently under control and are rated at sufficiently low to remove the need for the high-level management oversight accorded projects on the 'Projects of Concern' list.¹⁷⁰

4.26 Subsequently, the Parliamentary Secretary announced that the M113 upgrade project was now back on track and estimated to meet its original schedule and specifications within budget.

Production at [*the Prime Contractor's*] Bandiana facilities is now being ramped up from approximately four vehicles per month to more than 10 vehicles per month to achieve the delivery of the final vehicle by December 2010, in accordance with the original schedule.¹⁷¹

Production facilities at Bandiana

4.27 ANAO visited the production facilities at Bandiana in August 2008 to observe operations, examine relevant records and discuss production with Defence and the Prime Contractor. ANAO found evidence of significant delays in extending M113 hulls. Defence advised that, at that time, over 100 hulls had been stripped, inspected, grit-blasted and were awaiting entry to the factory. A sample of the stripped hulls is shown in Figure 4.4.

¹⁷⁰ Briefing from DMO to the Parliamentary Secretary for Defence Procurement, 7 May 2008, paragraph 8, copies to Minister for Defence, Chief of the Defence Force, Chief of Army, Secretary of Defence, CEO of DMO and others.

¹⁷¹ The Hon Greg Combet MP, Parliamentary Secretary for Defence Procurement (2008), *M113 Upgrade Project back on track*, Media Release 021/2008, 22 May.

Figure 4.4**Stripped M113 hulls awaiting extension**

Source: ANAO fieldwork at Bandiana production facility, 13 August 2008.

4.28 The bottleneck in extending M113 hulls was due, to some degree, to the need to re-work extended hulls to correct faults before they could enter the assembly line. The faults included incorrectly fitted brackets and attachment points, poor fitting doors and hatches and problems with the machining of some drive train surfaces.

4.29 Some of the faults and consequent delays to vehicle assembly were attributed to variations in the build of the M113 hulls entering the factory. Were the original hulls uniform in size and build, hull extension would proceed more like a production line and less like a jobbing shop, with a corresponding higher rate of production. However, even after pre-production inspection, there were often significant variations between hulls, so that the work required to extend one hull often differed from that needed to extend the next. Defence advised ANAO in November 2008 that:

The rework rates are primarily managed by the [Prime] Contractor – Defence does not pay for re-work and therefore does not conduct formal analysis of

rework rates...any subsequent impact on the schedule is the responsibility of the Prime Contractor to correct.

4.30 Another potential source of delay to vehicle assembly identified by Defence is the scarcity of internal communication sets, discussed at paragraph 4.3. These are removed from M113s when the hulls are stripped and are then refurbished and refitted to the upgraded vehicles. However, fewer sets are available than anticipated and those that are available are also being used in Bushmasters. Defence's difficulties in replacing these sets are compounded by the long lead time required for their production.

Schedule slippage

4.31 The Prime Contractor advised Defence in July 2008 that, due to insufficient facilities at Bandiana, they would struggle to extend hulls at a rate sufficient to produce 350 upgraded M113s by December 2010.¹⁷² During ANAO's visit to Bandiana, the Prime Contractor confirmed to the ANAO its July 2008 advice to Defence that the production facilities at Bandiana were not adequate to meet the proposed production schedule for the upgraded M113s.

4.32 In the Prime Contractor's view, the Bandiana production site had been set up to meet the original production schedule agreed in 2002, rather than the compressed schedule proposed in September 2007 and agreed in October 2007 at Global Settlement. At that time, both parties had agreed to a production schedule under which 350 vehicles would be delivered by December 2010 (see paragraph 4.14). The Prime Contractor advised Defence that:

- delivering 350 upgraded M113s by December 2010 would necessitate extending five hulls per fortnight;
- a rate of four hulls per fortnight could be achieved by significantly expanding the Bandiana facilities, still leaving a shortfall of between 60 and 80 upgraded M113s at December 2010; and
- the present rate of hull extension of three hulls per fortnight at Bandiana, running at full capacity with two shifts, would result in a shortfall of approximately 100 upgraded M113s by December 2010.

¹⁷² Under the CSP contract, which encompasses M113 hull extension, the Commonwealth is responsible for providing the necessary facilities. ANAO notes that, as of 22 May 2008, the Prime Contractor had signed off on the completion of the last of the necessary improvements made to Bandiana production facility.

4.33 ANAO considers that the production risks previously identified by Defence, summarised in Table 4.1, have now been realised. To alleviate the shortfalls in production, in August 2008 the Prime Contractor proposed to Defence an expansion of the hull extension facilities at Bandiana and extending M113 hulls under the CSP contract at its Wingfield factory in South Australia or its Williamstown facility, in Melbourne, Victoria.

