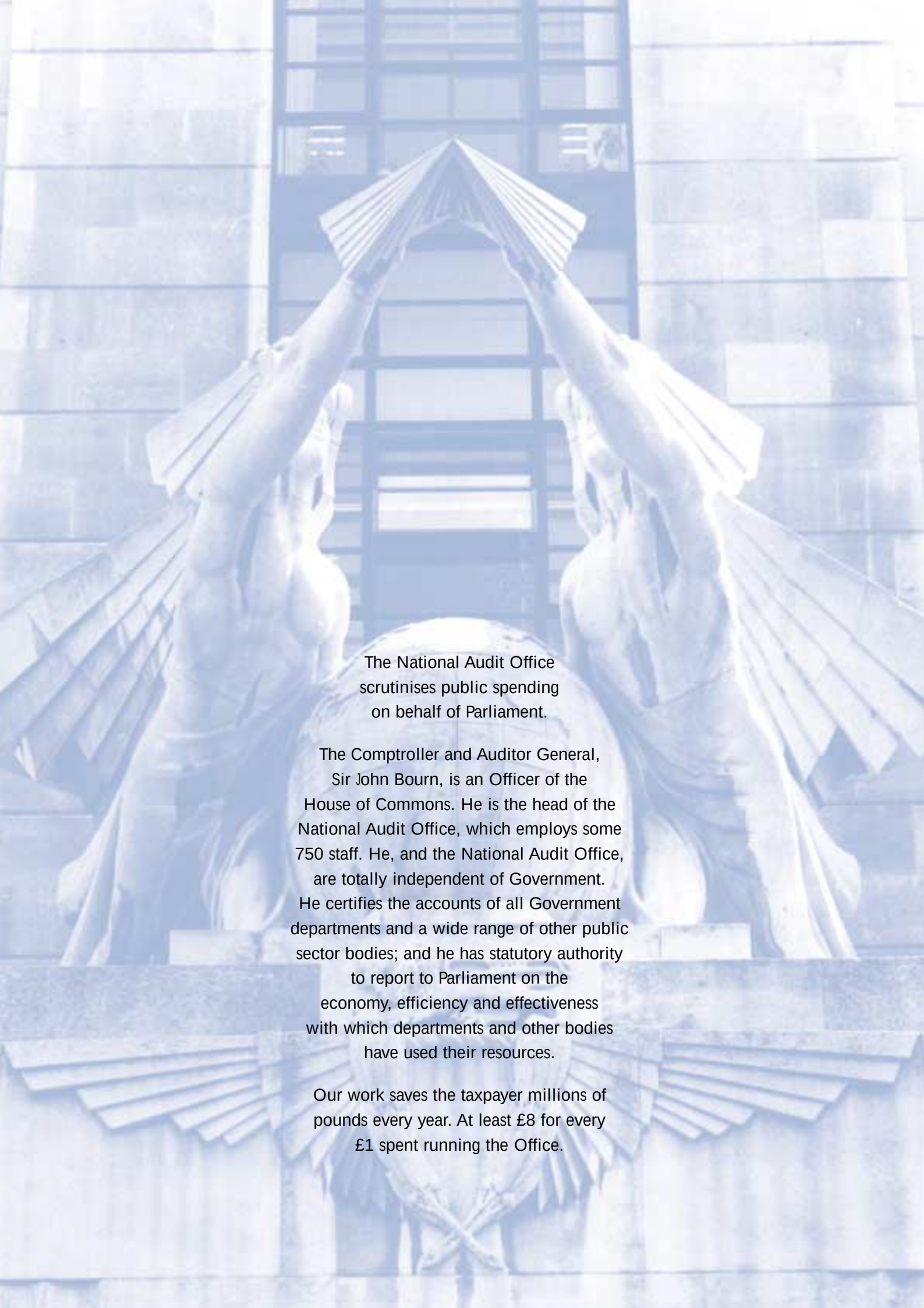
NATIONAL AUDIT OFFICE

Ministry of Defence

Major Projects Report 2001

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL
HC 330 Session 2001-2002: 23 November 2001



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Ministry of Defence

Major Projects Report 2001

Future Transport Aircraft (A400M)

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John Bourn
Comptroller and Auditor General

National Audit Office
16 November 2001

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Cover Photograph: Artist's Impression of a Type 45 Destroyer

executive summary

1 Each year since 1984 the Ministry of Defence (the Department) has reported to Parliament on its progress in procuring major defence equipments. Prior to 1991, the Department classified much of the data submitted to Parliament and our analyses of the key themes and trends emerging were therefore not published. The Major Projects Report 2001 is the tenth that we have published since the level of classification was reduced.

2 The Major Projects Report 2001 covers the period to 31 March 2001 and provides cost, time and technical performance data for 30 projects split, in accordance with Smart Acquisition principles[1], between the 20 largest projects on which the main investment decision has been taken and the 10 largest projects yet to reach that point. In the future, the range of data reported will expand to include whole life cost information.

Air-Launched Anti-Armour Weapon

3 Smart Acquisition began in 1998 and comprised a wide range of initiatives intended to enable defence equipment to be delivered faster, cheaper and better. Our report on the Major Projects Report 2000 showed that the Department was meeting the technical requirements of customers and that there were signs cost control was improving but time remained a problem. However, we concluded that it was too early to expect to see any major impact on the projects in the Report as a result of Smart Acquisition as most of them had started before Smart Acquisition had been introduced. This report on the Major Projects Report 2001 examines whether trends in cost, time and technical performance are continuing and whether, a year further down track, we can say more about the Department's progress under Smart Acquisition.

1 Smart Acquisition was previously known as the Smart Procurement Initiative, which was introduced in July 1998. The change of name, in 2000, reflected the sustainment and reinforcement of the Smart Procurement Initiative across the Department's "acquisition community", which comprises the Equipment Capability Customer, the Defence Procurement Agency, the Defence Logistics Organisation and the Service end-user of the equipment.

4 Our overall conclusions are that, there is evidence of continued improved cost control, that delays are beginning to be brought under control, and although the proportion has fallen slightly (from 98 percent to 93 percent), the Department is still expecting to meet the majority of the technical requirements of customers. On pre-Main Gate projects, the Department is working to develop a comprehensive set of measures of suitable quality to assess the success of the phase in reducing risk to an acceptable level for Main Gate and whether it is spending the right amount of time and money doing this. On the progress of Smart Acquisition, we found that the different parts of the Department measure their performance separately and the Department is working to develop the quality and coherence of the metrics being used. As the metrics evolve, the Department intends to draw on them to develop indicators to demonstrate at a corporate level whether performance is improving under Smart Acquisition. Separately to the Major Projects Report, the National Audit Office is examining other aspects of Smart Acquisition such as the implementation of Integrated Project Teams and how well they are enabling a through-life approach and delivering improved performance.

5 Our more specific conclusions are summarised below:

For projects that have passed the main investment point and are in the Demonstration and Manufacture phase:

i) in the last year most projects' performance is the same or better in time, cost and performance terms;

ii) the Department is continuing to control project costs better;

iii) some projects continue to slip but there is evidence that the Department is beginning to slow the rate of slippage and reduce the number of projects affected; and

iv) the Department is continuing to meet the military customer's requirements in the vast majority of cases but, in the last year, technical factors have led to performance falling short of requirements in two cases.

For projects that have yet to reach the main investment point and are in the Assessment Phase:

v) the Department needs to be able reliably to assess and quantify the extent to which risks are being reduced in the pre-Main Gate phase but does not currently do this in a comprehensive and suitably quantified way; and

vi) the Department is rightly looking to develop better, more quantified risk reduction measures and to use them in conjunction with cost and time measures to inform successful pre-Main Gate performance.

On measuring the progress of Smart Acquisition:

vii) various information on whether Smart Acquisition is delivering the expected benefits is available. The Department's £2 billion Smart Acquisition target provides information on the initial cost reductions made by the Defence Procurement Agency but does not capture all of the continuing benefits anticipated across the Department; and

viii) the Department is working to improve the link between the different sources of information through evolving current metrics and developing new ones to provide a more comprehensive and coherent assessment of the progress of Smart Acquisition.

WAH-64 Apache Attack Helicopter

Part 1

Performance during the Demonstration and Manufacture phase

1.1 Under Smart Acquisition, Main Gate approval is the point at which the Department makes the decision to invest major funding and normally signals the start of Demonstration and Manufacture of an equipment being procured (fuller details are given in Appendix 1). At Main Gate, the Ministry of Defence (the Department) should have a high degree of confidence that it can meet the cost, time and technical performance parameters being approved.

1.2 All of the post-Main Gate projects featuring in the 2001 Major Projects Report were conceived prior to the introduction of Smart Acquisition although three received Smart Main Gate approvals in respect of time. For each project with main investment approvals before the introduction of Smart Acquisition, the Department has identified and agreed with us the approval which best approximates to a Main Gate approval in order to establish the baseline against which performance has been measured. It should be noted, however, that these approvals were not set with the same degree of confidence used under Smart Acquisition, and legacy projects are more likely to continue to show variations against the approval baseline than more recently approved programmes.

1.3 In the first part of our Report, we examine progress on the Department's 20 largest post-Main Gate procurement projects against the cost, time and technical targets set at Main Gate approval[2]. We look at the causes of any variation from these targets, identify any indications of improvements in cost, time and technical performance during the financial year 2000-2001 and examine the operational impact of project performance. Our analysis shows that the Department is forecasting to meet the majority of technical requirements of customers, but not always within time and cost. However, there is evidence that the Department is continuing to improve cost control and beginning to bring delays under control. The Department is committed to developing processes, tools, techniques and a culture which it hopes will underpin further improvements as encapsulated in its Strategic Goal. This commits the Department to deliver 90 per cent of major projects[3] within approval (time, cost and performance) by 2005.

In the last year, most projects' performance is the same or better in cost, time and performance terms

1.4 Project performance is a reflection of the degree of variation between the cost, time and Key User Requirement parameters approved at Main Gate and current forecasts of costs, in-service dates, and proportion of Key User Requirements expected to be met. **Figure 1** overleaf shows since 31 March 2000:

- performance against 80 per cent of parameters is the same, or better, than it was a year ago;
- 55 per cent of projects experienced no adverse performance;
- 15 per cent of projects experienced adverse performance against one or more parameter; and
- no projects performed adversely against all three parameters.

2 MR Trigat is included in Appendix 2 as a cancelled project for information purposes. It has not been included in the analysis of project performance as it is no longer an active project.

3 For the purposes of the Strategic Goal, major projects are defined as post-Main Gate projects with a forecast spend in excess of £20 million and which have yet to enter service.

1 Summary of Post-Main Gate project performance in the last year

Performance against 80 per cent of parameters is the same, or better, than it was a year ago

Project	No in-year cost increase	No in-year delay	No KURs[1] missed in-year
AAAW	✔	✔	✔
ASRAAM	✔	✗	✗
ASTOR	✗	✔	✔
Astute	✔	✔	✔
Apache	✗	✗	✔
CASOM	✔	✔	✔
C-130 J	✗	✔	✔
Eurofighter	✗	✔	✔
ERO/MCS	✔	✔	✔
HVM	✔	✔	✔
LPD(R)	✔	✔	✔
Merlin Mk3	✔	✔	✔
Merlin Mk1	✔	✔	✔
MRAV	✔	✔	✔
Nimrod MRA Mk 4	✔	✔	✔
S&T Update	✗	✗	✔
Seawolf MLU	✔	✗	✔
Spearfish	✔	✔	✗
Sting Ray	✗	✔	✔
Tornado MLU	✔	✔	✔
No. of projects with no adverse impact	14	16	18
No. of projects with adverse impact	6	4	2

NOTE

Key User Requirements are requirements or constraints identified from within the wider set of user requirements, assessed as key to the achievement of a mission.

Source: National Audit Office

The Department is continuing to control project costs better

1.5 Cost control is about minimising the variation between costs actually incurred and those approved in advance. It is measured in the Major Projects Report by comparing the current forecast cost, made up of the costs incurred to date on the project and those forecast to be incurred in the future, against the approved cost at Main Gate. We found that:

- across the 20 post-Main Gate projects, forecast costs are 6.6 per cent (£2.6 billion) above approval but, for the second year running, costs have decreased in the last year (paragraphs 1.6 to 1.8);
- there is some commonality between the main causes of cost variation in 2000-2001 and the main causes of cost variation since Main Gate (paragraphs 1.9 to 1.14); and
- there is evidence that newer projects are showing less cost overrun than older projects (paragraphs 1.15 to 1.16).

