



National Audit Office

MINISTRY OF DEFENCE

Major Projects Report 2007

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

The National Audit Office scrutinises public spending on behalf of Parliament. The Comptroller and Auditor General, Sir John Bourn, is an Officer of the House of Commons. He is the head of the National Audit Office, which employs some 850 staff. He, and the National Audit Office, are totally independent of Government. He certifies the accounts of all Government departments and a wide range of other public sector bodies; and he has statutory authority to report to Parliament on the economy, efficiency and effectiveness with which departments and other bodies have used their resources. Our work saves the taxpayer millions of pounds every year. At least £8 for every £1 spent running the Office.



National Audit Office

MINISTRY OF DEFENCE
Major Projects Report 2007

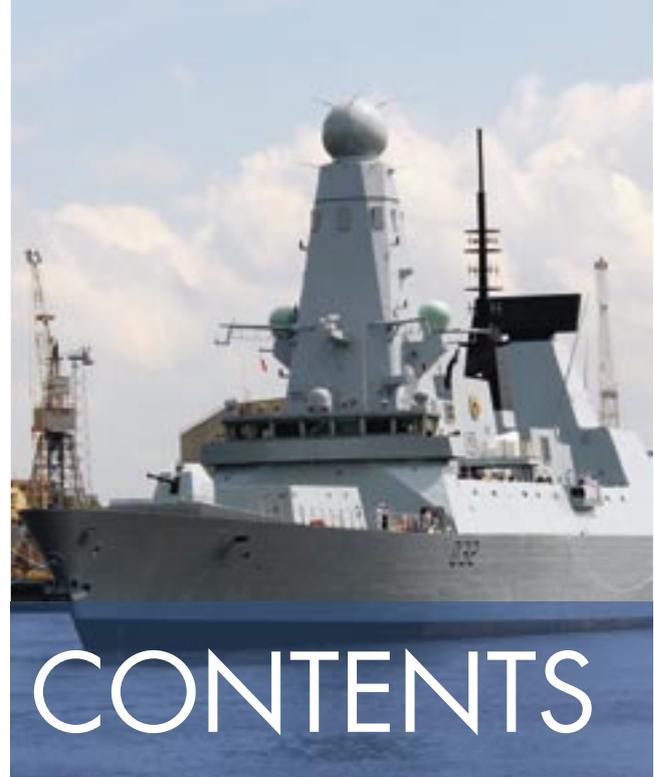
This volume has been published alongside a second and third volume
comprising of –

Ministry of Defence: Major Projects Report 2007 Project Summary Sheets
HC 98-II, Session 2007-2008

The Landing Ship Dock (Auxiliary) Project HC 98-III, Session 2007-2008

LONDON: The Stationery Office
£13.90

Ordered by the
House of Commons
to be printed on 26 November 2007



This report has been prepared under Section 6 of the National Audit Act 1983 for presentation to the House of Commons in accordance with Section 9 of the Act.

John Bourn
Comptroller and Auditor General
National Audit Office

20 November 2007

The National Audit Office study team consisted of:

Alison Terry, Alison Smith, Marisa Chambers, Michael Ralph, Tom Hughes, Andrew Makin, Kevin Pierson, David Powell, Harry Shave, Mark Shearsby and Martin Wheatley, under the direction of Tim Banfield

This report can be found on the National Audit Office web site at www.nao.org.uk

For further information about the National Audit Office please contact:

National Audit Office
 Press Office
 157-197 Buckingham Palace Road
 Victoria
 London
 SW1W 9SP

Tel: 020 7798 7400

Email: enquiries@nao.gsi.gov.uk

© National Audit Office 2007

SUMMARY	4
PART ONE	
Actions in-year mean the Department is in a similar position to 2006 for forecast cost and performance, but there continue to be time delays	10
The Department has continued to be proactive in addressing potential in-year cost increases	10
62 per cent of cost reductions have been achieved by reallocating expenditure to other projects or budgets	11
The Department has reduced quantities and deferred delivery of equipment and associated training and infrastructure	11
The majority of projects have no in-year slippage, but four have had significant delays	12
The Department will have fuller sight of the cost and capability impact of time delays under the new planning process	15
The Department believes that improved acquisition processes are reducing the impact of technical factors on project delivery	16
The Department has mitigated some risks to Key User Requirements as they have arisen	18
The Department is reducing uncertainty around equipment delivery by approving projects in stages	18

PART TWO

There have been some important developments on projects related to the Maritime Industrial Strategy 22

The Maritime Industrial Strategy was introduced nearly two years ago and represents a fundamental change in how the Department and Industry work with each other 22

The Department has made some progress against the Strategy 23

The Maritime Industrial Strategy is becoming part of the Department's everyday business and the formation of Defence Equipment and Support has provided extra impetus 23

The Department now needs to develop specific and defined performance measures for the success of the Maritime Industrial Strategy 26

APPENDICES

1 Methodology 27

2 Assessment Phase projects as of 31 March 2007 29

3 Cost performance since the main investment decision and in-year 30

4 Time performance since the main investment decision 32

GLOSSARY 34



SUMMARY

1 The Major Projects Report 2007 covers cost, time and performance data for military equipment projects in the year ended 31 March 2007. We examined¹ 20 of the largest projects (**detailed in Figure 1 on page 6**), where the main investment decision has been taken by the Ministry of Defence (the Department); and ten projects still in the Assessment Phase (detailed in Appendix 2).

Seven projects are new to this year's Report.² Detailed Summary Sheets for each of the 30 Projects are in Volume II of this Report. There have been significant developments of Parliamentary interest on a project that appeared in the Major Projects Report until 2002-03, the Landing Ship Dock (Auxiliary)³ and our detailed findings are in Volume III.

¹ Our methodology is described in Appendix 1.

² The Merlin Mk 1 helicopter Capability Sustainment Programme and the Soothsayer communications project are new in the post-investment decision population as well as the Falcon (Communications System) and Watchkeeper (Unmanned Air Vehicle) projects, which have previously featured as Assessment Phase projects. The Frigates and Destroyers Programme for networking of sensors and shared identical air picture, which appeared in the Major Projects Report 2005, returns to the Assessment Phase population. The Maritime Airborne Surveillance and Control project (surveillance and battle management capability) and Search and Rescue Helicopter project are included for the first time in the Assessment Phase project population.

³ Vessels for the deployment of troops, vehicles and equipment directly into operational areas.

Overall the Department is in a similar position to the Major Projects Report 2006 for forecast cost and performance, but there continue to be time delays

2 The current total forecast cost for the 19⁴ largest projects is £28 billion, an increase of 11 per cent compared with the 'most likely' (budgeted) cost when the main investment decision was taken. The Department expects ten projects to deliver within their 'most likely' cost, and was again pro-active in limiting potential in-year cost increases, with 13 projects showing a fall in their forecast costs, and one project reporting no change. Progress on a small number of older projects has been of concern in the past, and there has been significant net cost growth in-year in the production of the Type 45 Destroyer (£354 million) and the Astute Class Submarine (£142 million).

3 As in the Major Projects Report 2006 the Department has reduced the forecast costs of its projects by reducing quantities of equipments and re-assessing requirements (£81 million; £226 million over two years) and by re-allocating expenditure to other projects or budget lines (£609 million, making a total of over £1 billion over two years). The Department's rationale for continuing to re-allocate budgets and expenditure is to better measure the performance of individual teams in controlling their project costs and to distinguish the costs of maintaining defence-critical industrial capability in accordance with the Defence Industrial Strategy, which are more appropriately overseen at a corporate level. This year, the largest component (£305 million) relates to maintaining industrial capacity and capability in line with the Maritime Industrial Strategy (Paragraph 8 to 12). We would not expect to see this level of re-allocation in existing projects in future reports.

4 Although the principle of allocating budgets to those best placed to manage them is sensible and results in savings to the individual projects, many of the same project teams continue to be responsible for the transferred budgets. For example, the budget relating to warranty costs of £64 million for the Support Vehicles project was re-categorised as In-Service costs, but this is still being managed by the same project team. This is not a saving to Defence as a whole.

5 Two equipments, the Guided Multiple Launch Rocket System and Sting Ray torpedo, met their Sponsor's⁵ agreed definition of In-Service during 2006-07, bringing the total number of projects covered by the Report that are In-Service to six.⁶ For the remaining equipments the Department predicts no additional slippage on eight projects and that five may be delayed further. The total in-year slippage was 38 months, compared to 33 months in the Major Projects Report 2006.

6 The Department still expects to meet all the Key User Requirements on 17 of the 20 largest projects. Key User Requirements are selected because they are critical to the successful employment of the equipment; however mission needs may change because of changes in the threat. Key User Requirements are therefore subject to continual review. Seven projects have identified risks to the delivery of one or more of their Key User Requirements (12 in total) as at 31 March 2007, and the Department is taking mitigating action to address these.

7 In the Major Projects Report 2006 we explained that by focusing on initial procurement activities, the Report in its current form does not give a complete account of the Department's performance in delivering capability throughout the life of an equipment. As a result we have been working with the Department to develop the Report to provide a clearer representation of equipment acquisition performance, including a view on sustaining capability once it has been introduced. The original intention was that a revised format would be submitted to the Committee of Public Accounts for its approval in spring 2007, but this has now slipped to late 2007. The reason for this slippage is that the changes will be the most significant revision to the Major Projects Report in over 20 years. It is important that the measures fully reflect evolving acquisition practices and are consistent with other metrics the Department is in the process of developing. The Department aims to deliver a first report in the revised format in 2009.

⁴ One project, the Typhoon aircraft, is excluded from the analysis of costs as the information is commercially sensitive.

⁵ In previous Major Projects Reports the Sponsor was known as the Customer. The Sponsor is responsible for leading the capability change planning process and identifying the equipment and support requirements to optimise the UK's Defence capability within allocated resources. In doing so the Equipment Capability Customer acts as the Sponsor for new and enhanced equipment and support programmes.

⁶ The Typhoon aircraft, Bowman communications system, Brimstone anti-armour weapon and C-Vehicle (rough terrain engineer vehicles) were in-Service as at 31 March 2006.

1 Major Projects Report Summary of Post Main Gate Projects

Project	Description	In-year change on costs to completion	In-year change on In-Service Date	In-year change in Key User Requirements	Current forecast cost to completion (£m)
A400M	Heavy transport aircraft	+13	0	No change	2,629
Astute Class Submarine	Attack submarine	+142	-1	No change	3,798
Beyond Visual Range Air-to-Air Missile (Meteor)	Air-to-air missile	-36	0	No change	1,168
Bowman	Data and voice communication radios	-10		No change	2,009
Brimstone	Anti-armour weapon	-1		No change	899
C Vehicle Capability	Rough terrain engineer vehicles and material handling equipment	0		No change	703
Falcon	Deployable communication system	-13	0	No change	292
Guided Multiple Launch Rocket System	Global positioning system guided rockets	-172	-1	No change	91
Joint Combat Aircraft	Fighter/attack aircraft	-58		No change	1,858
Merlin Mk 1 Capability Sustainment Programme	Update of helicopter weapon system avionics	-5	0	No change	832
Next Generation Light Anti-Armour Weapon	Short range anti-armour weapon	+4	+12	No change	318
Nimrod Maritime Reconnaissance and Attack Mk4	Reconnaissance and attack patrol aircraft	-16	0	No change	3,500
Precision Guided Bomb	All weather/24 hour general purpose precision bomb	-67	0	No change	277
Soothsayer	Integrated land electronic warfare system	-2	+4	No change	195
Sting Ray Life Extension and Capability Upgrade	Life extended and enhanced lightweight torpedo	-12	+1	No change	577
Support Vehicle	Cargo and recovery vehicles and trailers	-75	0	No change	1,263
Terrier	Armoured engineering vehicle	+3	+12	No change	299
Type 45 Destroyer	Anti-air warfare destroyer	+354	+11	No change	6,464
Typhoon	Fighter aircraft	Commercially sensitive		No change	Commercially sensitive
Watchkeeper	All weather/24 hour intelligence, surveillance and reconnaissance capability	-6	0	No change	901

Source: National Audit Office

Budgeted cost to completion at Approval (£m)	Current forecast In-Service Date	Expected In-Service Date at Approval	Key Developments in 2006-07
2,628	March 2011	February 2009	
2,578	November 2008	June 2005	Significant in-year cost growth. Revised contract arrangement agreed.
1,240	August 2013	September 2011	
1,898	Met In-Service Date March 2004	March 2004	
814	Met In-Service Date March 2005	September 2001	
674	Met In-Service Date March 2006	October 2005	Key User Requirement for availability of spares 'at risk'.
307	June 2010	June 2010	First year that progress on project is reported.
319	Met In-Service Date March 2007	March 2007	Funding for majority of rockets transferred to another programme. Project In-Service following revision of definition. Three Key User Requirements 'at risk'.
2,034		In-Service Date not yet approved	Memorandum Of Understanding for Production Sustainment and Follow-On Development signed.
837	February 2014	February 2014	First year that progress on project is reported.
377	July 2008	November 2006	Delay due to need for further firing trials.
2,813	September 2010	April 2003	
339	September 2007	June 2007	
142	February 2008	December 2006	First year that progress on project is reported.
727		December 2002	Project met In-Service Date definition in June 2006.
1,367	February 2008	September 2005	
295	September 2009	September 2008	Delay due to problems integrating Bowman communications system.
5,000	November 2010	May 2007	New contract agreed but significant cost growth and delay to In-Service Date.
16,671	Met In-Service Date June 2003	December 1998	
907	June 2010	June 2010	First year that progress on project is reported.

There have been some important developments on projects as a result of the Maritime Industrial Strategy

8 This year, the Department has identified costs totalling £305 million on two projects, the Type 45 Destroyer and the Astute Class Submarine, which relate to maintaining industrial capacity and capability in line with the Defence Industrial Strategy. These costs have been re-allocated to separate budget lines within the Department's Equipment Plan and in light of this we undertook a high-level review of the progress being made in implementing the Maritime Industrial Strategy.