4.34 ANAO confirmed with the Prime Contractor that this would require transporting hulls from Bandiana to either facility, once they had been established with the requisite jigs and tools, including Computer Numeric Cutting (CNC) machines. Extended hulls would then be returned to Bandiana for assembly under the Major Upgrade Contract. The Prime Contractor also confirmed that it was proposing to reduce pressure on the Bandiana facilities by producing all nine of the armoured recovery vehicles (ARVLs) at its Wingfield factory.

4.35 In August 2008, Defence advised ANAO that it was considering a range of proposals from the Prime Contractor, on the basis that the 2010 contract end date should be met, at no additional cost to the Commonwealth. Recovering the production schedule for the first 350 upgraded vehicles is necessary if the additional 81 vehicles purchased under the ELF initiative are to be delivered by the end of 2011. In announcing the Government's approval to purchase the additional upgraded APCs, the Minister for Defence stated that:

[the Prime Contractor] is also opening additional facilities in Williamstown, Victoria and Wingfield, South Australia to ensure all of its delivery commitments are met'.¹⁷³

4.36 Based on advice from Defence and from the Prime Contractor, ANAO has applied the current production rates and those flagged by the Prime Contractor in August 2008 to develop estimates of the likely schedule for completion of the first 350 upgraded M113s at all three sites. The estimated schedules thus derived are shown in Table 4.2.

¹⁷³ The Hon Joel Fitzgibbon MP, Minister for Defence (2008), Government approves additional Armoured Personnel Carriers, Media Release 148/2008, 28 October.

Table 4.2

Recovering the M113 Major Upgrade production schedule

| | Production scenario | Hull extensions complete | Final vehicle produced | Slippage |
|---------------------------------------|---|--------------------------|------------------------|-----------|
| Base-line | Current rate of production at Bandiana (assembly line at 50 per cent capacity) | August 2014 | September 2014 | 45 months |
| Successive augmentation of production | Plus: Remaining ARVLs produced at Wingfield (assembly line at 50 per cent capacity) | May 2014 | June 2014 | 42 months |
| | Plus: Additional hull extension facilities at Bandiana from July 2009 (assembly line at 100 per cent capacity) | November 2011 | December 2011 | 12 months |
| | Plus: Additional hulls extended at Williamstown, Melbourne, from July 2009 (assembly line at 100 per cent capacity) | November 2010 | June 2011 | 6 months |
| | Plus: Two assembly line shifts from June 2009 (assembly line at 160 per cent capacity) | November 2010 | December 2010 | On time |

Source: ANAO analysis of advice from Defence and the Prime Contractor.

4.37 In March 2009, Defence advised that the Prime Contractor had accepted that it was wholly responsible for schedule recovery and that the following steps were being undertaken to recover the production schedule:

The contractor is providing temporary facility upgrades at Bandiana, at its own cost, to provide the required air and power services by April 2009. This work has commenced.

The Williamstown facility was inspected [by Defence] on 30 January 2009. The work bays have been established with all required services. The trunnion has been installed.

The first hull [extension] is underway at Williamstown and seven hulls are now held at this location.

Bandiana currently runs two shifts on the [hull extension] lines. This system will be extended into the [vehicle] assembly line if required; however, the [Prime Contractor] believes that efficiencies in the [vehicle] assembly process may negate the need for a second shift on the [vehicle] assembly line. These workers are not specialist tradespeople and are easier to recruit and train locally.

4.38 Defence advised in March 2009 that the cost of the additional work was being undertaken by the Prime Contractor and was either covered under the existing CSP contract or will not have a financial impact on the Major Upgrade Contract:

The contractor has accepted that it must meet all schedule recovery costs. The Commonwealth will hold the contractor to these obligations.

4.39 Defence and the Prime Contractor consider it feasible to recover schedule by establishing and bringing two new hull extension facilities to full production in a timely fashion, and by significantly raising the rate of vehicle assembly. Achieving this places a premium on Defence's close monitoring of progress and having in place strategies to respond to any further slippage. The risk remains that it may not be possible to achieve all the necessary improvements in a timely fashion.

M113 capability

4.40 The M113 continues to be important to Defence's future capability planning for Australia's land forces. The M113 Major Upgrade Contract cites the life of the upgraded vehicle as 20 years and Defence plans to keep M113s in service until at least 2020.