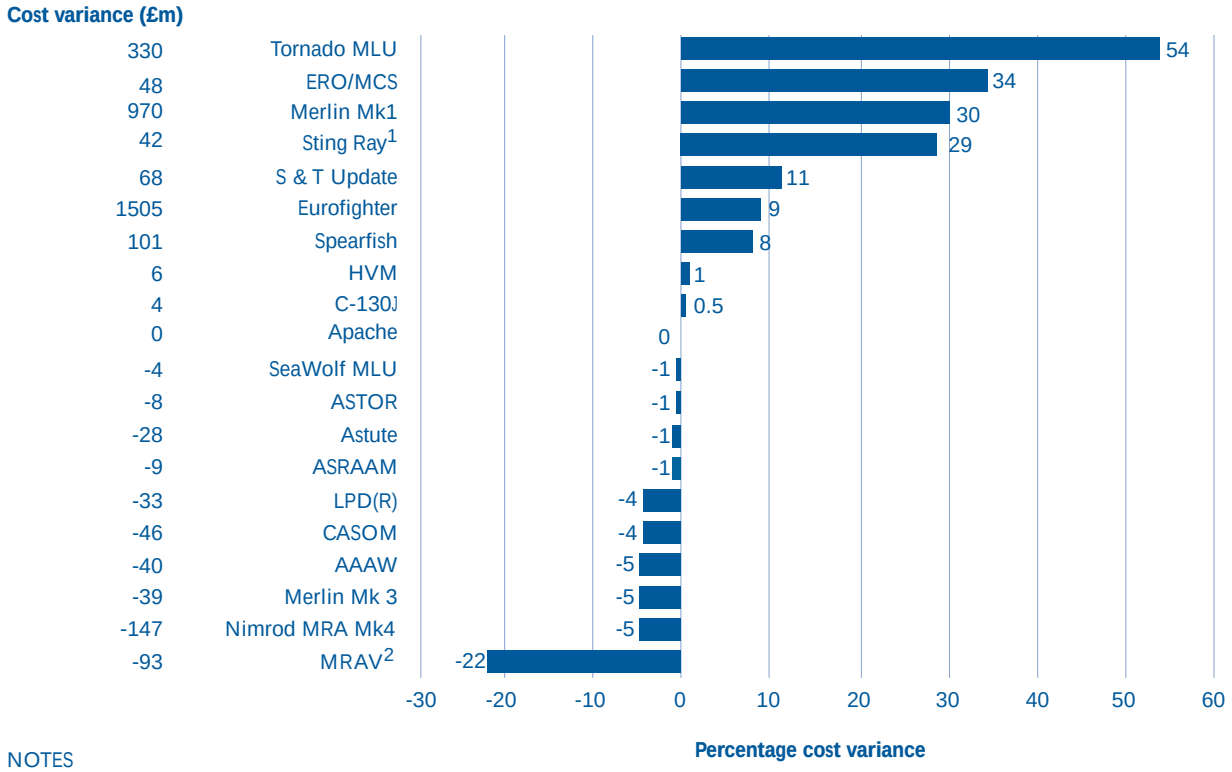
Forecast costs are 6.6 per cent above approval but have decreased by 0.25 per cent in the last year, continuing a downward trend

1.6 The 20 post-Main Gate projects in the 2001 Major Projects Report are currently forecast to cost £42.66 billion compared to £40.03 billion approved at Main Gate, an increase of £2.63 billion or 6.6 per cent. Nine projects are forecast to exceed their Main Gate cost approval, one is forecast to match its approval, while the remaining ten are expected to be under budget. **Figure 2** provides details of the cost variance on each of the 20 projects and shows that:

- over 90 per cent of the cost increases of £3.07 billion are accounted for by cost overruns on three programmes, Eurofighter, Merlin Mk.1 and Tornado Mid-Life Update. Most of the cost overruns on these projects occurred some years ago and the rate of cost increase has slowed considerably as these programmes have matured;
- similarly, 54 per cent of the cost decrease of £447 million are accounted for by two projects, Nimrod MRA Mk4 and Multi-Role Armoured Vehicle; and
- on the remaining 15 projects, net cost overrun is only £6 million and the average percentage variation from approval (positive or negative) is 7 per cent.

2 Percentage cost changes since Main Gate approval

Fourteen projects are forecast to be delivered within ten percent of the cost approved at Main Gate



NOTES

1. Cost overrun on Sting Ray is expressed as a percentage of full development and initial production approval only. Approval for further production is expected in 2002.
2. Cost overrun on MRAV is expressed as a percentage of the cost of development and production of a first batch of 200 vehicles. The United Kingdom expects to procure more than 1000 vehicles.

Source: National Audit Office

1.7 **Figure 3** overleaf shows that in the last year, total costs have decreased by £100 million[4] (0.25 per cent of the approved cost) across the 20 projects. This figure comprises costs decreases of £283 million on 12 projects and costs increases of £183 million on 6 projects. There has been no in-year variation on two projects.

1.8 For the 18 projects common to the Major Projects Report 2000 and the Major Projects Report 2001, total forecast costs have decreased. **Figure 4** overleaf shows that total percentage cost variation against Main Gate approval for these 18 projects has fallen from 6.23 per cent to 5.73 per cent between 1999 and 2001.

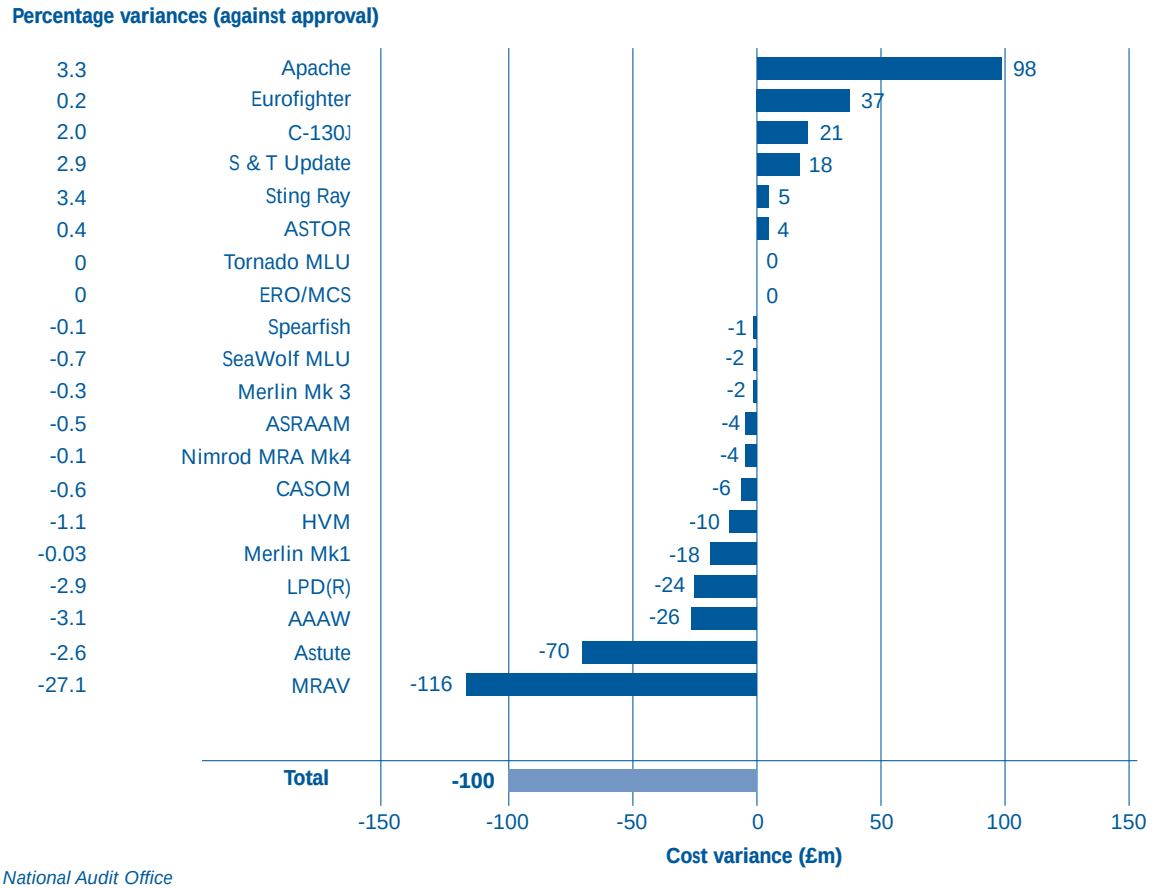
There is some commonality between the main causes of cost variation in the last year and historically

1.9 The Major Projects Report 2001 breaks down the reasons for cost variance into 11 categories, listed at Appendix 5. The categories are the same as those that appeared in the Major Projects Report 2001, with the exception of a new category called risk differential. The risk differential category applies only to projects with approvals given after the introduction of Smart Acquisition and measures the variations arising from the difference between risk allowed for in the current cost estimate (which the Department is 50 per cent confident of achieving) and risk allowed for in the cost approval (which the Department is 90 per cent confident of achieving). For projects approved under Smart Acquisition procedures, reported cost variation will be negative unless all of the risks allowed for in the 90 per cent approval materialise. Average cost variation from the planned (50 per cent) figure will be higher if all the risks do materialise or some unpredicted change affects the project. The overall cost of any project may be affected by more than one cause of variation, and may reflect both cost increases and cost decreases.

4 *These figures take account of revisions to the Major Projects Report 2000 approvals baseline for 7 projects (AAAW, ASRAAM, Apache, C-130J, Merlin Mk. 3, Merlin Mk. 1, and Nimrod MRA Mk4) projects brought about by more accurate information on Interest on Capital charges becoming available. Interest on Capital represents the opportunity cost to the Government of employing money in capital expenditure instead of alternative investment opportunities. For the public sector, Interest on Capital is charged at 6 per cent of the average capital employed during each year. Only 2 projects (Apache and Merlin Mk. 1) are significantly affected by Interest on Capital revisions.*

3 Cost changes between 31 March 2000 and 31 March 2001

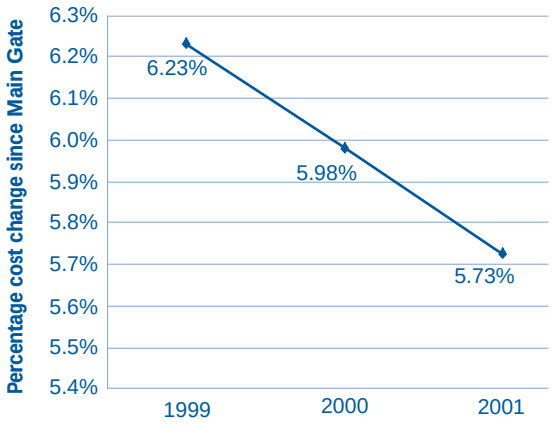
In the last year, forecast project costs have decreased by £100 million



Source: National Audit Office

4 Total percentage cost variation against Main Gate approval to projects common to MPR 2000 and MPR 2001 since March 1999

The total percentage cost variation against Main Gate approval for 18 projects has fallen from 6.23 per cent to 5.73 per cent between 1999 and 2001



Source: National Audit Office

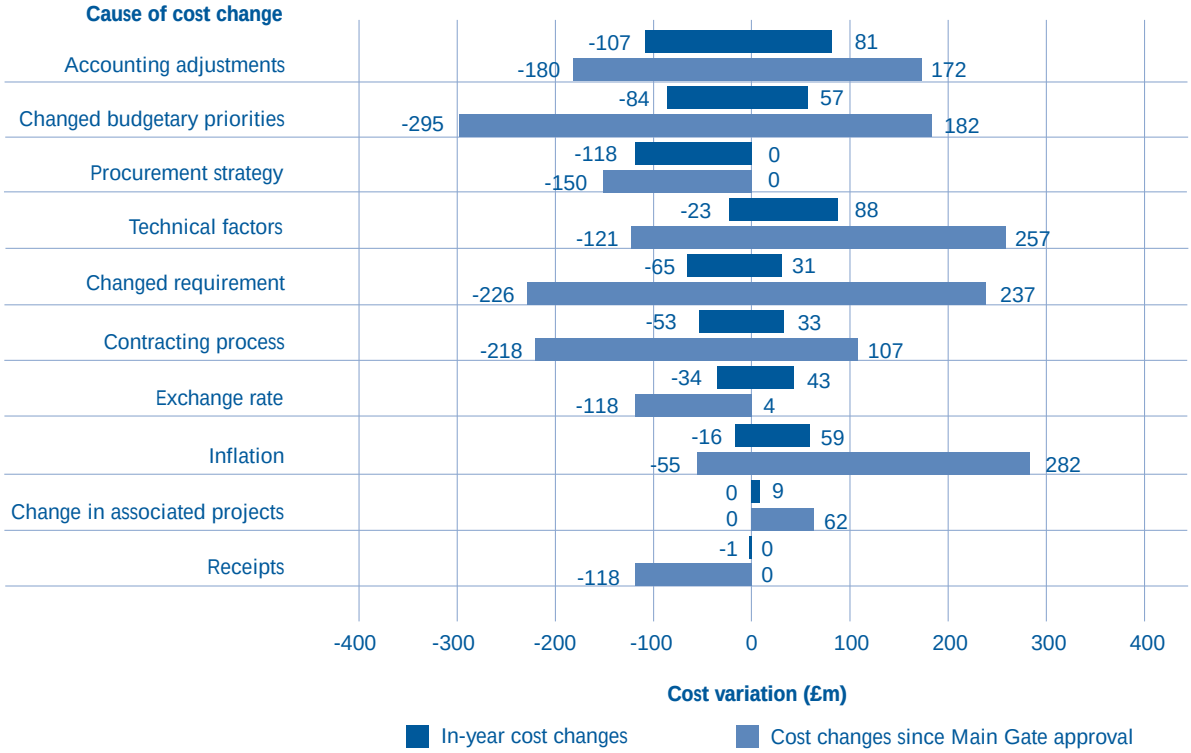
1.10 **Figure 5** shows the amount of cost change attributable to each cause, both in the last year and since Main Gate approval. We have excluded cost variances on Eurofighter, Merlin Mk 1 and Tornado Mid-life Update since increases on these projects together account for over 90 per cent of cost overruns and obscure the more general messages emerging from the other 17 projects. For example, changes to the customers' requirements flowing from operational reassessment have increased costs on Eurofighter by £239 million, compared to a total of £237 million on the other 17 projects.

