

The Auditor-General
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Performance Audit

Management of the Collins-class Operations Sustainment

Department of Defence

Australian National Audit Office

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Canberra ACT
25 February 2009

Dear Mr President
Dear Mr Speaker

The Australian National Audit Office has undertaken a performance in the *Department of Defence* in accordance with the authority contained in the *Auditor-General Act 1997*. I present the report of this audit and the accompanying brochure to the Parliament. The report is titled *Management of the Collins-class Operations Sustainment*.

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



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.

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Abbreviations

ADF	Australian Defence Force
AEO	Authorised Engineering Organisation
ANAO	Australian National Audit Office
APL	Assembly Parts List
ASC	ASC Pty Ltd
ASDEFCON	Australian Defence Contracting
ASRV	Australian Submarine Rescue Vehicle
BAE	BAE Systems Australia Limited
BDL	Base Direct Labour
CDIA	Cal Dive International Australia Pty Limited
CEO	Chief Executive Officer
COLSPO	Collins Systems Program Office
DA	Design Authority
DGNPT	Director General Navy Personnel Training
DISSUB	Disabled submarine
DMDR	Defective Material and Design Report
DMO	Defence Materiel Organisation
DNOP	Directorate of Naval Officers' Postings
DNV	Det Norske Veritas Marine Classification Society
DNWM	Directorate of Navy Workforce Management
DSCM	Directorate of Sailor Career Management
DSME	Directorate of Submarine Engineering
DSR	Demand Satisfaction Rates

ELSS	Emergency Life Support Services
FCD	Full Cycle Dockings
FDA	Fraser Diving Australia
FDI	Fraser Diving International
FIS	Financial Investigation Services
FMA	Financial Management and Accountability
GFE	Government Furnished Equipment
GSS	Global Submarine Services Pty Ltd
ILS	Integrated Logistics Support
IMP	Inventory Management Plan
ITRI	Invitation to Register Interest
KPIs	Key Performance Indicators
LARS	Launch and Recovery System
LOE	Level of Effort
LSA-N	Logistics Support Agency – Navy
MOSHIP	Mother ship
NAVYSYSCOM	Navy Systems Command
OEM	Original Equipment Manufacturer
OMP	Obsolescence Management Plan
OQE	Objective Quality Evidence
PBC	Performance Based Contract
RAN	Royal Australian Navy
RFT	Request for Tender
RSC	Required Ships Characteristics
SCAs	Supply Customer Accounts

SDSS	Standard Defence Supply System
SEOO	Statement of Expected Operational Outputs
SERC	Submarine Escape and Rescue Centre
SERS	Submarine Escape Rescue Suite
SETF	Submarine Escape Training Facility
SIMS	Ships Information Management System
SLIMS	Shipboard Logistics Information Management System
SMCSPO	Submarine Combat Systems Program Office
SMFEG	Submarine Force Element Group
SPOs	Systems Program Offices
STSC	Submarine Training Systems Centre
TA-SM	Training Authority – Submarines
TEWG	Tender Evaluation Working Group
TLSA	Through Life Support Agreement
TUP	Transfer Under Pressure chamber
URDs	Unit Ready Days
UUC	Usage Upkeep Cycle

Summary and Recommendations

Summary

Background

1. The Royal Australian Navy (RAN)¹ has six Collins-class submarines. The submarine force fulfils the roles of maritime strike and interdiction, maritime surveillance, reconnaissance and intelligence collection, undersea warfare, and special forces operations. Construction of the first of the six submarines, HMAS *Collins*, began in 1990 with delivery in 1996. The final submarine, HMAS *Rankin*, was delivered in 2003. The submarines are expected to have a remaining asset life ranging from 2026 till 2030.
2. The Collins-class submarine force and the majority of submarine related Defence force infrastructure are operated out of HMAS Stirling in Western Australia. Sustainment of the submarine force occurs across facilities in Western Australia and South Australia.² Sustainment includes all activities associated with keeping the submarines operational and maintained and includes the provision of logistics, other support services and suitably trained personnel.
3. Sustainment of the Collins-class has presented difficulties to Defence from the introduction into service of the submarines due to two main reasons, namely that:
 - during the build stage a number of design deficiencies and consequential operational limitations were identified which meant that the submarines could not initially perform at the level required for naval operations.³ Subsequently, a number of projects covering the heavyweight torpedoes, the submarine platform, the combat system, and propeller and hull needed to be undertaken to address these deficiencies; and

¹ RAN is the correct acronym for the Royal Australian Navy. However, for simplicity, the Royal Australian Navy is generally referred to as 'Navy' throughout this report.

² The Collins-class submarine force and the majority of submarine related Defence force infrastructure are operated out of HMAS Stirling in Western Australia. However, there are also support facilities located at ASC Pty Ltd at Adelaide in South Australia and ASC has an additional covered submarine facility at the Common User Facility at Henderson in Western Australia.

³ This was the finding of a 1999 report (the McIntosh Prescott Report) commissioned by the then Minister for Defence, 'Report to the Minister for Defence on the Collins-class Submarines and Related Matters from Malcolm McIntosh AC, Kt and John B. Prescott, AC, 20 June 1999 (Section 2. What's Wrong).

- the Collins-class was introduced into service without a validated strategy for the operational sustainment of the submarines throughout the life of the class and without a good understanding of the real cost for support of the complex submarine platform. The original sustainment budget was loosely based on the experience of the predecessor submarine, the Oberon Class, and Defence advised the Australian National Audit Office (ANAO) that this approach was inadequate.
4. Defence advised the ANAO that additional factors affecting maintenance requirements have included: an inadequate initial maintenance regime; an inadequate Integrated Logistics Support regime; poor systems reliability; the need to rely on Design Authorities⁴ and Original Equipment Manufacturers⁵ located offshore; that the contemporary technical regulatory frameworks applying to the Collins-class and its systems, which provide confidence that platforms are safe, are significantly more stringent than those that applied to the Oberon Class submarines; and the extensive technical knowledge and comprehension that is required because the RAN is the 'Parent Navy' for the Collins-class submarines.⁶
5. To facilitate the proper support of the submarines, Defence has put in place a number of contractual arrangements with commercial suppliers that support their sustainment. The key contract is the Through Life Support

⁴ The Design Authority (DA) is the organisation responsible for the initial design, design review and internal design approval of materiel systems; and for the design of modifications or changes to a materiel system. In the case of the Collins-class this is Kockums in Sweden.

⁵ The Original Equipment Manufacturer (OEM) is the company which produced a particular item of equipment at the construction stage. The reliance on offshore DAs and OEMs has meant a convoluted, time consuming and hence costly logistics chain in terms of accessing design authorisation for changes. Equipment such as the towed array handling system, buoyant wire antenna, masts and periscopes have specialist maintenance requirements which also require returning the equipment to overseas based OEMs in some cases.

⁶ Navy operates the Collins-class submarines as a 'Parent Navy'. This refers to the extensive knowledge, engineering services, configuration control, supply support, training, intellectual property, and technical comprehension of design concepts, principles and systems which affect the through-life support of a naval platform that is vested in, and managed by, the Navy of origin. It also requires development of an industry capacity that includes an understanding of the design philosophy to the extent necessary to design and implement modifications and undertake major repairs safely and effectively. The costs of establishing a Defence capability as a Parent Navy, and the cost of establishing a national industry capacity, proved much more costly for the Collins-class than envisaged during the build.

Agreement (TLSA) Defence entered into with ASC Pty Ltd (ASC)⁷, the builder of the submarines, in December 2003. The TLSA is worth up to \$3.5 billion over 25 years (15 year agreement, with a further two–five year options). The TLSA covers the full range of platform maintenance support and design services for the submarines to maintain the required level of operational capability and accounts for approximately 60 per cent of the total sustainment expenditure. In addition, there are contracts with a number of external suppliers related to the support of combat systems for the submarines and provision of submarine escape and rescue services and training. While much of the technical support for the submarines is provided by external contractors, Defence has a major role in inventory management related to the equipment and spares for the submarines.

6. The total cost under the sustainment contracts examined in this audit⁸ for the six submarines in the Collins-class fleet was \$226.13 million in 2006–07 and \$239.84 million in 2007–08.

Audit approach

7. The objective of the audit was to assess the effectiveness of sustainability arrangements for the Collins-class submarine force. This included examination of the following contracts relating to sustainment of the submarines:

- the Through Life Support Agreement with ASC;
- the contract covering tactical, communications, navigation sensors, non-acoustic sensors and electronic support measures with Raytheon Australia Pty Ltd (Raytheon);

⁷ The Australian Government had a substantial minority shareholding in ASC during the main construction period of the Collins-class submarines. In November 2000, the then Government acquired the portion of the shareholding in ASC that it did not already own. In announcing the acquisition of full ownership of ASC, the then Ministers for Defence, Industry, Science and Resources, and Finance and Administration indicated the then Government's intention was that the company be restructured to implement more sustainable arrangements for the future support of the Collins-class submarines and facilitate ASC's onward sale. In announcing the TLSA in December 2003, the then Ministers for Defence and Finance and Administration stated that the agreement fulfilled a Government commitment that all submarine full cycle dockings would be undertaken by ASC in South Australia and provided the basis for the long-term commercial viability of ASC. ASC's Statement of Corporate Intent 2008 to 2011, tabled in the Parliament in September 2008, states that among the company's corporate objectives for the period is ensuring that the other corporate objectives are met in a manner that will facilitate the timely privatisation of the company and to support the shareholder [that is, the Australian Government] in preparing the company for sale.

⁸ This audit also considered the costs associated with work done on the remediation of the Remora submarine rescue vehicle and associated equipment (related to Submarine Escape and Rescue).

- the contract for the SCYLLA sonar sub-system with Thales Underwater Systems Pty Ltd (Thales);
- the contract for periscope support with BAE Systems Australia Limited (BAE);
- the Submarine Escape and Rescue Centre contract with Cal Dive International Australia Pty Ltd; and
- the training contract with ASC.

8. The audit focussed on performance information reporting by the submarine System Program Offices on reliability, safety systems and logistic support services. In the context of the sustainability arrangements, the audit considered combat system upgrades and personnel escape and rescue systems. Any arrangements that the Commonwealth may be considering regarding the potential sale of ASC were not within the scope of this audit.

Conclusion

9. The arrangements to sustain the Collins-class submarines necessarily have regard to the build, operational demands, ongoing maintenance and crewing arrangements for the submarines. The 1999 McIntosh Prescott Report⁹ referred to a number of design deficiencies and consequential operational limitations for the submarines, and Defence has also drawn attention to deficiencies regarding the original strategy for operational sustainment. Recognising these deficiencies within the original Collins-class acquisition process, and the implications of these for the ongoing sustainment of the submarine fleet, the ANAO considers that Defence currently has in place generally sound arrangements for managing submarine sustainment.

10. The Defence Materiel Organisation (DMO) and Navy each have roles in relation to the sustainment of the Collins-class. The principal contract for through life support of the submarines — TLSA — is between DMO and ASC Pty Ltd (the builder of the Collins-class). The TLSA is a cost-plus contract¹⁰,

⁹ See footnote 3.

¹⁰ Under a cost-plus contract, *bona fide* costs incurred by the contractor are reimbursed by the principal, together with a margin calculated in a predetermined manner. Costs plus contracts may be based on cost plus percentage, cost plus fixed fee or cost plus a sliding-scale fee.

with incentives, offering long-term commercial stability to ASC¹¹, with the Commonwealth assuming a significant proportion of the commercial risk that might otherwise apply to ASC. Within this context, DMO is generally managing the day to day elements of the contract effectively. It is also managing effectively the three main separate contracts with combat system suppliers.

11. The ANAO considers that DMO and Navy could improve sustainment performance for the Collins-class through improvement to inventory management. When the Collins-class submarines were delivered there was no prescribed inventory management plan and no computer-based inventory management system in place. The submarines have suffered spares shortfalls since entering service. Defence introduced an Inventory Management Plan (IMP) for the submarines in November 2006 which set out the deficiencies with the Collins-class logistics system including low levels of codification of stores¹², problems with inventory management systems¹³ and obsolescence. It is important that, as resources allow, DMO and Navy make progress in implementing the 2006 Inventory Management Plan and address issues related to onboard management of inventory.

12. Submarine escape and rescue services and training, whilst not part of the direct maintenance of the Collins-class submarines, are integral to their sustainment and capability. DMO is responsible for the management of the contractual arrangements for the delivery of Submarine Escape and Rescue Centre (SERC) services. A number of significant issues have occurred in the management of this capability over time¹⁴, including unapproved works and

¹¹ Defence's Procurement Approval of 22 December 2003 advised that 'The TLS agreement establishes ASC as the principal provider of platform related submarine maintenance and provides the basis for the long-term commercial viability of ASC. It will also preserve the important strategic capability represented by the ASC's core skill base of submarine maintenance and design expertise.' ASC commented to ANAO that the TLISA has a profit floor and a cap.

¹² To facilitate asset management and financial reporting, all items of supply that are repetitively procured, owned, stored or repaired by Defence are required to be codified. As a sponsored nation in the NATO Codification System (NCS), Australia is required to adhere to the policies and principles as published in the NATO Manual of Codification and accordingly Defence adheres to the NCS.

¹³ Among other things these problems included loss of trust in the logistics system by submariners and a lack of interest in maintaining onboard accounts.

¹⁴ ASC was the original provider of the Submarine Escape and Rescue Suite services and some of the equipment from 1996 to June 2003. Following a tender process, Fraser Diving Australia was awarded a five year contract in June 2003 to provide Submarine Escape and Rescue Centre services, including operation of the Submarine Escape and Rescue Suite. Fraser Diving Australia was sold to Cal Dive International in 2006 and subsequently operated as Cal Dive International Australia Pty Ltd.

configuration changes that affected the design integrity of the rescue vehicle, the Remora, and the launch and recovery winching system¹⁵ for this vehicle.

13. The contract for the provision of SERC services operating the RAN submarine escape and rescue capability, including the Submarine Escape Training Facility (SETF) at HMAS Stirling in Western Australia, expired in June 2008. Prior to the expiry of that contract, the Collins Systems Program Office (COLSPO) within DMO conducted a tender process and selected a preferred tenderer. However, no new contract had been signed by the time this audit was completed.

14. In December 2006, the rescue vehicle Remora was lost on the seabed in approximately 120 metres of water. Following the recovery of the Remora in April 2007, the rescue vehicle and the launch and recovery winching system were each returned to their Original Equipment Manufacturers overseas for remediation. Defence has been required to put alternative rescue services in place for the period since December 2006 as the Remora and the launch and recovery winching system have yet to be introduced back into service. DMO estimates that the total cost of remediation of the Remora and launch and recovery winching system, including addressing obsolescence issues not connected to damage suffered following the loss of the Remora, will be \$15.57 million.

15. Any new contract Defence may negotiate to operate the RAN submarine rescue capability presents the opportunity for Defence to put in place arrangements to address the issues that arose in connection with the previous contract. DMO advises that it is currently evaluating options for the future of the RAN organic submarine rescue capability. Defence considers that a contract in place with a UK contractor will maintain the capability currently available to the RAN and provide the DMO with the time to plan and implement the recommissioning of the Australian capability.

16. Navy is effectively managing the contract with its supplier, ASC Pty Ltd, for on-shore submariner training services.¹⁶ However, the supply of suitable training services is only one aspect of achieving an adequate supply of appropriately trained personnel. While arrangements to train submariners

¹⁵ The function of the launch and recovery winching system (the LARS) is to facilitate the launch and recovery of the Remora from a mother ship.

¹⁶ This excludes submarine escape training services. These services were provided previously by the Submarine Escape and Rescue Centre contractor using the SETF at HMAS Stirling. However, following the expiry of this contract in June 2008 and the stalled negotiations with the preferred replacement tenderer, Navy has put in place temporary arrangements for the provision of this training.

were within the scope of this audit, the audit scope did not include examination of other significant drivers which affect the success of Navy recruitment and retention strategies. Current demand for submariners is a total of 667 officers and sailors with a supply of 423 at June 2008, or a shortfall of 244 or 37 per cent across all categories of submariners. The shortfall has more than doubled over the previous four years, with the greatest shortage being in the skill areas that have been in demand in the mining industry in Western Australia where the Collins-class submarine force and the majority of submarine related Defence force infrastructure is located.

17. In this context, the ANAO notes that Defence has generally not achieved its annual target for Unit Ready Days¹⁷ (particularly quality Unit Ready Days) despite the target often being adjusted downwards when reviewed mid year.¹⁸ A significant contributor to the difficulty in achieving Unit Ready Days (URDs) has been that the number of trained submariners available in Navy has consistently fallen short of requirements and this is having a considerable impact on overall submarine force capability. The ANAO also notes that there has been a substantial increase in the cost of URDs over the life of the current TLSA. With reduced numbers of URDs and increasing sustainment costs, the unit cost of achieved quantity URDs escalated from \$254 015 in 2003–04 to \$272 545 in 2007–08, and the unit cost of achieved quality URDs escalated from \$259 537 to \$429 052 in the same period.

18. Defence advised the ANAO that the shortage of submariners has been the primary driver for having three submarines in Full Cycle Docking from May 2008. As Defence makes progress in addressing the shortfall in the submariner workforce, the capacity of DMO to effectively negotiate the delivery of timely and cost-effective services from all of its contractors, in particular ASC, together with the capacity of Defence's inventory management

¹⁷ Unit Ready Days (URDs) are the number of days that a force element is available for tasking. Planned URDs are determined by aggregating total days for the unit in commission, less all days when the unit is programmed to be in major maintenance and conducting pre-workup (preparations for initial operational training). In measuring URDs, Defence distinguishes between the total number of URDs achieved (called Quantity URDs) and Quality URDs. The quality measure takes into consideration any constraints on operations that may be imposed such as systems shortcomings or availability of submariners.

¹⁸ URDs targets were introduced for the Collins-class in 2003–04. The target of expected URDs for 2008–09 contained in the relevant Defence Portfolio Budget Statements is 684, which is the lowest since targets were introduced and compares to a target for 2005–06 of 1463 in the Defence Additional Estimates Statements for that year (2005–06 being the year in which the highest target was set). The low target for 2008–09 is attributed to the plan to have four submarines in docking at various points during the year — two submarines in Full Cycle Docking for the entire year, one other in Full Cycle Docking for half of the year and another in Mid Cycle Docking for part of the year.

arrangements to facilitate the deployment and sustainment at sea of more submarines, will become increasingly important.

Key findings by chapter

Management framework for sustainment arrangements (Chapter 2)

19. Defence faced challenges in establishing appropriate sustainment arrangements for the Collins-class because of deficiencies in design and sustainment arrangements within the original acquisition. Notwithstanding, the ANAO considers that Defence has put in place an appropriate management framework for the provision of sustainment support for the Collins-class submarine fleet.

20. In announcing the TLSA in December 2003, the then Ministers for Defence, and Finance and Administration stated that it fulfilled a Government commitment that all submarine full cycle dockings would be undertaken by ASC in South Australia. The TSLA is a cost-plus contract, with incentives, offering long-term commercial stability to ASC¹⁹, with the Commonwealth assuming a significant proportion of the commercial risk that might otherwise apply to ASC.²⁰

21. This arrangement was put in place with the intent of the Commonwealth benefiting from ongoing support of the Collins-class submarines and retaining the capacity in Australia to assist the development of current and future submarine capability. The ANAO notes, however, that there are inherent tensions in the arrangements related to the TLSA. For instance, the Government has expressed the wish to preserve submarine maintenance capability (which lies with ASC) in Australia while the strategic objectives of

¹⁹ Defence's Procurement Approval of 22 December 2003 advised that 'The TLS agreement establishes ASC as the principal provider of platform related submarine maintenance and provides the basis for the long-term commercial viability of ASC. It will also preserve the important strategic capability represented by the ASC's core skill base of submarine maintenance and design expertise.'

²⁰ See paragraph 2.24 for a discussion of a number of features included in the TLSA aimed at assisting the commercial viability of ASC including:

- limiting ASC's liability to \$10 million in any financial year in respect of claims arising from ASC's supplies to the Commonwealth;
- the Commonwealth indemnifying such claims in excess of the liability limit or in respect of damage to property, injury or death;
- ensuring ASC's TLSA financing costs are low by maintaining a positive cash flow; and
- paying ASC's monthly capability payments (covering labour, material and sub-contractor costs, plus a profit component) in advance, with retrospective adjustment for the actual work undertaken.

the TLSA include reducing the real costs of owning the submarines (objective (b)). The cost-plus nature of the TLSA contract also limits DMO's capacity to apply normal commercial pressures in looking to obtain the best value for money for the investment in sustainment of the Collins-class.

22. The Australian Government has wholly owned ASC since 2000. However, the previous Government had expressed its intention to sell the company and ASC's *Statement of Corporate Intent 2008 to 2011* states that the company is working with the shareholder (that is, the Australian Government) in preparing the company for sale. The TLSA contractual arrangements are a critical element of the relationship between DMO and ASC, requiring close consideration in making any decision to sell ASC.

23. DMO has established appropriate Systems Program Offices (SPOs)²¹ which have responsibility for managing its principal sustainment activities, including the contracts DMO has in place to secure necessary external support. These are the:

- Collins Systems Program Office (COLSPO), which has overall responsibility for platform integrity and performance; and
- Submarine Combat Systems Program Office (SMCSPO), which has responsibility for communications, navigation and combat systems including weapons systems.

24. As noted in paragraph 2, the provision of suitably trained personnel is also a component of sustainment. Within Navy there is a clear allocation of responsibility for the provision of training for the Collins-class submarine force. Navy Systems Command (NAVYSYSCOM) is responsible for the shore based training of crew for the submarines and has a contract in place with ASC for this.

Maintaining Collins-class operations (Chapter 3)

25. The ANAO notes that having viable, long term suppliers of ongoing maintenance services is a critical element in Defence's capacity to effectively sustain the Collins-class submarine force. The TLSA with ASC and the contractual arrangements with each of the major combat system contractors (Raytheon, Thales and BAE) have been put in place to secure these services.

²¹ The DMO's System Program Offices (SPOs) are the business units that manage the delivery of materiel sustainment under Materiel Sustainment Agreements made between the Capability Managers in Defence and the Chief Executive Officer of the DMO.

26. From its examination of payments, reporting and communications arrangements, the ANAO considers that DMO is generally managing the day-to-day elements of the TLSA with ASC in an effective manner. However, the cost effectiveness of the TLSA to Defence relies on an annual capability payment negotiation process achieving an outcome that appropriately balances cost to Defence and returns to ASC.