4.41 M113s are integral to the Hardened and Networked Army (HNA) initiative announced in 2005 at a cost of approximately \$1.5 billion. HNA is a ten year plan beginning in 2006 to 'increase the size and firepower of the land forces, improve the protection provided to our troops, and allow them to communicate better on the future battlefield'.¹⁷⁴ HNA intends to make Army more capable of sustaining its deployed forces through an increase in number of personnel.¹⁷⁵

¹⁷⁴ Department of Defence (2005), *The Hardened and Networked Army* (Defence Update 2005 supplement).

¹⁷⁵ Defence advice to ANAO, December 2008.

4.42 The upgraded M113 fleet is a key element of Army's mechanised capability.¹⁷⁶ HNA created an additional mechanised battalion, with 5/7 RAR separating into two mechanised battalions. Defence advised ANAO that 7 RAR will move to Adelaide by 2011 and 5 RAR will remain in Darwin, which will provide Army with two mechanised battalions. Both battalions will be equipped with upgraded M113s. To achieve this end, in October 2008, the Minister for Defence announced that additional 81 upgraded M113s would be procured under ELF 'to improve the capability of the Army's Mechanised Infantry units, 7 RAR, a recently established battalion, and 5 RAR, both of which are currently based in Darwin'.¹⁷⁷

Achieving capability

4.43 The *Defence Capability Development Manual* 2006 sets out the requirements for achieving capability, which is defined as:

the power to achieve a desired operational effect in a nominated environment, within a specified time, and to sustain that effect for a designated period.

4.44 Achieving an upgraded M113 capability commences with Introduction Into Service, a symbolic event that occurred on 17 November 2007 at the ceremonial handover of 4 APCs to Army at 7 RAR in Darwin.¹⁷⁸ Another 12 vehicles were delivered progressively from 7 December 2007 up until January 2008. In all, 7 RAR had received a total of 14 APCs, an AF and an ARVL at the time of this audit.

4.45 Capability is determined by reference to Fundamental Inputs to Capability. These are:

the standard list for consideration of what is required to generate 'capability'. The list is to be used by [Australian Defence Organisation] agencies at all levels and is designed to ensure that all agencies manage and report capability using a common set of management areas.

¹⁷⁶ Department of Defence (2006), responses to written questions on notice from Joint Committee of Public Accounts and Audit inquiry *Review of Auditor-General's Reports Nos. 43 (2004–05) to No.6 (2005–06)*, Management of the M113 Armoured Personnel Carrier Upgrade Project question 17.

¹⁷⁷ The Hon Joel Fitzgibbon MP, Minister for Defence (2008), *Government approves additional armoured personnel carriers*, Media Release 148/2008, 28 October.

¹⁷⁸ Department of Defence (2007), *Army's latest fighting vehicles arrive at 1 Brigade*, Media Release MSPA 435/07, 15 November.

4.46 Set out at Figure 4.5, the Fundamental Inputs to Capability are the component personnel, equipment and support systems that enable Defence to effectively deploy and sustain its forces.¹⁷⁹ They include, for example, the systems and arrangements for training personnel, administering equipment parts and spares and conducting maintenance, as well as those for overseeing and planning operations and exercises.

Figure 4.5

Fundamental inputs to capability

Organisation: the required personnel establishment, correct structure and the appropriate balance of skills.

Personnel: personnel who satisfy the necessary readiness requirements and have the competencies to perform the functions of their positions (skilled in performing both specialist and common military tasks).

Collective training: a comprehensive and on-going collective training regime validated against preparedness requirements.

Major Systems: those systems that have a unit cost of \$1m or more, such as armoured personnel carriers. Major systems are core components of capability.

Supplies: there are 11 different types of supplies, many of which need more consideration than just quantity (for example serviceability, configuration and operational viability). Examples of supplies are subsistence items; petrol, oils and lubricants; construction items; small arms and communication equipment; and repair parts.

Facilities: buildings, structures, property, plant and equipment, and areas for training and other purposes, as well as utilities and civil engineering support.

Support: a broad category that involves support to all areas of Defence, from communications and IT to research and development to administrative and logistical support. Support services may be provided by external organisations.

Command and Management: command and decision-making process and procedures at all levels of Defence needed to plan, apply, measure, monitor and evaluate agency functions. Command and management include written guidance such as instructions, directions and doctrine.

Source: Department of Defence (2006), *Defence Capability Development Manual*, pp. 4-5.

4.47 Capability is therefore more than solely having available a core component or a major system such as the M113. The upgraded M113s achieve capability when Defence can bring to bear inputs such as trained operators and maintainers, spare parts and maintenance equipment, and the administrative

¹⁷⁹ Department of Defence (2006), *Defence Capability Development Manual*, pp. 4-5.

apparatus necessary to integrate the M113s into its planning and operations. The practical effect of this doctrine is that, while major systems may be delivered and individually functional, they may not provide a capability unless all other relevant inputs are present.