9 We found that the Department has made progress against its stated aims in the Maritime Industrial Strategy. It has identified the key ship and submarine building capabilities it needs to maintain in the United Kingdom, and quantified the core workload necessary to retain the key skills of the workforce in both the sectors. For the surface ship sector the Department will underwrite a core workload, which will enable Industry to plan the necessary rationalisation and long term transformation required to meet this capacity level. We recommend that Forward work plans for the nuclear sub-surface build programme should be shared with Industry, even with the proviso that they may change, because it would create more certainty and would similarly enable companies to plan for the longer term.

10 Contracts are being revised to incentivise Industry to reduce costs and improve its record on delivery of major equipments. The predicted improvements as a result of the new arrangements for the production of surface ships and the Astute Class Submarine are dependent on continued commitment, innovation and strong leadership from both the Department and Industry.

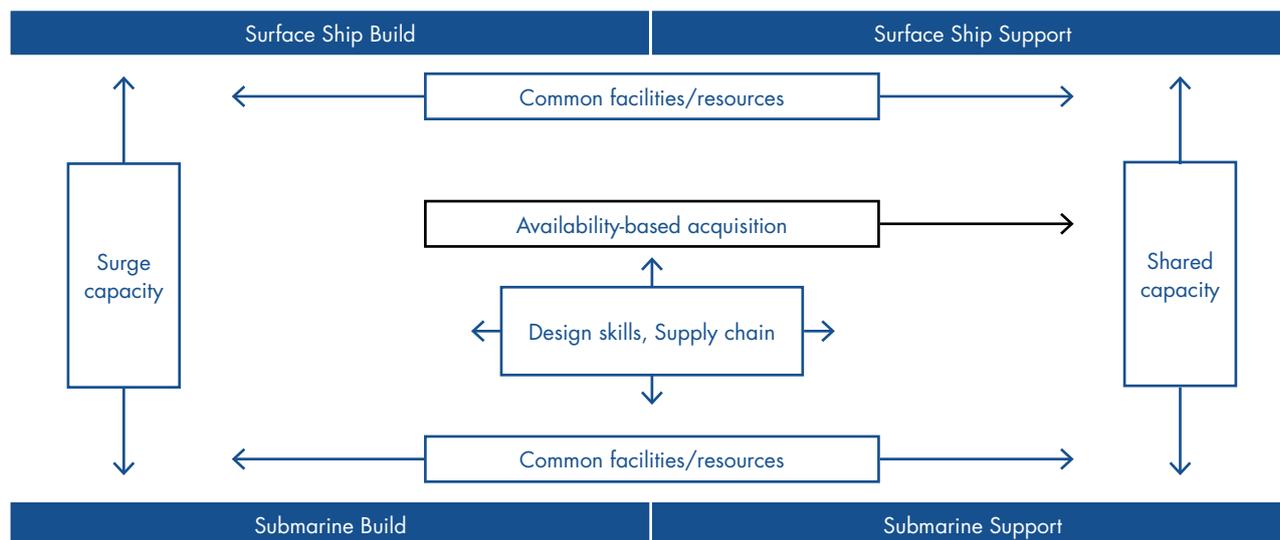
11 Restructuring of Industry, which was identified as a priority in the Maritime Industrial Strategy, is now underway, although it has taken longer than initially envisaged in the surface ship sector. **Figure 2** summaries the Department's plans and its progress against them.

12 Currently the Department collates its data on the cost of implementing individual policies and decisions made as the result of the Defence Industrial Strategy but could not provide us with an overall picture. The system for consolidating the full cost of rationalising and sustaining the Defence industrial base is immature and differences in the way costs are identified in the Planning Round make analysis over time difficult. We recommend that the Department establishes a framework with which it can measure value for money to Defence as a whole, so that it can determine the cost-effectiveness of investment in sustaining the maritime industrial base.

2 Currently the maritime sector is characterised by limited sharing of resources and facilities between the Surface Ship and Submarine sectors, and between build and support

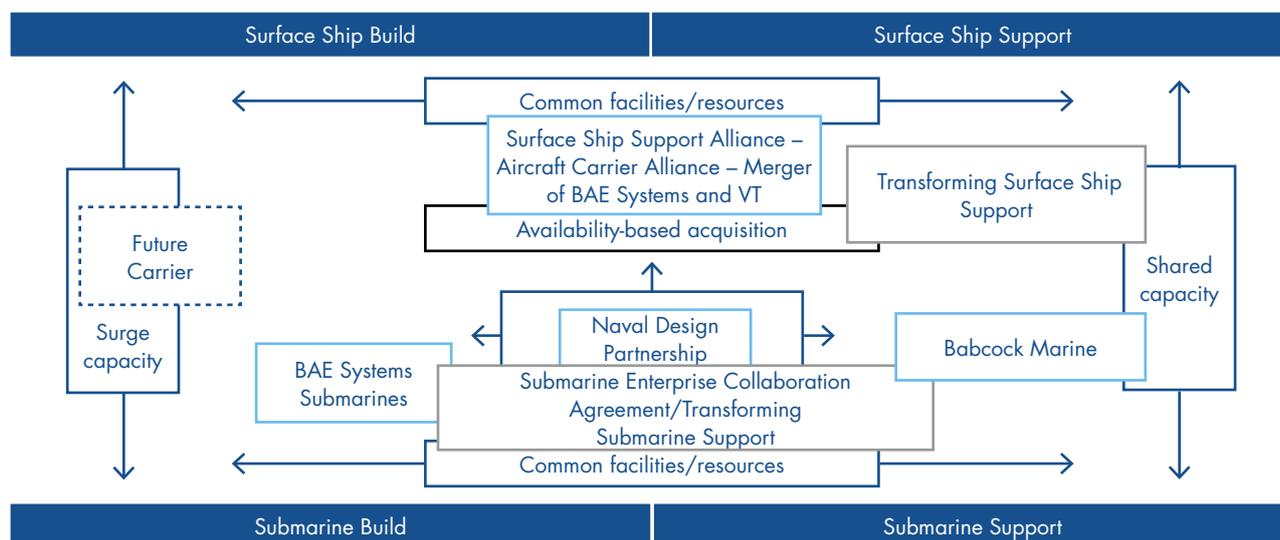
The long-term aim

Through its Maritime Industrial Strategy initiatives, the Department is aiming to transform the sector, so that maritime industry resources and facilities are shared across Submarines and Surface Ships, and across build and support. The intention is to remove excess capacity, which should lead to significant efficiency gains.



The Department is making good progress towards achieving these aims

All elements of the Maritime Industrial Strategy are being progressed, with some almost complete. The Department is confident this will lead to a new business model for the maritime sector.



- Departmental and industrial resources and facilities
- Departmental initiatives
- Departmental equipment project
- Industrial joint ventures and rationalisation
- Contracts whereby the Department pays for assets to be available for use rather than for repair and spares

Source: National Audit Office



Actions in-year mean the Department is in a similar position to 2006 for forecast cost and performance, but there continue to be time delays

1.1 In the first part of this Report we examine the progress on the 20 largest equipment projects, where the Department has made the main investment decision to proceed, and the ten largest projects which have not reached this level of maturity and are still in the Assessment Phase. Our analysis showed that the Department was again active in limiting possible cost increases. Five project teams forecasted delays in-year. There are risks to the achievement of Key User Requirements, but the Department is taking mitigating action to address these as they emerge.

The Department has continued to be proactive in addressing potential in-year cost increases

1.2 As we reported in the Major Projects Report 2006, the Department undertook a Review of its top 20 projects where the main investment decision had been taken, in order to control its costs better. The Department has again re-allocated budgets and costs, re-assessed requirements and reduced quantities of equipments to manage the costs of the population of the Major Projects Report 2007. By continuing to re-allocate certain costs the Department aims to better measure how individual teams are performing in controlling their project costs and to distinguish the costs of maintaining defence-critical industrial capability in accordance with the Defence Industrial Strategy. These costs which constitute this year's largest re-allocation are more appropriately overseen at a corporate level. Due to the basis on which the Major Projects Report is compiled, some of these measures appear as a cost reduction to the individual project.

However, there may not be a cost reduction for Defence as a whole, and the Department may have to forego other activities, which could previously have been provided, or make corresponding efficiency gains to accommodate the expenditure (see paragraph 1.5). This means that the Major Projects Report neither shows the overall in-year cost changes for 2007, nor the trends over the last two years.

1.3 In comparison to the total budgeted costs when the main investment decision was taken, the 19 projects for which we analyse the costs⁷ were forecast to be over budget by £2.5 billion, or around 11 per cent. The Department expects that ten projects will be delivered within their 'most likely' (budgeted) cost. There are variations between individual projects, with a rise in forecast costs on five projects balanced by reductions on 13 projects and one project reporting no change. Appendix 3 provides further details of cost performance since the main investment decision and in-year.

1.4 The majority of the forecast cost growth in the Major Projects Report 2007 is due to significant in-year increases to forecast costs of £496 million on the Type 45 Destroyer and Astute Class Submarine projects. This overall figure comprises cost increases offset by cost reductions and **Figures 3 opposite and 4 on page 12** provide more details of the developments in-year on these two projects. In both cases, the actions that have been taken should place the projects on a better footing in the longer-term. The Department has now agreed revised contracts for the first batch of the Astute Class Submarine and six Type 45 Destroyers.

⁷ One project, the Typhoon aircraft, is excluded from the analysis of costs as the information is commercially sensitive.

3 There has been progress on the Type 45 Destroyer Project, but a net increase in forecast costs of £354 million

The Type 45 project provides a new class of anti-air warfare destroyers for the Royal Navy. Initially, the Department intended to commission twelve ships, subsequently this was cut to eight ships, of which six have been ordered so far. Following the cutting of steel for the sixth ship in January 2007, all six ships are now in production. The second ship, HMS Dauntless, was launched on 23 January 2007 and the First of Class, HMS Daring, commenced sea-trials in July 2007.

There have been major changes to the forecast cost and delivery date since our last report, primarily as a result of the renegotiation of the contract which has taken place this year. This renegotiation encompassed a comprehensive review of cost and schedule risk for Type 45 by a joint Department and BAE Systems project team. Forecast costs have increased by a net figure of £354 million overall and the project has been delayed by a further 11 months:

- These new commercial arrangements complete the procurement activity on ships 4–6 and finalise several contract adjustments for ships 1–3. The contract was agreed on 8 August 2007 and contains an estimated increase in overall project cost of £462 million. The increase has been offset by a reduction in

forecast costs of £108 million. £30 million has been saved through an Equipment Plan Option to reduce the quantity of Principal Anti-Air Missiles being procured (paragraph 1.7), and the remaining £78 million relates to sustaining industrial capability and capacity and has been transferred to a separate budget line (Part 2).

- The revised contract has a different approach to the procurement of the destroyers: the point at which the Department assumes responsibility for the destroyer (Acceptance of Contract) will now take place earlier, at the beginning of Stage 2 Sea trials, with BAE Systems' supporting the trials. This should help provide more certainty over the In-Service Date.
- The project-wide risk review however has also resulted in a delay to the current forecast In-Service Date for HMS Daring of a further 11 months. This has meant an extra £2 million will need to be spent in order to run on one Type 42 Destroyer for this period. This additional cost will be met from the existing support budget for the Type 42 Destroyer.

Source: National Audit Office analysis of Departmental data

62 per cent of cost reductions have been achieved by reallocating expenditure to other projects or budgets

1.5 As in the Major Projects Report 2006, the majority (£609 million or 62 per cent) of all cost reductions were achieved by transferring the costs to other projects or budget lines where these can be more effectively managed. **Figure 5 on page 13** shows the main transfers to other projects or budgets in more detail. Re-allocating expenditure where appropriate is justified and results in savings to the individual projects, although does not necessarily represent a saving to the Department as a whole. One of the largest reductions, a decrease in forecast costs of £165 million on the Guided Multiple Launch Rocket System project is explained in more detail in **Figure 6 on page 14**.

1.6 Therefore the Major Projects Report in its current form, focusing on initial procurement and individual projects, does not give a complete account of the Department's performance across the spectrum of capability and acquisition activity and makes it difficult to provide a full assessment of progress on projects. We would not expect to see this level of re-allocation in existing projects in future reports.

The Department has reduced quantities and deferred delivery of equipment and associated training and infrastructure

1.7 The Department will achieve cost savings of £81 million having re-evaluated the quantities of equipment required and re-assessed project requirements. For example on the Type 45 Destroyer project the quantity of Principal Anti-Air Missiles being procured has been reduced, resulting in a £30 million decrease to the forecast costs. Similarly, the requirement for a Centralised Crypto Management Unit (a single device that downloads information from multiple communications sources) in the A400M aircraft has been removed, reducing the forecast cost by £12 million.

1.8 The Department has achieved further small cost reductions of £7 million on four projects by delaying delivery of equipments and their associated training and infrastructure. For example, the National Training Facility for the A400M aircraft has been deferred by two years, saving £2 million.

4 There has been progress on the Astute Class Submarine Project, but a net increase in forecast costs of £142 million

The Astute Class Submarine is the replacement for the existing Swiftsure and Trafalgar Classes of nuclear attack submarine. The Department has approved three boats, but it is expected that there will be a class of seven. The project is now £1.2 billion over the original budget in the main investment approval. A contract was placed for the fourth boat¹, which is crucial to the sustainment of the Submarine Industrial Base, on 21 May 2007. This initial £200 million contract covers manufacture work through to March 2008. The First of Class, HMS Astute, was launched on 8 June 2007 by the Duchess of Cornwall.