27. The negotiation process includes agreeing appropriate Key Performance Indicators (KPIs), against which ASC's performance is measured and its entitlement to Performance Incentive Payments is determined. Clause 19.18(d)(i) of the TLSA indicates: 'the KPIs to be met by ASC in order to achieve Performance Incentives should ordinarily be set at a level that are as likely to be met as not.' It is difficult to reconcile the expectations reflected in this clause with the extent of ASC's success in achieving performance incentives over the years. Since the TLSA commenced, the company has received, on average, 87 per cent of the available incentives for the four years 2003–04 to 2007–08. The ANAO notes that DMO's own assessment of performance (see paragraph 3.27) was that ASC was performing as contracted or just above that level over the period when these substantial performance incentives were being paid.

28. ASC advised ANAO in January 2009 that:

.....it is often the case that the customer [in setting an incentive] takes a '*stretch schedule target*', dictated say, by RAN operational imperatives, to be the required project schedule. Again meeting the date would most likely only generate an '*as contracted*' customer assessment, whereas ASC and its people have made huge efforts, often working long hours, to meet the date required.

It should be noted that ASC needs to secure a substantial proportion of the incentives to achieve a reasonable commercial return. Even if ASC were to achieve 100% of its incentives, its returns would not be abnormally or even particularly high.....

29. The current design of the Performance Incentive Payments arrangements in the TLSA is such that ASC is provided with substantial payments for performance broadly in line with the contractual requirements. The ANAO drew Defence's attention to clause 19.19 of the TLSA that provides for a review of remuneration arrangements to occur within four years from the commencement date. The ANAO suggested that the KPIs should be reviewed to ensure that they take appropriate account of the expectations of the parties set out in the relevant clauses of the TLSA²² and are calibrated to appropriately

²² In particular in clause 19.18(d)(i) and clause 19.18.(d).(iv) of the TLSA. See paragraphs 3.29 and 3.31.

reward ASC for quality performance while delivering against the strategic objectives²³ for the contract.

30. Defence advised that, at the time the provision in clause 19.19 was available, DMO was having difficulty achieving an agreed costed response from ASC for 2008–09.²⁴ Defence added that, with any review of profits and incentives also requiring the agreement of ASC, it was not considered to be an appropriate time to commence such a review. Defence further advised that, given that it is pursuing significant changes to the TLSA to put it on a firmer commercial basis (in anticipation of the sale of ASC), it considered that a better result for a review of the profit and incentive structure (as well as the fundamental cost plus nature of the contract) would be achieved in the context of the overall changes being sought.

31. The ANAO considers that the management arrangements for existing combat system support contracts are appropriate, including the processes applied to payment arrangements and reporting by contractors. Issues have arisen with the contract related to periscopes that have highlighted the difficulty and delays in certifying and repairing periscopes, and the emerging level of obsolescence affecting this key combat system.²⁵

Inventory management

32. When the Collins-class submarines were delivered there was no prescribed inventory management plan and no computer-based inventory management system in place. The submarines have suffered logistics spares shortfalls since entering service. DMO introduced an Inventory Management Plan (IMP) for the submarines in November 2006 which set out the deficiencies with the Collins-class logistics system including low levels of codification of stores²⁶, problems with inventory management systems²⁷ and obsolescence. A consequence of obsolescence is that maintenance scheduling becomes more

²³ See paragraphs 2.21 to 2.23 and Table 2.1 for further information about the strategic objectives of the TLSA.

²⁴ In January 2009, Defence advised that all incentives for 2008–09 have yet to be agreed.

²⁵ In September 2008, Defence stated that the underlying problem with the periscopes is the lack of an in-country, competent, design support network for periscopes that could certify the equipment after repair. BAE Systems advised ANAO that funding for recertifications of resource materials was secured in January 2005 and that at that time 12 of 16 systems were out of certification. BAE Systems also noted that obsolescence management funding was secured in August 2008.

²⁶ To facilitate asset management and financial reporting, all items of supply that are repetitively procured, owned, stored or repaired by Defence are required to be codified. As a sponsored nation in the NATO Codification System (NCS), Australia is required to adhere to the policies and principles as published in the NATO Manual of Codification and accordingly Defence adheres to the NCS.

²⁷ Among other things these problems included loss of trust in the logistics system by submariners which led to a lack of interest in maintaining onboard accounts.

complex and greater delays in completing maintenance occur resulting in reductions in capability.

33. The IMP stated that by December 2008 there would be an accountable, mature and self sustaining logistics system and identified a number of goals that had to be met as a prerequisite to achieving this objective. One of these goals was 100 per cent codification of stores by 30 June 2007 to provide the ability to manage items in the Standard Defence Supply System (SDSS), allow tracking of consumption rates and prediction of future requirements. However, Defence advised ANAO that the codification project was not completed until June 2008. As the completion of this project is a prerequisite for a number of other important activities²⁸ in the IMP, the target dates for completion of these activities have also been delayed.

34. The ANAO considers that there has been some improvement in Demand Satisfaction Rates (an inventory performance measure included in the Materiel Sustainment Agreement between the DMO and Navy) over the past two years, although overall performance remains unsatisfactory. Further improvement is required in the management of inventory related to the sustainment of Collins-class submarines. Defence advised ANAO in September 2008 that it now considers Demand Satisfaction Rates not to be a reliable measure and is relying on a number of alternative measures.²⁹ In addition to the activities already underway as part of the IMP, there is a need for an obsolescence remediation plan which incorporates all major suppliers and investigation of arrangements with major suppliers with the aim of reducing associated administrative costs and the lead times for parts.

35. A further challenge to the sustainment of the Collins-class fleet is that each submarine currently has a different combat system configuration and, given the stage they are in their life cycles, there will never be a uniform baseline across the fleet. At best there will be two baselines across the six submarines. The ANAO notes that currently the Ships Information

²⁸ For example, population of an Assembly Parts List was reliant on 100 per cent codification first having been completed. An Assembly Parts List is a list of equipment identifying assembly and associated sub assembly relationships, utilising data such that a technician can identify a spare as well as allowing a quarterly Submarine Allowance List to be calculated to provide a submarine with an accepted statistical chance of rectifying a defect from onboard spares. As a consequence of the lack of a populated Assembly Parts List, onboard spares allowances for the submarines have been based on Original Equipment Manufacturer recommendations, which have not been maintained and updated and so do not reflect current demand. Defence advised the ANAO in September 2008 that an Assembly Parts List for the Collins-class was expected to be populated by 31 December 2008.

²⁹ Defence referred to measures such as Configuration Effectiveness, Ship's Allowance List Effectiveness and UNDA (Urgency of Need Designator) Demand Satisfaction.

Management System (SIMS)³⁰ is not used for onboard inventory management on the Collins-class. Defence advised ANAO that necessary detail to maintain combat system software is retained within SMCSPO and its contractors using specialised software configuration management systems, rather than SIMS.

Onboard inventory management

36. To provide the best possible chance of crew being able to rectify defects from onboard spares, DMO's IMP identified the need for the creation of a 'live' Ships Allowance List.³¹ To produce such a list requires the implementation of an onboard inventory system to supply the required data. The Shipboard Logistics Information Management System (SLIMS) has been installed and trialled on two of the Collins-class submarines unsuccessfully. The lack of success was attributed by COLSPO to the insufficient availability of 'store specialists' amongst the available submariners. Whilst Navy advised that it intended to pursue filling such positions, there are currently no target dates for this, nor for the continuation of trials or the installation of SLIMS on the remaining submarines.

Unit Ready Days

37. Defence has consistently not achieved the planned level of Unit Ready Days (URDs) for the Collins-class submarines, with the percentage of quality URDs³² achieved falling from 82.8 per cent of the target in 2003–04³³ to 46.1 per cent in 2006–07, before rising to 57.6 per cent in 2007–08. With reduced numbers of URDs and increasing sustainment costs, the unit cost of achieved quantity URDs escalated from \$254 015 in 2003–04 to \$272 545 in 2007–08, and the unit cost of achieved quality URDs escalated from \$259 537 to \$429 052 in the same period.

³⁰ The Ships Information Management System is a management program the RAN uses that contains relevant technical data related to a particular vessel. It is also a data base indicating equipment acquisitions to support the vessel. It is used for onboard inventory management.

³¹ Most of the Navy's surface ships have inventory management software that by recording usage and based on historical consumption and onboard maintenance capability produces a 'live' Ships Allowance List.

³² In measuring URDs, Defence distinguishes between the total number of URDs achieved (called Quantity URDs) and Quality URDs. The quality measure takes into consideration any constraints on operations that may be imposed such as systems shortcomings or availability of submariners.

³³ The expected number of URDs for 2003–04 was 945 against an achievement of 799 Quantity URDs and 782 Quality URDs. The expected number of URDs for 2007–08 in the Defence Portfolio Budget Statements was 1004. The revised target included in the 2007–08 Defence Additional Estimates Statements was 970. Achievement against the revised target was 880 Quantity URDs and 559 Quality URDs.

38. Largely as a direct result of the intention for the equivalent of three submarines to be in either full cycle or mid cycle docking during the year³⁴, the planned URDs for 2008–09 is set at the lowest level since the introduction of this measure for the Collins-class in 2003–04. The planned URDs for 2008–09 is only 684, which is significantly lower than the target for 2007–08 of 970.³⁵ Accordingly, even if all of these planned URDs are achieved, the unit cost for URDs in 2008–09 will rise further not only because the number of URDs achieved for the Collins-class will be lower than in previous years but also in light of the significant costs involved in undertaking such a high level of major maintenance activity in the financial year.

39. It is unclear whether the current strategy of having high levels of maintenance undertaken in specific years, such as 2008–09, will lead to more cost effective outcomes in the future, given the ongoing commitment to fund a base level of maintenance capability in ASC through the TLSA. Navy advised the ANAO in June 2008 that the shortage of trained personnel to operate the submarines had been the primary driver for having three submarines in docking from May 2008. The DMO took the increased submarine access afforded by the shortage of submarine crews as an opportunity to undertake additional submarine upgrades. This additional upgrade work has extended planned maintenance periods and is an added factor that has also contributed to a dip in planned URDs.

Submarine escape and rescue services (Chapter 4)

40. Submarine Escape and Rescue Centre (SERC) services³⁶ have been provided under contract to DMO. In December 2006, the rescue vehicle, the *Remora*, was being operated by the then contractor when a failure of the launch and recovery winching system resulted in the *Remora* being lost on the sea bed in approximately 120 metres of water. The *Remora* was subsequently recovered, although considerable remedial work has been required, including

³⁴ Four submarines are planned to be in docking at various points during the year — two submarines in Full Cycle Docking for the entire year, one other in Full Cycle Docking for half of the year and another in Mid Cycle Docking for part of the year

³⁵ This is the revised target for 2007–08 set out in the Defence Additional Estimates Statements.

³⁶ The submarine escape and rescue service capability for the Collins-class consists of the Submarine Escape Training Facility (SETF) and the Submarine Escape Rescue Suite (SERS). The SETF is a Commonwealth supplied facility located at HMAS Stirling at Garden Island in Western Australia. The SERS is a fully integrated suite of equipment designed to rescue and treat survivors of a disabled submarine under a full range of accident scenarios. It provides a deployable capability to rescue submariners directly from a stricken submarine using a submersible vessel (the *Remora*) operating from a surface ship.

to the launch and recovery winching system. To undertake the remediation required both the Remora and the launch and recovery winching system to be returned to their Original Equipment Manufacturers overseas.³⁷ The Remora and the launch and recovery winching system are now both back in Australia but are yet to be reintroduced into service.

41. Defence advised the ANAO that alternative rescue services are in place. The Commander of the Australian Fleet initiated an arrangement for the UK Submarine Rescue Service, with its submersible, to be available to support submarine materiel certification and crew competency assessment. Defence advised in January 2009 that, until a longer term position is resolved, it has contracted the UK contractor for a six month standby submarine rescue service, incorporating emergency deployment in support of a disabled submarine. The Collins-class submarines are also certified to mate with the US Navy Submarine Rescue System in shallow waters. The Director of COLSPO advised the ANAO in June 2008 that the unavailability of the Remora has not affected any training exercise or any sea trials post Full Cycle Dockings.

42. In January 2009, Defence advised that following refurbishment in Canada by OceanWorks International, and the conduct of certain testing, the Remora arrived at Fremantle in August 2008. Remora is currently in storage at Henderson, WA. The launch and recovery winching system has completed certain testing in Glasgow but this was not accepted by Defence due to deficiencies. A review by the Class Society DNV of the launch and recovery winching system is outstanding and DMO is currently evaluating options for the future of the RAN organic submarine rescue capability. Defence considers that the contract with the UK contractor will maintain the submarine rescue capability and provide the DMO with the time to plan and implement the recommissioning of the Australian capability.

43. A five year contract for the provision of SERC services expired in June 2008. COLSPO conducted a tender process to secure a new contractor to provide these services in 2007–08. A preferred tenderer was selected as a result of this tender process. However, no new contract had been signed at the time

³⁷ The Remora was shipped to OceanWorks International in Canada for detailed examination, restoration and obsolescence remediation of its capability. The opportunity was also taken to undergo a full 10 year recertification by the classification society. Classification societies are organisations that establish and apply technical standards in relation to the design, construction and survey of marine related facilities, including ships and offshore structures. The launch and recovery winching system was returned to Caley Ocean Systems in Scotland for repair and subsequent survey and testing. OceanWorks is integrating the work on both the Remora and the launch and recovery winching system and managing the certification of both of these through the classification society.

this audit report was finalised. The 2003 SERC contract which ended in June 2008, covered both the operation of the Submarine Escape Rescue Suite (SERS) and the operation of the Submarine Escape Training Facility (SETF). On 31 January 2009, Defence issued a media release³⁸ discussing a temporary measure that had been put in place to secure pressurised submarine escape training for RAN submariners as part of their ongoing safety training program. In the absence of a current contractor to operate the SETF, Defence plans to send up to 100 submariners to Canada later this year to undertake such training. The media release pointed out that the cost of sending the submariners to Canada does not require any new funding as the training will be paid for with money already allocated for training that would have been conducted at the SETF. The media release further noted that RAN personnel could still take part in unpressurised escape training at the SETF which would minimise the time required to continue their training in Canada.

44. A number of significant issues occurred in the management of Defence's SERC capability over time, including unapproved works and configuration changes that have affected the design integrity of the Remora and the launch and recovery winching system. The negotiation of any new contract to operate this capability would provide Defence with the opportunity to put in place arrangements to address the issues that arose in connection with the previous contract. The total cost of the previous contract signed in 2003 for the five years to June 2008 was \$20.19 million. In addition, following the loss of the Remora in December 2006, DMO has estimated its total expenditure on recovery, repairs and remediation of the rescue vehicle, as well as repair of the launch and recovery winching system, will be \$15.57 million.

45. The ANAO notes that the Defence Procurement Policy Manual refers to the consideration of circumstances when it may be appropriate that the Commonwealth be named as an insured on a supplier's insurance policies, including where the Commonwealth has an interest in the property insured. Notwithstanding the reference made in Defence's policy, the 2003 contract did not require that the Commonwealth be named as an insured in the contractor's insurance policy for plant and equipment despite the fact that Defence owned both the rescue vehicle, the Remora, and the launch and recovery winching system. Defence advises that any new contract for these services will require that the Commonwealth be specified as an interested party on the relevant policy.

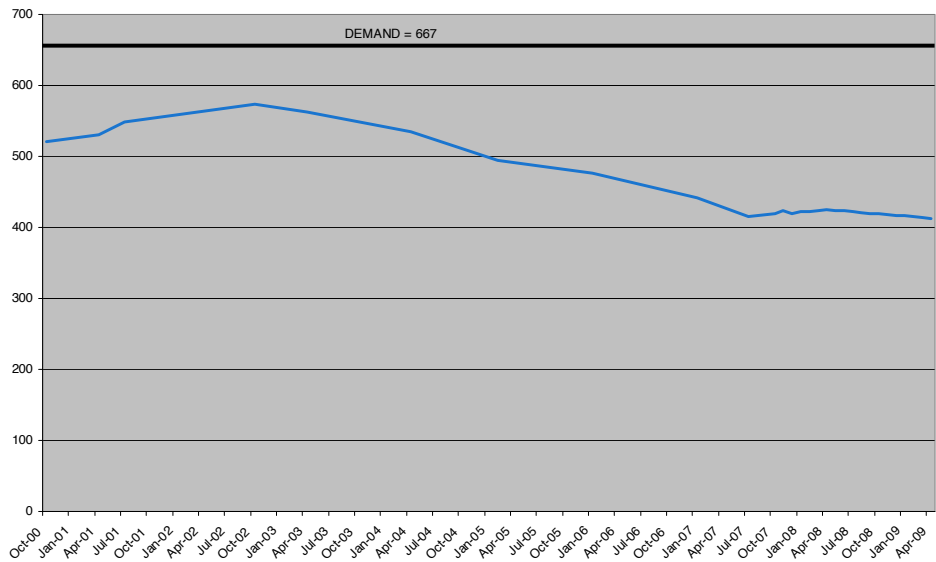
³⁸ Defence Media Release, *Navy Puts Safety First with Submarine Force*, 31 January 2009.

Training (Chapter 5)

46. ASC undertakes the training role for submarine crew through a contract arrangement with the Director General Navy Personnel Training, an element of Navy Systems Command (NAVSYSCOM). The contract is managed by Training Authority Submarines, a business unit of NAVSYSCOM located in the Submarine Training and Systems Centre at HMAS Stirling. The current Training Contract with ASC is for five years from July 2005 to 2010 at a cost of \$4.48 million per annum (2005–06 prices). Whilst the contract has been adequately managed, the number of trained submariners has been steadily falling below requirements.

47. Current demand for submariners is a total of 667 officers and sailors with a supply of 423 at June 2008, or a shortfall of 244 or 37 per cent across all categories of submariners. The shortfall has more than doubled over the last four years (see Figure 1).

Figure 1
Numbers of available submariners – October 2000 to April 2009



Source: Submarine Training and Systems Centre.

48. The shortfall is greater if the numbers of submariners that are unable to be deployed through medical, compassionate or other reasons are taken into account. As at June 2008, 38 submariners could not be deployed bringing the total shortfall of submariners to 43 per cent.

49. Factors affecting this situation include: the loss of submariners to alternative employment in Western Australia; lower numbers of available new submariners because of Navy's recruiting success levels; and insufficient billets on operational submarines available to train crew.

50. Part of the ADF's response to recruitment shortfalls was to increase pay and allowances including retention bonuses across all forces in August 2007.³⁹ In April 2008, a Navy Capability Allowance aimed at retaining trained and experienced serving sailors was announced. For submariners of Able Seaman to Chief Petty Officer ranks who agree to a further 18 months service, the allowance provided is \$60 000. In addition, in May 2008, the Chief of Navy instigated a review of submarine workforce sustainability to report by the end of October 2008. In January 2009 Defence advised that the Chief of Navy is currently reviewing the report on submarine Workforce Sustainability.

Recommendation

51. The ANAO made one recommendation aimed at improving Defence's inventory management for the Collins-class.

Summary of agency response

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

The Australian National Audit Office has made one recommendation in this report. Defence agrees with qualification to the recommendation.

Regarding the recommendation, the ANAO considers DMO and Navy could improve sustainment performance for the Collins-class through improvement to inventory management. Defence introduced an Inventory Management Plan for the submarines in 2006 which set out the deficiencies with the Collins-class logistics system including low levels of codification of stores, problems with inventory management systems and obsolescence. DMO and Navy intend to make progress in implementing the 2006 Inventory Management Plan and address issues related to onboard management of inventory. Consequently, this recommendation is agreed with qualification; that is, that progress will be made as resources allow.

³⁹ For example, a marine technician earning \$50 254 per annum in 2001 now receives \$80 451 including a \$10 000 retention bonus.

Overall, Defence notes that “the ANAO considers that Defence currently has in place generally sound arrangements for managing submarine sustainment”. However, Defence notes that the audit has identified areas that Defence (specifically, DMO and Navy) can focus on with a view to making further improvements in the management of the Collins-class operations sustainment.

Recommendation

Recommendation No. 1

Para 3.83

The ANAO recommends that, in order to improve the management of Collins-class inventory and to increase platform availability, Defence gives priority to the implementation of COLSPO's Inventory Management Plan including:

- (a) initiation, as part of the Inventory Management Plan, of an obsolescence remediation plan which incorporates all major suppliers; and
- (b) investigation of arrangements with major suppliers with the aim of reducing associated administrative costs and lead times for parts.

Defence response: Agreed with qualification.

Audit Findings and Conclusions

1. Introduction

This chapter provides an overview of the Collins-class submarines and outlines the sustainment arrangements for the fleet and its costs. The chapter also sets out the audit scope and objectives.

Background

1.1 The Royal Australian Navy (RAN)⁴⁰ has six Collins-class submarines. Two of the six submarines have been upgraded with heavy-weight torpedoes. Projects are in place to progressively enhance the combat capability of all six submarines including weapons, sensors and communication systems upgrades.

1.2 The submarine force fulfils the roles of maritime strike and interdiction, maritime surveillance, reconnaissance and intelligence collection, undersea warfare, and special forces operations. The submarines also contribute to regional engagement and security through the conduct of port visits and exercises with regional nations. They may be employed to operate independently, either as an element of the ongoing national intelligence collection effort or as a forward reconnaissance unit in an area of heightened tension. They may also be employed as one of a number of key elements in task group operations that deny opponents the use of Australia's maritime approaches.

Collins-class submarine development

1.3 In 1982 Defence established a Collins-class project to replace the ageing Oberon Class submarines as they reached the end of their service lives. A new design was required to meet the needs of Navy which included the ability to: travel great distances; operate in varying environments; have state-of-the art weapons systems; and perform traditional submarine functions using the most advanced technology available.

1.4 The vessels were designed in Sweden by Kockums AB and constructed at Adelaide in South Australia by the Australian Submarine Corporation (ASC).⁴¹ Construction of the first of the six submarines, HMAS *Collins*, began in

⁴⁰ RAN is the correct acronym for the Royal Australian Navy. However, for simplicity, the Royal Australian Navy is generally referred to as 'Navy' throughout this report.

⁴¹ The company changed its name and corporate identity on 5 October 2004 from 'Australian Submarine Corporation' to 'ASC Pty Ltd' to better reflect its future business and shipbuilding endeavours.

1990. The submarines and associated support and facilities were to be delivered between January 1995 and October 1999 at a total project cost of \$5.121 billion at January 2006 prices.⁴² HMAS *Collins* was delivered in 1996 followed by HMAS *Farncomb* in 1998; HMAS *Waller* in 1999; HMAS *Dechaineux* and HMAS *Sheehan* in 2001; and the final submarine, HMAS *Rankin*, in 2003. They are expected to have a remaining asset life ranging from 2026 for HMAS *Collins* till 2030 for HMAS *Rankin*.