Current status of upgraded M113 capability

4.48 Defence advised ANAO that, as of December 2007, the upgraded M113s issued to 7 RAR represented a limited Initial Operating Capability. If the circumstances required, they were available for operational tasks and overseas deployment. There is still some way to go before the requirements for Operational Release (summarised in Table 4.3) are met.

Table 4.3

Capability milestones for the first delivery of upgraded M113s

| Event/milestone | Description | Date achieved |
|---|---|----------------------------|
| In-Service Date | Symbolic date marking beginning of in-service phase | 15 November 2007 |
| Initial Operational Capability | First group of vehicles can be deployed | December 2007 ^A |
| Initial Release | Company issued with a full complement of vehicles, including all variants, vehicles ready for operational test & evaluation by Army | Yet to be achieved |
| Operational Testing and Evaluation | Dry and live firing activities in a domestic military training area, completion of Mission Essential Tasks | Yet to be achieved |
| Operational Release | Capability proven effective and in all respects, vehicles ready for operational service | Yet to be achieved |
| Notes: A Defence advice to ANAO, December 2008. The <i>Defence Capability Development Manual</i> typically shows Initial Operating Capability achieved by prior completion of Initial Release, Operational Testing and Evaluation and Operational Release. | | |

Source: ANAO analysis of *Defence Capability Development Manual*, pp. 89-91; Defence advice to ANAO, December 2008.

4.49 Defence advised in March 2009 that:

Full Operational Capability requires all 431 vehicles to be delivered ... and is currently programmed for December 2011 due to the inclusion of the additional 81 vehicles for the ELF component. Even discounting the ELF

vehicles, Full Operational Capability for the original 350 vehicles was planned for July 2011.

4.50 Defence is managing a range of competing priorities, including the 'Raise, Train and Sustain' functions, the introduction into service of equipment delivered through the Defence Capability Plan, and supporting current and future operations:

These competing responsibilities are, on occasion, mutually exclusive. [*The*] introduction into service [*of the upgraded M113s*] was a case in point.

In 2008, based on a high operational tempo, the Chief of Army took the decision that support to current and ongoing operations outweighed the requirement to prioritise and synchronise [*upgraded M113*] fundamental inputs to capability and introduction into service. Accordingly, soldiers who were posted to Army's mechanised units, 5 RAR and 7 RAR, deployed overseas on operations.

With soldiers deployed on operations, personnel are unavailable for individual training [*for upgraded M113s*]. In turn this impacts on future throughput requirements for training establishments and the ability to conduct collective training.

Considered cumulatively, support to ongoing operations delays [*achieving*] Full Operational Capability [*for the upgraded M113s*]. It is important to note that Army is focusing its resources on the issue of prime import, support to current operations. The resulting opportunity cost is known and accepted.

4.51 Consistent with this advice, ANAO's September 2008 visit to Robertson Barracks in Darwin (base for 7 RAR) found that 7 RAR had not yet to put the upgraded M113s to regular use. A significant factor was that new M113 crews, replacing those that had been deployed overseas, had only just completed their training. Other contributing factors were deficiencies in tools and equipment for the upgraded vehicles, and difficulties in securing repair spares parts. Specifically, ANAO found:

- certain spare parts, tools and testing equipment needed to deploy and sustain the upgraded vehicles were over 12 months late. As at September 2008, 7 RAR manifests showed deficiencies ranging from missing screwdrivers and first aid kits through to missing LPG gas cutting kits and specialist laptop accessories, and
- evidence of extended delays in obtaining repair spare parts.

4.52 DMO subsequently advised ANAO in November 2008 that:

Although some items were delivered as part of the introduction into service activities, some items were missing. Some [*items for the Armoured Fitter and Armoured Recovery Vehicle*] were not available. In March 2008, DMO addressed the deficiency list provided by 7 RAR in February 2008. The missing items have been dispatched as they have become available. [*DMO has*] now issued the majority of the missing items.

4.53 ANAO found that the 16 upgraded M113s delivered to Darwin did not fully met Army's acceptance requirements. They were not fully compliant against Army's Technical Regulatory Framework and were provisionally accepted, principally because the maintenance and user manuals had yet to be consolidated to reflect the actual build state of the vehicles.¹⁸⁰

4.54 The provisional design acceptance certificates¹⁸¹ issued for the first 16 M113s introduced into service are valid until December 2008. In order for the vehicles to achieve full design acceptance, the DMO fleet or project manager must finalise all outstanding design issues, including finalisation of the user and maintenance manuals, and obtain sign off from the Design Acceptance Authority Representative.