1.11 The main causes of cost increase in the last year are:

- **Technical factors**, which have accounted for £88 million of cost increases on five programmes. Most of these cost increases have occurred on the Eurofighter and Advanced Short Range Air-to-Air Missile (ASRAAM) projects. On the Eurofighter programme, the Department is faced with £33 million of obsolescence costs resulting from rapid changes in computer hardware technology while on ASRAAM technical problems have led to slippage on the programme, which in turn has resulted in an additional £25 million in Interest on Capital charges.

5 Causes of changes to project costs since 31 March 2000 and since Main Gate approval

Technical factors, inflation and changes in the customers' requirements flowing from changed budgetary priorities have been major causes of cost variation historically and in the last year



NOTES

1. This figure excludes the variances on the Eurofighter, Merlin Mk 1 and Tornado Mid-Life Update projects.
2. See **Appendix 5** for an explanation of the categories.

Source: National Audit Office

- **Accounting adjustments**, which have resulted in cost increases of £81million on four programmes. These variations do not reflect any substantive change and are the result of imported costs arising from changes in accounting rules or changes in the definition of terms. The majority of the cost increases in the last year have been on the Eurofighter programme, where £70 million worth of Interest on Capital charges have accrued partly due to the Department deciding that the Defence Procurement Agency would hold assets for longer than expected. The capital charges would otherwise have been borne by other parts of the Department.

- **Inflation**, which has led to cost increases of £59 million on six programmes. For example, costs have risen by £28 million on the Astute project and £17 million on the Attack Helicopter project due to changes in inflation assumptions between those used to make future cost forecasts in the Major Projects Report 2000 and those used in the Major Projects Report 2001.

1.12 **Box 1** overleaf examines a less conventional cause of in-year cost increase on the Sting Ray torpedo project, the Department's Insensitive Munitions Policy, which may affect other projects in a similar way.

Box 1 - Impact of the Department's Insensitive Munitions Policy on Sting Ray and other munitions

1. The Sting Ray lightweight torpedo provides the main anti-submarine warfare capability for ships and aircraft and entered operational service in 1983. The Sting Ray Life Extension and Capability Upgrade programme is designed to enable the torpedo, to remain in use until around 2025. In reviewing the requirement for a replacement torpedo a range of options will be considered. It may then be possible to pursue an international collaborative solution as the UK requirement, if confirmed, may coincide with similar requirements in other nations for replacement lightweight torpedoes. The life-extended Sting Ray torpedo was originally expected to enter service in December 2002. This date has now slipped to May 2006 and the project is running £42 million above approved cost. Since the Major Projects Report 2000, there has been a net cost increase of £5 million. The reasons for these variations are set out in the Sting Ray Project Summary Sheet at Appendix 2, pages 109 to 113.

2. The main element of cost change in the last year has been an additional £12 million required for assessment work on a new Insensitive Munition warhead. This has been required to comply with the Department's Insensitive Munitions policy aimed at improving the safety of munitions. An Insensitive Munition incorporates new technology and is designed and manufactured to minimise the risk of an inadvertent violent reaction when subjected to unexpected stimuli such as accidental fire or unplanned impacts. Conventional non-Insensitive Munitions can react violently in such situations and may explode or detonate, leading to injuries or worse, and potentially catastrophic local damage. Under the Health and Safety at Work Act of 1974, the Department has a legal responsibility to reduce the level of risk to the public and personnel handling and operating munitions in peace and in war to as low as reasonably practicable. The Department's Insensitive Munitions policy was issued in 1990 and updated in 1996 in line with NATO standards for Insensitive Munitions that were agreed in 1995. This policy for Insensitive Munitions was revised and reissued in September 2001 to align with the requirements of the policy statement by the Secretary of State for Defence regarding the Management of Safety and Environmental Protection in the Department.

3. In reviewing Royal Navy equipment, the Defence Ordnance Safety Group has prioritised the Sting Ray warhead for replacement because it has a higher risk of accidental detonation than many other weapon systems. A feasibility study undertaken between 1998 and 1999 examined five options and concluded that two of these should be evaluated in an Assessment Phase - a new design Insensitive Munition warhead and a modified commercial off-the-shelf warhead. The assessment work is due to be undertaken by BAE SYSTEMS and is expected to complete in July 2003. If technically practicable, approval will then be sought for the cost of Demonstration and Manufacture of an Insensitive Munition warhead.

4. The new warhead would be introduced on an incremental acquisition basis, with an in-service date of May 2008. This is later than the currently forecast in-service date of May 2006 for the upgraded Sting Ray torpedo and pending introduction of the Insensitive Munition warhead, the upgraded torpedo will be fitted with the existing conventional non-Insensitive Munition warhead. The Department is satisfied that the requirement for an Insensitive Munition warhead will have no adverse impact on the capability of Sting Ray. For Sting Ray torpedoes currently in use, the Department has set procedures in place to minimise the risk to personnel and these will remain pending the introduction of the Insensitive Munition warhead.

5. To minimise the risk of accidental detonation, the Department is planning to implement its Insensitive Munitions policy on a rolling basis across all of its 1800 munitions over approximately 20 to 30 years. The Defence Ordnance Safety Group is currently undertaking a comprehensive review to identify the munitions that will most benefit from Insensitive Munition compliance and to seek opportunities for the appropriate insertion of Insensitive Munition technology. For legacy equipment, this will typically equate to Insensitive Munition insertion at the point of Mid-Life Update or life extension, as is the case with Sting Ray. All new projects are expected to be Insensitive Munition compliant from inception. The development of the Insensitive Munition implementation strategy is scheduled to complete by the end of 2001. This will outline a prioritised programme for the achievement of Insensitive Munition compliant inventories, and will help to develop and tailor cost-effective Insensitive Munition solutions on a case-by-case basis.

6. The Department recognises the significant improvements offered by Insensitive Munitions to the operational, environmental, Health and Safety requirements of individual programmes. It expects the new policy to lead to lower through-life costs by, for example, easing storage and handling constraints, and allowing greater quantities than previously to be transported by rail/sea/air in a single journey. The Department also expects to make some savings through the reduced costs associated with platform design and construction, and the less restrictive requirements for port facilities that the introduction of an Insensitive Munitions complement will allow.

1.13 The main causes of cost decrease in the last year are:

- **Changes in procurement strategy**, which account for £118 million of cost decreases on one programme, the Multi-Role Armoured Vehicle. The cost decreases are due to the Netherlands joining the collaborative programme, which will reduce the United Kingdom's share of initial production from 300 to 200 vehicles and therefore result in lower initial development and production costs. The overall number of vehicles that the Department plans to acquire has not reduced with the Netherlands joining the programme. The number is currently under review as part of a Combat Support Vehicle Balance of Investment study. This study is expected to report in 2002 and will help determine total programme costs.
- **Accounting adjustments**, which have resulted in cost decreases of £107 million on four programmes. The majority of the cost reductions are on the Astute programme, where a revised resource profile following discussions with industry has led to £98 million of cost reductions in the last year.
- **Changes in the customers' requirement flowing from changed budgetary priorities**, which have led to cost decreases of £84 million on 11 programmes. Such changes occur when the customer re-assesses his priorities in terms of the level of funding that he considers he needs to commit a particular activity. For example, a decision was taken to reduce quantities on the Advanced Air-Launched Anti-Armour Weapon by 25 per cent and this decision has contributed to in-year cost decreases of £30 million.

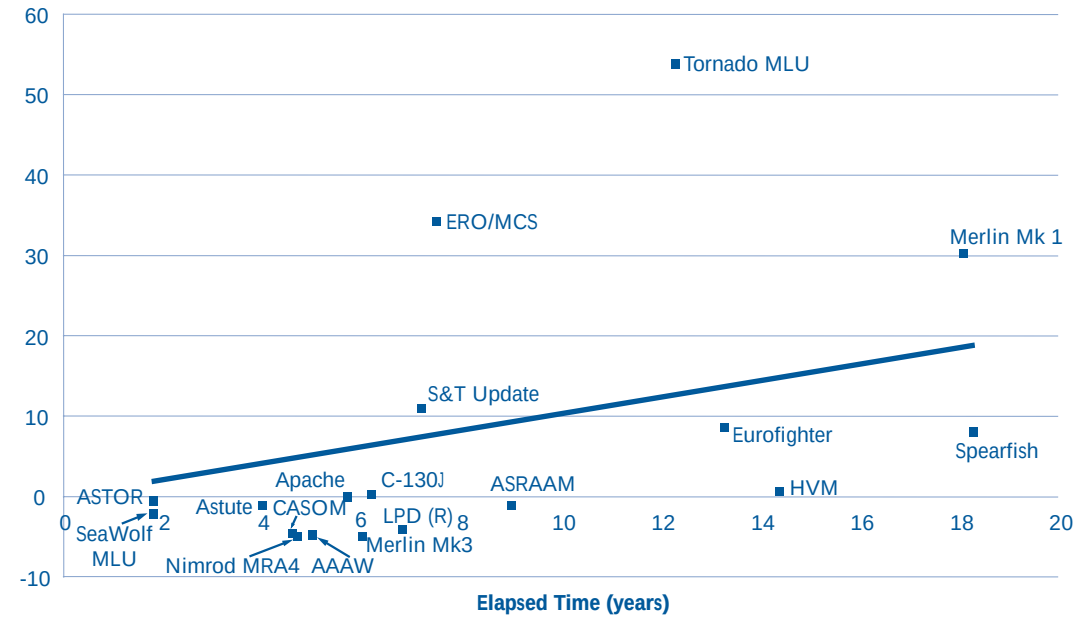
1.14 **Figure 5** (on page 7) also shows that technical factors and inflation have been the major causes of cost increase historically as well as in the last year, while changes in the customers' requirement flowing from changed budgetary priorities have been a major historic cause of cost decrease as well as in the last year.

Newer projects are showing less cost overrun than older projects

1.15 **Figure 6** shows the 5 projects approved within the last five years are below approved cost, while 5 of the 8 projects approved between 5 and 10 years ago are on or below approval and one of the three that is above approval is above by less than half a per cent. All of the 5 projects approved more than 10 years ago are above cost, although one is above by less than 1 per cent.

6 Analysis of percentage cost overrun against elapsed time since Main Gate approval

Newer projects are showing less cost overrun than older projects



NOTES

1. MRAV and Sting Ray have been excluded from this analysis. Both programmes have incurred exceptionally large percentage cost variations (MRAV = -22 per cent; Sting Ray = 29 per cent) in the relatively short periods of time since each project passed Main Gate approval. In the case of MRAV, decreased forecast project costs of £93 million have resulted in a high pecentage underrun because there is only approval for development and initial production. Similarly, cost overrun on Sting Ray is expressed as a percentage of full development and initial production rather than total procurement cost.
2. The equation of the linear trend line is y = 1.0292x - 0.2041. The correlation co-efficient, R^2 = 0.2041. The closer the R^2 is to 1, the better the correlation. R^2 = 0.2041 suggests a weak correlation.

