National Audit Office

MINISTRY OF DEFENCE

The Landing Ship Dock (Auxiliary) Project

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL | HC 98-III Session 2007-2008 | 30 November 2007

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SUMMARY

1 The Landing Ship Dock (Auxiliary)[1] (LSD(A)) project was initiated to replace the existing 'Sir' Class vessels and to provide a major element of the Armed Forces sealift capability. This report examines the reasons for the substantial cost increases and delays on the project and considers how the Ministry of Defence (the Department) has recovered the situation. Our methodology is explained at Appendix 1.

2 In 2000 the Department invited tenders to build two LSD(A)'s with options for a further three against a budget of £150 million. The lowest and most compliant bid received was from Swan Hunter. However, broader industrial considerations meant that it was decided that the number of vessels to be procured should be increased from two to four, with the additional two vessels built at the BAE Systems Govan yard. Given that the additional cost of procuring the two extra vessels would otherwise have to be met by displacing higher priorities on the defence programme, the Treasury agreed

1 The vessels were initially called Alternative Landing Ships Logistic, but were re-titled Landing Ship Dock (Auxiliary)s (LSD(A)s) in Autumn 2002 when a new ship number designation was adopted to match other amphibious ships in service. In addition the name change matched the NATO designation requirements for a vessel with an integral dock. For ease of reference we refer throughout this report to the new vessels by their current LSD(A) name.

additional funding to cover the additional costs within the forward defence programme. As a result of this change, the Department placed separate contracts with Swan Hunter and BAE Systems and assumed an additional risk with liability for the timely delivery of design information to BAE Systems to enable them to 'build to print' their two vessels. The total value of the contracts was £332 million.

3 Contracts were placed with Swan Hunter in December 2000 and with BAE Systems in November 2001. Whilst the Department identified many of the risks on the project, they were not adequately mitigated and the failure to fully apply the principles of 'SMART procurement' which required a strict 'eyes on, hands off'[2] approach meant that the risks were not always managed effectively and the scale of emerging problems was not always apparent. Once the problems became clear, the Department responded well and took sensible project management and commercial actions to limit its exposure to risk and put itself in a position to deliver all four vessels.

4 Three of the four vessels have now been delivered into service with delays of between 12 and 28 months. Eight out of the ten Key User Requirements (KURS) have been met so far and the costs of the project have increased by some 80 per cent to a contracted price of £596 million. Many of the problems on the project stemmed from the way it was initiated, in particular the commercial and project management, budget under-estimation and over-confidence in contractor competence. As both our previous reports and those of the Committee of Public Accounts have made clear, the issues are not unique to the LSD(A) project and we note that the Department is confident that its current project delivery arrangements mean that such problems should be less likely to arise on new projects. Appendix 2 provides details of the specific measures which the Department is taking to address the factors listed earlier in this paragraph.

5 Recognising the unrealistic basis upon which the project was initiated we commissioned HVR consultants to produce a more realistic cost estimate, drawing on experience from other projects, for the LSD(A) procurement and reflecting a two yard build strategy. The analysis shows that the contracted cost of the project, at £596 million fits within the likely range of contract prices for a project of this type. We also note that the vessels have been very well received by users as offering a step change in capability and have already been used in operations.

6 Once a project has encountered difficulties of the scale of those experienced on the LSD(A) project, history suggests it is very difficult to fully recover the situation. However, the project has been recovered and the Department deserves credit for successfully delivering the vessels into service. There are a number of central factors in this successful recovery from which the Department can draw broader lessons:

- Incentivise the achievement of the full range of desired outcomes with the intelligent use of contract terms and appropriate commercial arrangements that protect the contracting parties. These should reflect the specific circumstances of the project and the risks being assumed by the Department and industry.
- Having good and timely visibility of project progress supported by credible, timely and relevant metrics monitoring the performance, time and cost baseline.
- Having a common understanding with industry partners of project costs, delivery plans, assumptions, risks and opportunities.
- Given that project personnel will change during the life of the project, maintain a comprehensive project history detailing the rationale underpinning key decisions.
- That historic trend analysis can provide an important 'sanity check' on the realism of time and cost estimates.

The factors listed above are consistent with our 'Gold Standard'[3] work on project delivery and re-emphasise the importance of the Department and its commercial partners routinely adopting such practices if they are to consistently deliver successful project outcomes. The Department's change initiatives, as listed in Appendix 2 are already consistent with many of our recommendations.