1.5 In 1999, the then Minister for Defence commissioned a report on the Collins-class by Dr Malcolm McIntosh, the former Chief of Defence Procurement in the United Kingdom, and the former Chief Executive of BHP, Mr John Prescott. The McIntosh-Prescott Report was completed in June 1999 and identified that, at the time, the submarines could not perform at the level required for naval operations with the underlying cause being a myriad of design deficiencies and consequential operational limitations relating to the platform and combat system.⁴³

1.6 Following the McIntosh-Prescott Report additional work was progressed under a number of separate but related projects covering the heavyweight torpedoes, the submarine platform, the combat system, and propeller and hull improvements at a cost of \$1.556 billion at January 2006 prices.⁴⁴

1.7 The 2000 Defence White paper included a plan to bring all six submarines to an improved capability, against current and future requirements, by the end of 2008. Defence advised the ANAO that this is now unlikely to occur before 2012 because of the need to align implementation with the Full Cycle Docking⁴⁵ schedule.

1.8 The submarines were constructed in Australia by ASC. The Australian Government had a substantial minority shareholding in ASC during the main construction period of the Collins-class submarines. In November 2000, the then Government acquired the portion of the shareholding in ASC that it did

⁴² Brief for ANAO – Submarine Sustainment, April 2007 (Annex C), p. 21.

⁴³ 'Report to the Minister for Defence on the Collins-class Submarines and Related Matters' from Malcolm McIntosh, AC, Kt and John B. Prescott, AC, 20 June 1999 (Section 2. What's Wrong).

⁴⁴ Brief for ANAO – Submarine Sustainment, April 2007 (Annex C), p. 21.

⁴⁵ A Full Cycle Docking is a major overhaul and refit. It involves removing the submarine from the water, placing it in a covered workshop and stripping it of all its components down to the bare hull and checking and inspecting all components and replacing them where necessary before reassembly. The opportunity is also taken to implement approved upgrades, modifications and enhancements of major systems and capabilities such as combat systems and torpedos.

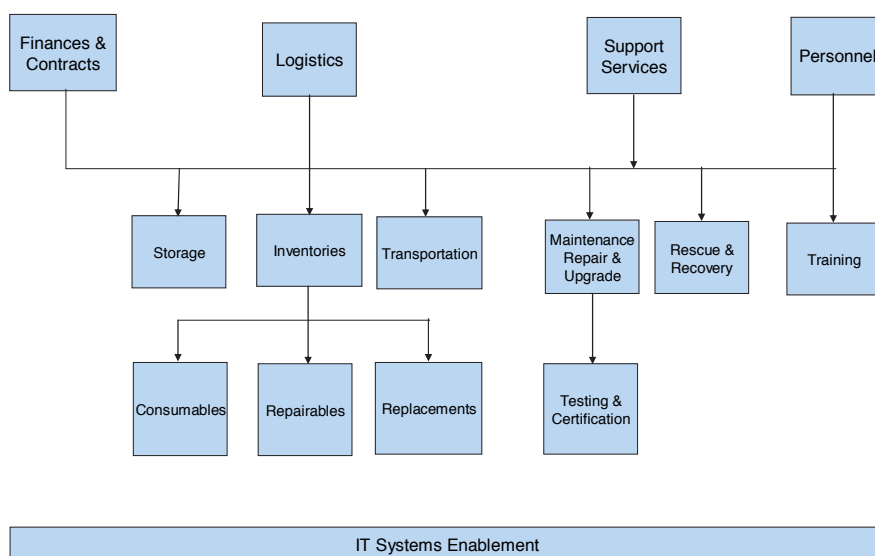
not already own. The then Government's intention was that the company be restructured to implement more sustainable arrangements for the future support of Collins-class submarines and facilitate ASC's onward sale.⁴⁶ ASC's *Statement of Corporate Intent 2008 to 2011*, tabled in the Parliament in September 2008, states that among the company's corporate objectives for the period is ensuring that the other corporate objectives are met in a manner that will facilitate the timely privatisation of the company and to support the shareholder [that is, the Australian Government] in preparing the company for sale.

Collins-class sustainment arrangements

1.9 Sustainment, as indicated in Figure 1.1, includes all activities associated with keeping the submarines operational and maintained and includes the provision of logistics, other support services and suitably trained personnel.

Figure 1.1

Components of sustainment of the Collins-class submarines



Source: ANAO analysis

⁴⁶ Joint Press Release, 26 June 2000, Ministers for Defence, Industry, Science and Resources, and Finance and Administration.

1.10 The Defence Materiel Organisation (DMO) is the service delivery agency responsible for equipping and sustaining the Australian Defence Force (ADF) through the acquisition of capital equipment assets and the sustainment of these assets throughout their in-service life.⁴⁷ This includes the Collins-class submarines.

1.11 Materiel Sustainment Agreements⁴⁸ are made between the Capability Managers and the Chief Executive Officer (CEO) of DMO. These agreements cover the sustainment of current capability, including services such as repair and maintenance, and the provision of fuel and explosive ordnance. Sustainment agreements are based around sustainment products defined by each of the DMO's systems divisions and Capability Managers, and they are reviewed and agreed on an annual basis.

1.12 Within Navy, responsibility for determining the level of support required for the submarines lies largely with the Submarine Force Element Group (SMFEG). Initial and continuation training for the crew of the submarines is the responsibility of Navy Systems Command (NAVSYSCOM), with some training being internally provided and some sourced externally under contract. Further training is provided on board at sea to ensure a cohesive integration of skills to develop competence and proficiency in all aspects to achieve submarine operations.

1.13 The DMO's Systems Program Offices (SPOs) are the business units that manage the delivery of materiel sustainment. The SPOs rely on the Materiel Sustainment Agreements to articulate required output and deliverables from the Capability Manager, and are funded accordingly. Within DMO, submarine related activities are undertaken by two SPOs:

- the Collins Systems Program Office (COLSPO), which has overall responsibility for hull integrity and platform systems, including the weapons discharge system; and

⁴⁷ DMO's business is driven by the defence policies and objectives set by the Australian Government and the operational requirements of the ADF. DMO was made a prescribed agency under the provisions of the Financial Management and Accountability Act 1997 (FMA Act) on 1 July 2005. As a prescribed agency, the DMO became a financially autonomous organisation within the Defence portfolio and now operates under purchaser-provider arrangements established with Defence groups. The DMO is effectively run as a separate 'business' from the rest of the Defence organisation. Defence provides funds to DMO and these are expended against agreed outcomes.

⁴⁸ Materiel Sustainment Agreements are made between the Capability Manager in Defence and the DMO and state in concise terms what in-service support services and products the DMO (as the supplier) will deliver, for how much and when.

- the Submarine Combat Systems Program Office (SMCSPO), which has responsibility for the functions and sub systems of communications, sonar, tactical, weapons, navigation, electronic warfare and periscopes.

1.14 COLSPO and SMCSPO purchase support for the submarines from external suppliers.

1.15 The Collins-class submarine force and the majority of submarine related Defence force infrastructure are operated out of HMAS Stirling in Western Australia. However, there are also support facilities located at ASC Pty Ltd at Adelaide in South Australia and ASC has an additional covered submarine facility at the Common User Facility at Henderson in Western Australia.

Sustainment activities

1.16 The Usage Upkeep Cycle (UUC) is the scheduled maintenance and operational program for an ADF platform, as recommended by the Original Equipment Manufacturer, to optimise platform availability for the life of the vessel. The UUC for the Collins-class is described in Figure 1.2.

Figure 1.2

Usage Upkeep Cycle for the Collins-class submarines

The seven year UUC was planned to comprise:

- six years in operational service;
- a Full Cycle Docking^A, initially envisaged as one year in duration. However, experience has shown that the actual time a full cycle docking is taking is in excess of 100 weeks;
- in every 78 week (18 months) period there must be a docking to attend to maintenance of hull fittings and other items that cannot be achieved while the boat is in the water (two intermediate and a mid-cycle docking)^B; and
- three further maintenance periods between dockings. This comprises two, two week self-maintenance periods and one intermediate maintenance period of eight weeks.

Notes: A. A Full Cycle Docking is a major overhaul and refit. It involves removing the submarine from the water, placing it in a covered workshop and stripping it of all its components down to the bare hull and checking and inspecting all components and replacing them where necessary before reassembly. The opportunity is also taken to implement approved upgrades, modifications and enhancements of major systems and capabilities such as combat systems and torpedos.

B. Full cycle dockings (FCDs) are carried out at ASC's facility in South Australia. Intermediate and mid-cycle dockings are undertaken at a commercial slipway at Henderson, Western Australia, near HMAS *Stirling*.

Source: Defence advice to ANAO April 2007.

1.17 In December 2003, Defence awarded a Through Life Support Agreement (TLSA) to ASC, the builder of the Collins-class submarines, for the ongoing design enhancements, maintenance and support of the submarines' platform systems until the end of their operational lives. In addition to the maintenance activities that are outlined in Figure 1.2, in which ASC plays a major role, DMO has contracts with a number of external suppliers related to the support of combat systems for the submarines, provision of submarine escape and rescue services and training for submarine crews (see paragraph 1.18). Navy also has a contract with ASC to provide part of the training required for submarine crew.

Key sustainment contracts

1.18 The following are the key contracts relating to sustainment of the submarines:

- the TLSA with ASC;
- the contract covering tactical, communications, navigation sensors, non-acoustic sensors and electronic support measures with Raytheon Australia Pty Ltd (Raytheon);
- the contract for the SCYLLA sonar sub-system with Thales Underwater Systems Pty Ltd (Thales);
- the contract for periscope support with BAE Systems Australia Limited (BAE);
- the Submarine Escape and Rescue Centre contract with Cal Dive International Australia Pty Ltd;⁴⁹ and
- the training contract with ASC.

1.19 Table 1.1 sets out the costs of each of these contracts in 2006–07 and 2007–08.

⁴⁹ This contract expired in June 2008. Prior to the expiry of the contract, COLSPO conducted a tender process and selected a preferred tenderer. However, no new contract had been signed by the time this audit was completed.

Table 1.1**Sustainment contract costs for 2006–07 and 2007–08**

Contract	Cost (\$million)	
	2006-07	2007-08
Through Life Support Agreement ^A	192.29	190.34
Tactical, communications, navigation sensors, non-acoustic sensors and electronic support measures	15.76	18.76
SCYLLA sonar sub-system	7.22	9.42
Periscope support	1.37	2.47
Submarine Escape and Rescue Centre	4.10	3.78
Remora Remediation ^B	1.10	10.62
Training	4.29	4.45
Total	226.13	239.84

Notes: A. The TLSA is also used to contract for capital improvement work on the submarines by ASC, the value of which is not shown here.

B. These expenditures related to recovery and remediation works undertaken following the loss of the submarine rescue vehicle, the *Remora*, in December 2006 (see discussion in Chapter 4). In addition, DMO is seeking approval to roll \$3.85 million into 2008–09 related to this matter.

Source: DMO

1.20 The total sustainment contract costs for the six submarines were \$226.13 million in 2006–07 and \$239.84 million in 2007–08.

Audit approach

1.21 The objective of the audit was to assess the effectiveness of sustainability arrangements for the Collins-class submarine force. This included examination of the key contracts in place relating to sustainment of the submarines set out in paragraph 1.18.

1.22 The audit focussed on performance information reporting by the submarine System Program Offices on reliability, safety systems and logistic support services. In the context of the sustainability arrangements, the audit considered combat system upgrades and submarine personnel escape and rescue systems.

1.23 The audit examined the overall framework in place for the management of sustainability arrangements, including the roles of Defence Offices and the contracts and agreements that are in place to support sustainability. In relation to the principal contracts, the audit examined:

- contract management arrangements for each contract;
- issues that have arisen in the management of the contracts and how these have been dealt with;
- the consistency of payments with contractual provisions; and
- the implications for sustainability of the provision of spares.

1.24 The examination of performance measures related to sustainment included consideration of:

- scorecards related to individual contracts;
- demand satisfaction rates related to the provision of parts; and
- the overall measure of Unit Ready Days.⁵⁰

1.25 Audit fieldwork was conducted between April 2007 and June 2008 and included visits to the Collins-class submarine site at HMAS Stirling, the submarine construction and full cycle docking site in South Australia and Defence and DMO in Canberra. The fieldwork involved discussions with relevant support personnel and examining relevant documentation, focusing on the contractual arrangements with external suppliers.

1.26 The audit was conducted in accordance with the ANAO auditing standards at a cost to the ANAO of \$509 000.

Report structure

1.27 The remainder of the report is organised into four chapters:

- Chapter 2 examines the management framework for sustainment arrangements within Defence, including the responsibilities of relevant areas of Defence and DMO;

⁵⁰ The number of days that a force element is available for tasking. Planned unit ready days are determined by aggregating total days for the unit in commission, less all days when the unit is programmed to be in major maintenance and conducting pre-workup (preparations for initial operational training).

- Chapter 3 covers the operational aspects of maintaining the fleet of Collins-class submarines, including the management of the relevant contracts and the achievement of performance objectives;
- Chapter 4 discusses the arrangements for safety and rescue services; and
- Chapter 5 examines submariner training.

2. Management Framework for Sustainment Arrangements

This chapter examines the management framework that Defence has established for the sustainment of the Collins-class.

Introduction

2.1 The audit assessed whether the roles and responsibilities of the areas of Defence involved in the sustainment of the Collins-class submarines have been identified and that there are appropriate contractual arrangements in place with external service providers.

2.2 This chapter discusses the development of the logistics arrangements for Collins-class sustainment. It also discusses the principal elements of the framework under which sustainment arrangements are managed within Defence and the responsibilities of relevant areas in Defence, including in relation to the management of the contracts under which external suppliers support sustainment.

Development of logistics arrangements for the Collins-class submarines

2.3 To appreciate the current task confronting Defence in terms of the sustainment of Collins-class submarines it is important to recognise both the complexity of the vessel and its numerous systems, and to place it in the context of the deficiencies within the original Collins-class strategy for sustainment operations. The sustainment task is overlaid with a number of concurrent activities, including upgrades to systems and rectification of build deficiencies. When added to the factors below, the end result is a complex scheduling exercise built around fleet operational requirements and full cycle dockings.

Initial under-estimation of costs

2.4 At the outset of this audit, Defence advised the ANAO that the Collins-class was introduced into service without a validated strategy for through life

support and without a good understanding of the real cost for support⁵¹ of the complex submarine platform.⁵² Rather, the sustainment budget for these submarines was initially based on the Navy's experience in supporting the Oberon Class submarines. Defence advised the ANAO that this approach was inadequate.

2.5 One of the reasons for this was that much of the maintenance of Oberon Class submarines, the predecessor to the Collins-class, was performed by uniformed personnel. Accordingly, the cost of this support was not transparent but rather included in the overall Navy manpower bill. Similarly, Defence advised that the full cost of maintenance undertaken in dockyards could not be broken down to identify those costs specific to the submarine fleet alone.

Additional factors affecting maintenance requirements

2.6 Defence advised that this initial under-estimation of logistic requirements for the Collins-class has been compounded by a range of factors that arose from the nature of the project itself. In advice to the ANAO, Defence outlined factors such as:

- **Offshore Design Authorities and Original Equipment Manufacturers.** The reliance on offshore design authorities⁵³ and original equipment manufacturers⁵⁴ (OEMs) has meant a convoluted, time consuming and hence costly logistics chain in terms of accessing design authorisation for changes. Equipment such as the towed array handling system, buoyant wire antenna, masts and periscopes have specialist maintenance requirements which also require returning the equipment to overseas based OEMs in some cases. Defence is still learning what items will need replacement or repair overseas, with the resultant cost yet to be fully quantified.

⁵¹ Defence advises that this could no longer occur under the two-pass project approval process. Defence notes that the Capability Development Group and DMO, in conjunction with the Services/Groups, ensure that validated Logistic Support Concepts and Integrated Logistic Support Plans are in place prior to submission to government for second pass approval. Additionally the Capability Development Group, DMO and the Chief Financial Officer Group are required to ensure Net Personnel and Operating Costs and Life Cycle Costs have been comprehensively developed for second pass.

⁵² Brief for ANAO Submarine Sustainment, Enclosure 1 to DGSM/OUT/2007/260 dated 20 April 07, p.1.

⁵³ The Design Authority (DA) is the organisation responsible for the initial design, design review and internal design approval of materiel systems; and for the design of modifications or changes to a materiel system. In the case of the Collins-class this is Kockums in Sweden. The DA is responsible for advising of the possible impact on the existing design of any engineering change proposals.

⁵⁴ The company which produced a particular item of equipment at the construction stage.

- **An inadequate initial maintenance regime.** There are indications that the maintenance baseline may present a case of over-maintenance in some systems and under-maintenance in others, which translates into high rates of defect occurrence within those systems receiving insufficient attention. This in turn affects corrective, or non-routine, maintenance and drives up the consumption of spares beyond original usage studies and increases cost.
- **Poor systems reliability.** This can be attributed to two major aspects – unsuitable designs leading to recurrent and frequent defects; and poor overall support infrastructure to combat recurrent defects stemming from the design. Related to designs there have been questions whether systems are fit for purpose. Systems such as diesel engines, fuel storage, bilge systems, hydraulics, sensors, propellers, battery charging and power distribution remain less than robust with recurrent failures, which affects maintenance and inventory replacement costs.
- **Contemporary Defence technical regulatory framework requirements.** Contemporary technical regulatory frameworks, which provide confidence that platforms are safe, are significantly more stringent than those that were applied to the Oberon Class submarines. They require high levels of documentary evidence, which in turn require labour intensive and costly processes.
- **Development of ‘Parent Navy’ Capability.** The RAN operates the Collins-class submarines as a ‘Parent Navy’. This refers to the extensive knowledge, engineering services, configuration control, supply support, training, intellectual property, and technical comprehension of design concepts, principles and systems which affect the through-life support of a naval platform that is vested in, and managed by, the Navy of origin. It also requires development of an industry capacity that includes an understanding of the design philosophy to the extent necessary to design and implement modifications and undertake major repairs safely and effectively. The costs of establishing a Defence capability as a Parent Navy, and the cost of establishing a national industry capacity proved much more costly for the Collins-class than envisaged during the build.

2.7 The deficiencies in the original Collins-class project, and their flow-on to logistics and maintenance arrangements, have resulted in ongoing challenges for Defence. To facilitate the proper support of the submarines,

Defence has put in place a number of contractual arrangements with commercial suppliers that support their sustainment.

Principal elements of the framework for management of Collins-class sustainment

2.8 The Submarine Force Element Group Headquarters (SMFEG) is part of Navy's Fleet Command which brings together the platforms, weapons systems and people able to conduct Navy's core business. Within the total Navy planning framework, FEGs define and articulate their requirements, priorities and expectations from other agencies and service providers. Accordingly, the SMFEG is the customer for sustainment of the Collins-class. As outlined in Chapter 1, DMO is the service delivery agency responsible for equipping and sustaining the ADF through the acquisition of capital equipment assets and the sustainment of these assets throughout their in-service life. Accordingly, the DMO is service provider for materiel support of the submarines while Director General Navy Personnel Training (DGNPT), an element of Navy Systems Command (NAVYSYSCOM) provides training services for SMFEG.

Materiel Sustainment Agreement

2.9 The arrangements under which DMO provides sustainment support for the submarines are established under a Materiel Sustainment Agreement between DMO and the Navy. Performance targets included in the Agreement cover measures such as Unit Ready Days and the Demand Satisfaction Rates for repairable inventory and consumables.

2.10 The ANAO examined relevant elements of the Materiel Sustainment Agreement between Navy and DMO for the period 1 July 2007 to 30 June 2017. The Agreement covers DMO's responsibilities as the supplier to:

- provide a single point of contact for each product under the agreement;
- report monthly on contracted services funding and output performance targets agreed in each of the product schedules; and
- provide the supplies and services set out in the Agreement.

2.11 The Agreement outlines issues that affected the sustainment of the Collins-class submarines when it was put in place in July 2007, including:

- lack of spares affecting capability and operational availability;

- obsolescence, with items and components increasingly being superseded or no longer under manufacture;⁵⁵ and
- lack of qualified Navy personnel to provide necessary skill sets.

Responsibilities of relevant areas in Defence

2.12 DMO's Maritime Systems Division has a range of responsibilities ranging from the acquisition of the materiel elements of approved capability investments, to their sustainment support. In the case of the Collins-class the principal responsibility lies with the Director General Submarines, located at Russell Offices, Canberra.

2.13 The Collins-class submarine is a complex weapons platform which incorporates a number of significant sub-systems. As discussed in Chapter 1, the submarines are supported by two Systems Program Offices:

- the Collins Systems Program Office (COLSPO) which has overall responsibility for the platform integrity and performance; and
- the Submarine Combat Systems Program Office (SMCSPO) which has responsibility for communications, navigation and the combat systems including the weapons systems.

Collins Systems Program Office

2.14 The Collins Systems Program Office (COLSPO) has been established within DMO to provide logistics support to the Collins-class platform and associated support infrastructure. COLSPO is headquartered at HMAS Stirling in Western Australia, and has support elements located at the ASC site in South Australia. The Director COLSPO is responsible to the Director General Submarines.

2.15 While Defence contracted ASC to build the Collins-class it had not initially planned on contracting ASC as the designer and maintainer.⁵⁶ During the build program, ASC conducted maintenance of the submarines including

⁵⁵ Obsolescence is the loss or impending loss of the ability to procure items to continue operational support of equipment. Obsolescent parts or components are those that are being superseded or phased out of future production. The likelihood of encountering obsolescent parts or components of a platform or system is increased the longer the life of the platform or system. In the case of the Collins-class, the submarines have a life cycle much longer than the constituent parts and systems. Obsolescence not only increases the complexity of maintaining systems because suitable parts can be difficult to source, or because systems may need to be replaced before the useful life of the platform expires, but also affects operational availability.

⁵⁶ Brief for ANAO Submarine Sustainment, Enclosure 1 to DGSM/OUT/2007/260 dated 20 April 07, p. 1.

full cycle dockings (FCDs) and other in-service support under a range of ad hoc contractual arrangements.

2.16 On completion of the submarine build program in March 2003, ASC, and a number of other companies, were contracted by Defence to provide submarine maintenance through individual In Service Support contracts. COLSPO was responsible for the administration of the Platform Support Contract with ASC. Prior to 2003, ad hoc arrangements existed for maintenance requirements.