The majority of the cost growth in year – £399 million – can be attributed to materials (41 per cent), labour (17 per cent), inflation (16 per cent) and the associated cost of capital (16 per cent).² Despite the increased costs, significant progress has been made on the project in-year:

- In-year increases have been offset by the Department compressing the sea trials for the programme (£3 million plus £30 million cost of capital impact), taking an option as a result of a Cost Optimisation study (£29 million) and claiming additional Shipbuilders Relief (£12 million). The Department has also transferred £227 million relating to costs for industrial base sustainment to separate budget lines managed by the same project team (Part 2).³
- In order to improve performance and efficiency there have been changes to construction methods and the processes in place at Barrow. For the construction of boats 2 and 3, pressure hull units are positioned on their end to assist the workforce during the assembly, speeding up proceedings.

Psychologists are working with the existing teams to improve communication and management styles. Further improvement in relationships between the workforce and management should lead to productivity gains. Although more expensive in the short term, these initiatives are expected to have long-term benefits on costs, particularly for boats 4 to 7 and other future submarines.

- There were price increases associated with renegotiations of the contract for the first boat with BAE Systems in the wake of initial design problems. However, some of these costs may be recouped now that a Target Cost Incentive Fee arrangement with a maximum price has been agreed for boats 2 and 3. Under these arrangements, savings on the Target Cost will be shared by the Department and BAE Systems, thereby providing an additional incentive to drive costs down on labour and materials. Similarly any cost overruns above the Target Cost will be shared with the company.
- The Department expect the extensive communication and weapons trials and staff training to be completed for the hand over of HMS Astute by BAE Systems to the Royal Navy in August 2008. This will be followed by some final testing and so the forecast In-Service Date has advanced by one month to November 2008, although overall the project is still expected to be delivered 41 months late. Major milestones such as the closure of the reactor compartment have been achieved more quickly on the second boat, demonstrating the positive effects that learning from experience can have on the build schedule.

Source: National Audit Office analysis of Departmental data

NOTES

- 1 The Major Projects Report only covers the first batch of any equipment, so the fourth Boat falls outside of the Major Projects Report population.
- 2 More materials were required than was originally thought as a result of a more mature engineering design, and some materials, such as steel, have increased in price this year. More labour hours were also needed to fit these extra materials. Inflation costs have increased as historically 2.2 per cent was used whereas actual inflation is at 3.5 per cent. Cost of capital is the opportunity cost to the Department of having its resources tied up in projects and not available to invest elsewhere. This is line with commercial accounting practice. Other cost variations are: +£51 million due to a reassessment of the costs of items that are not included in the Astute main investment decision approval but are within the Equipment Plan budget for Astute. These budgets are credited against other projects.
- 3 £7 million accruals adjustments for revised estimates of work outstanding were also reported as a cost reduction.

The majority of projects have no in-year slippage, but four have had significant delays

Five projects have contributed to in-year delays which are more than those reported in 2005-06

1.9 Four of the 19 projects⁸ were already in-service at the start of the year. Two more projects, the Guided Multiple Launch Rocket System and Sting Ray torpedo, came into service in 2006-07. **Figure 7 on page 14** shows the time performance in-year for those projects which are

not yet in-service, or which met the definition of in-service during the year and there are signs that schedules are being controlled better. There has been no slippage in the last year on eight projects, and the Department has recovered one month against the schedule for the Astute Class Submarine and the Guided Multiple Launch Rocket System. However, as the following paragraphs explain in more detail, the remaining five projects have seen slippage in-year, contributing to an overall delay in-year of 38 months, an average of 2.5 months per project.⁹ This figure is slightly worse than the 33 months reported in the Major Projects Report 2006.

⁸ Bowman communications system, Brimstone anti-armour weapon, C Vehicle Capability (rough terrain engineering vehicles) and the Typhoon aircraft.

⁹ This figure is an average across 15 projects, excluding those equipments that have already been declared In-Service at the start of the year.

5 In 2006-07 £609 million was transferred to be managed either corporately or by other projects and budget holders

Project	Explanation	Total cost transferred (£m)	Managed by
Transfer of costs to other budgets			
Support Vehicle	Warranty costs, previously included within the Demonstration and Manufacture phase budget, have been re-categorised to the in-service budget.	-64	The same project team in a different budget line
Sting Ray torpedo	Modifications to the torpedo and conversion costs have been recognised as separate programmes.	-7	The same project team in a different budget line
Transfer of costs to other programmes			
Guided Multiple Launch Rocket System	Funding transferred to the Indirect Fire Precision Attack programme, which is in the Assessment Phase project population (Appendix 2).	-165	The same project team which as yet has no approval for the expenditure
Precision Guided Bomb	Reduction reflects the transfer of integration costs to the corresponding aircraft. These projects are currently outside the Major Projects population. ¹	-67	Tornado and Typhoon project teams
Falcon communications system	Costs associated with the Vehicle Military Engineering Programme transferred to Joint Electronic Surveillance Integrated Project Team. ²	-1	Different project team
Measures in line with the Defence Industrial Strategy (see Part 2 of the Report)			
Astute Class Submarine	Costs of maintaining a sovereign submarine build capability removed from programme.	-227	The same project team in a different budget line
Type 45 Destroyer	Additional costs, caused by a move of ship build from Barrow to the Clyde.	-78	The same project team in a different budget line
Total 2006-07		-609	
Total 2005-06		-448	
Major Projects Reports 2006 and 2007		-1,057	

Source: National Audit Office analysis of Departmental data

NOTES

- 1 Typhoon Future Capabilities Programme will be in the Major Projects population for 2007-08.
- 2 This expenditure does not fall within the Major Projects Report population.

1.10 Overall the 19 projects¹⁰ for which we analyse time performance are now predicted to achieve their In-Service Dates 441 months later than expected when they were approved, which is a 36 per cent increase on timescales overall. Much of this delay is due to historic problems on legacy projects, with three projects – the Nimrod MRA4 aircraft (89 months), the Typhoon aircraft (54 months), and the Astute Class Submarine (41 months) – making up almost half of the overall total. Appendix 4 provides further details on total time variations against approved In-Service Dates and on consumption of risk differential.

1.11 As **Figure 8 on page 15** shows the majority of the in-year delays were attributable to technical factors, that is unforeseen issues with the technology required to deliver the project. Again there may be a gap in the available capability, or a delay in the enhanced capability to the Armed Forces, and the Department may need to extend the out of service dates of other equipment until the replacement is ready. The reasons for the delays of 11 months on the Type 45 Destroyer and 12 months on Next Generation Light Anti-Armour Weapon are explained in **Figure 3 (page 11)** and **Figure 9 on page 15** respectively.

¹⁰ Joint Combat Aircraft is excluded from the analysis of time performance. The project is part of the United States Joint Strike Fighter programme and is aligned with its acquisition lifecycle. The current approval is for the cost of System Demonstration only and further approval will be sought for the cost and in-service date of the main procurement phases.

6 Forecast costs have been reduced and the In-Service definition met on the Guided Multiple Launch Rocket System Project

The Guided Multiple Launch Rocket System is a long range surface to surface rocket. It has twice the range of the previous systems and uses the Global Positioning System to achieve precision accuracy. The rocket contains a conventional 200lb High Explosive warhead, and can be used to defeat both area and precision targets.

There have been major changes to the cost, delivery date and performance of the equipment since our last report. The Department has transferred some forecast expenditure to the Indirect Fire Precision Attack project; changed the In-Service Date definition and declared three Key User Requirements to be 'at risk'.

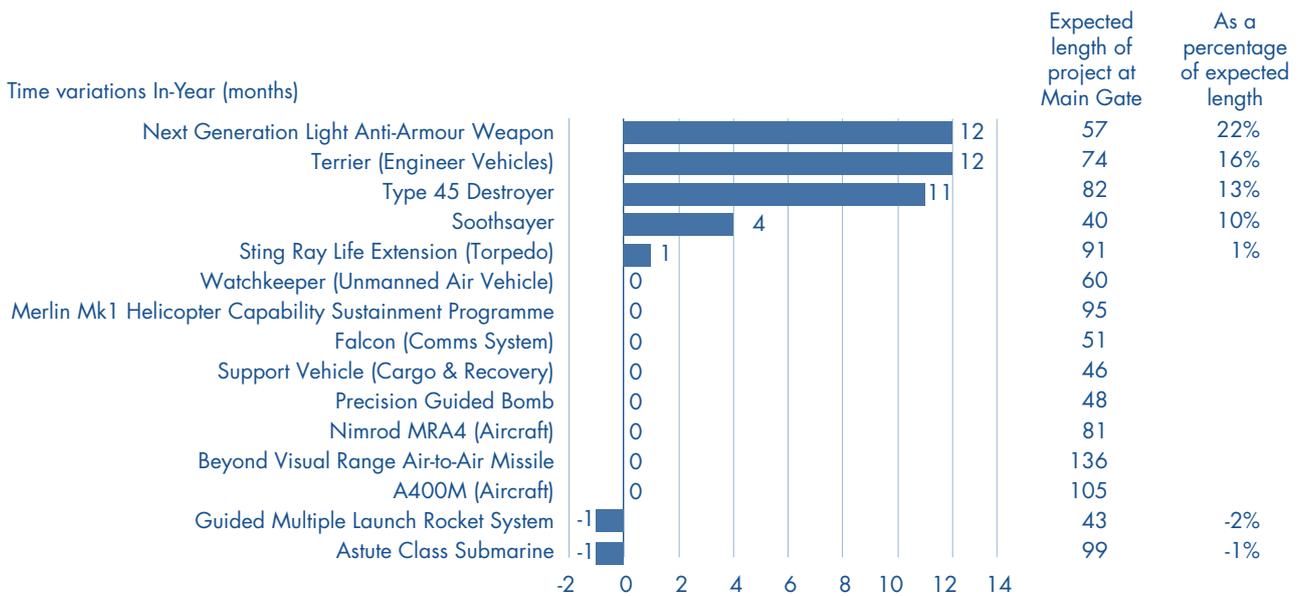
- The forecast cost of the project has been reduced by £172 million. £7 million was saved during the year, partly due to more favourable exchange rates. £165 million, funding for later buy rockets, was transferred to the Indirect Fire Precision Attack programme under an internal option. This project is still in the Assessment Phase. The Guided Multiple Launch Rocket System has procured 654 rockets for immediate use, and expects to procure a further two batches of improved rockets as a top-up to meet current policy guidance, delivering a total of 1,488 rockets. Existing Operational Analysis indicates that a total of 4,080 rockets are required. The remainder will be procured via the Indirect Fire Precision Attack, where further assessments of the quantities required will be carried out in the context of the overall procurement of precision munitions. This project has a continuous Assessment Phase, and the decision to buy further rockets has not yet been taken.

- The definition of In-Service date was redefined in September 2006 by the Military Sponsor as a result of recent United States operational experience of the Guided Multiple Launch Rocket System, and because likely United Kingdom deployments would be smaller in scale than originally assumed. The definition of In-Service was revised from the ability to deploy a battery with a stockpile of 654 rockets to the ability to deploy a troop of four launchers with a stockpile of 156 rockets. This definition was achieved in March 2007 and the troop has subsequently been deployed on operations in Afghanistan.

- Three out of ten Key User Requirements are now considered to be 'at risk' due to technical factors, but the project team have identified actions to mitigate these risks in the longer term. Firstly, the current rocket lacks an air-burst fuze and has reduced effect against the most demanding targets. The tri-mode fuze will be incorporated into the next batch of rockets to be delivered, and all subsequent buys will be of the more capable rocket. Secondly, for reasons of guaranteed reliability, the travelling speed of launchers carrying these rockets is currently limited but it is expected that this restriction will be lifted once further trials have been conducted. Finally, as the rockets have only recently come into service, continual assessment is required to prove they have a 93 per cent probability of correctly functioning throughout a ten-year shelf life.

Source: National Audit Office analysis of Departmental data

7 There has been no further delay this year on two-thirds of the projects



Source: National Audit Office analysis of Departmental data

NOTES

- 1 Joint Combat Aircraft is not included in the analysis as its In-Service Date has not yet been approved.
- 2 The Bowman communications system, Brimstone anti-armour weapon, C Vehicle Capability and the Typhoon aircraft had met their in-service definition before 1 April 2006.

The Department will have fuller sight of the cost and capability impact of time delays under the new planning process

1.12 As Figure 8 shows the in-year delays on the five projects have resulted in estimated additional costs of only £2 million. This figure, low compared with other years, reflects the fact that the Department's budgetary processes are such that costs associated with run-ons of equipment are usually subsumed or factored into other budget holders' funding bids, and so not reported in the Major Projects Report.

1.13 From 2008 the Department's equipment and support planning process has been unified.¹¹ Previously the Equipment Plan looked at ten-year acquisition costings, while the Short Term Plan looked at all other costs, including support costs, over a four year timeframe. The intention is for this change to help focus the Department more clearly on through life capability planning and through life cost management, involving all the relevant stakeholders, including the Sponsor¹² and the frontline commands.

8 Five projects were forecast to be delayed

Project	Net Delay (months)	Cause	Cost	Operational Impact
Next Generation Light Anti-Armour Weapon	+12	Technical Factors	Nil	Potential capability gap
Terrier vehicle	+12	Changed Requirement to overcome integration problems with Bowman communications system	Nil	Capability Delay
Type 45 Destroyer	+11	Technical Factors	£2 million	Capability Delay
Soothsayer communications system	+4	Technical Factors	Nil	Capability Delay
Sting Ray torpedo	+1	Technical Factors	Nil	Potential capability gap

Source: National Audit Office analysis of Department data

9 The Next Generation Light Anti-Armour Weapon Project has been delayed by at least 12 months

The Next Generation Light Anti-Armour Weapon is intended to provide a man-portable short-range weapon for use with all Services. The project is an enhanced-off-the-shelf procurement, developed in collaboration with Sweden, incorporating training systems and equipment support. The Next Generation Light Anti-Armour Weapon was intended to replace the Light Anti-Armour Weapon 80, with an improved capability to attack both heavy and light armoured vehicles and also structures. The Department withdrew the Light Anti-Armour Weapon 80 system early and filled the capability gap with the acquisition of the Interim Light Anti-Armour Weapon as an Urgent Operational Requirement. Therefore it was procured in limited numbers to cover current operational commitments, is less capable than the next generation weapon and has a current out of service date of May 2009.