2 Whereby contractors should bear full responsibility for the successful completion of their contracts, while keeping the MoD informed of progress as necessary. When carrying the risk they should have the opportunity for reward if they are successful in delivering to time, cost and specification.

3 The Gold Standard work examines practical evidence of how well factors affecting the successful delivery of projects are being managed by the MoD and what can be learned from successful MoD projects and those from commercial organisations and overseas Ministries of Defence. So far, we have looked at project control, contracting practices and collaborative working. We are currently looking at the use of competition and trade-offs. All the work can be viewed on www.naodefencevfm.org.

PART ONE

1999-2000 – Fundamental early changes to the project structure increased the risk to the Department

1.1 This part of our report examines the way in which the LSD(A) project was established. It highlights the operational importance of the vessels and that the number of vessels to be procured and the commercial arrangements changed just before project approval was given which increased the risk to the Department. These risks were further exacerbated by constraints on the project budget.

There was a clear requirement for the vessels

1.2 Since 1967, a major element of the Armed Forces sealift capability has been provided by five Landing Ships Logistic (the 'Sir' Class) operated by the Royal Fleet Auxiliary. Operational experiences during the 1990-91 Gulf conflict and in the recent security conflict in the Balkans emphasised the importance of having dedicated logistics ships and highlighted the United Kingdom's dependence on commercial charters to provide a part of this capability.

1.3 By 1995, the 'Sir' Class vessels were ageing and the Department began a Ship Life Extension Programme (SLEP) to refit the ships and extend their lives by 15 years. However the SLEP was more complicated and expensive than originally envisaged. The cost of the Programme almost doubled (from £45 million to £85 million) and there were delays of two years. This led the Department to review other options to meet its outstanding sealift requirement.

1.4 In 1998, the Department concluded that the most cost effective way to deliver the required capability would be to procure a new class of ship – the LSD(A)'s – with a service life of 25 years against a further 15 for the SLEP 'Sir' vessels and at a cost and capability similar to refitting the rest of the existing 'Sir' class vessels. The Department's operational analysis showed that to fully meet the maximum sealift capability the RFA would require five new ships. In April 2000 the Department issued an Invitation to Tender to five UK shipbuilding consortia for the design and build of two LSD(A)'s with an option for up to a further three.

The budget was constrained

1.5 The Department must meet the operational needs of the Armed Forces from within a finite budget and therefore has to make trade-offs between the relative priorities of fully meeting all capabilities with the need to produce a balanced and affordable Equipment Plan. In the case of the LSD(A) capability, the Department budgeted for £150 million of funding, which was considered sufficient to procure two new LSD(A)s.

1.6 The Department's procurement strategy for two ships recognised that delivering two LSD(A)'s with the full capability required within the £150 million budget available was the key risk to the project. The Invitation to Tender made specific allowance for bidders to propose solutions which traded performance against cost. Three tenders were submitted in response to the Invitation to Tender (ITT) by Swan Hunter, BAE Systems and Appledore Shipbuilders in June 2000. Swan Hunter was the only bidder to submit a tender that met all of the key performance parameter requirements. This was at a price of £148 million which was lower than either of the other two bids.

The project was affected by wider considerations

1.8 As well as re-affirming the requirement for the LSD(A)'s, the 1998 Strategic Defence Review concluded that the most cost effective way to meet the increased strategic sealift requirement would be to acquire additional roll-on roll-off ferries (RORO). In contrast to the LSD(A)s, which are designed to transport Royal Marines and their equipment and to put these forces ashore without the benefit of port facilities, the roll-on roll-off ferries are essentially large car ferries with a capability to use ports without specialist infrastructure. This capability is now being delivered through a PFI deal and, since the vessels are not warships, was procured under EC procurement rules. As part of the RORO assessment