Vehicle use

4.55 The combined impact of schedule delays, overseas deployments and deficiencies in tools, spare parts and testing equipment has been to significantly limit 7 RAR's use of the upgraded M113s, particularly for training exercises.¹⁸² Up until May 2008, 7 RAR's M113s had travelled a combined total of 974 kilometres over approximately 160 hours of operation, or an average 61 kilometres and ten hours operation per vehicle.

¹⁸⁰ Among the unconsolidated items were the brake designs, the operating instructions for the ARVL Winch, the stowage designs for the AF and ARVL, and the height settings for the turret joystick.

¹⁸¹ Provisional design acceptance certificates are issued after the Prime Contractor applies for a deviation for the completed vehicles, on the basis that they do not fully conform to contract specifications. Accordingly, DMO accepts the deviations and takes custody of the vehicles and delivers them to Army, where the M113 Design Acceptance Authority Representative signs provisional design acceptance certificates certifying that the technical integrity of the vehicles is satisfactory, subject to listed constraints, and that risk mitigation strategies have been adopted. Army signs off that the risk mitigation strategies are acceptable for operating the vehicles.

¹⁸² ANAO was advised that the crews originally trained to operate the vehicles had been rotated to other duties in May 2008. Since then, the vehicles had not been driven. 7 RAR expected to have trained crews available from September 2008.

4.56 Exercise training has been very restricted. 7 RAR had originally intended using the upgraded M113s in a March 2008 training exercise. Defence advised ANAO that the first training exercise involving the upgraded vehicles took place in November 2008:

Seven Armoured Personnel Carriers, one Fitter and one Recovery [vehicle] were involved in the conduct of a 7 RAR training activity. This training was conducted over an eight day period and involved road run from Robertson Barracks to Mount Bunday Training Area, platoon manoeuvre, and live fire activity on Mount Bunday Training Area.¹⁸³

4.57 The major use of the upgraded M113s has been for driver and crew training purposes at Defence's Puckapunyal training grounds and with the School of Armour, accounting for some 93 per cent of the 130 000 kilometres travelled by all upgraded vehicles to December 2008. By that date, 7 RAR's vehicles had increased their average use from 61 kilometres to almost 540 kilometres per vehicle.

Defects and warranty claims

4.58 Early use of the upgraded vehicles is important in order to identify faults and defects for rectification or for claim under the warranty provisions of the M113 Major Upgrade Contract. The warranty provisions in the Contract highlight the importance of making claims within the first 12 months of supply:

The Contractor shall remedy by repair, replacement or modification, defects in design, materials and workmanship in the Supplies notified to the Contractor by the Project Authority during the period of 12 months, 350 engine hours or 2000 kilometres (as applicable), whichever is earlier.¹⁸⁴

4.59 As of September 2008, 76 Reports of Defective or Unsatisfactory Materiel (RODUMs) had been lodged for the upgraded M113s, and six warranty claims lodged with the Prime Contractor. RODUMs are Defence's mechanism for highlighting faults in materiel and setting in motion rectification and/or warranty claims. Each RODUM describes the defect or deficiency; the related circumstances; the probable cause; any subsequent

¹⁸³ Defence advice to ANAO, December 2008.

¹⁸⁴ The M113 Major Upgrade Contract also provides that if the vehicles are placed in storage immediately upon acceptance, the warranty period is 24 months from acceptance or, should the vehicles be used before the end of this 24 month period, the period is 12 months from acceptance less half the period spent in storage. Conditions of storage must conform to the Contractor's reasonable storage instructions.

action taken; and a recommendation for rectification. The nature of the RODUMs to date range from missing items (such as battery maintenance chargers) to defects in vehicle assembly (such as incorrect or cracked welds). ANAO notes that such issues are not unexpected when delivering major new systems.

4.60 Most of the 75 RODUMs were raised by the M113 training teams at Puckapunyal and by the School of Armour, with 17 notified by 7 RAR. This reflects 7 RAR's less extensive use of the upgraded M113s, which has, in turn, restricted possible warranty claims for the vehicles most likely to be involved in combat exercises and training with combined arms teams.