Source: National Audit Office

1.16 Newer projects could be showing less cost overrun either because there is less scope for problems to arise in the early years of projects or because the Department has been successful in driving out risks and controlling costs better. There is evidence to support this latter argument because there is no significant correlation between cost variation and elapsed time in **Figure 6**.

Some projects continue to slip but the Department is beginning to slow the rate of slippage and reduce the number of projects affected

1.17 Timescale control is about bringing equipment into service as close as possible to the date agreed as part of the approval process. As with costs, under Smart Acquisition the Department approves the in-service date of equipment which it is 90 per cent confident of achieving, and bases current plans on an earlier date which it is 50 per cent confident of achieving. Both of these dates fall within a timescale acceptable to the customer. Timescale performance is measured by comparing the current forecast in-service date underpinning the Department's plans (the 50 per cent date) with the in-service date set at approval (the 90 per cent date). For individual projects approved under Smart Acquisition procedures, therefore, reported slippage will be negative unless all of the risks allowed for in the 90 per cent approval materialise, or some other unexpected factor affects the project. The average slippage across the Major Projects Report population will be greater if the risks do materialise. We found that:

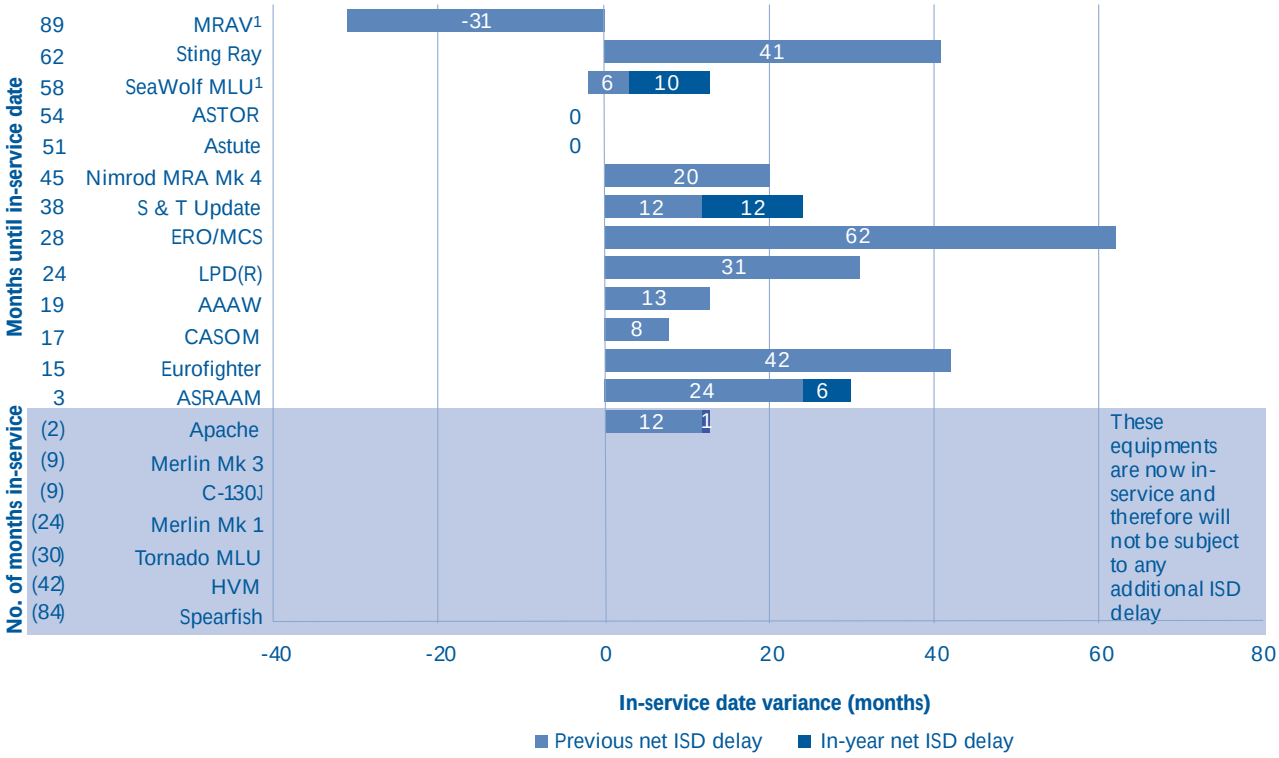
- slippage has increased in the last year but by less than in the previous year and only 4 of the 20 post-Main Gate projects have slipped in the last year (paragraphs 1.18 to 1.22);
- the main causes of slippage are as in the past (paragraphs 1.23 to 1.24); and
- delays to in-service dates have led to capability shortfalls for around three-quarters of the 20 post-Main Gate projects (paragraph 1.25).

Slippage has increased in the last year but by less than in previous years and only four projects have slipped

1.18 Across the 20 post-Main Gate projects there has been a total of 577 months slippage since their Main Gate approvals, with an average slippage per project of 29 months. **Figure 7** shows that 17 of the 20 projects have

7 In-service date variation since Main Gate approval

Three projects are expected to enter service early or on time



NOTE

1. MRAV and Seawolf MLU were approved since the introduction of Smart Acquisition and include provision for risk within their approved in-service dates (see paragraph 1.19)

Source: National Audit Office

slipped, two (ASTOR and Astute Class Submarine) are forecast to meet the in-service dates originally planned and one collaborative project (the Multi-Role Armoured Vehicle) is recording a negative variation. Of the 17 projects that have slipped, two have slipped by less than a year, six have slipped by between one and two years, four have slipped by between two and five years, and five have slipped by more than five years. Of the five that have slipped by more than five years, four have now entered service. The other, the Extended Range Ordnance/Modular Charge System, is 28 months from entering service.

1.19 Within these overall slippage figures, the SeaWolf Mid-Life Update and Multi-Role Armoured Vehicle projects have recorded negative variations due to risk provision between their approved in-service dates (at 90 per cent confidence) and the earlier in-service dates planned to be met (at 50 per cent confidence) at Main Gate. This risk provision totals 34 months across the two projects or an average of just less than two months across the 20 post-Main Gate projects. However, changes in the customer's requirement flowing from changed budgetary priorities has led to 16 months slippage on Seawolf Mid-Life Update, while none of the 31-month risk provision for possible technical difficulties or problems with the collaborative programme on the Multi-Role Armoured Vehicle programme has yet been used up.

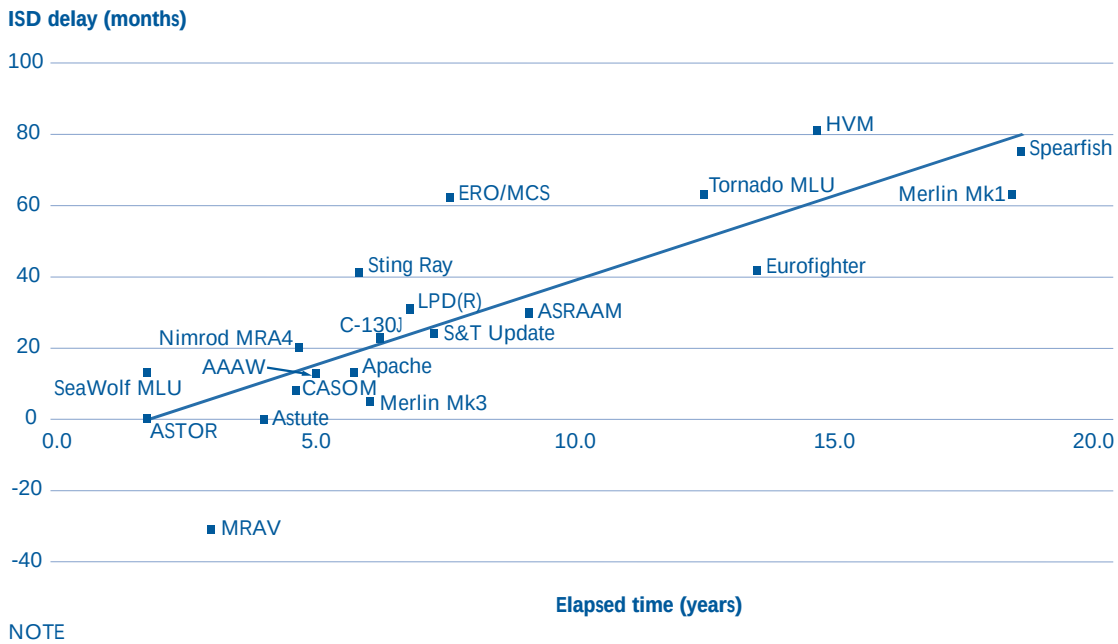
1.20 The slippage of project in-service dates since approval has cost the Department £1.38 billion in support costs through running on existing equipment. Against this, the Department have saved £1.06 billion through not having to support the new equipment as expected and £0.06 billion for other reasons such as receipts of liquidated damages. On average, across the 20 projects, slippage extends a project's lifecycle (from Main Gate approval to the current in-service date) by a quarter (27 per cent).

1.21 **Figure 7** shows that in the last year there has been 29 months additional slippage, an average of just over one month per project, less than half the slippage reported in the Major Projects Report 2000. Four projects have slipped in the last year compared to seven in the previous year. Those projects that have slipped have been delayed by less on average (just over 7 months average in-service delay per project) than the projects that slipped in the previous year (9 months average in-service delay per project). There has been no recovery of slippage on the remaining 16 projects.

1.22 For the 18 projects common to the Major Projects Report 2000 and Major Projects Report 2001, the average in-service date delay since Main Gate approval increased from 20 months to 25 months between 1999 and 2001. Unlike cost variations, an analysis of in-service date slippage against elapsed time since Main Gate approval shows a strong relationship between elapsed time and slippage, as demonstrated in **Figure 8**. Three projects approved within the last 5 years (Multi-Role Armoured Vehicle, ASTOR and Astute Class Submarine) have not slipped since Main Gate.

8 Analysis of ISD delay against elapsed time since Main Gate approval

There is a strong relationship between elapsed time and slippage



NOTE

The equation of the linear trend line is y = 4.8677x - 8.9966. The correlation co-efficient, R^2 = 0.7012. The closer R^2 is to 1, the better the correlation. R^2 = 0.7012 suggests a strong correlation.

Source: National Audit Office

The main causes of slippage are as in the past

1.23 The Major Projects Report breaks the reasons for in-service date delay down into eight categories, listed at Appendix 5. As with cost, a new category called risk provision has been included this year. **Figure 9** shows the main causes of in-service date delay since Main Gate approval have been:

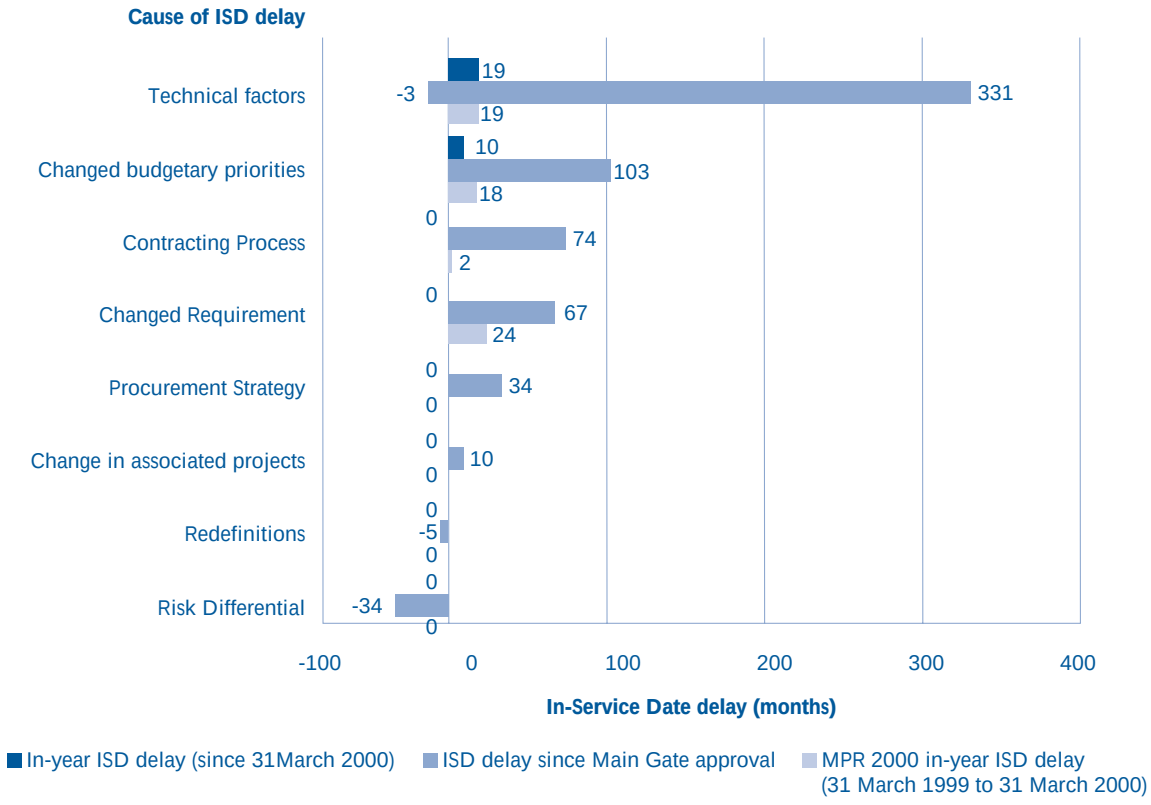
- **Technical Factors,** leading to a net total of 328 months delay on 13 programmes, just over half of the total delay recorded. For example, all of the 75 month delay on Spearfish, 69 months of delay on the High Velocity Missile and 32 months of delay on Merlin Mk 1 were caused by technical problems.
- **Changes in the customers' requirement flowing from changed budgetary priorities,** resulting in a total of 103 months slippage on six programmes. This reflects the effect of deferring individual projects to address problems of affordability across the procurement budget as a whole. Changed budgetary priorities have led to 36 months of delay on the Extended Range Ordnance/Modular Charge System project and a slippage of 24 months on the Sting Ray programmes.
- **Contracting process**, which has led to 74 months slippage on nine programmes. For example, the Sting Ray programme was delayed for 17 months due to a combination of contract negotiations taking longer than expected and reassessment of the programme timescales following those negotiations.