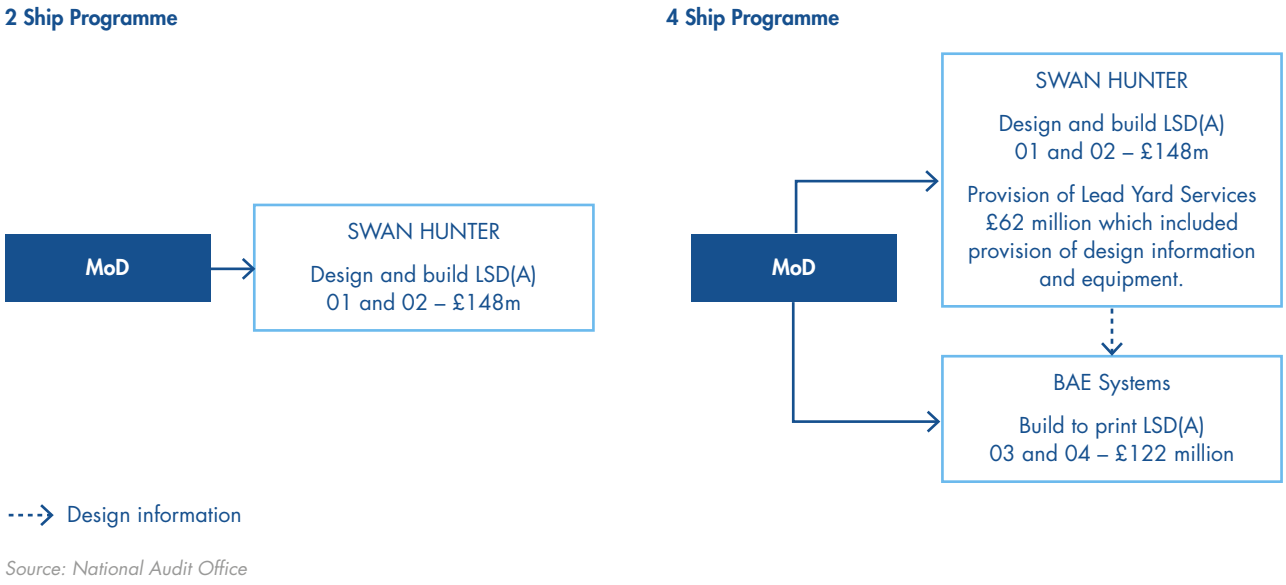
the Department, in close consultation with other parts of government looked carefully at wider factors. This included taking account of the industrial implications for the United Kingdom shipbuilding industry. The LSD(A) procurement was included in these wider considerations.[4]

1.9 There were concerns about the future of the Govan shipyard. Without securing orders for a minimum of two ships it was assessed that the yard would not be able to sustain the necessary skills capacity to meet the needs of the forward naval warship programme which included the Type 45 Destroyer and Future Aircraft Carrier. It was decided the number of LSD(A)'s to be procured should be increased to four, against an original capability requirement for five ships, with the two additional vessels to be built at the Govan yard. Given that the additional cost of procuring the two extra vessels would otherwise have to be met by displacing higher priorities on the defence programme, the Treasury provided the extra funding to cover the additional costs within the forward defence programme. The Department felt that, in the longer term this course of action would preserve a credible and cost effective maritime defence industrial capability for the UK.

The commercial arrangements increased the level of risk borne by the Department

1.10 **Figure 2** illustrates the commercial arrangements for the original two ship procurement and subsequent arrangements with Swan Hunter and BAE Systems once the decision was made to build an additional two vessels at the Govan shipyard. The Department's initial solution was for Swan Hunter to sub-contract directly with BAE Systems for the construction of the third and fourth vessels. However, given BAE Systems' reluctance to work in a direct contractual relationship with Swan Hunter, the Department instead contracted directly with BAE Systems and assumed liability for the timely delivery of design information from Swan Hunter to BAE Systems to enable them to 'build to print' their two vessels. In practice design data and equipment was passed directly from Swan Hunter to BAE Systems under the terms of the Lead Yard Services Contract. The Department considered that, in the circumstances, placing a direct contract with BAE Systems was the most effective way of delivering the LSD(A) programme. The Swan Hunter contract was awarded on 18 December 2000 and the BAE Systems contract was awarded on 19 November 2001.

2 Commercial arrangement for the 2 ship and subsequent 4 ship build



Source: National Audit Office

4 The announcement of award of both the roll-on-roll-off ferries and LSD(A) contracts was made in the House of Commons on 26 October 2000. Hansard. Volume 355, columns 411-419.

PART TWO

2000-2003 – Deficiencies in project management led to significant cost and time overruns

2.1 The extent of the problems on the project did not become apparent until September 2003[5] when Swan Hunter informed the Department that they would not be able to complete the contract within the agreed price. This part of the report examines why it took so long for the problems to become apparent. We conclude that, although the Department identified many of the risks, it failed to fully apply the principles of 'SMART procurement' which required a strict 'eyes-on, hands off' approach. This meant that the risks were not always managed effectively and the scale of emerging problems was not always apparent.