Future rollout and contingency planning

4.61 The next scheduled delivery to Army of upgraded M113s is set for July to September 2009, involving 67 APCs, 13 AFs and 7 ARVLs. Defence advised ANAO in November 2008 that current planning is for these vehicles to go to 1 Combat Engineer Regiment, 5 RAR and 7 RAR, all based in 1 Brigade. However: 'due to 1 Brigade operational commitments, this may change to suit 1 Brigade's needs and the Upgrade Project will continue to revise its plans as required'.¹⁸⁵ Defence also advised that between April 2008 and October 2008, 13 vehicles were delivered to the School of Armour and one to the Army School of Electrical and Mechanical Engineering for training.

4.62 Defence's assessment is that, to date, delays in the development of upgraded M113 capability have been manageable. The Chief of Army informed Parliament in May 2007 that:

Our operational requirement at the moment does not need [*the upgraded M113*] to go anywhere. The ASLAV and the Bushmaster are serving those purposes offshore. So in terms of current equipment, it is not letting us down—the fact that we do not have the upgraded M113.¹⁸⁶

4.63 Defence advised ANAO in December 2008 that:

¹⁸⁵ At the time of this audit, Army's Order of Issue shows 1 Combat Engineer Regiment receiving 10 vehicles by December 2009 (2 in June 2009 and 8 in December 2009), 5 RAR receiving 51 vehicles by December 2009 (4 in December 2008, 19 in June 2009 and 28 in December 2009), and 7 RAR receiving an additional 35 vehicles by December 2009 (3 in December 2008, 16 in June 2009 and 16 in December 2009).

¹⁸⁶ Commonwealth Parliamentary Debates (2007), Senate Foreign Affairs, Defence and Trade committee, *Budget estimates 2007–2008*, 30 May, p. 109.

The development of the [upgraded M113] capability is adversely impacted by support to operations. This cost has been assessed and accepted by Chief of Army as Capability Manager. Indeed, the cost is manageable within Army's wider priorities and strategic guidance.

4.64 In the circumstances, Defence has used other vehicles, such as the ASLAV and Bushmaster, and continued to operate its fleet of old M113s. In Defence's view, further minor delays in upgrading the M113 fleet are likely to be manageable. However, ANAO notes that prolonged delays would raise other issues, including the logistic problems of running mixed fleets of old M113s alongside upgraded M113s that share few common parts and require some different training.

4.65 Defence also acknowledges that the vehicles are likely to face increasing threats and it is considering a range of enhancements to the upgraded M113s should they be deployed on more hazardous missions. The enhancements, at a potential additional cost of approximately \$0.2 million per vehicle, could include :

- automatic fire suppression;
- air conditioning;
- belly plate armour to improve protection against mines;
- crew seats hung from the ceiling rather than attached to the floor, in order to minimise the impact on occupants from blasts under the hull; and
- bar armour on the vehicles' exterior to reduce the impact of Rocket Propelled Grenades.

4.66 In Defence's view, building such enhancements at this time would take considerable time and resources, with potential knock-on delays to the production of upgraded vehicles.

4.67 An overarching consideration is that the old M113 fleet cannot continue operating effectively for an indefinite period, and Defence is currently planning for the timely replacement of *all* its M113s.

4.68 Flagged by Defence under the LAND 400 project, Defence's previously published intention was to begin replacing M113s and ASLAVs from around 2015,¹⁸⁷ four years after the last delivery of the additional 81 upgraded M113s to be acquired under the ELF initiative. Defence's current assessment is that there are, as yet, no viable alternatives to the M113.



Ian McPhee

Auditor-General

Canberra ACT

27 March 2009

¹⁸⁷ LAND 400 is the project to replace Army's combat systems: Bushmasters, ASLAVs and M113s, and is planned to be implemented from 2015-2017 onward. See Department of Defence (2007) *LAND 400 Update*, Capability Development Group, <<http://www.defence.gov.au/capability/LEWGBRIEFS/default.asp>> [accessed 13 March 2009].

Appendix

Appendix 1: Defence's detailed comments in response to the audit's recommendations

Recommendation No.1

1. Agreed.
2. The *Defence Procurement Policy Manual* (DPPM) is the primary reference document for Defence procurement. The DPPM must comply with Commonwealth legislation and policy, as well as a range of internal Defence guidance
3. Many issues listed in Recommendation 1 are already addressed in DPPM V.6.6 Chapter 6.7 p.6.7.3 paragraph 14-15 which states that: where the proposed contract amendment will increase the value of the contract, Proposal Approval must also be exercised for the additional amount. Guidance on exercising Proposal Approval, including the competency requirements for Proposal Approvers, is contained in Section 1, Chapter 1.4 and Annex 6E contains a Contract Change Proposal Checklist.
4. In addition to the DPPM, DMO has specified and applied financial thresholds for the approval of changes to capital acquisition projects via DMI (FIN) 7/2005.
5. However, as the DMI (FIN) is a DMO specific instruction, DMO agrees to consider whether the DPPM should be reviewed to provide additional guidance on an appropriate threshold for determining changes in scope to acquisition projects or whether this additional guidance is more appropriately located in the Defence or DMO [Chief Executive Instructions (CEIs)].