1.24 **Figure 9** also shows the causes of 29 months in-service date delay in the last year. In particular:

- **Technical factors** have led to a total of 19 months of delay (66 per cent of the in-year slippage) on three projects, Swiftsure and Trafalgar Class Submarine Update (12 months), Advanced Short Range Air-to-Air Missile (6 months) and Attack Helicopter (1 month). The 12 month slippage on Swiftsure and Trafalgar Class Submarine Update was caused by software engineering problems which led to the sonar system development programme being delayed.
- **Changes in the customers' requirement flowing from changed budgetary priorities** have led to a total of 10 months delay (34 per cent of the in-year slippage) on one project, Seawolf Mid-Life Update.

9 Causes of in-service date delay since Main Gate approval and in-year delays since March 1999

The main causes of slippage are as in the past



Source: National Audit Office

Delays to in-service dates have led to capability shortfalls for around three-quarters of projects

1.25 Project delays mean that customer requirements will be met later than planned at the time of Main Gate approval. The nature and scale of any impact will, in practice, depend upon a range of factors such as the use that would have been made of the equipment during the period of slippage and the equipment it is replacing. For the 20 post-Main Gate projects in the Major Projects Report 2001, project slippage has led to capability shortfalls in 14 cases due to new capabilities not being available or continued use of lesser capabilities for longer whilst awaiting replacements. Two of these cases, Tornado Mid-Life Update and Extended Range Ordnance/Modular Charge System, were not included in the 2000 Major Projects Report and are being reported for the first time. Five of the affected projects are now in-service and therefore a shortfall no longer exists.

The Department is continuing to meet the military customer's requirements in the vast majority of cases but, in the last year, technical factors have led to performance falling short of requirements in two cases

1.26 Under Smart Acquisition, Key User Requirements are agreed at Main Gate and form a contract between an Integrated Project Team and the Equipment Capability Customer. The Department measures technical performance on a project by assessing the proportion of Key User Requirements currently expected to be met against the baselines specified by the military customer at Main Gate. Since all of the projects in the Major Projects Report 2001 were conceived prior to the introduction of Smart Acquisition, Key User Requirements have been defined retrospectively.

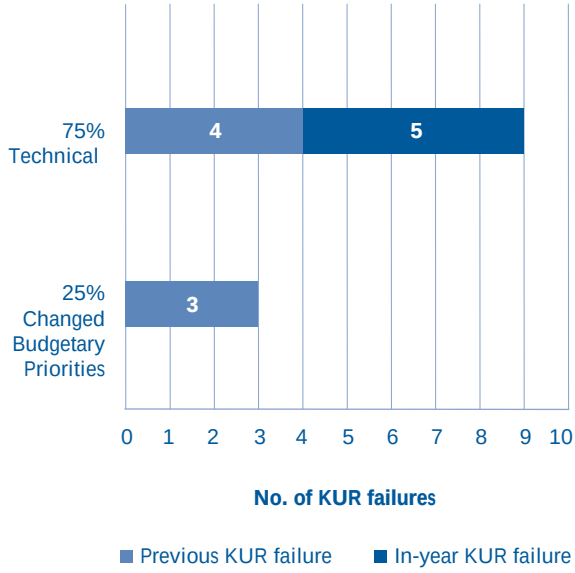
The Department expects to meet or exceed the Key User Requirements for the vast majority of projects.

1.27 Across the 20 post-Main Gate projects, the Department expects to meet or exceed 93 per cent (169 out of 181) of the minimum Key User Requirements set for the equipments being procured. The Department is forecasting to meet all of the Key User Requirements for 16 out of the 20 projects. The four projects where the Department are forecasting less than 100 per cent achievement are: Advanced Short-Range Air-to-Air Missile (60 per cent - 6 out of 10 Key User Requirements forecast to be met); Tornado (64 per cent - 9 out of 14 Key User Requirements forecast to be met); Spearfish (71 per cent - 5 out of 7 Key User Requirements forecast to be met) and Eurofighter (90 per cent - 9 out of 10 Key User Requirements forecast to be met).

1.28 **Figure 10** shows that technical factors are the reason for non-achievement of 9 of the 12 Key User Requirements forecast not to be met. Change in the customers' requirement flowing from changed budgetary priorities are the reason for non-achievement of the remaining 3 of the 12 Key User Requirements forecast not to be met. Under Smart Acquisition, in some circumstances a conscious decision may be taken in agreement with the Customer to trade-off performance against cost and time and therefore 100 per cent achievement of Key User Requirements cannot always be expected. The reasons for the Key User Requirement shortfalls on ASRAAM are being reported separately to the Committee of Public Accounts in a classified memorandum. This is because of the security and commercial sensitivities involved.

10 Causes of Key User Requirement Failure since Main Gate Approval

Technical factors are the reason for non-achievement of 9 of the 12 Key User Requirements forecast not to be met



NOTE

In the cases of 4 key requirements not met on the Tornado MLU project, the reasons for failure were an equal combination

Source: National Audit Office

The Department is forecasting to meet over 90 per cent of its Key User Requirements this year

1.29 The Department is forecasting to meet 93 per cent of Key User Requirements this year though this is a lower proportion of Key User Requirements than the 98 per cent reported in the Major Projects Report 2000. For the 18 projects common to the Major Projects Report 2000 and the Major Projects Report 2001 the proportion of Key User Requirements forecast to be met has fallen from 99 per cent (159 out of 161) to 96 per cent (152 out of 159). The changes have occurred on two projects, the Advanced Short Range Air-to Air Missile (forecasting non-achievement of 4 of 10 Key User Requirements) and Spearfish (non-achievement of an extra one Key User Requirement in addition to the one reported in the Major Projects Report 2000[5]).

Artist's Impression of a Meteor fired from Eurofighter Typhoon

5 *The position reported in the Major Projects Report 2000 on Spearfish's performance against its approved Key User Requirements was provisional.*

Part 2

Performance during the Assessment Phase

2.1 The Assessment Phase of a project is the phase between Initial Gate and Main Gate (see Appendix 1). It is an investigative phase with the objective of assessing the possible options for meeting the military requirement, down selecting them to a technological solution and reducing risks to an acceptable level for Main Gate. Much less is spent during the Assessment Phase than once a project has gone through Main Gate but what is spent on assessment, and how it is spent, is crucial to successful delivery of the project.

2.2 The Department aims to spend the right amount of time and money reducing risks during the Assessment Phase to arrive at Main Gate with high confidence that the project can be delivered within narrow cost, time and performance boundaries. Smart Acquisition suggests that, as a guide, up to 15 percent of the total procurement cost of a project can be spent before reaching Main Gate. In practice, the right proportion to be spent will be determined by factors such as the nature of the equipment (e.g. an upgrade or a completely new capability), the maturity of the technology involved, the scale and length of production, and the likely procurement strategy (e.g. collaborative, non-competitive, off-the shelf, Private Finance Initiative or Public Private Partnership).

2.3 On average, the 10 pre-Main Gate projects in the Major Projects Report 2001 are forecasting to spend 4 percent of their total procurement costs on assessment work and the proportion varies significantly between projects (see **Figure 13** on page 19). One project, the Future Transport Aircraft, is forecasting to spend less than 0.1 per cent because the aircraft is being procured in partnership with eight other nations on a commercial basis, with consequent sharing of the development costs[6]. In contrast, the Bowman project is forecasting to spend around 18 per cent, primarily because of the complexity of the technology involved and changes to the procurement strategy. To be confident that it is spending the right amount of money and time during the Assessment Phase, the Department needs to be able to reliably assess, in a quantified way, the extent to which risks are reduced and whether they have been reduced to an acceptable level.

2.4 This Part of our Report examines:

- how the Department currently measures risk reduction (paragraphs 2.5 to 2.10); and
- how the Department is proposing to improve how it measures risk reduction to better assess how projects are performing during the Assessment Phase and give greater confidence that projects are going to Main Gate at the right time (paragraphs 2.11 to 2.18).

The Department does not currently measure risk reduction during the assessment phase in a sufficiently comprehensive and suitably quantified way

2.5 The Department uses three-point estimates to measure the level of risk affecting the costs and timing of projects. This section of the Report examines whether the Department has established three-point cost and time estimates for all projects in the Major Projects Reports 2001 and how these estimates are used to assess the extent of risk reduction during the Assessment Phase.

The Department does not produce full three-point cost and time estimates for all projects

2.6 Three-point cost estimates were introduced as a requirement for projects in 1994 and, under Smart Acquisition, all projects are required to establish three-point risk estimates for cost and time at Initial Gate and to refine these estimates during the Assessment Phase. The three-points referred to are estimates at different confidence levels based on the probability of risks materialising as follows:

- **lowest cost/earliest time** (at 10 per cent confidence), assuming that risks do not materialise and everything goes well;

6 *Industry is currently spending funds in excess of this on design and risk reduction work and the Department would not pay the prime contractor for this work until a contract for the A400M aircraft is signed.*

- **most likely cost and time** (at 50 per cent confidence), representing the average position where some risks do materialise and some do not;
- **maximum cost/latest time** (at 90 per cent confidence), assuming that risks do materialise and things do not go well.

2.7 **Figure 11** shows that four of the 10 pre-Main Gate projects in the Major Projects Report 2001 had full three-point cost estimates at the report date, 31 March 2001, and four projects had full three-point time estimates. For the other projects, only partial estimates covering one or two of the three points were available, although full estimates were being developed in some cases (e.g. Bowman and CVF). Where estimates covered two points, it was the lowest cost or earliest time estimate that had been omitted. In the case of Skynet 5, which will provide next generation satellite communication services under a Private Finance Initiative agreement, the Department has decided that it cannot give a three-point time estimate with any certainty at this point. This is because the start of the new service will be co-ordinated with the run-down of the existing capability provided by Skynet 4 as its useful life is assessed as coming to an end, and the timing of the changeover is uncertain.

The Department does not measure the extent of risk reduction during the Assessment Phase in a comprehensive and suitably quantified way

2.8 Under Smart Acquisition, the range of cost and time covered by three-point estimates is expected to narrow between Initial Gate and Main Gate as risks are reduced. It is not clear to what extent the range is expected to narrow during the Assessment Phase or how wide a range is acceptable for a project to proceed through Main Gate. These parameters are unlikely to be standard across projects. They will depend on factors such as the nature and complexity of individual projects, which affect the risks involved and because of this the Equipment Approvals Committee review each project on a case by case basis.