Most project issues were identified but were not adequately mitigated

2.2 In addition to the extra risks which the four ship project commercial structure placed on the Department (described in paragraph 1.9 above), there were a number of technical and project management issues. The Department identified most of these issues – with the notable exception of the relative immaturity of the design. These issues were not managed as effectively as they could have been by the Department in the early stages (up to 2003) of the project. The principal issues and the effect they had on the project as they matured are summarised in **Figure 3**. We recognise that the Department has since taken action, more recently under the Defence Industrial Strategy, and other work streams outlined at Appendix 2 to help prevent these problems occurring.

The Department's understanding of project progress was limited

2.3 At the time the LSD(A) contracts were placed the Department's 'SMART Procurement' commercial philosophy was to transfer as much risk as possible to industry and to adopt an 'eyes-on/hands-off' approach. One effect of this philosophy as practiced on the LSD(A) project was that, whilst there were standard corporate reporting systems in place, the Department was taken by surprise by the announcement of Swan Hunter's financial difficulties in September 2003. Notably, six months before the problems became apparent the Department reported to Parliament[6] that, as at the 31 March 2003, the project was progressing satisfactorily and was due to deliver three months early and within budget.

The size and complexity of the project was not reflected in the number of staff in the Integrated Project Team

2.4 Before approval to proceed to contract was granted and the project was still based on a two vessel competition, the Department's Integrated Project Team was set up on the premise that the project was low-risk, using a proven design and that it would run smoothly. The composition of the team did not change following the move to a more complex four ship procurement. The resourcing of the team meant that it provided a significant challenge to the team to deal effectively with the more complex commercial and technical challenges.

5 Some 33 months after a contract was placed with Swan Hunter.
6 MPR 2003 HC 195. Project summary sheets pages 105-109.

3 Project issues and how they matured *continued*

Issue	Impact on the project
In 2000, Swan Hunter lacked recent experience of defence commercial arrangements and complex ship delivery. The Department identified this as a risk at the outset. Following the collapse of the company, it was bought by Jaap Kroese in 1994 and virtually all of the senior project and commercial staff changed. Therefore, whilst the Department had done business with Swan Hunter for decades, it was effectively dealing with a new company.	The company's lack of expertise as regards, for example, military test and acceptance procedures, adversely affected its ability to effectively meet its obligations to provide Lead Yard Services to the Follow On Yard BAE Systems.
The addition of two ships to the programme increased risk.	The project was taken forward within a more aggressive timescale than either the Department or Swan Hunter had originally envisaged when planning assumptions had been based on a two ship project. The planned-for gap of a year between the First of Class and the concurrent build of the second ship at the Govan yard was reduced very quickly to only three months. The demanding timescale was followed in order to provide the Govan yard with work for personnel engaged in steel working before other maritime defence work started. This was done despite the difficulties experienced on other recent parallel build ship projects, such as the Auxiliary Oiler Replacement (Fort Class) vessels.[1] Learning from those experiences we noted that had there been a longer lead time, (in the case of the Fort Class) of more than 20 months the problems associated with design evolution would be reduced. Greater lead time would have allowed sufficient opportunity to identify and resolve design flaws in the First of Class ship. The timescale for the LSD(A)s effectively removed the benefits of the 'First of Class', removing the opportunity for design and technical faults to be rectified and applied to the following vessels. This was a known risk to the Department.
Swan Hunters had deficiencies in risk, project and financial management. This became apparent as the project progressed.	Swan Hunter struggled to contain the costs of the programme and effectively manage the development of the design. In addition, their inadequate management of project progress data adversely affected the MoD's ability to determine an accurate cost and time to completion.
Under-estimation of design maturity at project outset. The Swan Hunter design was based on the Dutch ship builder, Royal De Schelde Enforcer concept, a derivative of the existing Dutch 'Rotterdam' class vessels. There was shared optimism within the Department that the design of the ship was far more mature than it actually was.	The immaturity of design at the outset led to significant difficulty for Swan Hunter in fulfilling its role in the development of the design. Only seven per cent of the design drawings were provided on time and over 52 per cent were over a year late. This led to significant delays in BAE Systems' build programme and a subsequent cost of £54 Million to the Department in delay and dislocation claims from BAE Systems.
Swan Hunter supplier management was weak. They were heavily dependent on a number of key sub-contractors, in particular the Dutch shipbuilder Royal De Schelde, the designers of the 'Rotterdam' class and the 'Enforcer' concept. Royal De Schelde was responsible for systems design and integration and as such was critical to developing a detailed design for the vessels which Swan Hunter then took forward under licence.	Such was Swan Hunter's reliance on sub-contractors and the input of many of them to the design process meant that any problems simply escalated down through the chain. Therefore, an integrated approach to the design was complicated further.
Swan Hunter's financial position was such that the MoD was effectively the sole customer of Swan Hunter for the majority of the project. This was a risk to emerge as the project progressed. Prior to placing the LSD(A) contract with Swan Hunter, the Department's experts in the Pricing and Forecasting Group had conducted two assessments into the company's financial standing. Each of these examinations concluded that, with existing additional low value commercial work, Swan Hunter was financially viable to carry out the LSD(A) contract. However, Swan Hunter would need to win further commercial work to remain sound. For the majority of the project though the MoD were sole customers of Swan Hunter as they did not win any further significant commercial work.	The effect of Swan Hunter's worsening financial position was that, whilst the fixed price contract included a standard provision whereby the Department could claim any extra costs incurred from Swan Hunter, its ability to do so was adversely affected by the company's weak financial position. Swan Hunter's financial weakness also affected the alternatives available to the Department to recover the project once the scale of the difficulties became apparent in September 2003. We explore this issue further in part 3.