Recommendation No.2

6. Agreed.
7. DPPM V6.6 Chapter 6.4 [Paragraphs 37-40 provides clear policy guidance on the circumstances in which prepayments (mobilisation payments) will be considered for inclusion in future major acquisition contracts. For example:

Mobilisation payments

37. A mobilisation (or advance) payment is a payment made to the contractor early in the contract period prior to the delivery of any supplies or achievement of any milestones. A mobilisation payment provides the contractor with funding to assist it to procure items required in order for it to fulfil obligations under the contract.

38. A mobilisation payment should only be paid under a contract where the contractor its subcontractors will incur significant non-recurring ramp-up costs, including the cost of procuring plant, machinery, materials and facilities for use in the production of supplies. A mobilisation payment will not usually be required for commercial-off-the-shelf acquisitions or procurements off a well established production line where only minor modifications to the products are required. The cost of money with the required ramp-up costs should be considered when determining the need for and amount of any mobilisation payment.

39. Only one mobilisation payment should be paid to the contractor under the contract. **Mobilisation payments will usually be for between 5-15% of the contract price.** Consideration should be given to the entire payment regime for the contract when determining an appropriate amount for the mobilisation payment. Where the contractor will be paid earned value payments, the contractor will be able to progressively claim a percentage of the cost of the upfront material and labour required by the contractor and therefore a mobilisation payment may not be required or the amount required may be less.

40. Where a mobilisation payment is paid it must be secured by a financial guarantee from a suitable financial institution (see Section 6, Chapter 6.2). Depending upon the value of the contract and the financial stability of the contractor, the mobilisation payment security may be for between 50% and 100% of the value of the mobilisation payment.

8. DMO shall consider inclusion in the DPPM of a requirement in submission for Contract Approval, for contracts using mobilisation payments, that a value for money justification be included for the delegate's review (including, where available, a value for money assessment by Financial Investigation Services) and additional guidance on the timing of repayment – i.e. at the earliest opportunity.

Recommendation No.3

9. Agreed.
10. DMO has extensively updated (as of 17 December 2008) advice on Liquidated Damages in the DMO CEIs. These CEIs include:
 - DMO CEI 8.2 Management of Claims by or against the Commonwealth.
 - DMO CEI 8.4 Settlement of Claims
 - DMO CEI 8.7 Liquidated Damages.
11. DMO has also provided these documents to Defence CFO [Group] for their consideration.
12. Liquidated Damages are dealt with at the Defence and DMO CEI level, the DPPM, the ASDEFCON templates and may also be included in DMI (FIN)s and the proposed DMI (PROC)s.
13. DMO shall consider whether current DMO policy provides sufficient guidance regarding application of liquidated damages to individual milestones (i.e. clearly identified, key contract and critical project milestones).

Series Titles

ANAO Audit Report No.1 2008–09

Employment and Management of Locally Engaged Staff

Department of Foreign Affairs and Trade

ANAO Audit Report No.2 2008–09

Tourism Australia

ANAO Audit Report No.3 2008–09

Establishment and Management of the Communications Fund

Department of Broadband, Communications and the Digital Economy

Department of Finance and Deregulation

ANAO Audit Report No.4 2008–09

The Business Partnership Agreement between the Department of Education, Employment and Workplace Relations (DEEWR) and Centrelink

Department of Education, Employment and Workplace Relations

Centrelink

ANAO Audit Report No.5 2008–09

The Senate Order for Departmental and Agency Contracts (Calendar Year 2007 Compliance)

ANAO Audit Report No.6 2008–09

Illegal, Unreported and Unregulated Fishing in the Southern Ocean

Australian Customs Service

ANAO Audit Report No.7 2008–09

Centrelink's Tip-off System

Centrelink

ANAO Audit Report No.8 2008–09

National Marine Unit

Australian Customs Service

ANAO Report No.9 2008–09

Defence Materiel Organisation—Major Projects Report 2007–08

ANAO Audit Report No.10 2008–09

Administration of the Textile, Clothing and Footwear Post–2005 (SIP) Scheme

Department of Innovation, Industry, Science and Research

ANAO Audit Report No.11 2008–09

Disability Employment Services

Department of Families, Housing, Community Services and Indigenous Affairs

Department of Education, Employment and Workplace Relations

ANAO Audit Report No.12 2008–09

Active After-school Communities Program

Australian Sports Commission

ANAO Audit Report No.13 2008–09

Government Agencies' Management of their Websites

Australian Bureau of Statistics

Department of Agriculture, Fisheries and Forestry

Department of Foreign Affairs and Trade

ANAO Audit Report No.14 2008–09

Audits of Financial Statement of Australian Government Agencies for the Period Ending June 2008