2.9 The range covered by current three-point cost and time estimates for the four projects with full estimates in the Major Projects Report 2001 is variable. These projects are at different stages in the Assessment Phase. On average, the range covered by three-point cost estimates is a fifth (19 per cent) of the most likely cost of the projects. The biggest cost range is for Skynet 5, covering 27 per cent of the most likely cost of the project, and the smallest range is for the Beyond Visual Range Air-to-Air Missile, covering 11 per cent of the

11 The completeness of three-point cost and time estimates as at 31 March 2001

Four projects had full three-point cost estimates and four projects had full three-point time estimates at 31 March 2001

Project	3-point estimate		2-point estimate		Most likely estimate only	
	Cost	Time	Cost	Time	Cost	Time
BOWMAN[1]					✔	✔
BVRAAM	✔	✔				
CVF[2]		✔			✔	
FCBA[3]				✔	✔	
FTA			✔	✔		
Eurofighter ASTA[3]				✔	✔	
LIMAWS Gun	✔	✔				
Skynet 5	✔					✔
Type 45	✔			✔		
TRACER[4]		✔			✔	
TOTAL	**4**	**4**	**1**	**4**	**5**	**2**

NOTES

1. Since 31 March 2001, the Department has established a current 3-point cost estimate and a current two-point time estimate for the Bowman project. The Chief of Defence Procurement has notified the Committee of Public Accounts of these estimates.
2. Since 31 March 2001, three point estimates for CVF have been generated based on data provided by industry as part of the Assessment Phase. However, in view of concerns about commercial sensitivity, the Department does not consider it prudent to release the data at this time.
3. At 31 March 2001, Eurofighter ASTA and Future Carrier Borne Aircraft had three-point cost estimates for parts of the projects.
4. At 31 March 2001, confirmation of reliable three point estimates for the Tactical Reconnaissance Armoured Combat Equipment Requirement (TRACER) was subject to the outcome of a Balance of Investment study to recommend appropriate capability levels and platform numbers. This has been overtaken by events, and the TRACER programme will not proceed beyond the current phase.

Source: National Audit Office

£1,368 million most likely cost of the project. The range covered by three-point time estimates is on average 11 per cent of the overall length of projects from Initial Gate to in-service date. The biggest time range is for the LIMAWS Gun, covering 23 per cent of the 94 month project and the smallest range is for CVF, covering 4 per cent of the 164 month project. The Department does not assess, in a quantified way, the stage of maturity reached by projects and the extent of risk remaining to put these ranges and the narrowing of ranges since Initial Gate into context.

2.10 The Department measures the outcome of the Assessment Phase in terms of whether the Main Gate submissions that go the Equipment Approvals Committee are successful in enabling the Committee to make a decision first time on whether or not to proceed with a project. It has a target to achieve this for 85 per cent of major projects during 2001-02, rising to 90 per cent from 2002-03. The Department is currently forecasting to beat its 2001-02 target. In making a decision at Main Gate, the Equipment Approvals Committee judge whether the level of risk remaining on a project has been reduced to an acceptable level and that an appropriate risk management strategy is in place. This is done on a case by case basis by the Committee, who consider the risk management plan as part of the Main Gate submission. The Department recognises that there is a need to define, measure and control levels of risk in a more quantified way, and this is something it is taking forward by improving risk management practice, and developing better risk metrics.

The Department is looking to develop better, more quantified measures of risk reduction to inform successful performance

2.11 The Department recognises that it needs to measure risk better and develop more quantifiable measures and targets for assessing risk reduction performance during the Assessment Phase. Such measures would give the Department heightened confidence that projects are going to Main Gate at the right time, following a full examination of the options, and having invested an appropriate amount of time and money in reducing risk to an acceptable level.

The Department is beginning to think about more quantified measures of risk

2.12 There are many different risks involved in projects such as technological, commercial and procurement strategy risks and measuring these risks is complex. The Department is thinking about how best to capture these risks in comprehensive and suitably quantified risk measures. As illustrated in Part 1 of this Report (**Figures 5 and 9** on pages 7 and 12), technical difficulties have been a major cause of cost increase and delay. To better assess technological maturity before Main Gate, the Department is investigating the use of Technology Readiness Levels as a mechanism for targeting risk reduction activity and measuring its effect. Using a quantified scale, ranging from a new and immature technology undergoing paper studies of the basic concept to a fully mature technology that has been proven, Technology Readiness Levels assess the readiness of technologies to be incorporated into a system such as a weapon. Guidance on Technology Readiness Levels and their application in support of project risk management has been made available to Integrated Project Teams and five teams are currently piloting the use of Technology Readiness Levels.

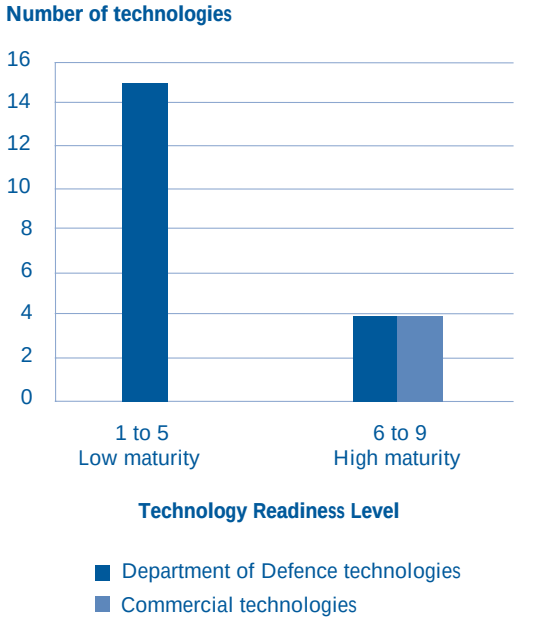
2.13 Technology Readiness Levels have the potential to better support and give added confidence to the Department's decision making during the Assessment Phase and at Main Gate. Used in conjunction with the narrowing of the cost and time ranges covered by three-point estimates, Technology Readiness Levels would enable the amount of risk reduction achieved and the risk remaining before reaching an acceptable level to be better quantified. This would better inform the Department's forecasts of how much time and money was required during the Assessment Phase to reduce risk to an acceptable level for Main Gate.

2.14 In our 1995/96 report, Initiatives to Manage Technical Risk on Defence Equipment programmes (HC361), we found that such evidence as is available on the benefits of Technology Demonstrator Programmes (programmes designed to demonstrate that scientifically proven technologies can be translated into engineered and effective solutions) indicates that they reduce technical risks, and thereby help to reduce both project timescales and costs.

Similarly, in 1999, the United States General Accounting Office found from examination of a range of technology development cases that demonstrating a high level of maturity before new technologies are incorporated into programmes puts those programmes in a better position to succeed in meeting cost, time and performance requirements[7]. **Figure 12** shows that based on a review of 23 technologies, 19 Department of Defence and 4 commercial, the General Accounting Office found that the majority of the Department of Defence technologies were at low maturity at the main investment commitment point. The General Accounting Office recommended that the Department Of Defence adopt a disciplined and knowledge-based approach of assessing technology maturity, such as Technology Readiness Levels, and require that technologies needed to meet a weapon's requirements reach a high readiness level before the main investment commitment is made. The Department is keeping track of U.S. experience in using Technology Readiness Levels.

12 Technology Readiness Levels at the main investment commitment point

The majority of Department of Defense technologies were at low maturity at the main investment commitment point



Source: United States General Accounting Office

Without comprehensively quantifying and measuring how well projects reduce risk, the Department is less able to assess if it is spending the right amount of time and money before Main Gate

2.15 The Department has established measures for assessing the cost and time performance of projects during the assessment phase. For cost, the Department's measure is the average percentage variation from the approved Assessment Phase cost. Excluding the Bowman project, which is forecasting a 212 per cent (£275 million) cost overrun during the Assessment Phase and skews analysis, the total net variation from approved cost across the nine remaining projects is 1.8 per cent or £13 million. **Figure 13** shows that the cost variations on individual projects vary with four projects forecasting a cost overrun, four forecasting to spend less than what was approved, and one project (Skynet 5) forecasting to spend the amount approved. The average absolute (positive or negative) percentage variation from approved assessment phase cost for the nine projects is 18 per cent.

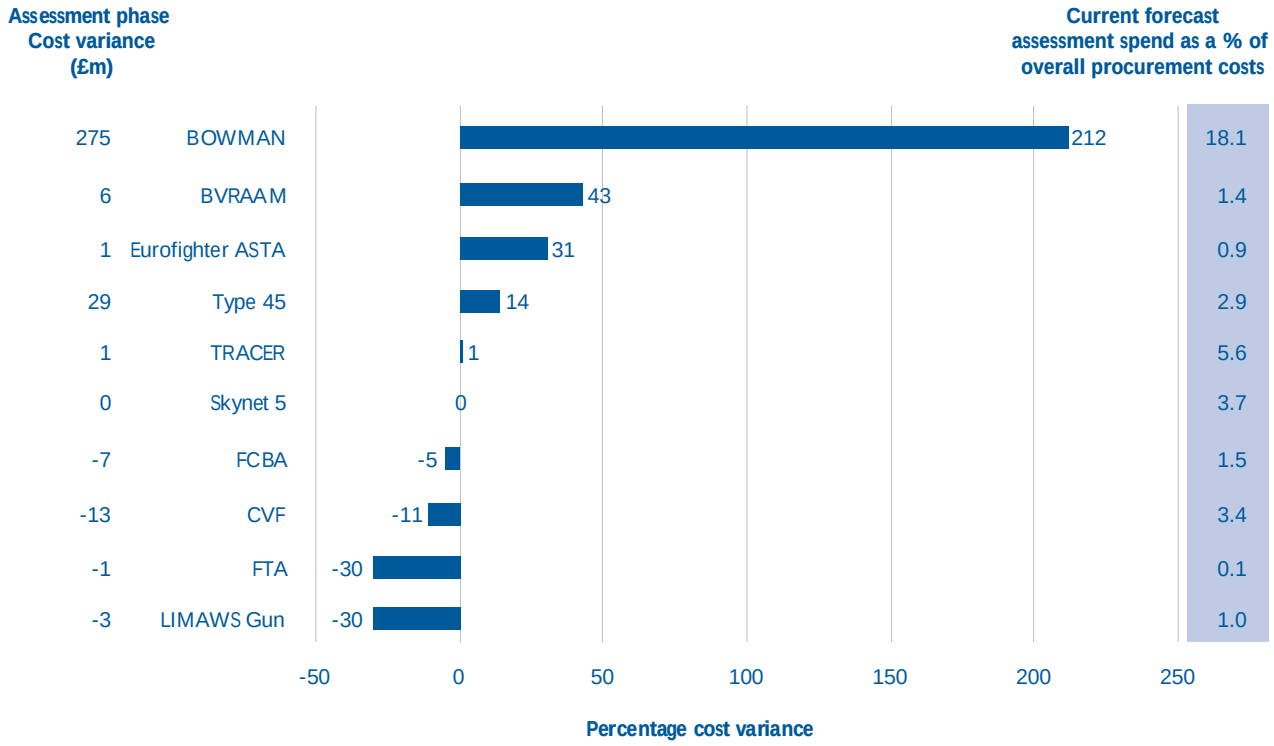
2.16 The Department's measure for time performance is the average variation from the planned Assessment Phase timescale between Initial Gate and Main Gate. Not all of the projects in the Major Projects Report 2001 had a forecast date for Main Gate in their original approvals as most of these original approvals pre-dated Smart Acquisition. **Figure 14** shows the variations against planned Assessment Phase timescale for the five projects for which comparative data is available. Excluding Bowman, which has been delayed for various reasons including technical difficulties and changes to the procurement strategy and is forecast to take 91 months longer than planned, the average forecast variation from the expected timescale for the four remaining projects is 27 months. For three projects the Assessment Phase is forecast to last longer than was originally planned and for one project (CVF) the Assessment Phase is forecast to last the originally planned time.

2.17 These cost and time variations during the Assessment Phase need to be interpreted carefully in the context of whether risk is being successfully reduced. Under Smart Acquisition, spending more money in the Assessment Phase and postponing Main Gate may be the right thing to do if it reduces risks to an acceptable level for Main Gate. For example, on the Beyond Visual Range Air-to-Air Missile, the Department decided to spend more than originally planned in the Assessment Phase and postpone Main Gate in order to drive out risk by funding additional risk reduction work with both bidders. In order to take these sort of decisions consistently with informed confidence, the Department must be able to assess, in a quantified way, whether projects are on track to successfully reduce risk to an acceptable level.