Source: National Audit Office

NOTE

1 The 1991 Statement on Major Defence Projects. HC 121.

PART THREE

2003-July 2006 – The Department took sensible steps to recover the project

3.1 This part of the report examines what the Department did to respond to the situation it found itself in late 2003 after Swan Hunter announced it would not be able to complete the contract to the agreed price and schedule. It shows that it took time to fully understand and get a grip on the situation and took sensible project management and commercial actions to limit its exposure to risk and put itself in a position to deliver all four vessels. The outcome of the project is considered in Part 4.

Given the increasing operational importance of the vessels, the Department adopted a sensible way forward

3.2 Following the announcement by Swan Hunter in September 2003 the Department reviewed both the strength of the operational need for the LSD(A) capability and alternative ways of taking the project forward to deliver the capability cost-effectively.

3.3 The Department's analyses showed that the requirement for the LSD(A)'s capability was stronger than ever. The Littoral Manoeuvre Capability Audit in 2003 showed that provision of the four LSD(A)s would still fall short of the capability required to achieve an early and rapid effect ashore as described in the strategic defence review. To cancel part or all of the LSD(A) project would have meant a significant reduction in military capability to tactically deliver the baseline strength of amphibious force into theatre.

3.4 Whilst a range of options were considered, in practice the courses of action open to the Department were limited. In particular, Swan Hunter's financial position was sufficiently fragile that cancellation of part or the entire construction programme at the yard could have pushed the company into receivership. In addition the Department could also have been faced with significant contractual claims from BAE Systems for the non-delivery of both the remaining ship design and equipments being provided by Swan Hunter in its Lead Yard Services role. In effect the loss of Swan Hunter could bring the entire project to a halt with the prospect of part completed ships at BAE System's Govan yard.

3.5 On the basis of its analyses, the Department's preferred course of action was to continue to fund its contract with Swan Hunter so that it could continue to deliver its Lead Yard Services responsibilities which in turn would allow the continued construction of all four vessels at both yards.

3.6 Once the scale of the problems at Swan Hunter became apparent, the causes were subject to a number of reviews commissioned by both the Department and Swan Hunter. The reviews reached broadly similar conclusions and made similar recommendations concerning project management, financial health, risk management and project data quality which the Department and Swan Hunter began to implement.

3.7 The project was further delayed by an unexpected incident involving the engines on the Swan Hunter First of Class vessel, Largs Bay. In November 2004, two engines on the ship filled with sea water during early engine trials. This caused subsequent delay and change to the build programme. It effectively placed BAE Systems ahead of the First of Class vessel being built by Swan Hunter who had to subsequently re-prioritise the provision of designs to BAE Systems over their own build of Largs Bay. Given that the First of Class should have proved the design and reduced subsequent build risks and the commercial arrangements were framed on this basis, this reprioritisation exacerbated the existing cost, schedule and performance risks on the project.