Since the Major Projects Report 2006 the Next Generation Light Anti-Armour Weapon has failed its Design Qualification Tests, as certain requirements of the weapon were not adequately fulfilled. The contractor deferred the start of missile assembly and deliveries in order to conduct a repeat test and further firing trials.

- This has resulted in an increased cost of capital charge of £6 million, which has been partially offset by a reduced risk provision of £2 million.
- The In-Service Date has been delayed by 12 months. Due to the advanced stage of the weapon's development the occurrence of technical problems has meant that the time impact is proportionally high. The Department has provisionally deferred the entry of the system into service until at least July 2008. As a result the Interim Light Anti-Armour weapon may be required to remain in service for longer.

Source: National Audit Office analysis of Departmental data

¹¹ On 1 April 2007 the Defence Procurement Agency and the Defence Logistics Organisation merged.

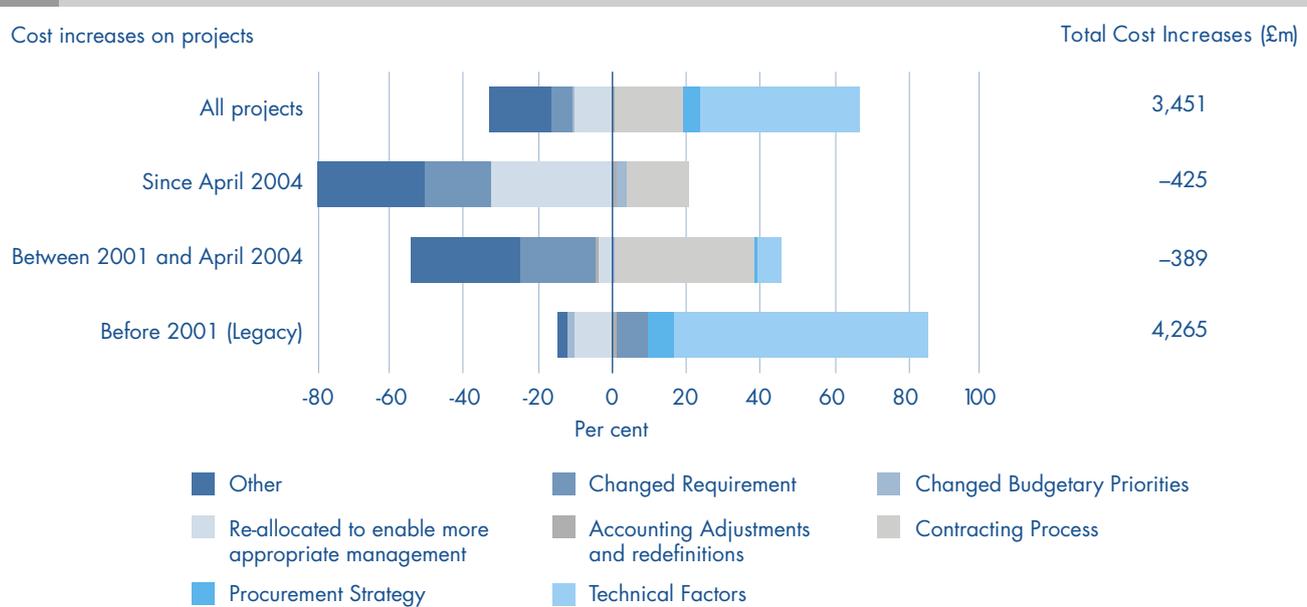
¹² In previous Major Projects Reports the Sponsor was known as the Customer. The Sponsor is responsible for leading the capability change planning process and identifying the equipment and support requirements to optimise the UK's Defence capability within allocated resources. In doing so the Equipment Capability Customer acts as the sponsor for new and enhanced equipment and support programmes.

The Department believes that improved acquisition processes are reducing the impact of technical factors on project delivery

1.14 Figures 10 and 11 show the main reasons for budget increases and delays over the life of the projects featured in this year's Major Projects Report. Technical factors are the main cause of cost growth on the legacy¹³ projects, but on the newer projects to date there has been virtually no cost increase attributable to technical factors. Two-thirds of the overruns on the older legacy projects are the result of technical factors and this means they have contributed to around half of all delays overall.

1.15 While the timing of technical problems is similar on newer projects, the scale of delay is showing signs of reducing (Figure 12). Although it is too early to draw a definite conclusion and prove a causal link, part of the improvement may reflect the Department's increased emphasis in recent years on only making major investment decisions when it has greater confidence in the maturity of the proposed solutions. However, our analysis shows that the indications of improvement should be treated with some caution at present as delays attributable to technical factors have typically increased significantly from around six or seven years into the Demonstration and Manufacture Phase, and in year nine onwards for cost. The newest projects have not yet reached this stage. The Department agrees with this finding.

10 Technical factors are the main reason for cost growth over the life of the projects featured in the Major Projects Report 2007



Source: National Audit Office analysis of Departmental data

NOTES

Projects in each category are:

Before 2001: Astute Class Submarine, Brimstone anti-armour weapon, Nimrod MRA4 aircraft and the Typhoon aircraft (not including cost changes from 2005 onwards, this information is commercially sensitive).

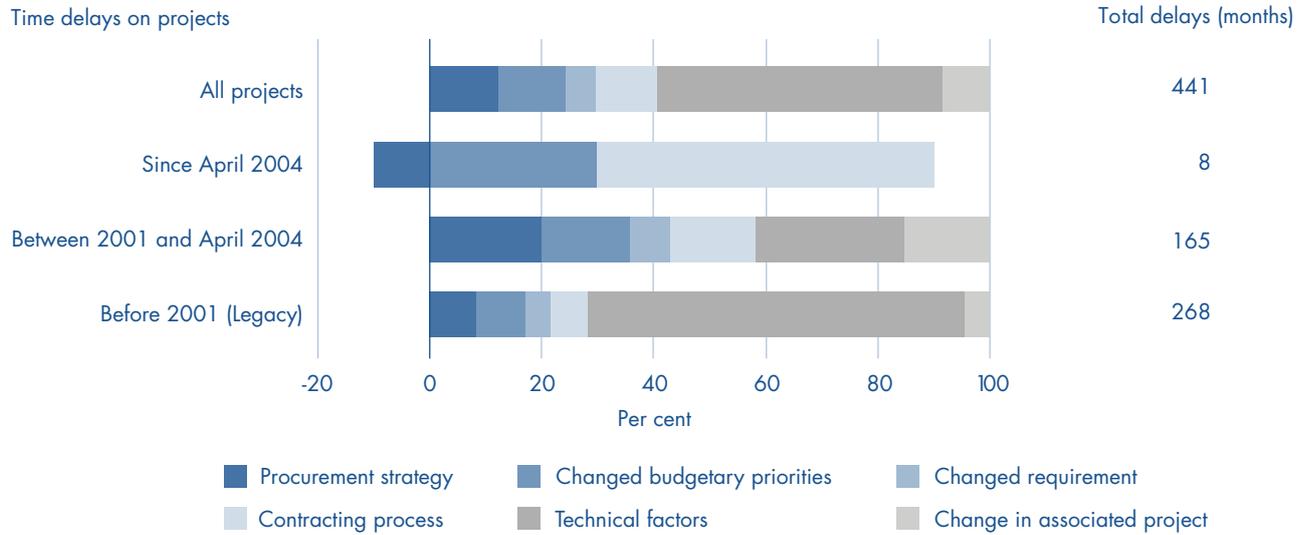
Between 2001 and April 2004: A400M aircraft, Beyond Visual Range Air to Air Missile, Bowman communications system, Joint Combat Aircraft, Next Generation Light Anti-Armour Weapon, Soothsayer communications system, Sting Ray torpedo, Support Vehicle, Terrier engineer vehicle and Type 45 Destroyer.

Since April 2004: C Vehicle Capability (rough terrain engineer vehicles), Falcon communications system, Guided Multiple Launch Rocket System, Merlin Mk 1 helicopter Capability Sustainment Programme, Precision Guided Bomb and Watchkeeper unmanned air vehicles.

Other includes Exchange Rate, Inflation, Receipts, Risk Differential and Change in Associated Project.

13 Astute Class Submarine, Brimstone anti-armour weapon, Nimrod MRA4 aircraft, Sting Ray torpedo and the Typhoon aircraft.

11 Technical factors are the main reasons for delays over the life of projects featured in the Major Projects Report 2007



Source: National Audit Office analysis of Departmental data

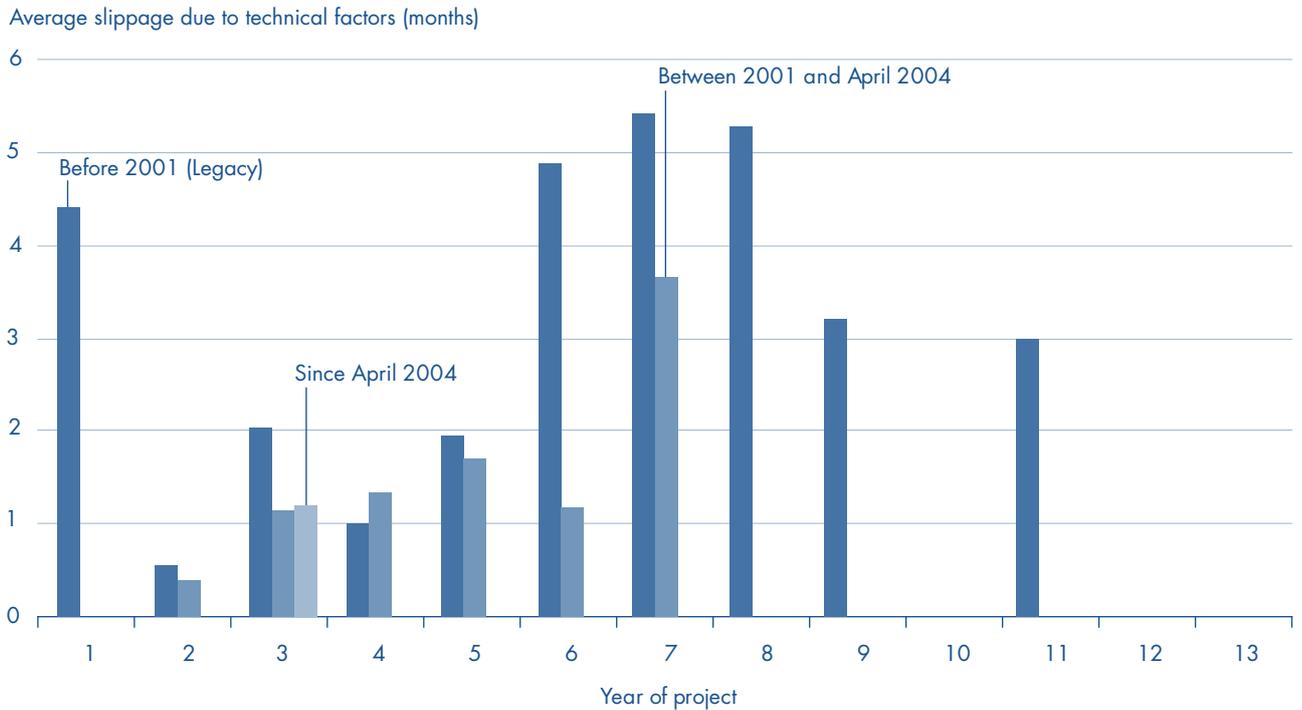
NOTES

Projects in Before 2001 category: Astute Class Submarine, Brimstone anti-armour weapon, Nimrod MRA4 aircraft, Sting Ray torpedo and the Typhoon aircraft.

Projects in Between 2001 and April 2004 category: A400M aircraft, Beyond Visual Range Air to Air Missile, Bowman communications system, Next Generation Light Anti-Armour Weapon, Soothsayer communications system, Support Vehicle, Terrier engineer vehicle and Type 45 Destroyer.

Projects in Since April 2004 category: C Vehicle Capability (rough terrain engineer vehicles), Falcon communications system, Guided Multiple Launch Rocket System, Merlin Mk 1 helicopter Capability Sustainment Programme, Precision Guided Bomb and Watchkeeper unmanned air vehicles.

12 Delays due to technical factors typically arise from around Year 6 on Major Projects



Source: National Audit Office analysis of Departmental data

The Department has mitigated some risks to Key User Requirements as they have arisen

1.16 Seventeen of the 20 projects on which the main investment decision has been taken are expected to meet all of their Key User Requirements, which is unchanged from last year. Those Key User Requirements which are not expected to be met are historic and are identical to those reported in the Major Projects Report 2006.¹⁴

1.17 Twelve Key User Requirements on seven projects are considered to be 'at risk', compared to 13 in 2006. On two projects, the Department has now taken actions to mitigate risks to two Key User Requirements identified in the Major Projects Report 2006:

- the Type 45 Destroyer's ability to operate both a Merlin and a Lynx helicopter is no longer considered at risk as the Sponsor of the project has now agreed to conduct Flying Trials using the larger Merlin helicopter on the first ship of the class.
- the requirement for the Terrier vehicle to be deployable by air was at risk until the A400M aircraft project team placed a contract amendment for a reinforced cargo floor.