2.17 COLSPO is an Authorised Engineering Organisation (AEO) under the RAN Naval Technical Regulatory System, with third party quality accreditation certified by Lloyd's Register, and is certified to cover the scope of activities identified in the COLSPO Business Operations Plan including to:

- undertake submarine materiel certification;
- upgrade the submarine to improve sustainability, capability and safety; and
- provide a submarine escape training and a rescue capability.

Through Life Support Agreement with ASC

2.18 In December 2003, Defence awarded a Through Life Support Agreement (TLSA) to ASC for the ongoing design enhancements, maintenance and support of the submarines' platform systems until the end of their operational lives. In announcing the contract in December 2003, the then Ministers for Defence, and Finance and Administration stated that it fulfilled a Government commitment that all submarine full cycle dockings would be undertaken by ASC in South Australia.⁵⁷ The arrangement established ASC as the principal provider of platform related submarine maintenance and provided the basis for the long-term commercial viability of ASC.⁵⁸

2.19 The initial duration of the agreement is for 15 years with the option to extend it for a further two – five year periods. Defence originally indicated that it was likely that around \$3.5 billion could be expended over the life of the contract. Defence indicated that this was dependent on future decisions regarding submarine capability, and that the proposed expenditure in future years would be agreed on an annual basis.

⁵⁷ Joint Press Release by Ministers for Defence and Finance and Administration on 8 December 2003.

⁵⁸ Brief for Procurement Approval, DGSM 1979/03, 22 December 2003.

2.20 The TLSA covers the full range of platform maintenance support and design services for the submarines to maintain the required level of operational capability for the Collins-class submarines. Accordingly, expenditure under the TLSA is approximately 60 per cent of total sustainment expenditure.⁵⁹

2.21 The 18 strategic objectives of the TLSA are set out in Table 2.1.⁶⁰ In addition to the primary objective of sustaining the Collins-class submarines (objective (a)), the strategic objectives address a range of important secondary aims such as achieving optimum operational capability (objective (d)), maximising availability and capability (objective (f)), and ensuring compliance with safety and other regulatory requirements (objective (q)).

2.22 Objectives (e) through to (i), along with objectives (k) and (n), are aimed at preserving the strategic capability represented by the ASC's core skill base of submarine platform maintenance and design expertise, and enhancing Australian skills, capability and facilities for sustaining the submarines. Objective (k), in particular, addresses the need to locally develop important submarine support capabilities 'in accordance with the Commonwealth's policy of Defence self-reliance.'

⁵⁹ In 2007–08, DMO's total submarine sustainment expenditure was \$332.6 million and expenditure under the TLSA with ASC was \$190.34 million.

⁶⁰ ASC advised the ANAO that the 18 strategic objectives proved unwieldy and that there is considerable overlap and duplication within the objectives set out in the TLSA. ASC indicated that it had agreed a set of five consolidated strategic incentives with DMO: (1) assure personnel and submarine safety; (2) strategically balance submarine availability and capability, and lifecycle costs; (3) recognise, strengthen and sustain the Australian industry capability and capacity to support materially and enhance the Collins-class submarines through life; (4) ensure the Commonwealth of Australia receives increasing 'value for money' services and for ASC to earn a reasonable commercial return; and (5) jointly foster relationships with key stakeholders and suppliers.

Table 2.1

Strategic Objectives of the Collins-class Through-Life Support Agreement

Objectives of the Parties to the Agreement	
a)	maintenance of the Australian submarine materiel capability
b)	reduce the logistics costs of ownership of the Submarines in real terms during the life of this Agreement
c)	establishment of a cooperative relationship between the Commonwealth and ASC that has sufficient flexibility to accommodate the tasks the Commonwealth may wish to engage ASC to undertake, which may change during the life of the relationship
d)	sustainable, effective and cost efficient design, engineering and logistics support for the life of class to achieve optimum operational availability
e)	retention and enhancement of Australian capability for Submarine materiel support and development
f)	assurance of ASC capability that may be considered unique and mandatory for the sustainment and enhancement of Submarines life of class
g)	development, maintenance and enhancement of appropriate skill sets and capabilities within both the Commonwealth and ASC
h)	to ensure availability of necessary facilities (including plant and systems) to maintain Australian Submarine materiel capability
i)	establishment and maintenance of submarine engineering design competence that will satisfy RAN technical Regulatory Requirements, for the future upgrade and development of the Submarines and the ability to support future Australian submarine acquisition or build programs
j)	to maximise the availability and capability of the Submarines to meet RAN's requirements and also to maximise fulfilment of the capability outcomes the RAN requires under the Defence Capability Plan (or other plans) within allocated resources
k)	in accordance with the Commonwealth's policy of Defence self-reliance, to maintain and develop strategically important TLS capabilities for the Submarines within Australia wherever practicable
l)	for ASC, as a commercial organisation, to obtain a reasonable return on its investment when it performs the TLS Role efficiently and successfully and a return that appropriately reflects the risks involved in performing the TLS Role
m)	for the Commonwealth, to obtain Value for Money on an ongoing basis in relation to Submarine TLS, including the continuous development of innovative and more transparent and cost effective ways for TLS to be provided

Objectives of the Parties to the Agreement	
n)	to facilitate the retention and enhancement of the capabilities and skills of supporting SMEs and OEMs and optimising relationships with foreign OEMs to obtain self-reliance which are critical to Submarine support and materiel capability
o)	to encourage the most efficient possible use of resources for the achievement of Submarine materiel capability, including, to the extent practicable, level loading
p)	to remunerate ASC in a manner that will ensure that ASC is not cash flow negative, noting that any cash flow issues to be considered by the parties are a function of the pattern of activities conducted under this Agreement and Activity Contracts in accordance with normal business practices rather than any issues resulting from a change in ASC's circumstances or other activities conducted by ASC
q)	to work within a framework that ensures personnel and materiel safety, and assures compliance with Regulatory requirements
r)	to achieve these joint objectives through a culture of mutual respect and cooperation, and in an environment that fosters innovation, continuous improvement, and full and frank exchange of views
s)	to the extent consistent with fulfilling its obligations under this Agreement and Activity Contracts, for ASC to seek and perform Non Defence Work, including without limitation, to encourage the efficient utilisation and the enhancement of ACS's expertise, skills, capabilities and resources

Source: Clause 2.1 of the *Strategic Agreement for Through-Life Support of the Collins Class Submarines* (Agreement Number 1041254)

2.23 The budgetary objectives include reducing the real costs of owning the submarines (objective (b)) and encouraging the most efficient possible use of resources (objective (o)). The broader financial and commercial objectives are for the Commonwealth to obtain value for money (objective (m)) and for ASC to obtain a reasonable return on its investment (objective (l)), to which end the Commonwealth undertakes to finance ASC's activities under the Agreement (objective (p)) and allows ASC to seek and perform non-Defence work (objective (s)).

2.24 The strategic objectives, set by the Director-General Submarines in DMO and the Chief Executive Officer of ASC, establish a broad framework for the administration of the TLSA and include a number of features to assist the commercial viability of ASC, such as:

- the continued use of Commonwealth land and facilities, under a licensing arrangement, at HMAS Stirling and at Outer Harbour, South Australia;
- limiting ASC's liability to \$10 million total in any financial year in respect of claims arising from ASC's supplies to the Commonwealth;
- the Commonwealth indemnifying such claims in excess of the liability limit, or in respect of damage to property, or injury or death;
- the timely provision by the Commonwealth of Government Furnished Equipment (GFE) and Information (GFI);
- ensuring timely access to submarines at Outer Harbour or HMAS Stirling, or reimbursing ASC for its reasonable costs if the Commonwealth chooses to make a submarine available at some other location;
- ensuring the ASC's TLSA financing costs are low by maintaining a positive cash flow;
- paying ASC's monthly capability payments (covering labour, materials and sub-contractor costs, plus a profit component) in advance, with retrospective adjustment for the actual work undertaken;
- adopting a cost-plus arrangement for contract payments, with the Commonwealth paying all ASC's *bona fide* contract costs plus an agreed rate of profit; and
- providing incentive payments to ASC, including payments for achieving schedule.

2.25 The overall effect of such measures is that the Commonwealth assumes a significant proportion of the commercial risk that might otherwise apply to ASC. This arrangement was put in place with the intent of the Commonwealth benefiting from ongoing support of the Collins-class submarines and retaining the capacity in Australia to assist the development of current and future submarine capability.

2.26 The ANAO notes, however, that there are inherent tensions in the arrangements related to the TLSA. For instance, the Government has expressed the wish to preserve submarine maintenance capability (which lies with ASC) in Australia while the strategic objectives of the TLSA include reducing the real costs of owning the submarines (objective (b)). The ANAO also notes that the TLSA is a cost-plus contract⁶¹, with incentives, and limits DMO's capacity to apply normal commercial pressures in looking to obtain the best value for money for the investment in sustainment of the Collins-class.

2.27 The Commonwealth currently wholly owns ASC. However, the previous Government had expressed its intention to sell the company and, as noted in paragraph 1.8, ASC's *Statement of Corporate Intent 2008 to 2011* states that the company is working with the shareholder [that is, the Australian Government] in preparing the company for sale. The TLSA contractual arrangements are a critical element of the relationship between DMO and ASC, requiring close consideration in making any decision to sell ASC.

Submarine Escape and Rescue Centre contract

2.28 Other elements of the through life support of the submarines include the Submarine Escape and Rescue Centre (SERC) and the training services provided by the Training Authority Submarines. These are separate contracted activities provided through industry support. The SERC contract is managed by COLSPO, and the contract with ASC for training services is managed by the Training Authority - Submarines (see paragraphs 2.39 to 2.41 and Chapter 5).

2.29 Following a tender process, COLSPO established a five-year contract for SERC services with Fraser Diving Australia (FDA) - a subsidiary of Fraser Diving International (FDI) in June 2003⁶². FDA was sold to Cal Dive

⁶¹ Under a cost-plus contract, *bona fide* costs incurred by the contractor are reimbursed by the principal, together with a margin calculated in a predetermined manner. Costs plus contracts may be based on cost plus percentage, cost plus fixed fee or cost plus a sliding-scale fee.

⁶² The Submarine Escape Training Facility (SETF) was initially manned and operated by Defence with the Submarine Escape and Rescue Suite (SERS) being provided by ASC through a five year contract commencing from 1996. Global Submarine Services Pty Ltd (GSS) acted as the major subcontractor to ASC providing most maintenance and all operational services related to the SETF. ASC were granted several extensions to the contract.

International in 2006 and operated as Cal Dive International Australia Pty Limited (CDIA).⁶³

2.30 The objectives of the SERC contract with FDA/Cal Dive were to:

- achieve and sustain effective SERC capabilities at required levels of availability, while minimising support requirements and costs; and
- ensure that all appropriate support elements are planned, acquired, evaluated and implemented by SERS Certificate 2.⁶⁴

2.31 Chapter 4 discusses this contract, including matters related to management of the contract and issues that have arisen with the contract.

Submarine Combat Systems Program Office

2.32 As noted in paragraph 2.13, SMCSPO is responsible for integrated combat system materiel support to the Collins-class submarines and associated support infrastructure. Accordingly, SMCSPO is responsible for the maintenance of legacy combat systems and manages contracts with three service providers: Thales Underwater Systems Pty Ltd (Thales); Raytheon Australia Pty Ltd (Raytheon); and BAE Systems Australia Limited (BAE).

2.33 SMCSPO (like COLSPO) is an Accredited Engineering Organisation under the Naval Technical Regulatory System. Both the COLSPO and SMCSPO are supported by the Directorate of Submarine Engineering (DSME) and the Logistics Support Agency – Navy (LSA-N):

- DSME provides specialist engineering support and advice on submarine systems, maintenance and engineering changes; and
- LSA-N provides logistics procurement services for all RAN ships, submarines and equipment.

2.34 The Macintosh-Prescott Report on the Collins-class Submarine and Related Matters⁶⁵ identified that the original combat system was severely restricted in its tactical capability. On 13 September 2002, the then Government agreed to purchase a replacement combat system for the submarines. The

⁶³ DMO conducted a further tender process for the provision of SERC services from mid 2008. A new contract to provide these services is currently being negotiated and is expected to be signed in late 2008.

⁶⁴ This Certificate comprises a statement by the contractor that the SERS is safe and available for exercises and normal operations.

⁶⁵ 'Report to the Minister for Defence on the Collins-class Submarines and Related Matters' from Malcolm McIntosh, AC, Ki and John B. Prescott, AC, 20 June 1999.

approved budget for that project was \$451.6 million in November 2008.⁶⁶ In addition to combat system work, the sonars currently installed in HMAS *Sheehan* and *Dechaineux* are being improved as part of the Combat System Augmentation initiative. Sonar improvements in all submarines are to be considered in a latter phase of the Collins Replacement Combat System project.⁶⁷ In addition to providing new capability, Collins Replacement Combat System project is to overcome the key deficiencies identified by the McIntosh-Prescott report concerning sonar controls and the quality of displays. This project is managed by SMCSPo as an acquisition project, separate from its management of the contracts related to the sustainment of the Collins-class submarines.

2.35 On 13 September 2002, the then Government agreed to a \$444 million project⁶⁸ to purchase a replacement combat system for the submarines. As part of the program, the sonar augmentation currently installed into HMAS *Sheehan* and *Dechaineux* will be improved and extended to the remaining submarines. In addition to providing new capability, the sonar program overcomes the key deficiencies identified by the McIntosh-Prescott report concerning sonar controls and the quality of displays. This project is managed by SMCSPo separately from its management of the contracts related to the sustainment of the Collins-class submarines.

Contractual arrangements for combat systems

2.36 The In Service Support contracts for combat systems were originally established based on a combination of Original Equipment Manufacturers' design authority experience and staff skill set, the intellectual property rights held by the Original Equipment Manufacturers and the perceived benefits for Defence in having more direct commercial and management access to the two strategic sub systems of sonar and periscopes. The Combat System was originally provided through the Combat System prime contractor, Rockwell International, subsequently novated to Boeing Australia and then novated to Raytheon Australia. The sonar was provided by Thales Australia and the periscopes by BAE, both under sub contracts to Rockwell International.

⁶⁶ Collins Replacement Combat System – SEA 1439 Phase 4A. ANAO Report No.9 2008–09, *Defence Materiel Organisation Major Projects Report 2007–08*, 27 November 2008, p.182.

⁶⁷ Collins Replacement Combat System – SEA 1439 Phase 6. ANAO Report No.9 2008–09, *Defence Materiel Organisation Major Projects Report 2007–08*, 27 November 2008, p.177, 180.

⁶⁸ Defence Brief to ANAO, 20 April 2007, Annex C, p. 21. This amount is in January 2006 prices.

2.37 There are currently three main combat system contracts under the sustainment arrangements for the Collins-class:

- a contract with Raytheon for combat system support (covering tactical, communications, navigation sensors, non-acoustic sensors and electronic support measures);
- a contract with Thales covers the SCYLLA Sonar sub-system; and
- a contract with BAE for periscope support.

2.38 The contractual arrangements with Raytheon and Thales have been extended to December 2008 and the contract with BAE has been extended to October 2009. DMO's management of these contracts is discussed in Chapter 3.

Director General Navy Personnel Training

2.39 The Director General Navy Personnel Training (DGNPT) is an element of Navy Systems Command (NAVYSYSCOM) and is responsible for providing training services for the SMFEG. This is performed by the Training Authority – Submarines (TA-SM) which is located in the Submarine Training and Systems Centre (STSC) at HMAS Stirling.

2.40 Training for the SMFEG is provided by both the TA-SM and external contractors, with approximately 40 per cent of the training delivered by the TA-SM's own staff and 60 per cent delivered by external contractors. From 1993 to 1998, Scientific Management Associates (SMA) was the external contractor.

Contract for the provision of Collins-class submarine training services

2.41 From 1998, ASC, which also holds the TLSA contract for the ongoing support of the Collins-class submarines, has been the external contractor responsible for providing an element of submarine training services. ASC undertakes this role through a contract arrangement with DGNPT which is separate from the TLSA arrangements. The contract is managed by TA-SM at the STSC at HMAS Stirling. ASC is responsible under the contract for providing training services so that the SMFEG can achieve its mission to provide a submarine capability required by the Commander Australian Fleet. This capability encompasses the ability of designated forces to be committed to conduct specified operational roles and tasks.

2.42 Chapter 5 examines matters related to this contract, as well as the overall number of submariners available.

3. Maintaining Collins-class Operations

This chapter discusses DMO's management of maintenance arrangements for the Collins-class and the extent to which targets for operational availability are being met.

Introduction

3.1 As discussed in Chapter 2, the sustainment arrangements relating to the Collins-class submarines rely on a number of contracts managed by COLSPO and SMCSP0. This chapter discusses DMO's management of the through life support arrangements for the Collins-class submarines and the combat system contracts for the submarines. It also examines inventory management arrangements that affect the performance of the principal submarine support contracts. The chapter also discusses the extent to which targets for operational availability are being met.

3.2 In relation to the contracts considered in this chapter⁶⁹, the audit examined:

- contract management arrangements for each contract;
- issues that have arisen in the management of the contracts and how these have been dealt with;
- the consistency of payments with contractual provisions; and
- the implications for sustainability of the provision of spares.

3.3 The examination of performance measures related to sustainment included consideration of:

- scorecards related to individual contracts;
- demand satisfaction rates related to the provision of parts; and
- the overall measure of Unit Ready Days.

3.4 In examining the contract management arrangements for each contract, the audit reviewed whether there existed reporting and communication

⁶⁹ The contracts concerned are: the Through Life Support Agreement with ASC; the contract covering tactical, communications, navigation sensors, non-acoustic sensors and electronic support measures with Raytheon Australia Pty Ltd (Raytheon); the contract for the SCYLLA sonar sub-system with Thales Underwater Systems Pty Ltd (Thales); and the contract for periscope support with BAE Systems Australia Limited (BAE).

arrangements that supported sound management of the contracts. In relation to payments, the audit examined the overall arrangements for matching payments and work completed, as well as their consistency with contractual provisions.

3.5 The audit also examined inventory management arrangements related to the Collins-class which are the responsibility of Defence and DMO.

Collins-class maintenance arrangements

3.6 Maintenance arrangements for the submarines consist of a series of programmed, scaled maintenance activities ranging from Full Cycle Dockings (FCDs) carried out at ASC's facilities in South Australia every 6 to 8 years through to shorter and more regular maintenance activities carried out in Western Australia or world wide, including the servicing of equipment by Original Equipment Manufacturers (OEMs).

3.7 The maintenance philosophy adopted by Defence for the Collins-class is based on the following broad concepts:

- planned service life of 28 years;
- a seven year usage and upkeep cycle (UUC);
- a capability usage of three 'standard' missions (70 day patrols) per year per submarine throughout their lives;
- platforms are independent of base support between assisted maintenance periods;
- the use of high technology;
- high levels of systems and/or equipment redundancy;
- minimum manned crews; and
- modular design driving a largely 'repair by replacement' maintenance environment.⁷⁰

3.8 The original planned maintenance schedule provides for some 225 weeks of available operational uptime during each seven year operational cycle – the equivalent of 1350 days per year in total for the six submarines - a 62 per cent operational availability. The minimum operational availability

⁷⁰ Defence Brief to the ANAO, 20 April 2007, Annex A, P. 8.

sought in the original Required Ships Characteristics (RSC)⁷¹, was 70 per cent or 1533 days per year in total for the fleet. As part of the contractual arrangements with ASC, one key performance indicator relates to sea days. Defence advised ANAO that available sea days in 2007–08 was 744, and the achieved sea days was 713.

3.9 For the first two years of support for the first completed submarine, HMAS Collins, 1996 to 1998, maintenance was provided on a sole sourcing basis by the prime suppliers. The largest of these were the contracts with ASC, Raytheon, Thales and BAE. From 1998–99 to 2000–01 support activity was contracted to numerous suppliers on the basis of competitive tenders. The first two full cycle dockings (HMAS *Collins* and *Farncomb*) were contracted to ASC on an ad hoc basis.

Through Life Support Agreement with ASC

Contract management

3.10 The TLSA is worth up to \$3.5 billion⁷² over 25 years (15 year agreement, with a further two – five year options). In announcing the contract in December 2003, the then Ministers for Defence, and Finance and Administration stated that it fulfilled a Government commitment that all submarine full cycle dockings would be undertaken by ASC in South Australia and also provided the basis for the long-term commercial viability of ASC.⁷³

3.11 As part of the contract management arrangements, DMO employs a number of mechanisms to obtain information from ASC and to facilitate communication between ASC and DMO (particularly COLSPO). For example, the ANAO noted:

- through life support monthly reports from ASC including maintenance status and level of defect rectification occurring;
- quarterly full cycle docking meetings, including reports highlighting progress, risks, issues and lessons learnt;

⁷¹ The Required Ships Characteristics (RSC) details the form, fit and function for an effective capability and is developed prior to the contract being developed by the New Submarine Project and Maritime Capability Development Group to reflect the Navy's requirements. The RSC is the pre-contract specification that is issued to tenderers. When the contract to build is being negotiated, the New Submarine Project develops another specification called the SUBSPEC which is included in the contract. In the case of the Collins-class, the SUBSPEC and the RSC are identical.

⁷² Defence advised the ANAO that this estimate of the value of the TLSA allowed for CPI increases.

⁷³ Joint Press Release by Ministers for Defence and Finance and Administration on 8 December 2003.

- quarterly joint meetings between DMO and ASC Executive, covering key issues arising under the contract such as schedule, risk, initiatives, finance/budget, inventory, and relationship. This is preceded by a working level Management Team Meeting which agrees to specific detail; and
- detailed Maintenance Engineering Monthly Reports, covering all aspects of sustainment activity on the submarines.

3.12 The quarterly meetings between DMO and ASC are minuted, with agreed actions recorded.

Payment arrangements

3.13 A key component of the TLSA is the Capability Payment. The Capability Payment is paid in advance to ASC in 12 monthly instalments and consists of:

- Base Direct Labour (BDL) - that is the labour costs associated with ASC's permanent workforce engaged on TLSA activities;
- recoverable costs - recoverable costs include labour and non labour costs for the corporate departments of ASC, rates, utilities, depreciation, business systems improvements and general operating expenses; and
- a margin associated with the recoverable costs.

3.14 Because the Capability Payment is made in advance there is pre-paid labour, referred to as Pre-paid Factors of Production, which has to be subsequently 'discharged' against the applicable Through Life Support Task or professional service. Materials and subcontractor costs are invoiced and paid at the end of each month. Profit on the Prepaid Factors of Production, material and sub contractor costs, is paid retrospectively based on BDL discharged and task completion.