The revised project structure set out a sensible framework to recover the project

3.8 In December 2004, the Department and Swan Hunter agreed an £84 million amendment to the contract with revised dates for acceptance and delivery of the vessels. In particular, the contract included a new Target Cost Incentive Fee payment arrangement to encourage Swan Hunter to reduce costs and whereby the company would receive zero profit if the target cost was breached and a share of savings if the cost was reduced.

3.9 In parallel with the agreement of the revised commercial arrangements, Swan Hunter took steps to improve its management capabilities. As part of these improvements Swan Hunter took on several secondees from BAE Systems. However, Swan Hunter had reduced staff numbers over the course of the project and even with the addition of the secondees there were still critical gaps in Swan Hunter's management team. Thus, whilst the BAE Systems secondees helped to improve project management, Swan Hunter's corporate and design governance remained weak.

3.10 The Department also increased its oversight capability by strengthening the staffing on the project, including increasing surveillance staff at Swan Hunter.

When Swan Hunter continued to under-perform the Department removed them from the project

3.11 On 25 June 2005 Swan Hunter informed the Department they could not complete the contract within the Target Cost to Completion. After an analysis of the options available to them under the revised Swan Hunter contract, the Department determined that placing a single prime contract with BAE Systems to complete the project would offer the least risk and best value for money. In July 2006, the Department disengaged from the Swan Hunter contract and transferred Design Authority and Lead Yard Services to BAE Systems. The second Swan Hunter ship, Lyme Bay, was towed to the BAE Systems Govan yard for completion. The MoD settled the Swan Hunter contract for a further £32 million.

PART FOUR

July 2006 onwards – The project has had a broadly positive outcome

4.1 This part of our report examines the outcome of the LSD(A) project. Three of the four vessels are in-service; eight out of the ten Key User Requirements have been achieved. The MoD expects one of the outstanding KURs to be met by July 2007 and the other is at risk with a minor shortfall. There has been excellent feedback from trials and operational users.

Costs increased by 80 percent but analysis shows the LSD(A)s have been delivered at a cost comparable to similar ships

4.2 The costs of the project have increased by some 80 per cent to a contracted price of £596 million. **Figure 4** shows the combined value of the original contract prices and other payments made to BAE Systems and Swan Hunter. The total value of the contract changes was £264 million.

4.3 Historic Trend Analysis is an estimating methodology which uses historical outturn data to generate cost and schedule trends for specific equipment types, thereby allowing an estimate to be plotted in context to similar past projects. Recognising the difficulties inherent in estimating costs and timescales on complex defence equipment projects, the Department's Investment Approvals Board[7] has, since 2005, required major equipment projects to include historic trends analysis. Had a similar analysis been required at the outset to the LSD(A) project in 1997 it would have alerted the Integrated Project Team (IPT) to the under-estimation in cost. We commissioned HVR Consultants to undertake a historical trend analysis and produce a cost estimating model for the LSD(A) procurement (reflecting the two yard strategy). This analysis shows that the contracted cost of the project, at £596 million, fits within the likely range of contract prices for a project of this type **(Figure 5)**.

The vessels are being delivered later than originally planned but have met most of their Key User Requirements

4.4 **Figure 6** shows the in-service dates achieved for the first three vessels and the forecast in-service date for the fourth. The first three vessels were accepted into service between 12 and 28 months late.

The vessels are delivering a step change in capability

4.5 The LSD(A)s have met eight out of ten Key User Requirements (KURs). The two outstanding requirements to be met are; 'the capability to maintain a speed of 18 knots fully laden and the ability to have a minimum range of 8,000 nautical miles at 15 knots' and a 'reliable combat support system and communication package to guarantee the timely and efficient exchange of information with the command platform'. At the time of writing both KURS are being progressed by the MoD. The full completion of the speed KUR is dependent on the scheduling of speed trials during 2007 [the ability to have a minimum range of 8,000 miles at 15 knots has been achieved].

4.6 The first LSD(A), RFA Mounts Bay, took part in 'Operation Vela', the largest deployment of amphibious vehicles since 2001. The exercise involved 3,000 personnel, naval and Royal Fleet Auxiliary ships, Royal Marines and Royal Navy helicopters. The exercise demonstrated the United Kingdom's ability to conduct coastal and beach operations in the challenging environment of West Africa and the crucial role of the LSD(A)'s in delivering amphibious capability.

7 The Investment Approvals Board is the senior committee of the MoD with delegated responsibility from the Treasury for investment decisions across defence.