7 *General Accounting Office, NSAID-99-162 Best Practices, Better Management of Technology Development Can Improve Weapon System Outcomes*

13 Cost variations on projects during the assessment phase

The cost variations on individual projects vary



Source: National Audit Office

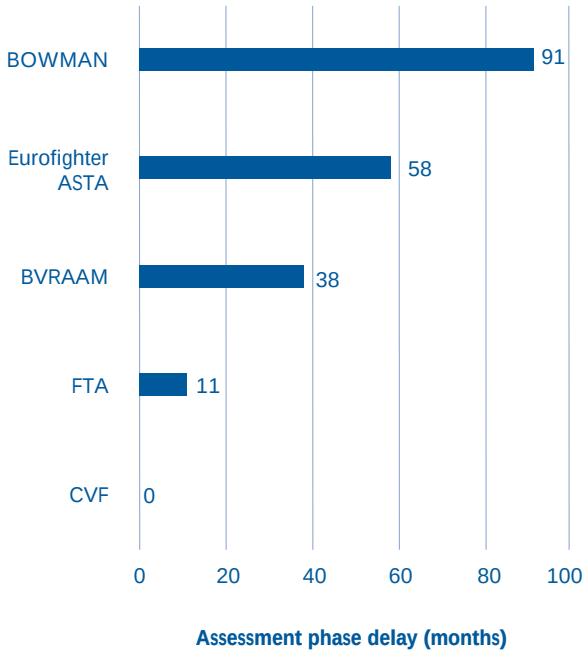
The Department is justifiably wary of setting cost and time targets in isolation as they need to be used in conjunction with risk assessment to assess performance

2.18 The Department has not set targets for cost and time performance during the Assessment Phase because it is concerned that in isolation such targets could create perverse incentives by placing more emphasis on cost and time at the expense of risk reduction. The primary goal of the Assessment Phase is to reduce risk on a project and as such the Department has to ensure that cost and time performance indicators for the Assessment Phase do not run counter to that objective. The Department intends to set cost and time targets in due course when it has developed complementary, quantifiable measures and targets to assess risk reduction.


Bowman

14 Time variations on projects during the assessment phase

Excluding Bowman, the average forecast variation from the expected timescale for the four remaining projects is 27 months



Source: National Audit Office

Artist's Impression of a Type 45 Destroyer

Part 3

Measurement of the impacts of Smart Acquisition

3.1 Smart Acquisition is intended to enable the Department to buy equipment "cheaper, faster and better" than was previously possible. We should thus expect, over time, to see noticeable improvements in the Department's performance against cost, time and technical parameters. These improvements should be seen across projects of all sizes and not be limited to those covered in the Major Projects Report.

3.2 In this part of the Report, we examine the performance indicators currently available to assess the impacts of Smart Acquisition on cost, time and technical performance across all projects. We also look at the Department's performance measurement plans for the future. We found that the different parts of the Department measure their performance separately and the Department is working to develop the quality and coherence of the metrics being used. As the metrics evolve, the Department intends to draw on them to develop indicators to demonstrate at a corporate level whether performance is improving under Smart Acquisition.

Information on whether Smart Acquisition is delivering the expected benefits is available from different sources

3.3 Since Smart Acquisition was introduced in 1998, its impact on acquisition performance has been assessed:

- through the Major Projects Report (paragraphs 3.4 to 3.5);
- by measuring progress against a £2 billion cost reduction target for the Defence Procurement Agency (paragraphs 3.6 to 3.9); and
- through various other separate measures established by the Defence Procurement Agency, Defence Logistics Organisation and Equipment Capability Customer some of which will be captured in the Department's 2000/2001 Performance Report (paragraph 3.10 to 3.12).

The Major Projects Report will over time provide more information on the impact of Smart Acquisition

3.4 The Major Projects Report assesses the performance of the 20 largest post-Main Gate and 10 largest pre-Main Gate projects by forecast spend. These projects cover the majority (some two thirds) of the Department's total procurement spend and the Report therefore gives a good indication of the Department's overall performance against agreed cost, time and performance parameters. It is still early to expect to see any major impact of Smart Acquisition on the projects in the report as most began before the introduction of Smart Acquisition. Indicatively, 17 of the 20 post-Main Gate projects currently in the population reached Main Gate prior to the introduction of Smart Acquisition and 8 of the 10 pre-Main Gate projects currently in the population reached Initial Gate prior to the introduction of Smart Acquisition.

3.5 The Major Projects Report population is changing over time and the proportion of projects approved under Smart Acquisition will increase. The Report will, in future, progressively provide a clearer picture of whether Smart Acquisition is delivering the expected benefits as newer projects replace older ones. In the Major Projects Report 2002, for example, it is expected that 12 of the 20 post-Main Gate projects included in the Report and six of the 10 pre-Main Gate projects will have been approved since the introduction of Smart Acquisition. Also, in future the Major Projects Report will include data on the whole-life costs associated with equipment acquisition. Using this data, the report will, over time, provide information on whether the continuing application of Smart Acquisition principles is delivering the expected through-life benefits.

The Department's £2 billion Smart Acquisition target provided some information on the benefits anticipated under Smart Acquisition in equipment procurement

3.6 In the Strategic Defence Review of 1998, the Department set a target to reduce costs by some £2 billion over 10 years from the introduction of Smart Acquisition. Between 1998 and 2001, the Department identified £2.4 billion of cost reductions and introduced additional capabilities, such as the new carrier and 16 Air Assault Brigade. The Smart Acquisition cost reductions help make a contribution to rebalancing of forces following the Strategic Defence Review. **Figure 15** gives a profile of these estimated cost reductions.

3.7 The Department also identified where the £2.4 billion cost reductions are expected to be made. **Figure 16** shows that 12 projects account for some 70 per cent of the anticipated cost reductions up to 2007/08. The specific reasons for forecast cost reductions on these projects include:

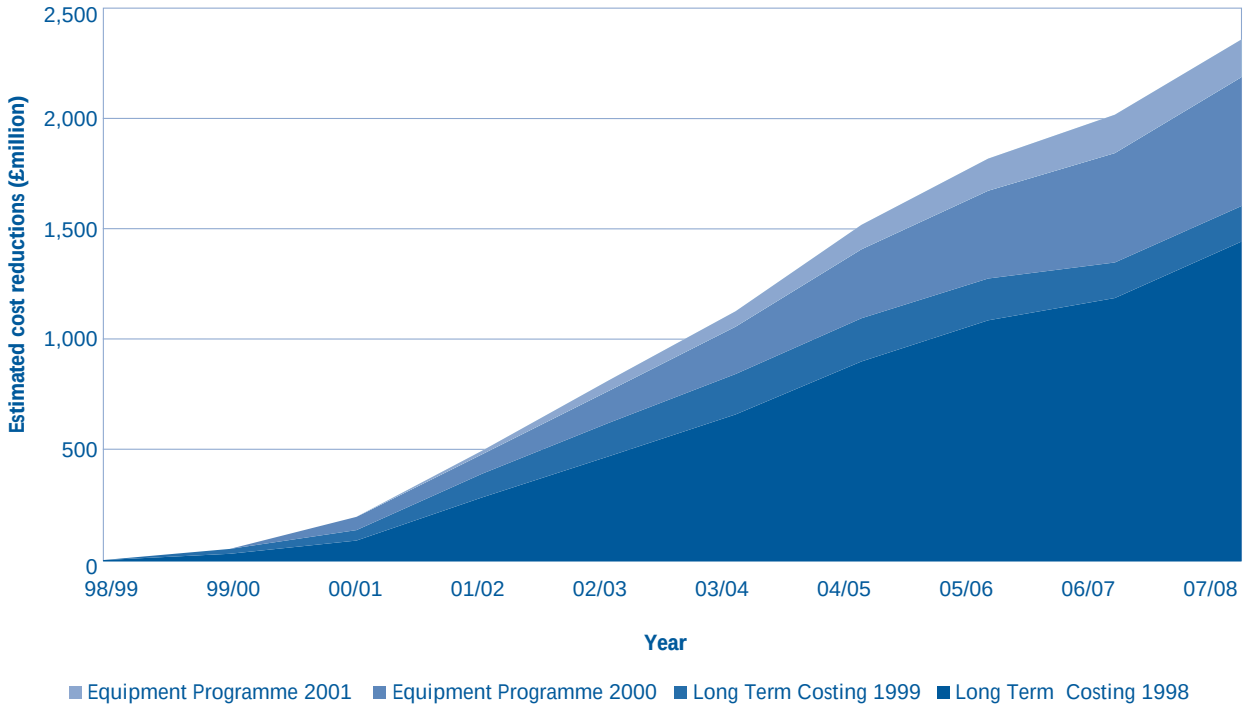
- planned use of incremental acquisition principles to reduce the risk of technological obsolescence (Common New Generation Frigate/Type 45 Destroyer and MINDER mine detection, marking and neutralisation system);
- partnering arrangements with industry, which the Department believes will enable open book pricing and improved contract incentivisation (Rapier Mk. 2 and Eurofighter); and
- potential revenue from third party useage under Private Finance Initiative/Public Private Partnership arrangements (Skynet 5 and Very Low Frequency Communications).

The Department will track progress on 11 large equipment programmes - covering approximately 60 percent of the expected cost reductions - to discover whether or not the forecast reductions are fully realised.

3.8 The Department's £2 billion cost reduction target is an input measure that does not capture the full impact of Smart Acquisition on equipment capability and project duration. The Department will not therefore be able to comprehensively demonstrate through the £2 billion target that the cost reductions have actually been used to deliver the planned capabilities at the end of the 10-year period within the envisaged budget, or that project timescales also reduced in that period. This is because cost reductions identified on projects may be balanced by additional costs elsewhere on the same project or in other parts of the defence equipment programme and additional costs may be traded-off against time or capability.

15 Profile of anticipated cost reductions up to 2007/08

The Department has to date identified £2.4 billion of Smart cost reductions



Source: Ministry of Defence

3.09 Also, the £2 billion target was intended to cover Smart Acquisition cost reductions in equipment procurement up to 2007/08, and did not capture cost reductions further through life. In developing Smart Acquisition measures, the Defence Procurement Agency, in some instances, identified through-life cost reductions that fell outside of this period. In the case of the Attack Helicopter, for example, the Department identified the potential to reduce the costs of supporting the aircraft in-service by £750 million due to the further application of Integrated Logistics Support principles. However, the Department's policy of budgeting for equipment procurement expenditure over ten years, whereas support and other activities are budgeted for over four years means that the Department is unable currently to fully monitor these potential benefits. The introduction of Whole Life Cost data in the future will help to address this issue.

Different parts of the Department have separate measures of how Smart Acquisition impacts on their performance

3.10 Smart Acquisition involves a community of stakeholders across the Department. Three of these - the Defence Procurement Agency, Defence Logistics Organisation and Equipment Capability Customer - each measure their performance under Smart Acquisition separately, although they do report collectively to the Defence Management Board and the Ministerial Steering Group on Smart Acquisition. The separate measures used by each of the organisations are summarised overleaf in **Figure 17**.

The Department is working to improve the link between the different sources of information through evolving current metrics and developing new ones

3.11 The Department has introduced Smart Acquisition reforms across the Department and recognises the need to measure its impacts coherently in order to be able to evaluate its continuing achievements. Under Smart Acquisition, the Department has instigated pan-Departmental acquisition processes, and there is a pan-Departmental Smart Acquisition Sustainment and Support Team. Part of the role of this team is to promote coherency and 'jointery' between the different parts of the Department by, for example, identifying and disseminating best practice across the acquisition community and providing advice on through-life project management.

3.12 The Department is looking to develop further metrics and targets for assessing the benefits of Smart Acquisition across the Department. In late 2000, the Department set up a joint Performance Task Force including representatives from the Defence Procurement Agency, Defence Logistics Organisation, and Equipment Capability Customer and Central Staffs. The objectives of the Performance Task Force are to marry, at the 'strategic level', all of the corporate stakeholders' acquisition objectives and targets.

16 Breakdown of expected cost reductions to 2007/08 by project (identified to 31 March 2001)

12 projects account for some 70 per cent of the cost reductions

Project	Estimated cost reductions to 2007/08 (£m at 97/98 prices)	% of total cost reductions	Department tracking?
Skynet 5	481	20.2	✔
Bowman	196	8.2	✔
Common New Generation Frigate/ Type 45 Destroyer	175	7.3	✔
Beyond Visual Range Air-to-Air Missile	169	7.1	✔
Precision Approach Landing System/Microwave Landing System	101	4.3	✔
MINDER	100	4.2	✔
Mines in the Next century	94	4.0	✗
Armoured Battlefield Support Vehicle	85	3.6	✔
Very Low Frequency Communications	57	2.4	✔
Rapier	48	2.0	✔
Eurofighter	39	1.6	✔
Airborne Stand-off Radar	35	1.5	✗
Other (some 210 measures)[1]	799	33.6	✗
TOTAL	**£2379m**	**100**	

NOTE

1 These measures cover cost reductions on individual projects and aggregate cost reductions across groupings of smaller projects (e.g. in-service ammunition, generic trainers and simulation, and command support environment).