3.15 There are also a series of agreed Incentive Payments for performance, targeted at Defence priorities. These are paid according to a number of strategic and activity criteria with a maximum set as a percentage of the BDL and recoverable costs. The intent is to drive continuous improvement and efficiencies, whilst meeting the strategic objectives of the Commonwealth.⁷⁴

3.16 Figure 3.1 describes the process undertaken annually to negotiate the Capability Payment which is based on an agreed formula at Clause 19.9 of the TLSA.

⁷⁴ ANAO interview with COLSPO on 26 June 2007.

Figure 3.1

Capability Payment Negotiation Process

On or before 28 February each year COLSPO is required to provide ASC with a Statement of Expected Operational Outputs (SEOO) for the forthcoming financial year.

The SEOO is an assessment of the demand for professional services and tasks. In addition, the SEOO provides four year forecasts of annual expenditure. The activities covered in the SEOO include the full range of services, from sustainment (defect rectification, maintenance service activities, Full Cycle Dockings), to generation activities for major and minor design projects to inventory services. Maintenance engineering activities incorporate services such as planning, sub contract management, Integrated Logistics Support (ILS), estimating and engineering services.

ASC reviews the SEOO and forecast annual expenditure and provides COLSPO with a detailed estimate of the costs expected to be incurred in producing the expected operational outputs (called the Costed Response).

By 20 May, COLSPO and ASC are expected to have agreed on the scope of work and contract price, to enable contract signature by June.

The monthly Capability Payment is then negotiated, and work commences in the new financial year.

Source: DMO

3.17 Table 3.1 indicates the TLSA sustainment costs for the years 2003–04 through to 2007–08.

Table 3.1

TLSA costs

2004–05 \$million	2005–06 \$million	2006–07 \$million	2007–08 \$million
116.0	159.0	192.29	190.34

Source: Source: DMO

3.18 As part of fieldwork undertaken at COLSPO, the ANAO compared the information presented by ASC in selected invoices with the anticipated work program agreed by DMO and the ASC. ASC invoices examined were consistent with the amounts included in the work program and contractual arrangements, with adjustments being made for the actual levels of work undertaken.

Achieving value for money, including Performance Incentive Payments

3.19 Another of the stated objectives of the TLSA is that it provides value for money.⁷⁵ The basis for entering into the TLSA with ASC was that Defence will achieve value for money by dealing with the only company which has the necessary equipment and expertise to perform the full gamut of maintenance services for the Collins-class.⁷⁶ In this context, a purpose of the long term agreement was to ensure that ASC's overheads and profit on Collins-class support activities were maintained at a consistent and reasonable rate rather than be subject to negotiation on a case by case basis.

3.20 The importance of taking steps to ensure value for money in this monopoly situation has been recognised by DMO. A Tender Evaluation Working Group (TEWG), comprising personnel from a range of organisations within DMO and Defence, including the Directorate of Financial Investigation Services⁷⁷ is established annually and is tasked with reviewing and assessing ASC's Costed Response to COLSPO's annual Statement of Expected Operational Outputs (refer to Figure 3.1 above). The TEWG seeks to achieve an appropriate balance between capability delivery and the cost to Defence.

3.21 An important element of the TLSA related to achieving value for money outcomes from the contract is the Performance Incentive Payment regime. The Incentive Payments included in the TLSA are structured at the 'Strategic' and 'Activity Based' levels, and are related to matters concerning working relationship between the parties (at all levels)⁷⁸, schedule achievement, available sea days, and other activity to achieve efficiencies or innovative solutions.

⁷⁵ Defence advised the ANAO that the value for money definition used in Defence indicated that value for money should be evaluated on a whole-of-life basis. It is influenced by a number of factors including: the procurement method adopted; market maturity; performance; risk; flexibility and adaptability; financial considerations; the anticipated obtainable price or disposal cost at the point of disposal, and evaluation of contract options. Officials purchasing goods and services need to be satisfied that the best possible outcome has been achieved by taking into account all relevant costs and benefits over the whole of the procurement cycle. Acceptance of the lowest price is not necessarily an indicator of best value for money.

⁷⁶ Collins-class *Through Life Support Agreement for FY06–07*, clause 6.1, COLSPO-WA/OUT/2006/1786, approved 6 June 2006.

⁷⁷ The Directorate of Financial Investigation Services (FIS), within the General Counsel Division of DMO, is responsible for providing assistance to the Defence portfolio in achieving value for money outcomes for procurements. Amongst other situations FIS assistance is sought when sustainment projects are valued at \$20 million or more.

⁷⁸ Data to measure this aspect of performance is gathered by means of a Relationship Feedback Form that covers matters such as responsiveness, innovation, teamwork and leadership.

3.22 The Incentive Payments are derived by reference to Key Performance Indicators (KPIs) agreed to by the parties. Strategic Level KPIs apply in respect of the totality of ASC's performance of the through life support role and are intended to be formulated with reference to:

- furthering the objectives of the TLSA (see Table 2.1 for a list of these);
- the types of behaviours or outcomes the parties wish to encourage;
- encouraging investment in and development of ASC's capability and skills through training and research and development;
- steps needed to encourage innovation in relation to matters such as obsolescence management; demonstrated capacity to manage Contingency;⁷⁹ and
- ASC's overall management of its capability and skills and ability to react appropriately and quickly to potentially adverse events.

3.23 Activity Level Incentives are those that apply under specific Purchase Orders and Activity Contracts. The TLSA provides that the appropriate KPIs in relation to Activity Level Incentives will vary during the agreement but during the first four years of the Initial Term, the parties anticipate that the KPIs will be primarily focussed on schedule (subject to safety and quality requirements having been met)⁸⁰.

3.24 Defence advised the ANAO that the design of the incentive payments arrangements is such that ASC is required to perform in line with the contractual requirements based on Commonwealth priorities, which are set at levels that have a reasonable chance of achievement. Defence makes payments on the basis of a comparison of targets versus achieved levels on all components of the incentive arrangements.

3.25 Both Defence and ASC advised the ANAO that they considered that the Incentive Payments available to ASC under the TLSA have achieved efficiencies in Collins-class maintenance functions by influencing ASC's behaviour and focus on Defence priorities.

⁷⁹ "Contingency" means an amount which may be included by ASC in an estimate that is in addition to the actual costs estimated to be incurred by ASC or the Factors of Production estimated to be provided by ASC in the provision of Professional Services or the performance of a Through Life Support Task and that represents ASC's estimate of the risks involved in the provision of the relevant Professional Services or the performance of the relevant TLS Task.

⁸⁰ ASC advised the ANAO that during the first four years of the TLSA the incentives were primarily focused on: the percentage of available sea days achieved; schedule; and relationship.

3.26 Incentive Payments made to ASC in the four years 2004–05 to 2007–08 were \$5.1 million, \$8.0 million, \$8.2 million and \$9.4 million respectively or 84 per cent, 87 per cent, 89 per cent and 94 per cent of the total available to the company under the TLSA.

3.27 In 2005, COLSPO's assessment in its periodic review of performance was that ASC was performing as contracted and in some instances just above that level. Similar outcomes of the assessments are made in other years. The ANAO notes that the design of the Incentive Payments arrangements in the TLSA is such that ASC is provided with substantial payments for performance broadly in line with the contractual requirements.

3.28 The then Government's objective in introducing the TLSA in December 2003 was to maintain a viable industry capability to support the Collins-class to the end of their life. As Table 3.2 shows, ASC's revenue and profitability improved considerably from 2003–04 onwards.⁸¹ Since November 2000, the ASC has been wholly-owned by the Commonwealth.

Table 3.2

ASC's Revenue and Operating Profit 2000–01 to 2007–08

Financial Year	2001–02 \$million	2002–03 \$million	2003–04 \$million	2004–05 \$million	2005–06 \$million	2006–07 \$million	2007–08 \$million
Revenue from Services	141.8	148.4	243.6	217.0	254.7	305.52	315.28
Operating Profit after Tax	0.1	5.9	16.1	16.1	18.5	29.6	29.7

Source: ASC Annual Reports

3.29 A distinctive element of the Performance Incentive Payment arrangements in the TLSA is that DMO is required to develop and agree with ASC the KPIs against which the company's performance will be measured. The ANAO notes that clause 19.18(d)(i) of the TLSA indicates: 'the KPIs to be met by ASC in order to achieve Performance Incentives should ordinarily be set at a level that are as likely to be met as not'.

3.30 It is difficult to reconcile the expectations reflected in this clause with the extent of ASC's success in achieving performance incentives over the years.

⁸¹ ASC commented to ANAO that the company's revenue and profits do not only derive from the TLSA and that there are profit contributions from other Defence projects, non-Defence projects and interest earnings.

Since the TLSA commenced, the company has received, on average, 87 per cent of the available incentives for the four years 2003–04 to 2007–08. The ANAO notes that COLSPO’s own assessment of performance (see paragraph 3.27) was that ASC was performing as contracted or just above that level over the period when substantial performance incentives were being paid.

3.31 The ANAO further notes that another clause of the TLSA provides that: ‘Performance Incentives are to be earned and will not be regarded as a surrogate for additional Profit’.⁸²

3.32 For the first four years of its operation, the TLSA prescribed a total pool available for incentive payments equal to 7 per cent of total basic direct labour costs and recoverable costs.⁸³ As a consequence, to date the available Performance Incentives have related to basic costs, for which ASC was reimbursed under the cost-plus TLSA contract, rather than earned value. The TLSA incentive arrangements in place to date amplify the cost-plus nature of the contract and may have diminished incentives to control costs.

3.33 ASC advised ANAO in January 2009 that:

...it is often the case that the customer [in setting an incentive] takes a ‘*stretch schedule target*’, dictated say, by RAN operational imperatives, to be the required project schedule. Again meeting the date would most likely only generate an ‘*as contracted*’ customer assessment, whereas ASC and its people have made huge efforts, often working long hours, to meet the date required.

It should be noted that ASC needs to secure a substantial proportion of the incentives to achieve a reasonable commercial return. Even if ASC were to achieve 100% of its incentives, its returns would not be abnormally or even particularly high...

3.34 The ANAO drew Defence’s attention to clause 19.19 of the TLSA that provides for a review of remuneration arrangements to occur within 4 years from the commencement date. The ANAO suggested that the KPIs should be reviewed to ensure that they take appropriate account of the expectations of the parties set out in clause 19.18(d)(i) and clause 19.18.(d)(iv) of the TLSA and

⁸² See clause Clause 19.18(d)(iv) of the TLSA.

⁸³ See clause Clause 19.18(b) of the TLSA. Basic direct labour comprises the costs of the ASC permanent workforce, including labour hired by ASC on the prospect of permanent engagement. Recoverable costs include overheads and indirect labour costs.

are calibrated to appropriately reward ASC for quality performance while delivering against the strategic objectives⁸⁴ for the contract.

3.35 Defence advised that, at the time the provision in clause 19.19 was available, DMO was having difficulty achieving an agreed costed response for 2008–09.⁸⁵ Defence added that, with any review of profits and incentives also requiring the agreement of ASC, it was not considered to be an appropriate time to commence such a review. Defence further advised that, given that it is pursuing significant changes to the TLSA to put it on a firmer commercial basis (in anticipation of the sale of ASC), it considered that a better result for a review of the profit and incentive structure (as well as the fundamental cost plus nature of the contract) would be achieved in the context of the overall changes being sought.

Managing the contractual relationship

3.36 DMO reports sustainment activities through the Monthly Reporting System (MRS) which provides a snapshot of product performance (in this case the Collins-class submarines). The report provides a brief overview of product performance during the period, with focus on technical, business management, operational and main provider support commitment. This covers all support providers to the submarine support mechanism. An example of the type of issue raised in these reports is included in the September 2008 report. That report referred to particular submarines being delayed in docking and the actions being undertaken to investigate such matters.

3.37 On a quarterly basis, DMO produces the relationship feedback report under which personnel at all levels report against their counterparts in ASC. The data underpinning the issues is discussed at the Quarterly Management Team meetings with ASC, with actions and responsibilities assigned to relevant stakeholders to resolve. Additionally, on a six monthly basis, DMO compiles the 360 degree report on contractors, who receive feedback based on Commonwealth assessment of performance. This provides industry with the forum to highlight issues to DMO Corporate Management related to particular projects. For example in the case of the TLSA contract, the ASC has raised issues such as the need for DMO to improve communication where there are known changes to planned work and design approval arrangements.

⁸⁴ See paragraphs 2.21 to 2.23 and Table 2.1 for further information about the strategic objectives of the TLSA.

⁸⁵ In January 2009, Defence advised that all incentives for 2008–09 have yet to be agreed.

3.38 These reporting arrangements, together with the responsibilities of the other party to respond to each report, provide a sound framework for ongoing contract communication and management.

Summary

3.39 The ANAO notes that having a viable, long term supplier of ongoing maintenance services is a critical element in Defence's capacity to effectively sustain the Collins-class submarine force. From its examination of payments, reporting and communications arrangements, the ANAO considers that DMO is generally undertaking the day-to-day management of the TLSA with ASC in an effective manner. The cost effectiveness of the TLSA to Defence relies on the annual capability payment negotiation process achieving an outcome that appropriately balances cost to Defence and returns to ASC.

3.40 The negotiation process includes agreeing appropriate Key Performance Indicators (KPIs), against which ASC's performance is measured and its entitlement to Performance Incentive Payments is determined. Clause 19.18(d)(i) of the TLSA indicates: 'the KPIs to be met by ASC in order to achieve Performance Incentives should ordinarily be set at a level that are as likely to be met as not.' It is difficult to reconcile the expectations reflected in this clause with the extent of ASC's success in achieving performance incentives over the years. Since the TLSA commenced, the company has received, on average, 87 per cent of the available incentives for the four years 2003–04 to 2007–08. The ANAO notes that COLSPO's own assessment of performance (see paragraph 3.27) was that ASC was performing as contracted or just above that level over the period when substantial performance incentives were being paid. The current design of the Performance Incentive Payments arrangements in the TLSA is such that ASC is provided with substantial payments for performance broadly in line with the contractual requirements.

3.41 The ANAO suggested that the KPIs should be reviewed to ensure that they take appropriate account of the expectations of the parties set out in the relevant clauses of the TLSA⁸⁶ and are calibrated to appropriately reward ASC for quality performance while delivering against the strategic objectives⁸⁷ for the contract. Defence advised that, given that it is pursuing significant changes to the TLSA to put it on a firmer commercial basis (in anticipation of the sale of

⁸⁶ In particular in clause 19.18(d)(i) and clause 19.18.(d).(iv) of the TLSA. See paragraphs 3.29 and 3.30.

⁸⁷ See paragraphs 2.21 to 2.23 and Table 2.1 for further information about the strategic objectives of the TLSA.

ASC), it considered that a better result for a review of the profit and incentive structure (as well as the fundamental cost plus nature of the contract) would be achieved in the context of the overall changes being sought.

Combat system contracts

Contract management

3.42 Defence contracted Raytheon in 1997 to provide tactical communications, navigation sensors, non acoustic sensors and electronic support measures. The original contract was for five years with the option to extend for a further five years. In 2002 Defence exercised its option to extend the contract until December 2007. The total amount expended under the two five year contracts was \$71.75 million. In December 2007, DMO negotiated an additional extension of the contract for one year to December 2008 at a cost of \$18.76 million.

3.43 Similarly, in 1997, Defence entered into a contract with Thales to provide SCYLLA Sonar sub-system service to the Collins-class submarines in 1997 for five years. This contract has since undergone a five year extension from 2002 to February 2007 and a further 12 month extension to February 2008. The contract price for the five years was \$25.35 million. In February 2008 the contract was extended until December 2008 at a contract price of \$7.98 million.

3.44 The contract with BAE was also initially signed in October 2002 for a five year period to October 2007 and subsequently extended for a further two years to October 2009. The contract price for the five years to December 2007 was \$6.34 million. In December 2007, it was extended for a further 22 months to October 2009 at a contract price of \$4.53 million.

3.45 The three current combat system In Service Support contracts are all Level of Effort (LOE) contracts and include estimated or budgeted hours of maintenance activities. Payments are based on hourly rates which are fixed for each 12 month period, for a range of different skill levels, and the actual number of hours invoiced for tasks undertaken. There are no performance measures or incentives included in the contracts. The Combat System domain managers within SMCSPO are tasked with managing the contracts to ensure that all LOE budgeted resources are fully utilized and deliver outcomes against the SMFEG agreed priority tasks.

3.46 SMCSPO holds regular quarterly meetings with the contractors at which progress in meeting maintenance and repair requirements for the combat systems is discussed. These meetings also discuss matters identified by

SMCSPO as arising from the regular reporting it receives from the contractors. The issues that are identified in this way can include delays in approval and delivery of stores, and the use of cannibalisation to meet parts requirements. This matter is discussed further at paragraphs 3.51 to 3.54.

3.47 DMO advised the ANAO that the current short term extensions of the three main combat systems contracts are designed to provide a continuation of services while a Global Contracting Strategy is developed and implemented for future combat system sustainment of the Collins-class. In September 2008, DMO advised the ANAO that it had determined the method of procurement and commenced discussions with Raytheon Australia and Thales Australia to put in place a Performance Based Contract (PBC) to replace the existing In Service Support contracts. The initial plan was to have these contracts in place for transition at the expiry of the current contracts in December 2008. As the move from the current contract structure to the PBC arrangements requires a full rework of the Statement of Work, related Data Service Descriptions and Data Item Descriptions, and the establishment of a suitable robust performance framework contract form, DMO advises that it is now not anticipated that the replacement contracts would not be established before June 2009. Accordingly, DMO intends to further extend the current contracts to support this later transition date.

Payment arrangements

3.48 The Thales contract⁸⁸ and the Raytheon contract⁸⁹ include provisions related to the price and payment arrangements with the Commonwealth. These contracts provide that the Commonwealth shall pay a claim for payment where the claim is accompanied by one of the following:

- the relevant supplies certificate;
- certification by the Project Authority⁹⁰ that the relevant supplies have been provided; or
- any other relevant documentation necessary to establish that the amount is in accordance with the contract.

⁸⁸ The Thales contract is for the SCYLLA sonar sub-system.

⁸⁹ The Raytheon contract covers tactical, communications, navigation sensors, non-acoustic sensors and electronic support measures.

⁹⁰ This is the person in DMO responsible under the contract as the Submarine Sustainment Manager.

3.49 The contract with BAE for periscope support contains provisions that are broadly similar to the other two contracts.

3.50 The ANAO compared the information presented to SMCSPO by contractors in a sample of invoices with the respective contract provisions. The ANAO's examination of selected invoices indicated that these invoices presented by contractors were consistent with the arrangements set down in the contracts.

Issues related to combat system contracts

3.51 The search-and-attack periscopes fitted on the Collins-class submarines are considered to be a vital and integral component of the mission effectiveness of the submarine fleet. Yet they have been problematic, starting with the first periscopes on the Collins-class fleet which vibrated badly and did not focus properly.⁹¹ Some of the periscope breakdowns have undermined submarine missions and capability.⁹²

3.52 The ANAO notes that the October 2006 to March 2007 Score Card on BAE referred to a concern at the failure rate of these periscopes and the frequency of repair. That Score Card also referred to the certification of periscopes being several months behind schedule.⁹³ In April 2007, SMCSPO noted that the resources available under the contract were inadequate to attend to the level of problems, thus limiting the amount of rectification undertaken.⁹⁴ Responding to the situation, SMCSPO initiated studies to identify the shortfalls and to provide input for the overall improvement of the periscopes systems support. In September 2008, DMO advised the ANAO that it was the difficulty and delays in certifying and repairing the periscopes, and the emerging level of obsolescence that exacerbated this problem. Defence stated that the lack of investment in the in-country support network has resulted in a reduced materiel state of periscopes and limited ability in-country to recertify periscopes.

⁹¹ BAE Systems notes that the contract for design and delivery of the periscopes was not with BAE Systems. In this respect the report refers to issues prior to the BAE Systems contract.

⁹² BAE document, Report 2, Periscope Remediation Report, May 2007.

⁹³ BAE Systems advised ANAO that it is authorised by license to conduct repairs on the periscopes and that all repairs are released to an approved configuration. Recertification of a periscope is conducted in accordance with an approved recertification plan. Design authority input is required for the recertification process only in the event of a non-conformance that requires analysis. BAE Systems considers that it is arguable that any schedule extension to a repair or recertification caused by the need for the design support network to answer an emergent question would take longer based on the location of the responsible party.

⁹⁴ ScoreCard for BAE for the period October 2006 to March 2007, April 2007.

3.53 In May 2007, in a report to SMCSPO, BAE indicated significant shortfalls in periscope support such as the recertification program, inadequate contract scope, obsolescence issues, loss of capability and lack of functioning test equipment. The certification of periscopes was several months behind schedule and resulted in a submarine⁹⁵ not being delivered with a complete set of recertified periscopes prior to completion of its FCD. In September 2007, in response to the issue, SMCSPO increased its monthly 'core level of effort' payments to BAE by 41 per cent from \$116 964 to \$164 316.

3.54 At the time of extending BAE's contract in October 2007 for a further 22 months, SMCSPO again noted the backlog of uncertified periscopes and the potential risk this represents to the safe operations of the submarines and stated that significant efforts would be undertaken to address this and the other issues identified by BAE in its May 2007 report.⁹⁶ SMCSPO stated that the backlog would be addressed by a number of separate support projects rather than as part of the renewed contract.⁹⁷ BAE Systems advised the ANAO that it acknowledges that SMCSPO has continued to seek funding to address the issues contained within the BAE Systems May 2007 report and to address the backlog of periscopes requiring recertification. BAE Systems further stated that it continues to work closely with SMCSPO to improve periscope maintenance.

Other combat system sustainment issues

3.55 A further challenge to the sustainment of the combat system is that during the transition from the Legacy/Combat System Augmentation baseline to the Replacement Combat System baseline, which is linked to the submarine docking program, there will be a period when three combat system baselines exist within the fleet. Defence anticipates that the steady state Replacement Combat System will have two baselines within the fleet at any one time related to the ongoing continuous improvement and technology refresh being used for the Tactical and Weapons system.⁹⁸

⁹⁵ HMAS *Waller*.

⁹⁶ BAE document, Report 2, Periscope Remediation Report, May 2007.

⁹⁷ SMCSPO, Procurement Plan, Services for Extension of Periscope Integrated Material Support Contract, October 2007.

⁹⁸ Defence advises that other elements of the Combat System such as Electronic Warfare and Communications are specifically configured for submarines related to specific operational tasking. The baseline elements of these systems are substantially common across the fleet.