4 Original contract prices and value of contracted changes paid to Swan Hunter and BAE Systems

Cost Data	Report paragraph references	Original Contract Price (£ million)	Contract Amendment Price (£ million)
Swan Hunter			
Design and Build Contract	1.9	148	
Lead Yard Service Contract	1.9	62	
December 2004 Contract Amendment (Dec 2004)	3.8		84
Miscellaneous Contract Amendments (covering spares, safety legislation, engine indemnity)	3.7		16
Full and final settlement (July 2006)	3.11		32
Sub-totals	n/a	210	132
Total Swan Hunter contract value	n/a	342	
BAE Systems			
Build Contract	1.9	122	
Misc Contract Amendments (covering design change, safety legislation, extension of time costs)	Figure 3		65
BAES Contract Amendment (July 06 – Completion of original BAES vessels, Complete second Swan Hunter vessel (Lyme Bay) and Design Authority)	3.11		67
Sub-totals	n/a	122	132
Total BAE Systems contract value	n/a	254	
Total Cost		**596**	

Source: Ministry of Defence

4.7 More generally, feedback from users has been very positive:

"…I have no doubt whatsoever that these exciting and capable ships will be the backbone of our world class amphibious support as part of the UK's Amphibious Task Group ...."

Commodore Bob Thornton RFA.
Head of the Royal Fleet Auxiliary Service

"Given the increasing importance of the projection of military power in support of expeditionary operations whether assuring, deterring, striking or stabilising and reconstructing the addition of the four Bay Class ships represents a crucial and timely addition to our amphibious force structure".

General Sir Jack Deverell KCB OBE

5 Estimated acquisition costs[1]

10%	50%	90%
£521 million	£566 million	£656 million

Source: HVR Consulting

NOTE
In forecasting terms this is called a three-point estimate, which is an estimate of the range of possible outturns. Estimates range from 10 per cent (minimum) to 90 per cent (maximum) with a 50 per cent (most likely) outturn located between these extremes.

6 Original and actual achieved In-Service Dates (ISD) for the four LSD(A)s

	ISD at Main Gate	ISD Achieved/ Forecast	Delay
Mounts Bay	May 2005	July 2006	14 months
Largs Bay	July 2004	November 2006	28 months
Cardigan Bay	December 2005	December 2006	12 months
Lyme Bay	June 2005	November 2007	29 months

Source: Ministry of Defence

APPENDIX ONE

Study scope and methodology

1 This appendix sets out the methodologies that we utilised in the course of this study.

Review of Departmental files

2 We undertook a detailed review of the Department's documentation over the course of the project's history. This included policy, scrutiny and approval papers from the earliest decisions, through the contract amendments and project reviews to the final decision to remove Swan Hunter from the project. We also examined material relating to the Department's risk management arrangements.

Interviews with key stakeholders

3 We consulted with 22 individuals and organisations who had been involved in the LSDA programme. This included those who had been involved in the early decisions through to those currently working on the programme and ranged from IPT leaders, capability decision-makers, contractors and internal review teams.

Consultants

4 HVR consultants were appointed to assist the NAO in making a statement on the overall value for money of the LSDA programme compared to similar projects in the UK and overseas. We asked HVR consultants to do the following:

a Identify a number of LSD(A) type ships, designed and built recently and to provide independent cost estimates for each.

b Provide an assessment of the validity of the estimated costs of the LSD(A) programme based on information detailed in the NAO Major Projects Reports.

c To undertake the analysis using HVR Family of Advanced Cost Estimating Tools (FACET). The FACET suit of models comprises an extensive collection of methods based on statistical analysis of the actual total costs of past projects which aim to establish the likely total costs of a project about to be undertaken.

5 The NAO did not have the in-house expertise to evaluate the estimated costs of a major shipbuilding programme and the HVR work provided independent assessment and comparison to make a judgement on the final value for money of the assets possible.

APPENDIX TWO

How the MoD does things now

The following table demonstrates why the MoD is confident that some of the problems that occurred at the initial stages of the LSD(A) project could be better managed or mitigated against today.