1.18 Some Key User Requirements are applicable through the life of the equipments and are defined as far as possible to be robust as threats or operational scenarios change. Three project teams have identified new risks to Key User Requirements this year. C Vehicle Capability, which is a range of rough terrain engineer vehicles and material handling equipment, has one of its Key User Requirements 'at risk' due to the Department operating above Defence Planning Assumptions (Figure 13).

A second Key User Requirement on the Bowman project, the interoperability of the communications system, is now 'at risk' until a new solution can be trialled in the operational field, and the Guided Multiple Launch Rocket System has risks to three of its ten Key User Requirements (see Figure 6, page 14). As last year, around 80 per cent of the Key User Requirements assessed as 'at risk' are due technical factors.

The Department is reducing uncertainty around equipment delivery by approving projects in stages

1.19 Appendix 2 provides a breakdown of the projects on which the main investment decision has not yet been made (and which are still in the Assessment Phase). Due to the long standing basis on which the Major Projects Report is compiled, projects are always measured against the first approval only and the nine projects for which we analyse the costs¹⁵ were forecast to be 212 per cent above their initial approved cost.¹⁶ Part of the reason for this variation is that on the Future Rapid Effect System vehicles, the Indirect Fire Precision Attack munitions and the Search and Rescue Helicopter projects the Department is sensibly breaking down the Assessment Phase into a number of discrete packages of work, and therefore seeking separate approvals for each of the stages (Figure 14).

13 The C Vehicle Capability Project is under budget and on time but spares availability is a concern

The C Vehicle Capability project is a Private Finance Initiative contract to provide a range of rough terrain engineer vehicles and material handling equipment to the Armed Forces. The contract was signed in June 2005 and full service commenced in May 2006, once the rollout of vehicles to all areas of the Armed Forces had been completed. Overall, the project was delivered one month ahead of its 'not to exceed' time of April 2006 and is £11 million under its 'not to exceed' cost of £714 million.

However, with the concurrent operational commitments in Iraq and Afghanistan the demand for spare parts for C Vehicle Capability has risen. The contractor has had difficulty meeting this higher level of requests for spare parts, especially the short notice required for high priority cases, although its contractual obligations have been met at all times since the Full Service Commencement Date. This has resulted in the Key User Requirement for availability being placed 'at risk'.

The contractor has begun work to improve the availability of spares. Since the start of the year an upward trend towards the 90 per cent target for availability has been apparent and the project team expect that the risk will be fully mitigated in 2008.

Source: National Audit Office analysis of Departmental data

14 The Department does not expect to meet one Key User Requirement on the Sting Ray torpedo, one on the Typhoon aircraft and three for Support Vehicle.

15 The forecast costs of the Assessment Phase for the Military Afloat Reach and Sustainability project has been classified as the information is commercially sensitive.

16 Known in the Department as Initial Gate Approval.

1.20 These approaches illustrate that the Department is choosing acquisition strategies for projects that are most appropriate to fit their individual circumstances and allow a better understanding of the risks involved in the technology and the risks to delivery (**Figures 15 to 17 on pages 20 and 21** detail the approaches on these three projects). This is in line with our 2005 Report *Driving Successful Delivery of Major Defence Projects: Effective Project Control is a Key Factor in Successful Projects*¹⁷,

which recommended planning for certainty by taking shorter planning chunks, and the need to plan in great detail in the short-term bearing in mind the longer-term perspective. The Joint Combat Aircraft project, which is following the United States of America three stage procurement cycle and therefore does not align with the major projects reporting process, also illustrates this approach (**Figure 18 on page 21**).

14 Future Rapid Effect System, Indirect Fire Precision Attack and Search and Rescue Helicopter have a number of Assessment Phases

Project	Assessment Phase 1		Assessment Phase 2		Assessment Phase 3		Total	
	Approved (£m)	Forecast Spend (£m)	Approved (£m)	Forecast Spend (£m)	Approved (£m)	Forecast Spend (£m)	Approved (£m)	Forecast Spend (£m)
Future Rapid Effect System	164 ¹	164	**2	454			164	618
Indirect Fire Precision Attack	24	19	26	26	23 ³	22	73	67
Search and Rescue Helicopter	1.3	0.4	9.9	11.6			11.2	12

Source: National Audit Office analysis of Departmental data

NOTES

- 1 Includes Approved cost at Initial Gate (for Initial Operating Capability roles) and an uplift of £51 million approved by the Investment Approvals Board in December 2006.
- 2 Assessment Phase 2 has not yet been approved. A proposal will be submitted to the Investment Approvals Board for approval in December 2007.
- 3 For Loitering Munition Capability Demonstration.

17 HC 30 2005-2006.

15 Incremental approvals on the Future Rapid Effect System Project reduce risk and the cost of the technology and allow vehicle development to run concurrently and at different speeds

The Future Rapid Effect System is a new, medium weight armoured vehicle fleet of over 3,000 vehicles which is designed to be more easily deployable and offer better protection than the current fleet.

The project is a complicated acquisition consisting of families of vehicles

The Initial Assessment Phase for Future Rapid Effect System project was approved in April 2004. At this time, it was envisaged that there would be a single source procurement of a common chassis that could be adapted to meet the requirements of the 16 defined Future Rapid Effect System roles. However, during the intervening years it became apparent that the project could not meet all of these roles using one single vehicle design. Therefore the Department decided the best solution would be a series of four families of vehicles (utility, reconnaissance, fire and manoeuvre support), which has since become five families with the addition of dedicated recovery vehicles. The capability will be delivered in phases as technology matures at different rates and some is being advanced more rapidly to meet requirements sooner. For example, experience on current Armed Forces deployments has demonstrated the need for enhanced vehicle

protection. In developing the acquisition strategy, the Department has also decided to deliver the Future Rapid Effect System by means of an Alliance with Industry, as it felt that no single company had the full range of skills necessary to deliver such a large and complex project to time and to budget.

The project team have opted for incremental approvals

Instead of a standard approvals process, the project team has opted for a new strategy. Each family of vehicles will go through a two-stage approach to main investment decision approval; the first before the Demonstration Phase followed by stage two before the Manufacturing Phase. Primarily, the addition of this second approval process gives the Department greater opportunity to drive down cost and risk before committing new funds as it can continue to trade-off benefits and costs throughout the Demonstration Phase. Other benefits include:

- manufacturing is only approved once an acceptable level of reliability has been achieved; and
- increased focus on developing cost-effective through-life support, such as training and logistics.

Source: National Audit Office analysis of Departmental data

16 Incremental approvals on the Indirect Fire Precision Attack project reduce the risk that the Department will order munitions which, by the time they are delivered, do not meet the requirement

The Indirect Fire Precision Attack project will provide a suite of five different surface to surface precision munitions for the attack of land based targets. The procurement is likely to include a mix of off-the-shelf and bespoke munitions. Following consultation with all of the key stakeholders, the project has adopted an incremental approach to the procurement, which will reduce the requirement for single, large investment decisions.

Incremental approvals allows the Department to vary the mix of munitions, their capability, and the quantities required in response to the changing operational environment

The Department identified incremental acquisition as the best strategy for the programme. This approach allows the Department to frequently assess the opportunities offered by technical enhancements in the munitions area, and to take into account the constantly changing threat to the United Kingdom's Forces. A more traditional approach would have been much less coherent, as this would have involved a number of separate programmes, each with their own individual type of weaponry, applying for their own funding.

The Department had initially planned to submit one Main Gate Business Case for approval and then apply for funding for each different munition through a series of Review Notes, but subsequently decided that a separate Assessment Phase and

main investment decision for each munition would be a more appropriate strategy. The initial approval for Indirect Fire Precision Attack therefore relates only to the first stage of the Assessment Phase. The current forecast costs now also cover the second stage of Assessment, plus a Capability Demonstrator programme for loitering munitions (Figure 14).

By understanding the requirement better the team needs to conduct further Assessment Phases to support the incremental nature of the programme. This continuous assessment of the whole programme by the scrutiny and approvals communities will ensure that progress is closely monitored, and there will be a clear management chain to coordinate the strategy.

The main investment decision for the first munition, the Ballistic Sensor-Fused Munition, was taken in summer 2007 and it has an expected In-Service Date of 2011. The four remaining weapons will be submitted individually for approval, after further analysis and risk reduction.

Although the capability is expected to be achieved by a mixture of guided rockets, enhanced artillery shells and loitering munitions, this mix is likely to change as the technology, requirements and threat continue to evolve. For this reason, only the first increment (the Ballistic Sensor-Fused Munition) has a defined cost and time-scale at present.

Source: National Audit Office analysis of Departmental data

17 The dual-stage approvals strategy allows for greater risk mitigation on the Search and Rescue Helicopter project

The Search and Rescue Helicopter project, which started in 2000, is a joint programme with the Maritime and Coastguard Agency. It seeks to replace the existing Ministry of Defence and Maritime and Coastguard Agency service in the next decade.

The complexity of the project has led to non-standard approvals process

The Search and Rescue Helicopter project has a number of complexities. It is a joint procurement, and decisions are required on the ownership of helicopters, basing arrangements, the involvement of Military aircrew, and the potential for contracting out logistics and support. A review of procurement strategies during the Concept Phase concluded that standard procurement gateways were not suitable for this project due to the degree of complexity involved.

Instead, the project will go through a two-stage Assessment Phase prior to the main investment decision. By using this approach, the Department was able to evaluate alternative procurement strategies, to identify the optimum solution for the project. By ruling out certain procurement strategies early on, the Department was then better able to focus on reducing the cost of and de-risking the remaining alternatives, before arriving at the final endorsed procurement strategy.

Source: National Audit Office analysis of Departmental data

A PFI type solution has been selected as the optimal procurement solution

During the first stage of the Assessment Phase, with an approved spend of £1.3 million, the project team refined the requirement and determined that the optimum procurement strategy for the delivery of the required future capability was through a joint PFI arrangement. They also sought approval to progress to the second stage of the Assessment Phase.

Currently the project team is well into the second stage of the Assessment Phase, which is approved to £9.9 million, and is focussing on implementing the PFI Strategy. The team are conducting a competition under European Union procurement regulations using the Competitive Dialogue procedure.

The second stage of the Assessment Phase will conclude with the main investment decision, and the signature of the Search and Rescue Helicopter contract. At this point, the capability will already have been fully established under the PFI approach. This strategy differs from a standard approach to equipment acquisition, whereby the Department enters into the Demonstration and Manufacture phase with a selected contractor, but during which the equipment capability requirement continues to evolve.

18 The Joint Combat Aircraft acquisition strategy requires a four-stage approvals process

Joint Combat Aircraft is a multi-role fighter attack aircraft being designed to replace the Harrier fleet.

The incremental strategy was a natural progression from that used by the United States of America with Joint Strike Fighter

In looking at options available to meet the requirement for a Joint Combat Aircraft, a number of feasibility studies were conducted, including a study of Joint Strike Fighter. The subsequent decision, based on affordability and capability to become a partner in the United States of America's Joint Strike Fighter programme, hugely influenced the United Kingdom's Joint Combat Aircraft acquisition strategy. Joint Strike Fighter is an incremental acquisition programme and so it was natural for the Joint Combat Aircraft to be dealt with in the same manner.

There are three key phases to the approach

Firstly there is the Systems Development and Demonstration Phase, on which the Major Projects Report currently comments and is designed to provide a fully developed and tested aircraft. The ensuing Production, Sustainment and Follow-on Development Phases, which will be reported as a separate programme in the Major Projects Report, will be conducted on a multilateral collaborative basis and will determine the way in which the aircraft are purchased and ultimately supported and upgraded.

Four main investment decisions have been approved in order to minimise the inherent risk

At the same time as approval was granted by the Investment Approvals Board to join the Joint Strike Fighter programme as a

partner nation in 2006, the subsequent investment decisions were also defined and approved as follows:

- 2006 Main Gate 1: the signing of the Memorandum of Understanding.
- 2009 Main Gate 2: procurement of jets to participate in joint Operational Test and Evaluation as a risk reduction measure.
- 2011 Main Gate 3: procurement of jets for the United Kingdom Operational Conversion Unit for initial pilot and maintainer training. The final elimination of risk will occur between this date and the end of the Systems Development and Demonstration phase in 2013.
- 2014 Main Gate 4: delivery of aircraft to squadrons and a proven through-life sustainment plan.

This approach reduces the inherent risk in programmes where development and production are being run concurrently. The incremental approach also gives the United Kingdom the right to leave the programme during the Systems Development and Demonstration phase without having made major commitments to purchase all the planned aircraft requirements.

Through-life requirements have been taken into account to avoid future complications to the programme

The procurement strategy incorporates the through-life requirements (for a period of 30 years) as part of the approvals process. Through-life sustainment is expected to involve a biennial upgrade cycle which will be chiefly funded by a United States of America investment with the United Kingdom contributing just four per cent of this cost.

Source: National Audit Office analysis of Departmental data



There have been some important developments on projects related to the Maritime Industrial Strategy

2.1 The *Defence Industrial Strategy*¹⁸ was published in December 2005. It builds on the *Defence Industrial Policy*¹⁹ first published in 2002, and aims to provide “greater transparency of our future defence requirements and, for the first time, set out those industrial capabilities we need to retain in the United Kingdom to ensure we can continue to operate our equipment in the way we choose”.²⁰ The Strategy looks at the different sectors within Defence and sets out the approach needed in each area in order to maintain operational sovereignty.

2.2 In the Major Projects Report 2007 the Department will incur expenditure of £305 million on two projects, Type 45 Destroyer and the Astute Class Submarine, to maintain industrial capacity and capability in line with the Defence Industrial Strategy. The expenditure will be managed separately in the Department’s Plan for equipment and support as it is not directly related to the individual projects:

- Additional costs of £78 million were incurred when BAE Systems moved work on the Type 45 Destroyer from the Barrow shipyard to the Clyde in 2003, following problems in managing production of both the Astute Class Submarine and the destroyer in the same yard.
- The Department has calculated that it needs to spend £227 million to sustain design skills if there is to be a forward programme of work in the nuclear submarine sector within the United Kingdom.