3.56 The high level configuration definition of the Combat Systems fitted to each submarine is available in the Ships Information Management System (SIMS).⁹⁹ At the hardware level this definition is down to the Lowest Replaceable Unit level but for software it is at a high level of configuration definition at the sub system level. Defence advises that this level of detail is sufficient for the submarine level of configuration status accounting and control. The lower level of configuration detail required to maintain the software is in place within the SMCSPO and its contractors using specialised software configuration management systems.

3.57 The ANAO notes that currently SIMS is not used for onboard inventory management. Defence advised the ANAO that current inventory management on the submarines is accomplished through localised management at SMCSPO level in conjunction with full cycle docking rotations.

Inventory management

3.58 This section provides an overview of the inventory management arrangements for the Collins-class submarines, their history, recent activities to upgrade the system, the ability of the supply chain to meet operational requirements, and the impact on capability. Inventory management is an integral part of the sustainment of the Collins-class submarines. Inventory management is a responsibility of Defence and DMO, although ASC plays an important role in matters such as obsolescence.

3.59 There are in excess of 37 000 items on the SIMS for the Collins-class. The flow of parts is shown in Figure 3.2. Each submarine carries an inventory of parts valued at around \$15 million. Responsibility for parts is allocated under a Service Level Agreement between the Navy Logistics Support Agency (LSA-N) and COLSPO. At a working level these agreements have the following accountability for spares: SMFEG for maintaining the onboard account; LSA-N for codified items;¹⁰⁰ and COLSPO for Full Cycle Docking requirements. Warehousing responsibilities rest with Joint Logistics Command.

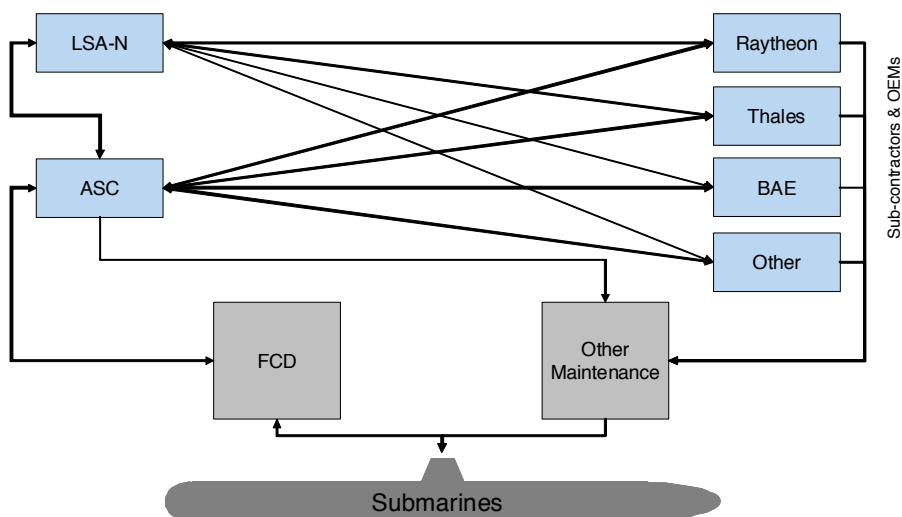
⁹⁹ The Ships Information Management System is a management program which contains relevant technical and configuration data for a particular vessel. Currently SIMS is not used for onboard inventory management.

¹⁰⁰ To facilitate asset management and financial reporting, all items of supply that are repetitively procured, owned, stored or repaired by Defence are required to be codified. As a sponsored nation in the NATO Codification System (NCS), Australia is required to adhere to the policies and principles as published in the NATO Manual of Codification and accordingly Defence adheres to the NCS.

Figure 3.2

Collins-class maintenance

Consumable and Repairable Parts Flow Diagram



Source: ANAO from field work data.

3.60 When the Collins-class submarines were delivered there was no prescribed inventory management plan and no computer-based inventory management system in place. The submarines have suffered from logistics spares shortfalls since entering service.

3.61 DMO introduced an Inventory Management Plan (IMP) in November 2006 which detailed the deficiencies with the Collins-class logistics system. The IMP stated that by December 2008 there will be an accountable, mature self sustaining logistic system. The IMP also identified a number of goals that had to be met as a prerequisite to achieving the main objective.

3.62 The deficiencies identified by the IMP in the Collins-class logistics system included:

- the lack of a populated Assembly Parts List (APL);¹⁰¹

¹⁰¹ An Assembly Parts List is a list of equipment identifying assembly and associated sub assembly relationships, utilising data such that a technician can identify a spare as well as allowing a quarterly Submarine Allowance List to be calculated to provide a submarine with an accepted statistical chance of rectifying a defect from onboard spares.

- as a consequence of the lack of a populated APL, on board spares allowance for the submarines were based on Original Equipment Manufacturer (OEM) recommendations, which have not been maintained and updated and do not reflect current demand;
- loss of trust in the logistics system by submariners, which led to a lack of interest in maintaining on board accounts;
- low levels of codification;
- the management of Supply Customer Accounts¹⁰² (SCA's) is illogical, confused, lacks ownership and is managed between several groups;
- obsolescence management has not been effective;
- inventory management has been complicated by LSA-N being separate from the terms and conditions of the TLSA; and
- repair or replacement of equipment by OEMs operates under one set of arrangements for Full Cycle Docking and separate arrangements for other maintenance (where LSA-N is involved), creating issues such as which requirements should have priority by the OEM.¹⁰³

3.63 In September 2008, Defence advised the ANAO that SCA management at COLSPO has improved significantly in the past 18 months, and has been remediated in accordance with the IMP proposals. In addition, Defence noted that forecasting tools of the Wholesale Inventory Investment Model and ASC will assist in identifying those parts required for the wholesale inventory that can be procured under the same terms and conditions as the rest of the TLSA. The Standard Defence Supply System (SDSS) will need to be set up accordingly. In relation to repair or replacement of equipment by OEMs, Defence is developing a business case to roll consumable items into maintenance activities and amend the relevant instruction to reflect this more efficient business practice. Defence also noted that an APL is expected to be populated by 31 December 2008.

¹⁰² A Supply Customer Account (SCA) is an accounting medium for all ADF assets on issue or loan, and is represented by one of the following entities: a contractor venue acting as a supplier; a contractor venue acting as a repair base; a Defence business unit or an element of a business unit; or an individual belonging to a Defence business unit. The entity is authorised to request, consume and hold Defence assets and consumables on behalf of the Commonwealth. The SCA is the only medium utilised for the requisitioning process.

¹⁰³ Collins-class Submarine Inventory Management Plan, November 2006.

3.64 An added responsibility for the management of Collins-class submarines' inventory compared to many other Navy platforms is that the engineering certification requirements for the submarines are similar to those applying to aircraft. To manage these engineering certification requirements an Objective Quality Evidence (OQE) documentation process has been employed. This involves following an item through the stores system, allowing the end user to certify that the item is fit for purpose. The IMP states the need to track OQE documentation has resulted in a large additional administrative burden.

Codification of Stores

3.65 As well as providing the ability to manage items in the SDSS, codification of stores allows tracking of consumption rates and prediction of future requirements. Codification relates to equipment assemblies and components that are replaced or repaired during maintenance.

3.66 The IMP had as a target 100 per cent codification by 30 June 2007. This target was not met. As at June 2007, just under 90 per cent of parts had been submitted to the National Codification Bureau for codification. DMO advised the ANAO in July 2008, the codification project was completed in June 2008. As the completion of codification is a prerequisite for other activities in the IMP, such as the population of an APL and combat systems support, the target dates for the completion of these activities have also been delayed by the delay in completing codification of all submarine parts.

Shipboard Logistics Information Management System (SLIMS)

3.67 The IMP included a 30 June 2008 target for the creation of a 'live' Ships Allowance List¹⁰⁴. The creation of such a Ships Allowance List would ensure the best possible chance of crew being able to rectify defects from onboard spares. To produce such a list requires the implementation of an onboard inventory system to supply the required data. The SLIMS system has been installed and trialled on HMAS *Collins* and *Waller* unsuccessfully. The lack of success is attributed by COLSPO to the inadequate availability of 'store specialists' amongst the available submariners. Whilst Navy advised that it intended to pursue filling such positions, there are no target dates for this, nor for the continuation of trials or the installation of SLIMS on the remaining submarines. In October 2008, Defence confirmed that the on-board trial was discontinued due to a combination of factors, including the lack of onboard

¹⁰⁴ Most of the Navy's surface ships have inventory management software that by recording usage and based on historical consumption and on board maintenance capability produces a 'live' Ships Allowance List

trained and experienced operators of the system. Defence noted that the trial was part of a larger project that includes an ashore element, which is still ongoing. The ANAO suggests that Defence consider setting a realistic target for filling the positions of stores specialists.

Obsolescence Management

3.68 Obsolescence is the loss or impending loss of the ability to procure items to continue operational support of equipment. Obsolescent parts or components are those that are being superseded or phased out of future production. The likelihood of encountering obsolescent parts or components of a platform or system is increased the longer the life of the platform or system. In the case of the Collins-class, the submarines have a life cycle much longer than the constituent parts and systems. Obsolescence not only increases the complexity of maintaining systems because suitable parts can be difficult to source, or because systems may need to be replaced before the useful life of the platform expires, but also affects operational availability.

3.69 Obsolescence in the Collins-class platform and systems and management of its effects is an increasing but currently unquantified cost of the sustainment of the submarines. A consequence of obsolescence is that maintenance scheduling becomes more complex and greater delays in maintenance occur resulting in reductions in capability.

3.70 The November 2006 IMP identified obsolescence as an issue and in the IMP DMO stated that management of obsolescence in inventory for the Collins-class has not been effective. In October 2007, COLSPO tasked ASC with investigating obsolescence with three OEMs. In December 2007, COLSPO released its Obsolescence Strategy and tasked ASC with developing a plan based on this strategy. In the COLSPO Obsolescence Strategy, DMO recognises that obsolescence management should be undertaken as early as possible and as an integral part of the design, production and in-service support stages to minimise potential remedial expenditure and thus the overall cost of sustainment and maximise operational availability.¹⁰⁵

3.71 Items in Defence equipment which are identified as obsolescent are entered into configuration and logistics management systems as a Defective Material and Design Report (DMDR). ASC has identified some 450 such DMDR's for the Collins-class. The IMP stated that the Configuration Change Process has been slow, non-responsive and unable to address obsolescent

¹⁰⁵ COLSPO Obsolescence Strategy, December 2007, p. 2.

items. In the IMP, COLSPO indicates that its Maintenance Systems Manager is addressing the matter by:

- prioritising obsolescence DMDR's for further analysis by ASC; and
- streamlining the Configuration Change Process and empowering interested parties (such as ASC and its suppliers) to resolve these issues.

3.72 Some obsolescence may be of sufficient magnitude as to require rectification through a major capital project, although most obsolescence management is a sustainment activity managed as part of the inventory replenishment process (same fit, form and function). In the case of the Collins-class submarines, the nature of some equipment that was specifically fabricated requires dedicated engineering effort to overcome obsolescence.

3.73 In 2006, in response to the increasing number of obsolescence issues arising, ASC introduced an Obsolescence Management Plan (OMP) which aims to ensure the availability of supportability risk items¹⁰⁶ and avoid unplanned redesigns. ASC's plan includes both reactive and proactive obsolescence management approaches and can be applied to sustainment and new generation activities throughout the life of a program.

3.74 Under reactive obsolescence management an item is only identified as obsolete when a purchase is attempted. That is obsolescence is managed retrospectively. Once an item has been identified as obsolete, a process is initiated to assess the applicability of any alternatives offered by the supplier or, where none is offered, to identify a suitable replacement item. The resolution may require some time and other options to provide a short term solution may need to be considered. These short term options may include, cannibalisation from other submarines, rebuild of salvaged parts or limited use of un-certified components under a controlled concession process.¹⁰⁷

3.75 A proactive obsolescence management strategy involves analysis of each system to identify items considered to be at risk of obsolescence, and taking appropriate action to mitigate this risk – this enables actions to be put in place well in advance. To facilitate this approach, ASC maintains contact with OEMs and suppliers to determine the current availability of a particular item

¹⁰⁶ A supportability risk item is defined by ASC as a purchased part or component that if not available would cause: an unplanned redesign of \$5000 or more; and/or a delay of more than one day in scheduled maintenance.

¹⁰⁷ The COLSPO Configuration Manual articulates how all configuration changes are formulated and provides context to the 'controlled concession process'. The manual outlines how the concession process is controlled at section 6.20. Concessions are recorded within SIMS.

and/or lower level components making up an item, the likelihood of an end to production, planned updates to items and the continued viability of the supplier. Each at risk item is categorised by a 'health' status. The results are entered into an obsolescence management database which is periodically monitored. Proactive monitoring may involve recommendations for configuration changes, re-design, or lifetime buys of spares.

3.76 The focus of ASC's OMP is on contractor furnished equipment. In March 2008, in response to a COLSPO request (refer to paragraph 3.70), ASC issued an Obsolescence Management Program Implementation Plan which included a work plan covering the period 2007–08 to 2013–14. DMO advised the ANAO that its approach covers all aspects of platform and combat system related inventory, including Government Furnished Equipment. Specific projects have been initiated to remediate current obsolescence issues, for example replacement Trelleborg Hoses. Additionally, ASC were tasked to engage specific manufacturers to develop short, medium and long term strategies to mitigate against long term obsolescence for their respective product line. Defence noted that progress has been slow due to resources being directed to higher priority operational requirements. Defence also advised that SMCSPO has been monitoring combat system obsolescence and as a result the funding requirements to implement the relevant obsolescence strategy have been highlighted in current planning documents.

Logistics Demand Satisfaction Rates

3.77 ANAO's 2006 performance audit report, *Management of the Standard Defence Supply System Remediation Programme*¹⁰⁸, reviewed the initiatives being undertaken by COLSPO to improve the management of submarine inventory. The audit found that the Demand Satisfaction Rate (DSR)¹⁰⁹ for spares received by COLSPO was well below optimal levels and showing a downward trend.

3.78 The DMO measures the DSR for spare and repair parts and reports the effectiveness of wholesale stock levels and the efficiency of the warehousing system and distribution services. The measure is a function of the requisitions with required delivery times within a month satisfied in full and on time, compared to the total number of requisitions with required delivery dates within that month. It is not a succinct or accurate measure of the performance

¹⁰⁸ ANAO Audit Report No.10 2006–2007, *Management of the Standard Defence Supply System Remediation Program*.

¹⁰⁹ The Demand Satisfaction rate is an inventory performance measure included in the Materiel Sustainment Agreement between the DMO and Navy.

of the Standard Defence Supply System as there are other factors contributing to the supply chain characteristics including transport, handling, packaging and administration. Defence advised the ANAO in September 2008 that the DSR is not a reliable measure of the impact on equipment reliability or repair because on board stocks are not measured and it applies to all classes of stores, not just equipment related spares.

3.79 The success in satisfying the agreed levels are recorded as Green, for a successful delivery – 85 per cent or more DSR, Amber between 75 per cent and 85 per cent DSR and Red as a less than optimal – less than 75 per cent DSR. The DSR is part of the Service Level Agreement COLSPO has with LSA-N.

3.80 For the period covered in the ANAO Audit Report No.10 2006–07, *Management of the Standard Defence Supply System Remediation Program*, January 2005 to June 2006, the DSR for Collins-class spares ranged from 80 per cent to 40 per cent with a downward trend. That is, a declining performance. Of the eighteen months covered all but four were in the Red range and none in the Green or successful delivery range. The Report also noted that there is a close correlation between the DSR and the measure of Platforms Mission Capable for Task suggesting that a deficient supply chain adversely impacts on capability. The Report further noted that COLSPO had responded by putting in place a number of actions as contained in the November 2006 IMP including codification.

3.81 Data obtained for this audit on the DSR for the 22 months to April 2008 show some improvement. The DSRs ranged from 58 per cent to 80 per cent, with nine results in the Amber range. In the last ten months, six were in the Amber range. None, however, were recorded in the successful delivery range for the entire period. LSA-N has argued that a more appropriate measure is Potential DSR which eliminates those activities it is not responsible for such as transport and warehousing.¹¹⁰ As such this measure is seen by LSA-N to better reflect performance in its area of responsibility. Whilst the satisfaction rating improves applying this redefined measure to the 22 months to April 2008, there are still no months in the successful delivery category and three in the less than optimal category or Red category.

3.82 In October 2008, Defence advised the ANAO that the management of Collins-class submarine inventory had recently changed with the appointment of a specific manager responsible for inventory. Defence's aim is to improve

¹¹⁰ ANAO interview with LSA-N, 8 August 2007.

performance in meeting demand over time. Defence also advised that DSRs are no longer used as an indicator and Defence is now relying on a number of alternative measures¹¹¹ to provide assurance on the inventory process. In addition, Defence is examining whether there are adequate stores to close out recorded urgent defects as it considers this to be a health indicator of supply chain performance. DMO noted that it is now measuring supply satisfaction from the 'point of issue' in ship to ensure better measurement.

Recommendation No.1

3.83 The ANAO recommends that, in order to improve the management of Collins-class inventory and to increase platform availability, Defence gives priority to the implementation of COLSPO's Inventory Management Plan including:

- (a) initiation, as part of the Inventory Management Plan, of an obsolescence remediation plan which incorporates all major suppliers; and
- (b) investigation of arrangements with major suppliers with the aim of reducing associated administrative costs and lead times for parts.

Defence response

3.84 Defence agreed with qualification to the recommendation and commented as follows:

The principal cause of the delay in implementing the COLSPO Inventory Management Plan is budgetary constraints.

Unit Ready Days

3.85 As noted in Chapter 1, the fleet of six Collins-class submarines provides the ADF with a capability for submarine operations, including anti-submarine warfare, maritime strike and interdiction, maritime surveillance and intelligence collection, and enhanced joint ADF operations.

3.86 A measure of this capability is the Unit Ready Days (URDs). The URDs for a force element such as the submarine fleet are the number of days that it is available for tasking within planned readiness requirements. Planned URDs are determined by aggregating total days for the unit in commission, less all

¹¹¹ Defence referred to Configuration Effectiveness, Ship's Allowance List Effectiveness and UNDA (Urgency of Need Designator) Demand Satisfaction.

days when the unit is programmed to be in major maintenance and conducting pre-workup (preparations for initial operational training) and are published as estimates in the Portfolio Budget Statements as part of the Budget Papers, with revised estimates being published at Additional Estimates. Defence Annual Reports report on the achievement against the revised estimates.

3.87 Table 3.3 shows the expected URDs and those achieved, with those URDs achieved reported separately as both quantity and quality. The quality measure is the better indicator of whether mission capability is being achieved. The quality measure takes into consideration any constraints on operations that may be imposed such as systems shortcomings or availability of submariners.

3.88 For URDs to be achieved it is not necessary for the full military capability for which the unit was designed to be met. URDs may be achieved if the unit is available for tasking for low-level activities such as, in the case of the Collins-class, search and rescue and surveillance.

Table 3.3

Unit Ready Days (URDs), Expected and Achieved (Quantity and Quality) 2003–04 to 2007–08

Year	Budget Estimate URDs	Revised Estimate URDs	Achieved Quantity URDs	Percentage Quantity URDs achieved ^A	Achieved Quality URDs	Percentage Quality URDs achieved ^A
2003–04	945	945	799	84.6	782	82.8
2004–05	948	768	741	96.5	707	74.6
2005–06	1560	1463	1432	97.9	1067	68.4
2006–07	1265	817	802	98.2	583	46.1
2007–08	1004	970	880	90.7	559	57.6

Notes: A. Achieved URDs reported in Defence's Annual Reports are calculated against the estimate of URDs contained in the Defence Portfolio Additional Estimates Statements for the relevant year, not the original estimate contained in the Defence Portfolio Budget Statements.

Source: Defence Portfolio Budget Statements, Defence Portfolio Additional Estimates Statements and Department of Defence Annual Reports.

3.89 For the five years since URD targets were introduced for the Collins-class, the ANAO notes that on average there has been a reduction of more than 13 per cent between the estimated URDs for a financial year reported in Defence's Portfolio Budget Statements and the revised estimated URDs

reported in the Defence Portfolio Additional Estimates Statements. Reductions in the estimated URDs are in the main attributed to changes in the docking program of individual submarines, delays in post full cycle docking work-ups and delays in completing certification licensing requirements.

3.90 The average achieved quantity URDs was 94 per cent of expected URDs based on the revised estimates, and the average achieved quality URDs was assessed as 75 per cent of expected URDs based on the revised estimates. The gap between forecast and achieved quality URDs is generally increasing.¹¹²

3.91 The target of expected URDs for 2008–09 is 684, which is the lowest since the introduction of URD targets for the Collins-class in 2003–04.. The low target is attributed by Defence to the scheduled maintenance cycle: two submarines are in Full Cycle Docking; one is in lay up mode (due to crew unavailability and capacity issues); one will undertake a scheduled Mid Cycle Docking; and another will undertake an Intermediate Docking. This compares to a target of expected URDs of 1463¹¹³ in 2005–06 when only one submarine was in docking for the entire year. Defence also advised that docking periods have extended, necessitated by emerging work requiring rectification. Defence further advised that this is symptomatic of ageing platforms requiring greater maintenance, particularly in metal loss in regions neither readily available, nor visible when the platform is in the water.

3.92 In Defence's annual reports, one of the reasons put forward for the performance shortfalls in URDs throughout the years covered by Table 3.3 has been systems related defects.¹¹⁴ Since 2005–06, operational constraints resulting from personnel shortfalls are also cited as a contributing reason. These two factors affect URDs (which is a measure of mission capability) and have a flow on effect on unit ready day costs for sustainment. In September 2008, Defence advised that in its view the underlying cause of under-performance in URDs is shortages of personnel, or Navy's inability to provide the requisite personnel to crew the boats. Defence indicated that one submarine was put into full cycle docking early because Navy was unable to crew the boat and that another

¹¹² Defence advised that when URDs were first introduced for the Collins-class in 2003–04 there was little clear definition of what constituted Unit Ready and thus how to count URDs. At one stage Defence used to count submarines in Assisted Maintenance Periods as still Unit Ready. Now Defence excludes submarines in any maintenance period. As advised by Defence, the effect of refining the definition of URDs has been to decrease the URDs it forecasts and achieves for each financial year.

¹¹³ This is the revised target included in the Defence Additional Estimates Statements for 2005–06.