Actions that led to the problems on LSDA	How things are done now
People	
At the time the project was set up the appointment of team members to IPTs was not driven by a clear professional acquisition competence framework.	The Department has taken forward lessons from SMART Acquisition through to the present day with the Defence Industrial Strategy. As part of the Defence Acquisition Change programme the Department has invested significantly in changing the behaviours and skills of the acquisition community as well as providing the human resources framework to support improved project delivery. A framework for behaviours (Defence Values for Acquisition) is in place and all acquisition staff will be assessed against this as part of the annual performance appraisal process. The Department's register of skills champions now includes Programme and Project Management, Engineering and Logistics to reinforce the acquisition competence framework. A programme of training and licensing for Project Managers, based upon the Association of Project Management Body of Knowledge is also now underway in the Department. Similar programmes are in place for Logistics and Engineering.
Estimating	
Budgets were capped on a cash basis through experience of similar or related programmes.	As part of the Defence Acquisition Change Programme the MoD has overhauled and improved its approvals processes. This now includes a mandated historical trend analysis comparator along with project estimates that explain any big variations in predicted time and cost for all major investment decisions. Furthermore all cost estimates must now be subject to independent (i.e. outside of the IPT) review. Within the new Defence Equipment and Support (DE&S) organisation an independent investment board has been formed to provide maturity assurance for investment approvals before they are scrutinised by the Defence Management Board.
Wider industrial and governmental issues	
Wider issues impacted on what the contract was initially being set up to deliver. Decisions based on wider issues were backed up with various reviews at the time e.g. strategic sealift review.	Wider issues still play a key role in defence procurement decisions but there is now a clearer framework for decisions in the form of the Defence Industrial Strategy (DIS). The key supplier management process and the development of negotiating strategies for major suppliers will enable MoD to assess the strategic and aggregate impact of different procurement choices, particularly those that affect the industrial base.
Risk Management	
Risk management was not fully valued or mitigated. Nor was it staffed appropriately.	Professionalism and improving project management competences have been a major drive within the MOD. The Department has introduced a project management licensing programme to drive the professionalism of its project managers. For example earned value management and risk is now managed by personnel who are qualified with industry standard qualifications using recognised project management tools and includes both technical and governance issues.

Actions that led to the problems on LSDA	How things are done now
Commercial management	
Commercial arrangements on the LSD(A) project left MoD in a high risk situation because it became responsible for the timeliness of providing design drawings to BAES. This relied solely on the ability of Swan Hunter to meet its obligation under the contract.	A centrally-located MoD Commercial Director has been appointed with wide experience in the private sector to improve commercial systems, management, policy and skills. Creation of the Commercial Directorate has integrated a number of discrete commercial support functions, thereby improving cross working, integration and transfer of information. This includes improving key supplier management thereby introducing a more rigorous engagement with suppliers on a holistic 'whole-book' management basis. The Department now undertakes due diligence on all its major projects to ensure that best practice and lessons indicated are promulgated Department-wide through a management board of commercial stakeholders.
Project management	
At the outset the Department and industry did not adequately control the project.	The Department aims to ensure the consistent application of the Gold Standard in effective project control. As a consequence of partnering arrangements, Joint MoD/Industry Project Management Boards are now in place for both major procurement and support projects leading to more open and integrated reporting. Defence Equipment and Support has also introduced a monthly Business Review to provide a more forensic assessment of project performance from the outset. Independent Internal Financial, Commercial, Technical and Project Management Assurance is a key feature of investment decisions. In addition, the application of Gateway Reviews provides further independent assurance.
Supplier confidence	
The MOD did not rigorously test the supply chain for maturity at the time the contract was awarded. The prime contractor's word was accepted about its capabilities. Financial analysis was undertaken by in-house cost accountants to produce financial health/risk checks.	Since 2004 the Department has progressively introduced the process of Key Supplier Management with its main suppliers. Key Supplier Management aims to deepen relations and understanding between the Department and its suppliers and a central feature of this process involves a comprehensive annual performance assessment of each supplier to better understand the strengths and weaknesses by individual project and collectively across the portfolio of business within the Department. This activity prompts closer and more focussed dialogue than hitherto between the Department and its main suppliers and has been a feature of the improved relationship between BAE Systems and the LSD(A) Integrated Project Team. More rigorous commercial assurance arrangements are in place now that, inter alia, aim to assess the bidder's capability and capacity to meet the requirement. This guidance is currently being reviewed with a view to further strengthening it. The Department is participating in the Society of British Aerospace Companies 21st Century Supply Chains initiative launched in July 2006, the central aim of which is to improve the efficiency, responsiveness and coherency of the supply chains of the UK Aerospace and defence industry. This activity should increasingly provide a significantly better understanding and transparency of performance of a large number of suppliers in the supply chains.

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