2.3 In the light of these re-allocations, the second part of our Report looks at the Defence Industrial Strategy in the Maritime sector. It offers a high level overview of the approach taken by the Department, which intends to publish a second version of the Defence Industrial Strategy before long. Overall we found that the Department is making progress against its stated aims in the Maritime Industrial Strategy. However the Department needs to develop robust performance indicators, and a framework to be able to assess whether it is getting value for money in totality from investments made to further the aims of the Defence Industrial Strategy.

The Maritime Industrial Strategy was introduced nearly two years ago and represents a fundamental change in how the Department and Industry work with each other

2.4 The Maritime Industrial Strategy sets out how the main principles of the Defence Industrial Strategy will be applied in the naval sector. It identifies those areas where it is considered essential to retain capability and skills in the United Kingdom, and sets out what the Department and Industry need to do to achieve this. Many of the ideas were already being taken forward through initiatives, such as Submarine Acquisition Modernisation and Transforming Surface Ship Support, and the Maritime Industrial Strategy progresses them further.

¹⁸ *Defence Industrial Strategy*, Defence White Paper, December 2005.

¹⁹ Ministry of Defence Policy Paper, Paper No 5, *Defence Industrial Policy*, October 2002.

²⁰ *Defence Industrial Strategy*, Foreword third paragraph.

2.5 In the past there have been several high-profile delays and cost increases on maritime projects. The Department thinks that the sector is unsustainable in its present form, as it was “characterised by high and increasing overheads, and with a skills base spread across too many entities”. There is also an excess capacity to produce the military capabilities Industry will be asked to deliver in the future; the Department is planning for “fewer, more capable platforms, with longer operational lives and increased opportunity for regular upgrades in response to new technologies and threats”.²¹

2.6 The Maritime Industrial Strategy therefore requires change by both the Department and Industry if the future naval programme is to be affordable and deliverable in the long term. From the Department’s perspective, it needs to provide more certainty and stability in its future work plans and provide a healthy order book for Industry. In turn, Industry needs to reduce costs and improve its record on delivery of major projects. Industrial restructuring involving rationalisation and consolidation is seen as the key to creating a viable and sustainable business which will achieve the improvements needed.

The Department has made some progress against the Strategy

2.7 The House of Commons Defence Select Committee reported on the *Defence Industrial Strategy* on 30 January 2007, and expressed concerns over the rate of progress in the Maritime sector during 2006. This concurs with the view expressed to us by Industry that the impetus for change built up by a pan-Industry team working with the Department, following the publication of the *Defence Industrial Policy*, was lost in 2005. Joint working has recently become prominent again, as evidenced by the revised Type 45 Destroyer contract recently agreed between the Department and BAE Systems. In 2007 the Department has made further progress and our findings are summarised in **Figure 19 overleaf**.

2.8 The agreed way forward on the Future Aircraft Carrier project and the announcement that BAE Systems and VT Group intend to form a joint venture in naval shipbuilding and support²² is a key component in the Maritime Industrial Strategy, as it will enable the modernisation of the shipbuilding Industry to take place, from which future projects should benefit. It should also

enable Industry to manage the reduction in workload, following the peak caused by production of the aircraft carriers. We plan to examine the Carrier Programme in more detail in the future.

The Maritime Industrial Strategy is becoming part of the Department’s everyday business and the formation of Defence Equipment and Support has provided extra impetus

2.9 Until recently, there were two separate organisations playing a role in the delivery of Defence equipment. The Defence Procurement Agency was primarily responsible for the capital costs associated with the acquisition of equipment and the Defence Logistics Organisation for support costs once it came into service.

2.10 We found that the merger of the two organisations in April 2007, to form Defence Equipment and Support has provided added impetus to the implementation of Maritime Industrial Strategy. It has created a more coherent and streamlined structure which facilitates a more joined up approach in that key individuals already putting the Strategy into practice are now in a better position to work together. As the following paragraphs highlight the new structure is enabling the Department to deploy key players’ existing skills and experience better.

2.11 The Department is heavily reliant on Industrial expertise and it is becoming a more intelligent customer, with its staff improving its ability to understand the explicit and implicit assumptions in the work, the suitability and limitations of chosen methodologies and the validity of the data. There is a monthly Maritime Industrial Strategy Board involving all the key internal Defence Equipment and Support and wider Departmental stakeholders. The newly created team with sole responsibility for monitoring and implementing the Maritime Industrial Strategy across Defence Equipment and Support give the Integrated Project Teams one focal point for all matters related to the Strategy, rather than a number of different individuals as was the case under the old structure. The Maritime Industrial Strategy team are also in a position to manage loading across the shipyards, as they can take a view across the sector as a whole.

²¹ *Defence Industrial Strategy*, Maritime Chapter, B2.47.

²² Hansard, House of Lords debate, Column 837, 25 July 2007; VT Group, Press Release, 25 July 2007.

19 The Department has made progress against the key aims of the Defence Industrial Strategy

The Department has identified the key ship and submarine building capabilities it needs to maintain in the UK and planned the work necessary to retain the skills of the workforce.

Submarine Sector

Aim: For the foreseeable future the United Kingdom will retain all of the capabilities unique to Submarines and their Nuclear Steam Raising Plant, to enable their design, development, build, support and decommissioning¹.

Progress: The Department has identified the core workforce necessary to retain strategic capabilities and the workload which is commercially viable for Industry – a guaranteed minimum of one nuclear submarine build project every 22 months, with a redesign every eight years.

The Department, with RAND Europe, has estimated the cost of retaining those designers whose skills are considered critical for any forward programme of work. In the shorter-term, they will be able to maintain their skills by working on the Future (Aircraft) Carrier project and the recently approved fourth Astute Class Submarine. The Government's decision to proceed with a successor to the nuclear deterrent has provided some certainty to the sector in the longer-term.

The Key Supplier Forum, comprising those companies whose products are critical to the ability to build submarines, was set up to prevent the recurrence of many of the problems in producing the early Astute Class Submarines as a result of the Department not taking actions to preserve the fragile supply chain.² Using the Maritime Industrial Strategy, the Department has ordered 'long lead items' for a further three Astute Class Submarines, although the boats have not yet been placed on contract. These orders will sustain the industrial infrastructure by ensuring a consistent supply of work, for example for specialist gear box manufacturers which without further orders may go out of business, and allow the Department to take advantage of economies of scale.

Surface Ship Sector

Aim: There is no absolute requirement to build all warships and Royal Fleet Auxiliary Vessels onshore, but a minimum ability to design, build and integrate complex warships in the United Kingdom must be retained.³

Progress: Although the Future (aircraft) Carrier programme will employ much of the nation's maritime engineering workforce to the end of the decade the Department's future needs will not sustain such a high level of activity in the long-term. Hence the Department has stated that it will underwrite a core workload equivalent to one complex warship, or a 5,500 tonne frigate, once work on the aircraft carriers begins to tail off. This also assumes there will be a redesign every six or seven years. This will enable Industry to plan the necessary rationalisation and long-term transformation required to meet this future steady-state demand.

Source: National Audit Office analysis

With this commitment the Department has made it clear that it will not pay a premium for capacity in excess of this core workload and any additional projects will be competed and may potentially be delivered offshore.

Industry is being incentivised to reduce costs and improve its record on delivery of major equipments

Aim: The United Kingdom's Maritime Industrial Base must deliver improvements in performance⁴, that is drive its costs down, become more efficient and improve its record on delivering major projects, if the maritime programme is to be affordable in the long-term. To do this the Department needs to work closely with Industry to encourage the changes needed, and in turn it must recognise the need for Industry to make attractive rates of return.

Progress: On the Astute Class Submarine programme, the Department is developing new incentivisation arrangements. It is working through the Key Supplier Forum to analyse the supply chain in detail, and to challenge suppliers to offer ways of delivering the required capability in a less expensive way in return for a higher return on investment.

The Department is working closely with BAE Systems to achieve the required cost reductions for Boats 4 to 7 through joint initiatives on overall commercial arrangements, overheads, and design change. The Department judges that it is on track to deliver the agreed savings of 15 per cent for Boat 4, with similar savings projected for later Submarines, assuming a 7-Boat programme. BAE Systems is seeking partnering arrangements with many of its key suppliers, including Thales, QinetiQ and others, which could result in savings targets for the Combat Systems for Boats 4-7 being exceeded.

The commercial arrangements between the Department and BAE Systems will be different, as the Department accepts more performance risk and takes greater ownership of strategic design decisions. Build performance will remain incentivised. The Department is in the process of agreeing milestones for delivery of submarines on a regular 22 month "drumbeat" of production with BAE Systems. If performance exceeds the agreed milestones, for example early delivery, then the Prime Contractor will be entitled to a premium, with corresponding penalties for failure to deliver.

As part of the new Six Ship Contract on the Type 45 Destroyer programme, which was signed in August 2007, the Department and BAE Systems have now agreed revised principles for incentivisation. At an overall level, there are agreed target and maximum prices. These are supported by a Target Cost Incentive Fee arrangement, similar to that now agreed for the Astute Class Submarines (Figure 4). The Department and BAE Systems have also agreed a Delivery Incentive Plan, whereby the contractor will be rewarded if the ships are delivered within a specified period of time. The Plan also provides protection against schedule delay.

NOTES

- 1 Defence Industrial Strategy, Maritime Chapter, B2.18
- 2 Oral Evidence, Committee of Public Accounts hearing 31 January 2007
- 3 Defence Industrial Strategy, Maritime Chapter, B.2.18, B.2.22
- 4 Defence Industrial Strategy, Maritime Chapter, B.2.47
- 5 Defence Industrial Strategy, Maritime Chapter, B2.48
- 6 Defence Industrial Strategy, Maritime Chapter, B2.52

Industry restructuring is underway

Aim: *Industrial restructuring is a priority and although its nature is for Industry to determine, it must be focused on the Department as its principle customer. It is fundamental to creating a viable and sustainable business to meet anticipated steady-state demand.*⁵

Progress: In the submarine sector, there was already in effect only one main supplier of build facilities and in June 2007 the Government used its Golden Share stake in DML Group to influence consolidation of the support services. Babcock International Group now has a controlling interest in both the Devonport and Faslane submarine bases.

In the surface ship sector, we found that the Department and Industry have together been able to establish a suitable route to restructuring, although this has taken longer than was initially planned. On 25 July BAE Systems and VT Group announced that they were to form a Surface-Ship Joint Venture, which will focus on construction and longer-term support. The Joint Venture will be underpinned by a Terms of Business Agreement which outlines the defined workload for the next 15 years.

The Department's long-term aim is to develop an even more consolidated approach, with synergies between surface ships and submarines in both build and support, as demonstrated by Figure 2 (Page 9).

There are signs that individual project procurement strategies are reflecting the aspirations of the Maritime Industrial Strategy

Aim: *To pursue procurement strategies and commercial arrangements that are optimised for the sector and deliver three key objectives: a sustainable enterprise, better performance for the Department and opportunities for attractive rates of return for Industry.*⁶

Progress: In pursuing an Alliance approach on the Future (aircraft) Carrier project the Department is using a strategy which is relatively new in the procurement of major Defence projects. It brings longer-term surety on workload but requires Industry to collaborate to deliver the desired project outcome, so work will be assigned to those best placed to complete it at the time, which should not compromise Industry's ability to make a profit and help to reduce risk for the Department.

In the submarine sector, despite the award of the initial build contract for the fourth Astute Class Submarine and the decision on the Future Nuclear Deterrent, Industry does not have the same level of certainty on the likely forward work plans.

2.12 Integrated Project Teams have been reorganised into new clusters, incorporating critical and other related projects, for example the Director General Submarines cluster now includes nuclear submarine programmes, as well as nuclear propulsion and weapons. Submissions for the Investment Approvals Board have to show they have addressed Maritime Industrial Strategy principles. This enables the Department to take a more holistic view of the sector, and to make decisions that are optimal for the maritime programme rather than for projects in isolation. For example, it may be better value for money for Defence in the longer term for the Astute Class Submarine to be procured at regular intervals, in order to sustain the industrial base, whereas viewed strictly in terms of the project in isolation ordering in batches may be a more appropriate solution, in order to take advantage of economies of scale.

The Department now needs to develop specific and defined performance measures for the success of the Maritime Industrial Strategy

2.13 It is too early to say whether the Department is successfully meeting all the aims of the Maritime Industrial Strategy. The Department has made progress in a number of areas but our high level review has identified that it needs to do more to develop its performance measures. Performance is currently monitored against the aspirations set out in the Defence Industrial Strategy, which have been translated into internal delivery milestones. The Department will assess whether the Defence Industrial Strategy is delivering the expected benefits by asking the Armed Forces, Departmental staff and Industry whether they can see improvements or changes in the processes.

2.14 As the Department and Industry are working in partnership, the Department should develop a more sophisticated performance framework to assess both its own progress and that of Industry. It needs to establish costing baselines and then develop specific and detailed benchmarks to measure the continuous improvement. Key Performance Indicators for Industry should reward contractors for making savings, achieving efficiencies and improving the timeliness of delivery.

2.15 Currently it is difficult for the Department to assess whether it is getting best value for money for Defence as a whole through the Defence Industrial Strategy. There is no single corporate budget holder responsible for the funds allocated to sustaining the industrial base. The costs for the long-term submarine and shipbuilding programme remain with the Attack Submarines and Type 45 Destroyer Integrated Project Teams, albeit in separate budget lines. This is appropriate for the purposes of financial accounting, but there is a lack of clarity as to how much the Department is spending overall to implement the Defence Industrial Strategy.