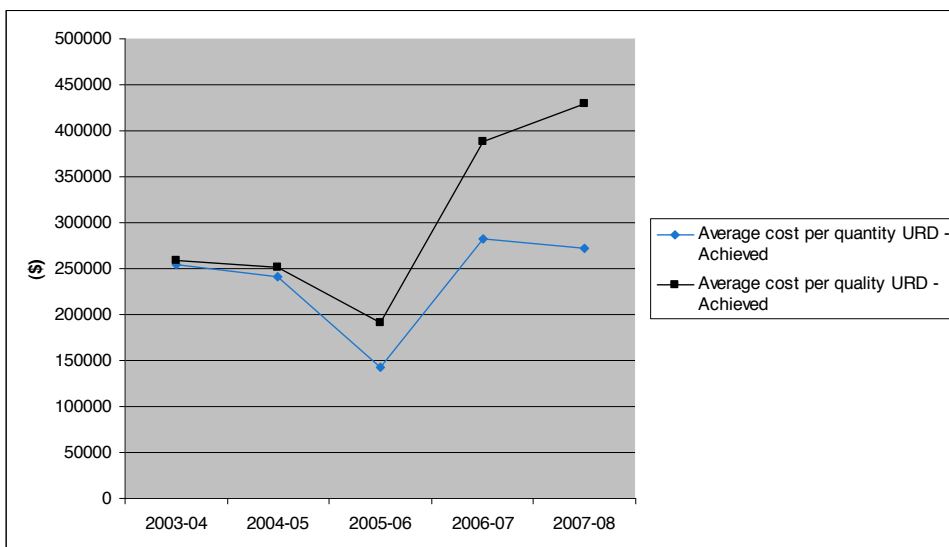
¹¹⁴ Defence Annual Reports for the four years 2003–04 to 2006–07, pages 115, 175, 108 and 66 respectively.

submarine could have been made ready relatively easily, but its crew were required for another submarine. The DMO took the increased submarine access afforded by the shortage of submarine crews as an opportunity to undertake additional submarine upgrades. This additional upgrade work has extended planned maintenance periods and is an added factor that has contributed to a dip in planned URDs.

3.93 Figure 3.3 shows the average cost per achieved URD over the period 2003–04 to 2007–08 in terms of both quantity and quality URDs.

Figure 3.3

Average cost of Unit Ready Days achieved (quantity and quality) from 2003–04 to 2007–08



Source: ANAO analysis of COLSPO data

3.94 Sustainment costs are an aggregation of contract expenditure on the Collins-class submarine fleet across COLSPO, SMCSPO and the Training Authority – Submarines.¹¹⁵ Figure 3.3 indicates increasing sustainment costs per achieved quantity URD over the period 2003–04 to 2007–08 from \$254 015 per achieved quantity URD in 2003–04 to \$272 545 per achieved quantity URD in 2007–08 – an increase of seven per cent. The growth over the same period for sustainment costs per achieved quality URD was from \$259 537 to \$429 052 – an increase of 65 per cent. The ANAO notes that sustainment costs are higher

¹¹⁵ These total contract costs were provided by DMO in October 2008. DMO noted that over time the organisation had changed and data reporting requirements have also changed.

in 2007–08 because of additional costs associated with the recovery, repair and remediation of the Remora, Defence’s submarine rescue vehicle — see Chapter 4 for discussion of the loss of the Remora. However, even if the additional costs following the loss of the Remora are excluded, sustainment costs per achieved quantity URD grew three per cent from 2003–04 to 2007–08 and sustainment costs per achieved quality URD grew 58 per cent over the same period.

4. Submarine Escape and Rescue Services

This chapter discusses the contract that is in place for the provision of escape and rescue services, including matters related to management of the contract and issues that have arisen with the contract.

Introduction

4.1 Submarine escape and rescue services whilst not part of the direct maintenance of the Collins-class submarines, are integral to their sustainment and capability.

4.2 In relation to the Submarine Escape and Rescue Centre (SERC) contract, the audit examined:

- contract management arrangements;
- issues that have arisen in the management of the contract and how these have been dealt with; and
- the consistency of payments with contractual provisions.

4.3 In examining the contract management arrangements, the audit considered whether there existed reporting and communication arrangements that supported sound management of the contract. In relation to payments, the audit examined the overall arrangements for matching payments and work completed, as well as their consistency with contractual provisions.

4.4 The audit also examined information related to the sinking of the rescue vehicle, the Remora, during exercises in late 2006, its recovery and subsequent remediation.

Submarine escape and rescue services

Background

4.5 In October 1994, the RAN Submarine Escape and Rescue Project was formed. This project was tasked with the procurement of a submerged rescue capability and associated support infrastructure and training facilities. The objective was to provide a submarine escape and rescue service capability to support First of Class trials and the subsequent licensing process for the Collins-class submarines as they were completed. The capability consists of the

Submarine Escape Training Facility (SETF) and the Submarine Escape and Rescue Suite (SERS).

4.6 The SETF is a Commonwealth supplied facility located at HMAS Stirling at Garden Island, Rockingham in Western Australia. The SETF requires recertification by a classification society¹¹⁶ every five years.

4.7 The SERS is a fully integrated suite of equipment designed to rescue and treat survivors of a disabled submarine under a full range of accident scenarios. It provides a deployable capability to rescue submariners directly from a stricken submarine using a submersible vessel operating from a surface ship. The suite includes:

- the Australian Submarine Rescue Vehicle (ASRV) - the Remora;
- two decompression chambers;
- a transfer under pressure unit;¹¹⁷
- compressors, bottled gases and medical stores,
- an Emergency Life Support Services (ELSS) system; and
- the Launch and Recovery System (LARS), which consists mainly of an A-frame and a lift winch.¹¹⁸

4.8 The LARS was designed by Caley Ocean Systems (Scotland). It is an A-frame arrangement designed to lift and transfer the rescue vehicle from the

¹¹⁶ Classification societies are organisations that establish and apply technical standards in relation to the design, construction and survey of marine related facilities including ships and offshore structures. These standards are issued by the classification society as published rules. A vessel that has been designed and built to the appropriate rules of a society may apply for a Certificate of Classification from that society. The society issues this certificate upon completion of relevant classification surveys. Such a certificate does not imply, and should not be construed as an express warranty of safety, fitness for purpose or seaworthiness of the ship. It is an attestation only that the vessel is in compliance with the standards that have been developed and published by the society issuing the classification certificate. As an independent, self-regulating body, a classification society has no commercial interests. Classification rules are developed to contribute to the structural strength and integrity of essential parts of the ship. A ship built in accordance with the rules of the International Association of Classification Societies will be assigned a class designation by the society on satisfactory completion of the relevant surveys. For ships in service, the society carries out surveys to ascertain that the ship remains in compliance with those rules. A ship is maintained in class provided that the relevant rules have, in the opinion of the society concerned, been complied with and surveys carried out in accordance with its rules.

¹¹⁷ The transfer under pressure unit allows rescued personnel to be transferred from the ASRV to deck-mounted decompression chambers on the mother ship for medical treatment.

¹¹⁸ The function of the LARS is to facilitate the launch and recovery of the ASRV. LARS is designed to mobilise the ASRV onto a range vessels but the main design intent is normally limited to two vessels, the MV Seahorse Spirit and the MV Seahorse Standard.

Transfer Under Pressure (TUP)¹¹⁹ chamber to the water, launch the vehicle, subsequently recover it and return it to the TUP. The LARS is transportable in standard cargo containers and deployable on a range of support vessels. The Remora was designed in Canada by Ocean Works International (formerly Can-Dive Marine Services Ltd) and is a 16.5 tonne remotely operated rescue vehicle with room for seven people, the operator and six others. It was leased by the Commonwealth from ASC between 1997 and 2003. In 2003, the lease expired and title and ownership of the Remora was vested in the Commonwealth.

4.9 The SETF was initially manned and operated by Defence with the SERS being provided by ASC through a five year contract commencing from 1996. Global Submarine Services Pty Ltd (GSS) acted as the major subcontractor to ASC providing most maintenance and all operational services under the SERS. ASC was granted several extensions to the contract.

4.10 In June 2001, Defence made the decision, endorsed by Navy, to commercialise all operations at the SETF and for the combined activities of the SETF and the SERS to be provided under the umbrella of a Submarine Escape and Rescue Centre (SERC).

Submarine Escape & Rescue Centre contract

Contract Management Arrangements

2003 Tender Process

4.11 An Invitation to Register Interest (ITRI) in the SERC contract was advertised in November 2002. ITRI briefing documents were sent to 43 companies. ITRI submissions were received from 13 respondents. The ITRI Evaluation Board assessed the respondents and recommended issuing the Request for Tender (RFT) documentation to five respondents. The RFT was issued in December 2002. After tenders closed on 17 February 2003 a Tender Evaluation Board, assisted by staff from DMO's Financial Investigation Service, evaluated the tenders. The Fraser Diving Australia (FDA)¹²⁰ bid was considered to offer the best capability and value for money from a whole of escape and rescue capability viewpoint. DMO provided a Minute to the then Minister stating that the selection of FDA was based on an evaluation by

¹¹⁹ Rescue and transfer under pressure is achieved by mating to the Transfer Under Pressure (TUP) chamber that is connected by flexible spool pieces to the two 36 man decompression chambers.

¹²⁰ A subsidiary of Fraser Diving International (FDI).

Defence experts, in accordance with an approved Tender Evaluation Plan, against the requirements of the RFT.¹²¹

4.12 A five-year contract was signed with FDA in June 2003 to provide SERC services. FDA was sold to Cal Dive International in 2006 and subsequently operated as Cal Dive International Australia Pty Limited (CDIA).

4.13 Following a tender de-brief conducted by COLSPO in September 2003, three complaints from unsuccessful tenderers were received by the then Minister and the then Head of Maritime Systems Division in DMO. The claims related mainly to alleged statements made by DMO at the tender de-brief of unsuccessful tenderers. Subsequently, the Inspector General undertook an independent review of the tender process. The review, which was completed in May 2004, found that the statements made by DMO officials at the tender de-brief were, in part, erroneous and may have led some of the tenderers to believe that their tender had not been considered fairly on its merits. The review found no evidence of unethical, dishonest or unlawful conduct by any participants in the process. The review also found strong evidence of poor administration of the procurement, which resulted in breaches of Commonwealth and Defence procurement policy. However, while there may have been a breach of process requirements, the review found that the identified process issues had not led to an outcome that was unfair or which indicated a lack of good faith by any of the participants.¹²²

4.14 The Inspector General made a number of recommendations aimed at redressing the issues that arose in this tender process and improving DMO performance in future tenders.¹²³

4.15 The ANAO noted that improved arrangements addressing the issues encountered in the 2003 tender were applied for the tender process for a proposed new contract for the provision of SERC services, including operation of the SETF, conducted by COLSPO in 2007–08. A preferred tenderer was selected as a result of this tender process. However, no new contract had been signed at the time this audit report was finalised. This is discussed further at paragraphs 4.19 to 4.25.

¹²¹ Minute from Rear Admiral, RAN to Minister of Defence, June 2003.

¹²² Inspector General Review into claims made concerning the Submarine Escape and Rescue Centre Tender Evaluation Process, 26 May 2004, p.1,3 and 33.

¹²³ Inspector General Review into claims concerning the Submarine Escape and Rescue Centre Tender Evaluation Process, 26 May 2004, p.33 and 34.

2003 Contract

4.16 Under the June 2003 contract for SERC services, which was the contract extant for the five years to June 2008, contract activities and the related payments were grouped as either routine or adhoc. Routine activities included a range of training requirements, maintenance, provision of an escape and rescue service in the event of a disabled submarine (DISSUB) or simulated DISSUB, provision of therapeutic recompression for ADF personnel and on occasions, civilian personnel, and; testing of submarine escape immersion suits and associated breathing units. Adhoc activities related primarily to operational and training exercises including the annual Black Carillon exercise¹²⁴ and non-routine repairs. The budgets for these activities and the actual expenditure against the budgets for the five years 2003–04 to 2007–08 are shown in Table 4.1. Expenditure for adhoc activities in some years was well below budget. This occurred largely because the level of activity in exercises was less than expected rather than because of significant cost efficiencies. There was no Black Carillon exercise in 2003 and the Black Carillon exercise for 2006 was abandoned following the loss of the Remora in early December 2006. The increase in 2007–08 expenditure on ad hoc activities reflects the costs of Remora’s remediation following its loss. Paragraphs 4.40 to 4.51 discuss the loss and remediation.

¹²⁴ Exercise Black Carillon is a Navy requirement, expected to be conducted annually, that fulfils training requirements and allows the efficacy of the SERS capability to be assessed. It also allows the contractor staff to retain proficiency in SERS operations. The exercise is managed and overseen by the Navy. COLSPO is responsible for ensuring that the contracted services are sufficiently robust to facilitate the exercise which involves attendance by the COLSPO staff responsible for the management of the SERC contract at the Planning and Washup meetings. There is no other direct COLSPO role in the exercise.

Table 4.1**Budgeted and Actual Expenditure for Submarine Escape and Rescue Centre Activities 2003–04 to 2007–08**

Year	Adhoc Activities		Routine Activities		Total Budget \$m	Total Actuals \$m
	Budget \$m	Actuals \$m	Budget \$m	Actuals \$m		
2003–04	4.70	1.81	2.80	2.12	7.50	3.93
2004–05	2.18	2.11	2.43	2.75	4.61	4.86
2005–06	3.92	1.70	2.60	1.85	6.52	3.55
2006–07	1.98	1.65	2.01	2.43	3.99	4.08 ^A
2007–08 ^B	1.33	1.12	2.66	2.65	3.99	3.77 ^C
Total	14.11	8.39	12.50	11.80	26.61	20.19

Notes: A. The total actual in 2006–07, including Remora recovery, was \$5.18 million.

B. In 2007–08, in addition to the adhoc and routine activities, there were Remora remediation activities. \$10.62 million was expended in 2007–08 and DMO is seeking permission to roll \$3.85 million into 2008–09. In 2006–07 \$1.1 million was spent on Remora recovery.

C. The total actual in 2007–08, including Remora remediation activities, was \$14.39 million.

Source: DMO

4.17 Payments under the contract were made in respect of monthly invoices for routine work. The contract provided that ad hoc work was charged based on agreed labour rates and a percentage on costs. The ANAO compared a selection of invoices submitted by the SERC contractor with the relevant records of work undertaken and the contractual provisions. The ANAO noted that payments examined had been made in accordance with work undertaken and the contract provisions.

4.18 During the five years the 2003 SERC contract was in place, the contractor provided COLSPO with monthly status reports relating to the SERC project covering such matters as outstanding maintenance, maintenance issues requiring technical review and spares usage and holdings. Monthly Contract Progress Meetings were held to review contract performance and to address issues raised, such as certification. Separate meetings were held to plan for the Black Carillon exercises.

Arrangements following the expiry of the 2003 Contract

4.19 Ahead of the expiry of the contract with Cal Dive in June 2008, DMO started the process of retendering in June 2007 with the release of an ITRI to create a shortlist of capable organisations to be invited to tender. Seven responses were received to the ITRI and four were identified as capable of

providing the required services and were invited to submit tenders in response to the RFT. One of these four later withdrew. The Evaluation Team used Australian Defence Contracting (ASDEFCON) templates¹²⁵ in accordance with the Defence contracting framework for the assessment process. By the tender closing date, in January 2008, three tenders were received and subsequently evaluated in accordance with the approved Tender Evaluation Plan and Tender Evaluation Guide. The evaluation process was completed in April 2008.

4.20 The proposed new contract issued as part of the RFT incorporated a number of important improvements including the requirement that the Commonwealth be specified as an interested party on the insurance policy for the Remora (see paragraphs 4.51 to 4.53). Other changes include:

- a move to the specification of deliverables rather than simply itemising services to be performed;
- incorporation of Key Performance Indicators (KPIs) linked to payments and penalties;
- the requirement for a risk assessment to determine liabilities of the parties (for example in the event of a loss of the Remora);
- formalised command and control provisions to ensure effective Commonwealth control of the capability during all phases of mobilisation; and
- a direction that all configuration changes are to be implemented and managed through the OEM, accredited by Class Society, and approved by the Commonwealth.

4.21 The procurement process was monitored by an independent probity adviser engaged by DMO. The probity advisor's report advised it considered that the procurement process had been conducted in accordance with the Probity Plan and government policies and that the preferred tenderer was selected based on presentation of the best value for money solution to meet the Commonwealth's requirements.

4.22 The matter of liability was an issue raised by tenderers during the tender process. Defence advised the ANAO that the revised contract provides

¹²⁵ The ASDEFCON suite of tendering and contracting templates have been developed by DMO and provides a set of pro-forma documents for use by procurement officers when drafting request for tenders (RFTs) for the acquisition of goods and services by Defence. The objectives of the templates include the standardisation and benchmarking of Defence's business practices and procedures

an indemnity to the contractor for death of, or personal injury to, persons, and property damage, occurring during submarine escape training and rescue operations for a disabled submarine. This indemnity excludes claims arising from contractor's gross negligence, wilful misconduct, fraud, bad faith or breach of a statutory obligation. A new contract was expected to be signed in August 2008. However, Defence advised ANAO that complications from the provision of government furnished equipment (GFE) had delayed contract signature.

4.23 COLSPO is currently evaluating options for the future of the RAN organic submarine rescue capability. Defence advised that, until a longer term position is resolved, it has contracted a UK contractor for a six month standby submarine rescue service, incorporating emergency deployment in support of a disabled submarine. Defence considers that the contract with the UK contractor will maintain the capability currently available to the RAN and provide the DMO with the time to plan and implement the recommissioning of the Australian capability.

4.24 However, the 2003 SERC contract covered both the operation of the SERS and the operation of the SETF. On 31 January 2009, Defence issued a media release¹²⁶ discussing a temporary measure that had been put in place to secure pressurised submarine escape training for RAN submariners as part of their ongoing safety training program. In the absence of a current contractor to operate the SETF, Defence plans to send up to 100 submariners to Canada later this year to undertake such training. The media release pointed out that the cost of sending the submariners to Canada does not require any new funding as the training will be paid for with money already allocated for training that would have been conducted at the SETF. The media release further noted that RAN personnel could still take part in unpressurised escape training at the SETF which would minimise the time required to continue their training in Canada.

Issues with the operation of the 2003–2008 SERC contract

4.25 Over the period 2003–2008 a number of issues arose relating to the operation of the SERC contract. The following is an outline of some of the issues and DMO's management of them.

¹²⁶ Defence Media Release, *Navy Puts Safety First with Submarine Force*, 31 January 2009.

Operation of the LARS

4.26 During exercise Black Carillon 2004, Det Norske Veritas Marine Classification Society (DNV) conducted surveys of equipment associated with the Remora whilst operating offshore and expressed concerns over the operation of the LARS, which resulted in the suspension of Black Carillon 2004. These concerns triggered a DNV design review, which uncovered inconsistencies between amendments made by the previous commercial operators¹²⁷ to the operating procedures of LARS (developed by the OEM for the LARS) and design calculations for the equipment. During this design review, an examination of the LARS structure uncovered structural defects (large elongated cracks in the LARS supporting legs) that have since been repaired. This issue separately precipitated a range of related concerns, such as the suitability of LARS mounting arrangements to certain mother ships (MOSHIPs). The Black Carillon exercise was subsequently abandoned for 2004.

4.27 In the course of examining the matter of the MOSHIP suitability associated with the LARS design loadings it was discovered that, MV SeaHorse Standard, the MOSHIP provided under contract, was not certified by its classification society, Bureau Veritas, to embark and operate a LARS-like system. This was the case notwithstanding that the MV Seahorse Standard had been used as the MOSHIP for the Remora by the previous SERS provider (GSS under sub-contract with ASC) since the commencement of Collins-class operations. In July 2005, the Director COLSPO appointed a SERC Integration Manager on a short tenure to produce an integrated project schedule and plan covering all initiatives with LARS, as well as SERS and SETF, underway with the contractor. Defence advised the ANAO that the recommendations in the report have been, or continue to be, actioned as part of the remediation of the capability and the movement towards meeting appropriate operational requirements.

Unapproved shutdown of the SETF

4.28 In June 2005, prior to seeking COLSPO's agreement, and financial approval for the works, FDA commenced a planned and forecasted maintenance period at the SETF which required its shutdown. The SERC contractor was undertaking the works because a DNV Condition of Class required the replacement of all windows in the SETF exceeding 10 years of age

¹²⁷ GSS under subcontract from ASC.

unless a risk assessment concluded otherwise.¹²⁸ Subsequently, at the commencement of the maintenance, the main water tank was drained and all acrylic windows were removed for assessment. Cal Dive advised the ANAO that COLSPO argued that FDA was obliged to replace these windows as FDA had accepted the SETF building as fit for purpose at contract signing, regardless of the fact that the DNV had changed its rules and applied a new condition of class, thus extending the shutdown period. There were further delays due to the timing of the delivery of replacement windows and subsequent certification and testing of them. Five training courses scheduled between mid August and early September were cancelled and training was delayed by eight weeks. A claim for liquidated damages was made by Defence in October 2005 in respect of the unprogrammed unavailability of the SETF. In September 2006, Defence agreed to a negotiated settlement with FDA.

Maintenance management database deficient

4.29 A Directorate of Navy Certification Audit of the SERC carried out in December 2005 found that there were shortcomings with the Maintenance Management Database¹²⁹ (Mainpac) as implemented by FDA. The aim of the audit was to provide the Commander Australian Navy Systems Command, as the Submarine Certification Authority, with confidence that the capability was materially safe, environmentally compliant, fit for purpose and that risk was being effectively managed.

4.30 The audit found that Mainpac as implemented by the SERC contractor did not have the capability or the functionality to manage long lead spares that could have affected the availability of the ASRV (the Remora) and its support systems. The audit also found that Mainpac as implemented by FDA did not allow deferred maintenance to be properly managed. When maintenance was deferred, say due to lack of spare parts, from the specified due date, the actual date that the task was finally completed was recorded and then used to establish the next due date using the required maintenance frequency or periodicity. In fact the next due date should be scheduled from the original required due date, not from the date the actual routine was completed.¹³⁰

¹²⁸ Cal Dive advised that, at the time, these windows were already 18 years old (eight years past the new condition of class requirement) and required immediate replacement.

¹²⁹ Provided by the Commonwealth to FDA to operate under the contract.

¹³⁰ The Remora was lost from December 2006 and therefore unavailable. This matter is discussed in paragraphs 4.40 to 4.54.

Defence advised the ANAO that this issue will be addressed in any future contract.