ANAO Audit Report No.15 2008–09

The Australian Institute of Marine Science's Management of its Co-investment Research Program

Australian Institute of Marine Science

ANAO Audit Report No.16 2008–09

The Australian Taxations Office's Administration of Business Continuity Management

Australian Taxation Office

ANAO Audit Report No.17 2008–09

The Administration of Job Network Outcome Payments

Department of Education, Employment and Workplace Relations

ANAO Audit Report No.18 2008–09

The Administration of Grants under the Australian Political Parties for Democracy Program

Department of Finance and Deregulation

ANAO Audit Report No.19 2008–09

CMAX Communications Contract for the 2020 summit

Department of the Prime Minister and Cabinet

ANAO Audit Report No.20 2008–09

Approval of Funding for Public Works

ANAO Audit Report No.21 2008–09

The Approval of Small and Medium Sized Business System Projects

Department of Education, Employment and Workplace Relations

Department of Health and Ageing

Department of Veterans' Affairs

ANAO Audit Report No.22 2008–09

Centrelink's Complaints Handling System

Centrelink

ANAO Audit Report No.23 2008–09

Management of the Collins-class Operations Sustainment

Department of Defence

ANAO Audit Report No.24 2008–09

The Administration of Contracting Arrangements in relation to Government

Advertising to November 2007

Department of the Prime Minister and Cabinet

Department of Finance and Deregulation

Department of Education, Employment and Workplace Relations

Department of Health and Ageing

Attorney-General's Department

ANAO Audit Report No.25 2008–09

Green Office Procurement and Sustainable Office Management

ANAO Audit Report No.26 2008–09

*Rural and Remote Health Workforce Capacity – the contribution made by
programs administered by the Department of Health and Ageing*

Department of Health and Ageing

ANAO Audit Report No.27 2008–09

Management of the M113 Armoured Personnel Carrier Upgrade Project

Current Better Practice Guides

The following Better Practice Guides are available on the Australian National Audit Office Website.

| | |
|--|-----------|
| Developing and Managing Internal Budgets | June 2008 |
| Agency Management of Parliamentary Workflow | May 2008 |
| Public Sector Internal Audit | |
| An Investment in Assurance and Business Improvement | Sep 2007 |
| Fairness and Transparency in Purchasing Decisions | |
| Probity in Australian Government Procurement | Aug 2007 |
| Administering Regulation | Mar 2007 |
| Developing and Managing Contracts | |
| Getting the Right Outcome, Paying the Right Price | Feb 2007 |
| Implementation of Programme and Policy Initiatives: | |
| Making implementation matter | Oct 2006 |
| Legal Services Arrangements in Australian Government Agencies | Aug 2006 |
| Preparation of Financial Statements by Public Sector Entities | Apr 2006 |
| Administration of Fringe Benefits Tax | Feb 2006 |
| User-Friendly Forms | |
| Key Principles and Practices to Effectively Design and Communicate Australian Government Forms | Jan 2006 |
| Public Sector Audit Committees | Feb 2005 |
| Fraud Control in Australian Government Agencies | Aug 2004 |
| Security and Control Update for SAP R/3 | June 2004 |
| Better Practice in Annual Performance Reporting | Apr 2004 |
| Management of Scientific Research and Development Projects in Commonwealth Agencies | Dec 2003 |
| Public Sector Governance | July 2003 |
| Goods and Services Tax (GST) Administration | May 2003 |

| | |
|--|-----------|
| Building Capability—A framework for managing learning and development in the APS | Apr 2003 |
| Administration of Grants | May 2002 |
| Performance Information in Portfolio Budget Statements | May 2002 |
| Some Better Practice Principles for Developing Policy Advice | Nov 2001 |
| Rehabilitation: Managing Return to Work | June 2001 |
| Business Continuity Management | Jan 2000 |
| Building a Better Financial Management Framework | Nov 1999 |
| Building Better Financial Management Support | Nov 1999 |
| Commonwealth Agency Energy Management | June 1999 |
| Security and Control for SAP R/3 | Oct 1998 |
| Controlling Performance and Outcomes | Dec 1997 |
| Protective Security Principles (in Audit Report No.21 1997–98) | Dec 1997 |