APPENDIX ONE

Methodology

Volume II of the Major Projects Report 2007 is the twenty-fourth to be produced by the Department. The Committee of Public Accounts requested it after their 9th Report, Session 1981-82, which noted the absence of any requirement for the Department to inform Parliament about the costs of its major military projects. Until 1991 both the Major Projects Statement and the associated National Audit Office Memorandum were provided to the Committee on a confidential basis. Another significant amendment to the information available to both Parliament and the public came in 1999, when the Department introduced major changes in organisation and procedures, generally described as Smart Procurement, and HM Treasury required all of central government to budget and account on the basis of resources and not cash.

Project population

Projects qualify for inclusion in the Major Projects Report if their forecast of future expenditure is among the 20 highest, for those that have achieved approval at the main investment decision, and the 10 highest for those projects still in the Assessment Phase. They are replaced when, as they progress through the procurement process, estimated forecast costs reduce below the level of the top projects, although their total costs may nonetheless be very high.

There are four new post-main investment decision projects in this year's Report – Merlin Mk 1 helicopter Capability Sustainment Programme and Soothsayer communications system feature for the first time and the Falcon communications system and Watchkeeper unmanned air vehicles projects were previously in the Assessment Phase population in 2005-06. The Frigates and Destroyers Programme (networking of sensors and shared identical air picture) was included in the Assessment Phase population of 2004-05; and Maritime Airborne Surveillance and Control (surveillance and battle management capability) and Search and Rescue Helicopter projects are new to the Assessment Phase population.

Scope of validation

The Major Projects Report is not a statutory account and we do not offer a formal audit opinion on the accuracy of data contained within it. The Department compiles the Project Summary Sheets according to the guidelines, to which we have agreed, and the figures are calculated on a different basis to the Department's Resource Account. The draft summary sheets are also made available to the industrial prime contractors for comment and amendments are incorporated as appropriate.

Our validations confirm that the Project Summary Sheets conform to the guidance and we check that it has been accurately and consistently applied. Each year Integrated Project Teams build up detailed forecasts for the equipments on costs and time to completion, which are subject to Departmental scrutiny for inclusion in its Equipment Plan. As part of the biennial planning process an Equipment Plan was produced for 2007 and it was therefore possible to agree the data supplied to said approved document. However, each Integrated Project Team had to substantiate any changes from the Equipment Plan forecasts by providing detailed audit trails. We do not question the forecasts or assumptions of the Department's long-term costings unless better information subsequently becomes available.

Other test checks on the data confirm In-Service Dates to project plans and the likely achievement of their Key User Requirements with the Equipment Capability Customers.

Outcome of validation

All the draft Project Summary Sheets were amended following validation. The incidence of significant errors has declined and for the majority the adjustments were minor to improve clarity. In particular, the Soothsayer, Future Integrated Soldier Technology, Precision Guided Bomb and C Vehicle Capability projects provided draft summary sheets that required few revisions.

Analysis

We considered whether the Department is currently forecasting to procure major equipments within time, to budget and to meet Key User Requirements. Our examination of time and forecast cost is based on the most likely estimates, but when a project has been approved under Smart Acquisition, there will be a 'not to exceed' value as well. As a consequence some of the in-year variations represent movement within this difference (the risk differential).

The analysis involved using both quantitative and qualitative sources of information. We focused on those projects showing the greatest cost or time variances and the factors that caused them to change, with particular attention being paid to the method by which they are being procured. Case examples of a few key projects illustrate our findings.

We have looked more closely in Part 2 of the Report at the Department's progress against the aims set out in the Maritime Industrial Strategy. We interviewed key personnel working within the Defence Equipment and Support organisation, the Equipment Capability Customer and the Acquisition Policy unit.

APPENDIX TWO

Assessment Phase projects as of 31 March 2007

Costs for the Demonstration and Manufacture Phase and In-Service Dates are not set until the main investment decision is made at Main Gate Approval. Forecasts prior to this Approval are for internal planning purposes only and publicly declaring these limit the Department's ability to make trade-offs and to conclude satisfactorily commercial arrangements. Therefore in the Project Summary Sheets

in Volume II of this Report, the envelopes for cost and time are classified for commercial reasons. However, to maintain transparency and public accountability, the Department will continue to provide a range for the cost of the Demonstration and Manufacture Phase and In-Service Date for the Committee of Public Accounts.

20 Cost of the Assessment Phase

Project	Description	Approved Cost at Initial Gate (£m)	Forecast Cost of Assessment Phase (£m)
Future Aircraft Carrier	Aircraft Carrier	118	299
Frigate and Destroyer Programme ¹	Detection and tracking device	25	55
Future Integrated Soldier Technology	Fighting system for dismounted close combat	26	36
Future Rapid Effect System	Medium weight armoured vehicle	113	618 ²
Future Strategic Tanker Aircraft	Tanker aircraft providing air-to-air refuelling capacity	13	37
Indirect Fire Precision Attack	Munitions	24	67 ³
Maritime Airborne Surveillance and Control ¹	Airborne surveillance and battle management capability	13	7
Military Afloat Reach and Sustainability	Auxiliary Vessels	44	*** ⁴
Search and Rescue Helicopter ¹	Search and Rescue Helicopter	1	12 ⁵
UK Military Flying Training System	Training System	39	30

Source: National Audit Office analysis of Departmental data

NOTES

- 1 These projects are new to the population.
- 2 Includes the costs of the Assessment Phase for the Initial Operating Capability roles and also the Assessment Phase for the Specialist roles which the Approved Cost did not.
- 3 Includes costs for Assessment Phase 2 and Loitering Munition Capability Demonstration of £49 million which was approved in June 2006 review note. This is not included in the Approved Cost, as Initial gate approval only covered Assessment Phase 1.
- 4 The forecast cost of the Assessment Phase for the MARS project has been classified as the information is commercially sensitive.
- 5 Represents total forecast cost for Assessment Phase 1 and Assessment Phase 2. AP1 approval £1.3 million with actual spend of £0.4 million. AP2 approval £9.9 million, with forecast spend of £11.6 million.

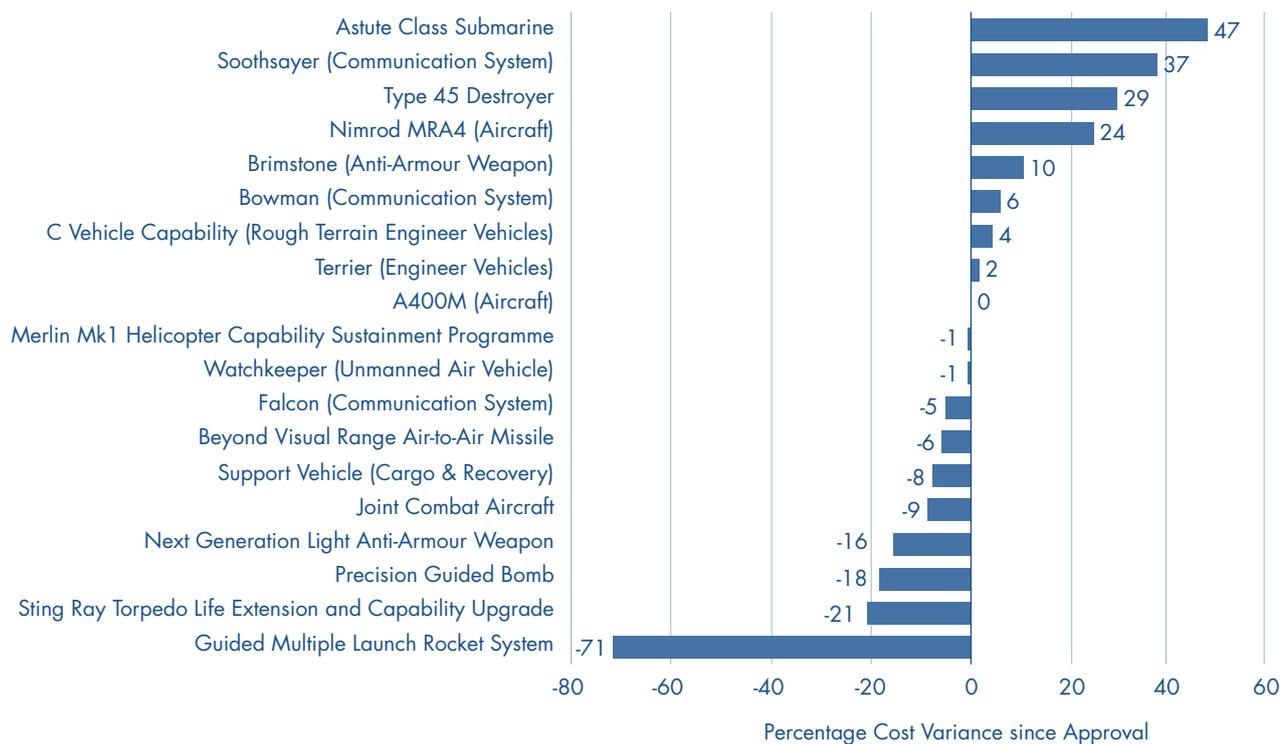
APPENDIX THREE

Cost performance since the main investment decision and in-year

Although individual approvals are set at the 'not to exceed' level (that is the cost if 90 per cent of the identified risks were to materialise), the Department continues to plan on the basis of the most likely (50 per cent confidence limit).

21 Eight projects are forecasting overruns against their 'most likely' costs at approval. Of these, five are also forecasting overruns against their 'not to exceed' cost estimates at approval

Cost Variation since Main Gate Approval



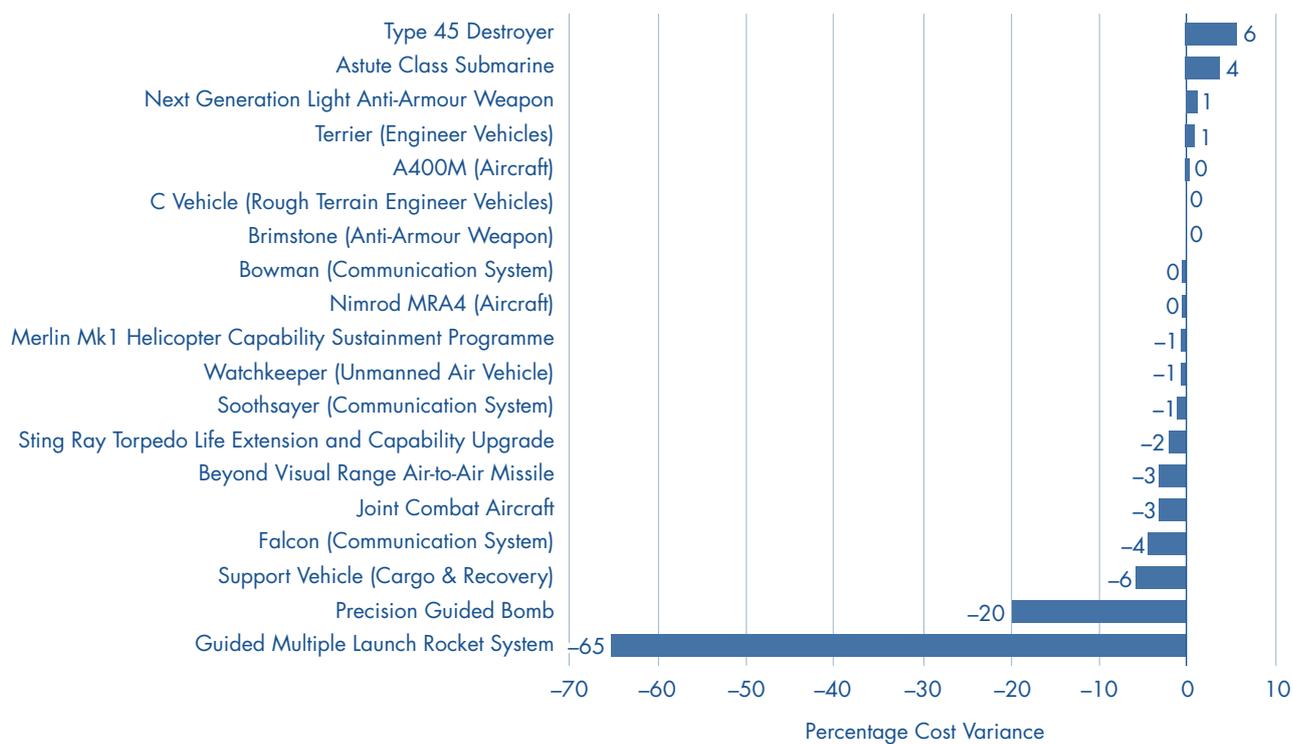
Source: National Audit Office analysis of Departmental data

NOTE

Typhoon is excluded from this analysis as the information is commercially sensitive.

22 Type 45 and Astute showed the greatest in-year cost increase. These are legacy projects, approved before the introduction of Smart Acquisition

Cost Variation In-year by project



Source: National Audit Office analysis of Departmental data

NOTE

Typhoon is excluded from this analysis as the information is commercially sensitive.