Flawed maintenance management and recording

4.31 In November 2006 COLSPO was advised that during the May 2006 recertification dive of the Remora the LARS winch wire was damaged during operations. FDA had replaced the damaged wire with a wire of a different specification. Defence advised that it directed FDA to use OEM design criteria and DNV rules for testing criteria when ordering new lifting wire. On 6 December 2006, Director COLSPO requested that a quality assurance audit be undertaken on process compliance and regulatory instructions and that a technical investigation be undertaken focusing on engineering issues. The COLSPO quality assurance audit report noted that:

- on the evidence available, it appeared that damage to the LARS winch wire (a critical component of the LARS Operating System), and/or alterations in its length, were not being effectively managed and documented;
- whilst the contractor had in place an effective process for the recording and management of SERS defects, evidence suggested its detailed application to the date of the review was sporadic; and
- a lack of knowledge/experience by the contractor in the use of the full range of the abilities of the Mainpac maintenance system¹³¹ had led to flawed maintenance management and recording.

Remora design integrity

4.32 In 2005, FDA, under instruction from COLSPO, engaged OceanWorks to conduct a physical configuration audit of the Remora to advise what, if any, design integrity issues required addressing to ensure the Remora's life expectancy of 20 years (from manufacture) and its alignment with the life expectancy of the Collins-class submarines was maintained. OceanWorks is the OEM for the Remora and has continued to act as the Design Authority supplying contracted specialist advice to DMO. As the OEM, OceanWorks also owns the intellectual property rights associated with the design and is in a position to maintain the technical integrity of the Remora by ensuring that any configuration changes maintain both the original design intent and the system certification in accordance with DNV class rules. The audit was undertaken as a risk mitigation strategy following the discovery by Caley Ocean Systems (the

¹³¹ Supplied by the Commonwealth.

OEM for the LARS) of incorrect and undocumented changes to the LARS in the course of the investigation into a fracture of one of the LARS' legs during Black Carillon 2004 operations (these matters are discussed in paragraphs 4.26 and 4.27).

4.33 The OceanWorks audit found that:

- a number of configuration changes had been made to the Remora over the previous 10 years without the involvement of OceanWorks as the designer. These changes had adversely affected the buoyancy and trim of the vehicle as well as aspects of the design system, presenting a risk to the technical integrity of the vehicle; and
- there were a number of obsolescence issues that compromised the reliability and function of the Remora. In particular the telemetry system was identified as obsolete with a high risk of failure during operations.

4.34 Defence advised the ANAO that, following procurement approval in October 2006, discussions commenced with OceanWorks to undertake a scoping study and assess the viability and preferred options for full remediation of the Remora, including obsolescence issues emphasised in the OceanWorks Physical Configuration Audit of 29 July 2005. The study was to include a particular emphasis on the Articulated Skirt Lip Seal, High Pressure De-Watering Pump and the Telemetry replacement. The report's recommendations were subsequently incorporated into the contract for remediation of the Remora following the recovery of the rescue vehicle after its loss in December 2006.

Capability Certification not completed

4.35 Under the 2003 Contract (and its predecessors), a completed and signed SERS Capability Certification, which is a clear statement by the contractor that the SERS is safe and available for exercises and normal operations, was to be provided by the contractor to the Project Authority.¹³² This has never been done. The contractor was unable to comply as Navy was not able to provide the Project Authority with a template for the certificate. The contract did not specify the frequency at which the contractor would be required to endorse the certificate.

4.36 In December 2005, the SERS Capability Certificate was replaced with the Submarine Rescue Capability Certificate on a trial basis. This is a more

¹³² Project Authority means the person holding or performing the office of Director Collins System Program Office or any other person appointed pursuant to the contract as the Project Authority.

holistic Navy document that requires endorsement from all SERS stakeholders (material, safety and certification, medical and operational). The Submarine Rescue Capability Certificate was provided for the material and certification of the SERS suite in February 2006 during the conduct of the Black Carillon Exercise and was current for 14 months from that time. Whilst the requirement for the SERS Capability Certificate was removed from the contract in July 2007 the contract was not amended to provide for the change to the Submarine Rescue Capability Certificate.

4.37 Nevertheless, the material status of the SERS capability was assessed and reported on annually when it was operating.¹³³ COLSPO advised the ANAO that in practice, certification of SERS capability was tied to deployments for Black Carillon exercises, which were generally an annual event in the November – December period. The last SERS Material Certification audit was conducted in November 2006 prior to Exercise Black Carillon. The aim of the audit was to provide the Commander Australian Navy Systems Command, as the Submarine Certification Authority, with confidence and assurances provided by COLPSO that the capability is materially safe, environmentally compliant, fit for purpose, and that risk is being effectively managed. The November 2006 report indicated satisfactory outcomes for quality management, engineering change management and maintenance management with no requests for corrective action. It was distributed to COLSPO and SMFEG. In addition, there was a requirement for the contractor to deliver a SERC Material Status Report on a monthly basis which was complied with.¹³⁴

Safety Case Report that management system not robust

4.38 Following the loss of the Remora in December 2006, as a precursor to bringing the SERS capability back into operation, DMO commissioned in December 2007 a Safety Case Report to summarise the current status of the safety case for the equipment and operations that comprise the SERS. The purpose of the report, completed in April 2008, was to provide COLSPO, and stakeholders who use and contribute to the capability, with visibility and

¹³³ The SERS capability has not been operable since December 2006 following the incident where the Remora was lost. See section commencing at paragraph 4.40.

¹³⁴ Cal Dive advised the ANAO in January 2009 that, immediately prior to, and during, the LARS upgrade works and [the build up to] Black Carillon 2006, it expressed its written and verbal concerns to COLSPO with regards to the LARS upgrade timetable and that there was not enough time to satisfactorily complete the Factory Acceptance Testing and training before mobilisation.

assurance of the extent to which safety was being managed. The report's conclusions included:

- there is no defined equipment baseline for the equipment that comprises the SERS capability;
- hazards identified and assessed cannot be declared As Low As Reasonably Practicable (ALARP);
- a detailed acceptance, maintenance and training program is required for the ASRV and LARS;
- a robust safety management system is not in place;
- an approved SERS System Requirements statement did not exist, although development work is in progress with the SFEG to produce one; and
- Mainpac was at an undefined state and was therefore being used in a manner that is inappropriate to sustain SERS capability.

4.39 The April 2008 Safety Case Report's recommendations included that:

- the SERS capability be defined and the system requirements be established;
- the ASRV and LARS complete acceptance tests and trials satisfactorily; and
- a robust Safety Management System be established.¹³⁵

Loss of the Remora

4.40 On 4 December 2006, the Remora was deployed at sea on MV Seahorse Standard to conduct tests and trials related to upgrades to a number of its components prior to the start of Exercise Black Carillon 2006. The Remora, which was being operated by the contractor and with two contractor personnel on board, suffered a failure of the launch and recovery winching system (LARS) while being recovered during a submarine escape exercise. The two contractor personnel were safely recovered the following day. However, the Remora was subsequently lost on the sea bed in approximately 120 metres of water. Prior to the loss of Remora, damage occurred to the LARS winch and ancillary equipment associated with the suite, such as the umbilical winch.¹³⁶

¹³⁵ Royal Australian Navy, Submarine Escape and Rescue Service, Safety Case Report, April 2008, p. 97-101.

¹³⁶ The umbilical cord extends to the Remora to provide power and communication services with the MOSHIP. The umbilical winch on the MOSHIP is used to pay out and retrieve the umbilical cord as the Remora is lowered and raised.

4.41 The Remora was located on 20 December 2006 and Cal Dive was unsuccessful in an attempt to recover the Remora on that date, due to equipment limitations on the chartered recovery vessel in the prevailing sea state.

4.42 Cal Dive, in conjunction with COLSPO, commenced planning immediately to recover the platform. Cal Dive subsequently advised DMO in late January 2007 that it would not proceed with the recovery of Remora unless the Commonwealth agreed to cover the costs ahead of any insurance pay-out related to the vessel's loss.¹³⁷

4.43 DMO commenced discussions and negotiations with potential overseas assistance providers and Navy, and the United States Navy was engaged to undertake the recovery.¹³⁸ The Remora was recovered on 24 April 2007, more than four months after it was lost.¹³⁹

4.44 OceanWorks is the prime contractor for the remediation and restoration of the Remora, with the LARS activity contracted to Caley under subcontract to OceanWorks. To facilitate an integrated approach, OceanWorks, on behalf of the Commonwealth, was held responsible for retaining DNV (the relevant certifier) and managing and coordinating efforts by all parties to present documentation, analyses, testing surveys and approvals necessary to achieve full certification of both the Remora and the LARS under DNV rules. As part of the work being undertaken the opportunity was taken to undergo a full 10 year recertification by DNV. DNV raised concerns about the structural integrity of the LARS in March 2008 and required further design analysis as part of the certification process.

4.45 Following remediation and the conduct of certain testing, the LARS was returned to Australia in July 2008 and the Remora arrived in mid August 2008. Both were scheduled to commence harbour and sea acceptance trials in the October/November 2008 timeframe, using expected favourable sea conditions. However, Defence advised the ANAO in September 2008 that this has been postponed as a result of uncertainty surrounding the certification and integrity of the LARS. The launch and recovery winching system has completed certain testing in Glasgow but this was not accepted by Defence due

¹³⁷ Cal Dive advised that ANAO that it subsequently received no further correspondence from COLSPO in relation to the recovery of the Remora.

¹³⁸ At the time the United States Navy was recovering the ADF Blackhawk helicopter lost off Fiji.

¹³⁹ The ANAO notes that advice from Defence and Cal Dive differ in regards to the extent of involvement that Cal Dive had in the consideration of options regarding the recovery of the Remora.

to deficiencies. A review by the Class Society DNV of the launch and recovery winching system is outstanding. In January 2009, Defence further advised ANAO that the lack of certification of the LARS has jeopardised sea trials and the subsequent return to service of the SERS. Defence also advised that COLSPO is currently evaluating options for the future of the RAN organic rescue capability.

4.46 In January 2007, the Defence Committee set aside \$20 million in the Defence budget for the recovery and repair of the Remora and associated equipment. The total cost of the recovery and repairs to date has been \$11.6 million¹⁴⁰, comprising:

- the recovery at a cost of \$1.1 million;¹⁴¹ and
- repair, remediation, recertification and return to operational service of the SERS at a cost of \$10.6 million.

4.47 The major components of work on the SERS in 2007–08 were:

- costs associated with the loss of Remora (recovery, transportation to OEMs of the Remora and the LARS, repairs and subsequent trials) of \$7.6 million;
- remediation, including of obsolescence, of \$2.3 million, and
- DNV recertification costs of \$1.7 million.

4.48 DMO is seeking approval to roll \$3.85 million into 2008–09 related to the repair and remediation of the Remora, and related matters. This would bring the total expected to be spent on Remora recovery and remediation to \$15.57 million.

4.49 The loss of the Remora and the associated costs of recovery and remediation is the subject of complex legal negotiation as well as a number of inquiries. The investigations include:

- a COMCARE investigation being undertaken into the cause and underlying safety issues associated with the deployment;¹⁴²

¹⁴⁰ The cost of the required sea trials will be additional expenditure. DMO is seeking to roll \$3.85 million over to 2008–09 which will include Remora related costs. DMO noted that this does not include some of the costs of the sea trials.

¹⁴¹ This amount was expended in 2006–07 and was expended from COLSPO funds, not the special budgetary provision.

¹⁴² COMCARE is involved because the Remora is owned by the Commonwealth even though it was being operated by a contractor.

- an internal DMO technical investigation sought to identify the failure mechanism which led to the incident; and
- Cal Dive's insurer (Lloyds) conducted an independent technical investigation.

4.50 These reviews, together with comments made in this audit report related to management of the SERC contract, will assist Defence in determining improved contract management approaches for any new SERC contract negotiated. There may also be benefit in the lessons from the difficulties with the SERC contractual arrangements being disseminated broadly within DMO and Defence, in particular in terms of the approaches needed to manage contracts where private sector entities are contracted to deliver services to Defence using Defence-owned equipment.

Insurance implications

4.51 The Remora is owned by the Commonwealth although it was being operated by a contractor at the time of its loss. In the 2003 contract with Cal Dive there was a requirement that before commencing work under the contract the contractor shall have insurance for plant and equipment for an amount of not less than \$10 million. There is no requirement in the contract for the Commonwealth to be named as an insured in relation to the Commonwealth equipment being used by the contractor.

4.52 Chapter 3.15 of the Defence Procurement Policy Manual discusses issues regarding naming the Commonwealth as an insured on a supplier's insurance policies. The Manual indicates that Defence does not generally require that the Commonwealth be named in such policies. However, it indicates that in some limited circumstances it may be appropriate to have the Commonwealth named on an insurance policy taken out by a supplier to assist in obtaining payment in the event of a liability arising. The Manual notes that such insurance policies may include property insurances, if the Commonwealth has an interest in the property insured.

4.53 Notwithstanding this reference being included in Defence's policy, the 2003 contract did not require that the Commonwealth be named as an insured in the contractor's insurance policy for plant and equipment. Given that it was not named in the contractor's insurance policy, the Commonwealth has been required to advise the insurer that it, as the owner, had a claim on the policy as an interested party. Defence advises that any future contract for the operation of the SERS will require that the Commonwealth be specified as an interested party on the relevant policy.

Alternative rescue services

4.54 To mitigate the impact of the loss of Remora on Collins-class operations, the Commander of the Australian Fleet initiated an arrangement for the UK Submarine Rescue Service, with its submersible, to be available to support submarine materiel certification and crew competency assessment. The Collins-class submarines are also certified to mate with the US Navy Submarine Rescue System in shallow waters. The Director of COLSPO advised the ANAO in June 2008 that the unavailability of the Remora has not affected any training exercises or any sea trials post Full Cycle Dockings.

In January 2009 Defence advised that, until the longer term position is resolved, it has contracted the UK contractor for a six month standby submarine rescue service, incorporating emergency deployment in support of a disabled submarine. Defence considers that this contract will maintain the capability currently available to the RAN and provide the DMO with the time to plan and implement the recommissioning of the Australian capability.

5. Training

This chapter examines matters related to the contract that Defence has in place with external suppliers to assist with the training of submariners, as well as the overall number of submariners available.

Introduction

5.1 In relation to the training contract, the audit examined:

- contract management arrangements;
- issues that have arisen in the management of the contract and how these have been dealt with; and
- the consistency of payments with contractual provisions.

5.2 In examining the contract management arrangements, the audit considered whether there existed reporting and communication arrangements that supported sound management of the contract. In relation to payments, the audit examined the overall arrangements for matching payments and work completed, as well as their consistency with contractual provisions.

5.3 The audit also reviewed the availability of submariners and its impact both on training and Mission Capability of the Collins-class.

Contract management arrangements

5.4 ASC undertakes the training role for submarine crew through a contract arrangement with the Director General Navy Personnel Training (DGNPT), an element of Navy Systems Command (NAVSYSCOM). The contract is managed by Training Authority Submarines (TA-SM) a business unit of NAVSYSCOM located in the Submarine Training and Systems Centre (STSC) at HMAS Stirling.

5.5 The current Training Contract with ASC is for five years from July 2005 to 2010 at \$4.48 million per annum (inclusive of GST)¹⁴³ to provide the following services: Contract Training Management; Training Schedule; Platform Training; Combat Training; Simulator Training; Training Technology; Training Development; Training Administration; Building Management;

¹⁴³ At 2005–06 prices.

Safety Management; Access Control; Quality System Management; and Operational Training and Support.

5.6 TA-SM chairs a working group each year of key organisations to determine the training requirements for the next twelve months. The organizations making up the working group are Directorate of Naval Officers' Postings (DNOP), Directorate of Sailor Career Management (DSCM), Directorate of Navy Workforce Management (DNWM), SMFEG, and the Contractor. These requirements form the Training Program. The Training Program is then circulated to major stakeholders for comment and agreement prior to being approved by TA-SM and promulgated as the TA-SM Training Program. The Contractor then develops and implements the TA-SM Training Schedule.

5.7 The contract obliges the Contractor to consider ways in which to develop a training workforce that is current and maintains an interest in the ongoing support of the Collins-class.

5.8 The Contractor and TA-SM meet annually, to review performance under the Contract on a set of Key Performance Indicators (KPIs) with the aim of improving the efficiency and effectiveness in the delivery of services. There are also quarterly review meetings that are minuted, with outstanding actions discussed, as well as issues arising related to the contract's ongoing management such as performance reporting.

5.9 Payments under the contract are monthly in arrears on presentation of an invoice by the contractor. The ANAO compared the information presented by the contractor in a sample of invoices with the respective contract provisions and the supporting documentation provided. The ANAO's examination of selected invoices indicated that invoices presented by the Contractor were consistent with the arrangements set down in the contract.

5.10 The ANAO examined Defence material related to the management of this contract, including invoicing and payments, recording of meeting outcomes, the development of the training schedule and assessments of contractor performance. No major issues were identified.

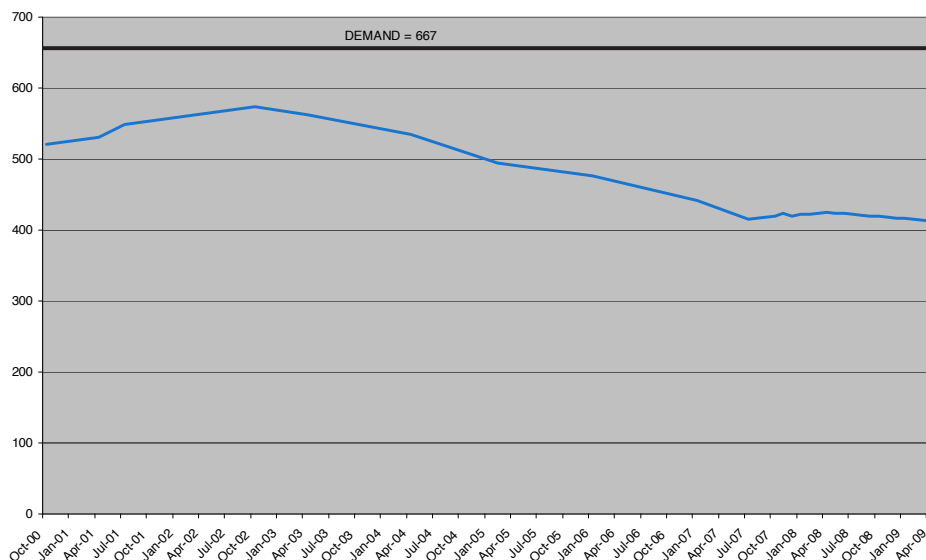
Availability of submariners and training

5.11 Whilst the training contract has been adequately managed, the number of trained submariners has been steadily falling below requirements. The

following diagram shows the number of available submariners against the demand workforce figure.

Figure 5.1

Numbers of available submariners – October 2000 to April 2009



Source: Submarine Training and Systems Centre.

5.12 Current demand for submariners is a total of 667 officers and sailors with a supply of 423 at June 2008, or a shortfall of 244 or 37 per cent across all categories of submariners. The shortfall has more than doubled over the previous four years. The shortfall is greater if the numbers of submariners that are unable to be deployed through medical, compassionate or other reasons are taken into account. As at June 2008, 38 submariners could not be deployed bringing the total shortfall of submariners to 43 per cent.

5.13 As the majority of the submarine workforce is transferred from within Navy, the below target recruitment into Navy is having a flow on effect to the numbers available for submarine training. In 2004–05, 2005–06, 2007–07 and 2007–08 Navy achieved 73 per cent, 72 per cent, 80 per cent and 73.5 per cent respectively of its recruitment target compared with 80 per cent, 84 per cent, 88.7 per cent and 85.7 per cent for the ADF overall. Part of the ADF's response was to increase pay and allowances including retention bonuses across all forces in August 2007. A marine technician, for example, earning pay and

allowances of \$50 254 per annum in 2001 now receives \$80 451 including a \$10 000 retention bonus. In April 2008, a Navy Capability Allowance aimed at retaining trained and experienced serving sailors was announced. For submariners of Able Seaman to Chief Petty Officer ranks who agree to a further 18 months service the allowance provided is \$60 000. The take up of the Naval Capability Allowance has been below expectations for submariners with only some 27 per cent of eligible submariners applying by June 2008.

5.14 The submarine workforce comprises a number of different categories, and ranks within those categories. Contributions are required at all levels to safely and effectively operate the Collins-class submarines, that is to constitute a 'whole and effective' workforce supply. The shortfall is not uniform across all skill areas and across all ranks. The greatest shortfall is at the more junior ranks. At May 2008 there was a requirement for 189 Able Seamen but only 77 were available – 41 per cent of the requirement. By contrast of the 55 Chief Petty Officers required 53 were available – almost 96 per cent of the requirement.

5.15 The greatest shortage has occurred in the skill areas that are also required in the mining industry in Western Australia. The requirement for mechanical and electrical technicians for the Collins-class submarines is 177 and 126 respectively, however as at May 2008 only 84 and 63 were available – 47 per cent and 50 per cent of the requirement. By contrast for acoustic warfare analysts and communications and information systems operators, of a requirement of 93 and 50 respectively, the availability was 52 and 38 – 56 per cent and 76 per cent of the requirement.

5.16 The output of submariner initial trainees is currently limited to approximately 74 graduates per year. Limitations exist, not within the Submarine Training and Systems Centre (STSC), but within the availability of operational submarine platforms for trainees to complete their 'at sea' training component. The number of placements is dependant and constrained to the number of submarines available with the number of training bunks for trainees generally limited to 10 per submarine depending on the submarine operations being undertaken. For 2008–09, with the equivalent of three submarines planned to be in docking for the whole year, the number of placements will be limited to around 30. Once training is completed the newly qualified submariners are posted back to shore duties awaiting a billet posting. Again the billet posting is dependent on the number of available submarines with some newly qualified submariners waiting up to twelve months before gaining a billet placement and their submarine and category consolidation.

5.17 Based on June 2008 projections of additions through training and retention rates, Navy expects to make a net gain of 33 submariners per year going forward. At this rate, the requirement for submariners should be met in eight years or by 2015, some 11 years before the first Collins-class submarine reaches the end of its asset life. In January 2009 Defence advised that three submarines are available now and a fourth crew will be formed not earlier than financial year 2010–11. The manning shortfalls cannot be met through shore posted personnel who have been previously trained as submariners as their earlier training would not be considered current.

5.18 In May 2008, the Chief of Navy instigated a review of submarine workforce sustainability to report by the end of October 2008. In January 2009 Defence advised that the Chief of Navy is currently reviewing the report on Workforce Sustainability.

Relationship to Unit Ready Days

5.19 One of the reasons Mission Capability for the Collins-class submarines, as measured by Unit Ready Days (URDs), is not being achieved is the shortage of trained personnel. Indeed the shortage of submariners has been the primary driver for having three submarines in Full Cycle Docking from May 2008. The achievement of URDs is discussed in more detail in Chapter 3.



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