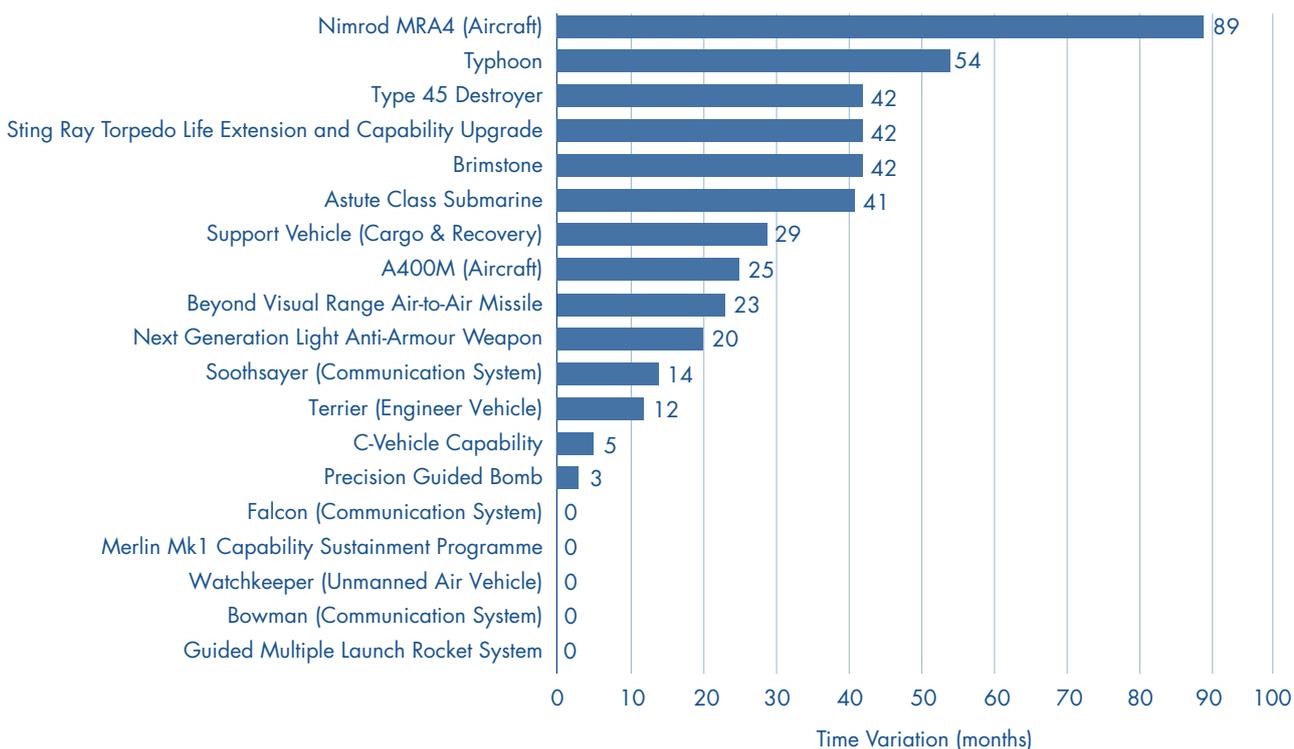
APPENDIX FOUR

Time performance since the main investment decision

Although individual approvals are set at the 'not to exceed' level (that is the cost if 90 per cent of the identified risks were to materialise), the Department continues to plan on the basis of the most likely (50 per cent confidence limit).

23 14 projects are forecasting delays against their "most likely" In-Service Dates at approval. Of these, 12 are also forecasting delays against their "not to exceed" in-Service date estimates at approval

Time Variations since Main Gate Approval (months)

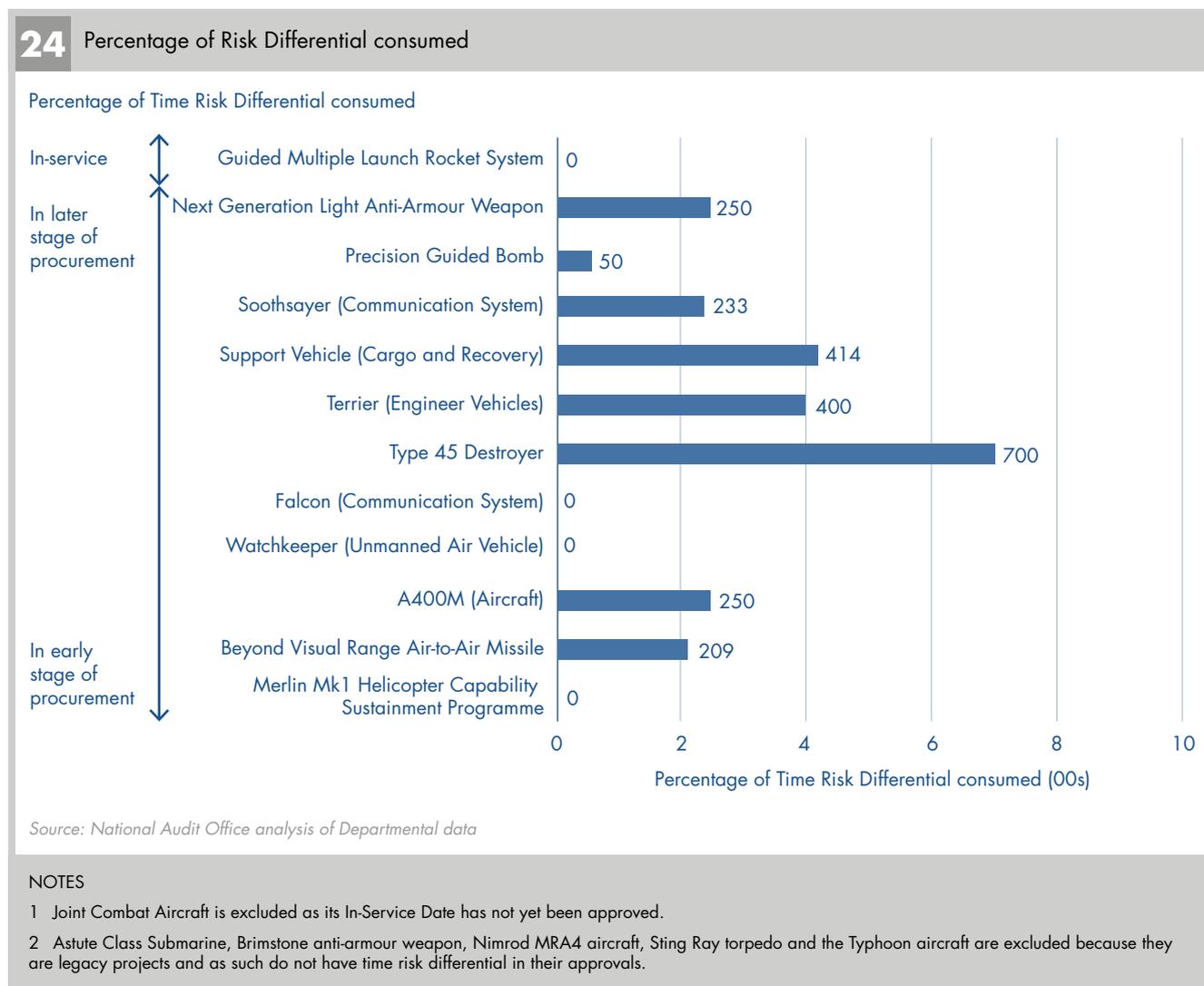


Source: National Audit Office analysis of Departmental data

NOTES

- 1 Joint Combat Aircraft is excluded as its In-Service Date has not yet been approved.
- 2 The Bowman communications system, Brimstone anti-armour weapon, C Vehicle Capability and the Typhoon aircraft had met their in-service definition before 1 April 2006.

Risk differential represents the difference between the budgeted (that is ‘most likely’) and the ‘not to exceed’ time estimates approved at the main investment decision. Figure 22 is showing that seven projects are forecasting to exceed their time estimates.



GLOSSARY

Approval	The formal decision by the Investment Approvals Board (and, dependent on the size of the project, HM Treasury) on the investment of funds in a project. Approval sets 'Not to Exceed' parameters for the project's cost and In-Service Date, which reflect the worst case scenario should all foreseen risks arise. The project cannot exceed these parameters without returning to the Investment Approvals Board for further approval. The Main Gate process also sets target 'Most Likely Estimate' figures for cost and In-Service Date. The difference between these targets and the approved not to exceed figures is known as a project's Risk Differential.
Assessment Phase	The second phase in the acquisition cycle after the Concept Phase and beginning with Initial Gate. The aim of the Assessment Phase is to develop an understanding of options for meeting the requirement that is sufficiently mature to enable selection of a preferred solution and identification, quantification and mitigation of the risks associated with that solution. At the end of the Assessment Phase a Business Case is submitted to the Investment Approvals Board for Main Gate Approval.
Business Case	The documentation submitted to the Investment Approvals Board at Initial Gate or Main Gate, making the case for proposed expenditure on the next phases of the project.
Cost of Capital	The opportunity cost to the Government of employing money in capital expenditure instead of on alternative investment opportunities. For the public sector, Cost of Capital is charged at 3.5 per cent of the average capital employed during each year. Prior to 1 April 2003 the rate was 6 per cent.
Defence Equipment and Support	Officially formed on 1 April 2007 from the merger of the Defence Procurement Agency and the Defence Logistics Organisation. It equips and supports the UK's armed forces for current and future operations. Including equipment and services ranging from ships, aircraft, vehicles and weapons, to electronic systems and information systems.
Defence Industrial Strategy	The UK Defence Industrial Strategy was announced on 15 December 2005 and is aimed at ensuring that our Armed Forces are provided with the equipment that they require, on time, and at best value for money. Part of this is the requirement that we can procure from a sustainable industrial base that retains within the UK those industrial capabilities that are required from a national security perspective, to ensure our appropriate sovereignty.
Defence Logistic Organisation	Prior to the formation of Defence Equipment and Support, logistics support for all three Services was the responsibility of the Defence Logistic Organisation.

Defence Procurement Agency	Prior to the formation of Defence Equipment and Support the main objectives of the Defence Procurement Agency were to buy weapons systems and platforms and manage major upgrades as well as delivering projects within defined performance, time and cost bands. Furthermore they provided certain procurement-related services, guidance and standards.
Demonstration and Manufacture Phase	The third and fourth phases in the acquisition cycle, which begin after Main Gate approval, and continue until the equipment enters service. During the Demonstration and Manufacture Phases, development risk is progressively eliminated, the ability to produce integrated capability is demonstrated and the solution to the military requirement is delivered.
Equipment Capability Customer	Since the creation of the Defence Equipment and Support organisation the Equipment Capability Customer has become responsible for leading the capability change planning process and identifying the equipment and support requirements to optimise the UK's Defence capability within allocated resources. In doing so the Equipment Capability Customer acts as the Sponsor for new and enhanced equipment and support programmes.
Equipment Plan	The Department's budgeting plan for expenditure on procurement of defence equipment, which runs across a ten year planning cycle.
Incremental Acquisition	A procurement strategy which aims to reduce risk and spread costs by building up a required capability over time. Each increment offers additional capability.
Initial Gate	The approval point preceding the Assessment Phase. At Initial Gate, a Business Case is put to the Investment Approvals Board to confirm that there is a well-constructed plan for the Assessment Phase that gives reasonable confidence that there are flexible solutions within the time, cost and performance envelope the Equipment Capability Customer has proposed.
In-Service Date	The definition varies between projects. For example Typhoon's In-Service Date is defined as the date of delivery of the first aircraft to the Royal Air Force. The Type 45 Destroyer's In-Service Date is defined as the date when the First of Class will meet the Customer's minimum operational requirement. It does not necessarily mean the capability is fully delivered.
Investment Approvals Board	The Departmental body responsible for the approval of investment in projects at Initial Gate and Main Gate. The Investment Approvals Board comprises the Vice Chief of Defence Staff, the second Permanent Under Secretary, the Chief of Defence Procurement and the Chief of Defence Logistics and is chaired by the Chief Scientific Advisor. For projects with a value of less than £100 million, delegated representatives of Investment Approvals Board members may authorise approval.
Key Supplier Forum	The forum constitutes ten of the major suppliers for Astute including second tier and even a third tier supplier. The forum looks to manage long-term relationships with these suppliers, offering a higher return on their investment to ensure their longevity in the industry.
Key User Requirements	These outline the requirements which are considered to be key to the achievement of the mission and are used to measure project performance. The Department recommends up to ten be defined for each project.

Integrated Project Team	Each project within the Major Projects Report has its own Integrated Project Team that manages the funding of the project and engages with Industry in order to develop solutions to the necessary capability requirements and to drive the programme forward.
Main Gate	The point at the end of the Assessment Phase when the decision to proceed with the project is made. At Main Gate the Business Case presented to the Investment Approvals Board recommends a single technical and procurement option. By Main Gate, risk should have been reduced to the extent that the Equipment Capability Customer and Integrated Project Team can, with a high degree of confidence, undertake to deliver the project to narrowly defined time, cost (procurement and whole-life) and performance parameters.
Maritime Industrial Strategy	A specific chapter of the Defence Industrial Strategy which aims to bring the Department and industry closer together so as to establish a sovereign capability for submarines and complex warships at the same time as delivering a more cost efficient portfolio of programmes.
Nuclear Steam Raising Plant	The nuclear steam raising plant is what drives our submarines, including the new Astute submarines. Rolls-Royce is the key supplier of nuclear steam raising plants to the Royal Navy.
Operational Sovereignty	The need, as identified by the Defence Industrial Strategy, to maintain indigenous industrial capabilities and technologies within a number of defence sectors within the UK in order to protect its national security.
Platform	A term in this instance which encompasses ships, submarines and specialist vessels, such as landing ship dock (auxiliary).
RAND	A non-profit institution that helps improve policy and decision making through research and analysis.
Smart Acquisition	Instead of approving each of four separate stages of a project, approval is given at two points. Major equipment projects are to only be submitted for the main investment decision once risks have been reduced and the most cost-effective solution identified. Approvals have no degree of tolerance and any breach of the approved figure for cost or time will necessitate a re-approval.
Submarine Acquisition Modernisation	The Submarine Acquisition Modernisation project is aiming to implement a more efficient, effective and sustainable submarine enterprise leading to a significant reduction in whole life costs and greater submarine availability.
Surface Ships Support	In the past it has been found that support services for our ships have not been efficient due to the competitive nature of the United Kingdom dockyards. A review of Surface Ship Support arrangements concluded that the best way of achieving a sustainable, efficient and affordable surface ship support market for the future would be through the formation of an alliance.
Terms of Business Agreement	The legal documentation that underpins a relationship between two trading parties, in this case the Department and its supplier.