Source: Ministry of Defence

17 **Measures currently being used by the Department to assess the impact of Smart Acquisition on the cost, time and performance of projects**[8]

	Defence Procurement Agency	Defence Logistics Organisation	Equipment Capability Customer
Cheaper (cost)	a. Average 2.6 per cent cumulative cost growth [Key Target 3], falling to 2.3 per cent from 2002/03. b. 60 per cent of Category A, B and C post-Main Gate/ pre-ISD projects[9] within approved costs, rising to 70 per cent in 2002/03. c. Cost reduction targets: - £2 billion between 1998/99 and 2007/08 [Strategic Defence Review]. - £750 million during the period 2001/02 to 2003/04 [Public Service Agreement]. - £200 million new cost reductions to be identified each annual 10-year planning round [Business Plan].	a. Target to reduce output costs by 20 per cent over 5 years (measurement includes disaggregation of cost reductions due to Smart Acquisition).	a. (A methodology for the collection, analysis and reporting of the trade-off of cost and time against Key User Requirements is under development).
Faster (time)	a. Average 11.4 months cumulative ISD slippage [Key Target 2], falling to 10 months from 2002/03. b. 60 per cent of Category A, B and C post-Main Gate/pre-ISD projects within approved timescales, rising to 70 per cent in 2002/03. a. 35 per cent of Category A, B and C post-Main Gate/ pre-ISD projects meeting their planned in- service dates, rising to 40 per cent in 2002/03.		a. (A methodology for the collection, analysis and reporting of the trade-off of cost and time against Key User Requirements is under development). b. Timeliness and quality Category A,B and C submissions and timeliness of decision taking.
Better (performance)	a. 97 per cent key requirements compliance [Key Target 1]. b. 60 per cent of Category A, B and C projects post-Main Gate/pre-ISD projects meeting approved Key User Requirements, rising to 70 per cent in 2002/03. c. Customer satisfaction rating (survey).	a. 98 per cent of Customer Supplier Agreements met. b. Customer satisfaction rating (survey). c. (Sustainability target being developed).	a. Public perceptions of the standard of military equipment (commissioned survey).

Source: Ministry of Defence

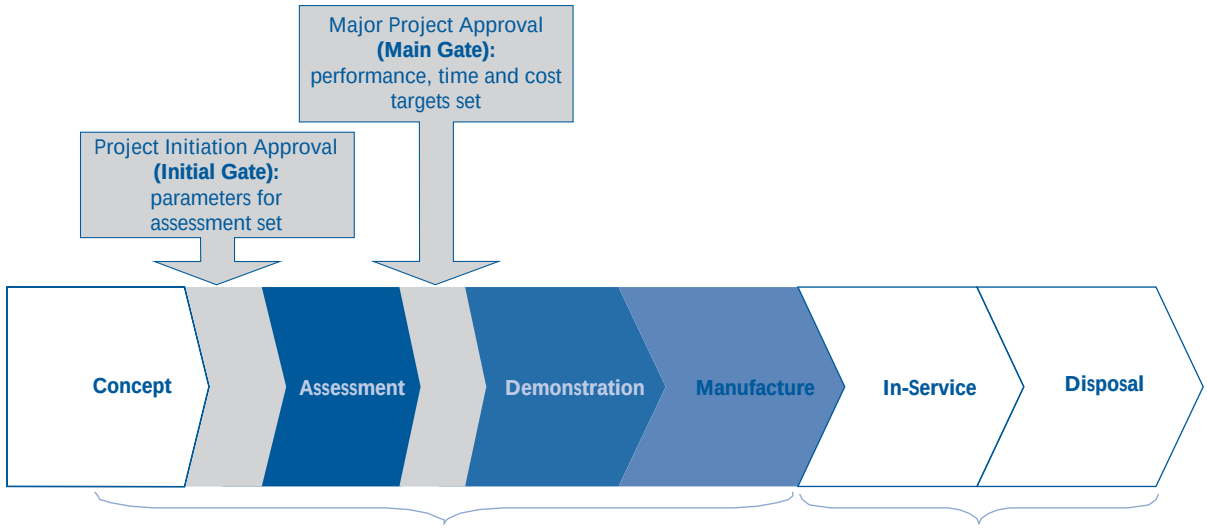
The Performance Task Force is aiming to further develop and promulgate a virtual Departmental Smart Acquisition Balanced Scorecard by March 2002 as a tool to identify potential new measures and ensure acquisition performance indicators are comprehensive and coherent for the different parts of the acquisition community within the Department. As current measures evolve and new indicators become available, the Department plans to capture and report them corporately where appropriate through its annual Departmental Performance Report.

8 The Department has included several other measures to assess the overall success of Smart Acquisition in its Business Plans for 2001/02, most notably:
a. On risk reduction in the Assessment Phase: 85 per cent of Category A, B and C projects - projects valued over £20 million - with successful Main Gate EAC submission first time (DPA only).
b. On implementation of through-life management processes: per cent of projects with costed Through Life Management Plans (DPA and DLO).
c. On innovation/learning: number of Learning from Experience seminars (4) and briefings (12) held each year (DPA only); per cent of key topic areas on the Acquisition Management System that have examples of best practice contributed from both minor and major programmes.
d. On stakeholders: staff satisfaction ratings (DPA, DLO and ECC); ratio of supportive/non-supportive media coverage (DPA monitored).
9 Category A, B and C projects are those with a forecast spend in excess of £20 million.

Appendix 1 The Smart Acquisition Cycle

1 Under the Smart Acquisition lifecycle, there are two key approval points, Initial Gate, at which parameters for the assessment phase are set, and Main Gate, at which performance, time and cost targets for the Demonstration and Manufacture phase are set. **Figure 1** outlines the acquisition lifecycle and the responsibilities of Integrated Project Teams at each stage.

1 The Smart Procurement acquisition cycle showing the role of Integrated Project Teams



Integrated Project Team created within the Defence Procurement Agency

- support creation of User Requirement Document
- create System Requirement Document & Design
- create/maintain Through-Life Management Plan
- identify, evaluate and down-select options
- produce Business Case
- obtain the equipment
- deliver into service

Integrated Project Team transfer to Defence Logistics Organisation

- support and maintain the system via the Through-Life Management Plan
- refine and undertake disposal plan

Source: National Audit Office

Appendix 2 Ministry of Defence - Project Summary Sheets

This appendix contains the Project Summary Sheets for all 20 post-Main Gate and 10 pre-Main Gate projects included in this year's Report, as well as one cancelled post-Main Gate project (MR Trigat).

APPENDIX 2: MINISTRY OF DEFENCE - PROJECT SUMMARY SHEETS

POST-MAIN GATE PROJECTS

PRE-MAIN GATE PROJECTS

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POST- MAIN GATE PROJECT SUMMARY SHEET

ADVANCED AIR-LAUNCHED ANTI-ARMOUR WEAPON (AAAW)

Integrated Project Team Responsible:
Brimstone

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

The Advanced Air-launched Anti-armour Weapon (AAAW), known as Brimstone, is designed to reduce the fighting power of enemy armoured forces as early and as far forward as possible. It replaces the BL755 cluster bomb in the anti-armour role, and will be carried on Tornado GR4/4a, Harrier GR9 and Eurofighter. These fixed-wing aircraft will complement the capability provided by the Apache AH64D armed with the Hellfire anti-armour weapon. Brimstone operates autonomously after launch, which helps reduce the hazard to the attacking aircraft from enemy fire. The longer reach and speed of deployment of fixed-wing aircraft means that they can engage armour far beyond the battlefield area and before it can join the contact battle.

Following an international competition a development and production contract was placed with Alenia Marconi Systems Ltd (formerly GEC Marconi Radar and Defence Systems) in November 1996. The development phase is progressing satisfactorily with all milestones achieved on time. Qualification testing of the launcher leading to a successful first flight of the weapon fitted to a Tornado GR1 was achieved in December 1998. The ground launch development firing programme, which was to have been completed in March 2000, is now due to be completed later in 2001 owing to technical difficulties. The first 12 missiles, for use on missile evaluation during 2001/02, are due to be delivered in July 2001.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
Tornado GR4/4a (Package 2)	2002	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
Alenia Marconi Systems. Prime Contractor	Development and Production	Firm price until December 1998, fixed price thereafter.	International competition.
Boeing North American Operations. Sub contractor.	-	-	-

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	809
Approved Cost at Main Gate	849*
Variation	-40
In-year changes in 2000/2001	-26

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Technical Factors	3	6	Reassessment of Development activities (+£3m); reassessment of Tornado Integration Requirements (-£3m) and Harrier Integration Requirements (-£2m); reassessment of level of Defence Evaluation and Research Agency (DERA) Support (-£1m).
Changed Requirement	4	3	Reduction in launcher quantities and Service Weapon Test Sets (-£2m); deletion of Tornado Inboard Pylon (-£1m); additional requirements for Emulators (+£4m).
Changed Budgetary Priorities	4	49	Delay to ISD, milestone payment and Eurofighter Integration (+£4m); reduction of missile quantity by 25% (-£49m).
Inflation	16		Difference between the inflation assumed at contract let and the GDP Indices from the time of approval (+£14m); difference between GDP and inflation on the main contract since placement (+£2m).
Exchange Rate		6	Change in US Dollar exchange rate quoted in the contract (-£6m).
Accounting Adjustments and Re-definitions		3	Changes due to conversion of cash based approvals and contract details to resource basis (-£3m).
Total	+27	-67	
Net Variation		-40	

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	282

2d. Years of peak procurement expenditure

2001/2002	2004/2005

* The approved cost has changed from the Major Projects Report 2000 because more accurate information on notional interest on capital charges has been used in converting the cash approval to a resource basis. The actual amount approved to be spent on the project has not changed.

2e. Unit production cost

Unit Production Cost (£m)*		Quantities Required	
at Main Gate	Current	at Main Gate	Current
***	***	***	***

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	Delivery of the first *** weapons and associated equipment to a front-line unit, and declaration that the unit is operational.

3b. Performance against approved in-service date

Current forecast ISD	October 2002
Approved ISD at Main Gate	September 2001
Variation (Months)	+13
In-year changes in 2000/2001	Nil

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Changed Requirement	12		Equipment Capability Customer request to bring Brimstone ISD into line with that of Tornado GR4/4a (Package 2) (+12 months).
Contracting Process	1		Delay in letting contract with Alenia Marconi Systems as pricing negotiations took longer than anticipated (+1 month).
Total	+13		
Net Variation	+13		

* UPC is the cost of 1 weapon, ie launcher plus 3 missiles.

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	1		Annual support cost for BL755 (approx +£1m/pa).
Other	19	5	Annual support cost for Brimstone (approx -£5m/pa). Additional costs to modify BL755 (+£11m). Urgent Operational Requirement for further modifications to BL755 (+£8m).
Total	+15		

3e. Operational impact of ISD variation

The ISD delay of 13 months results in the lack of a fully effective anti-armour capability and the run-on of RBL755 in the anti-armour role. However, 12 months of the delay are necessary to align Brimstone ISD with the availability of its Tornado GR4/4a (Package 2) platform.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	Carriage, launch and jettison from Tornado GR4/4a, Harrier GR9 and Eurofighter.	Yes
2	Autonomous operation after launch.	Yes
3	Detection and attack of Main Battle Tanks, Armoured Personnel Carriers and Self Propelled Guns.	Yes
4	Kill probability as defined in System Requirement Specification (SRS).	Yes
5	Launch from high and low altitude.	Yes
6	Resistance to active and passive countermeasures.	Yes
7	Component lives as defined in SRS.	Yes
8	Compatibility with existing aircraft loads.	Yes
9	Reliability, Maintainability and Testability as SRS.	Yes
10	Minimum Through-life costs.	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	None

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

Approval was given for feasibility studies to be carried out in 1982, however during Options for Change programme funding was withdrawn while alternatives for a future anti-armour capability were considered. The project was reinstated in 1993 and the revised Staff Requirement, for an Advanced Air-launched Anti-armour Weapon (AAAW), was presented to the Equipment Approvals Committee (EAC) early in 1994.

In June 1994, the EAC gave approval for an Invitation to Tender (ITT) to be issued to industry for an AAAW. Following issue of the ITT in December 1994, proposals were received from GEC Marconi, Hunting Engineering, Texas Instruments, Thorn EMI and British Aerospace.

Following full technical and commercial assessment of the proposals a further tender round took place in January 1996. This concentrated on the commercial aspects of the bids in line with revised timescales and production quantity requirements.

The tender assessment was completed in February 1996 with the findings being presented to EAC. Brimstone was found to have superior relative performance by a comfortable margin and also provided the most cost-effective solution. In July 1996 the Secretary of State for Defence announced that GEC Marconi had won the AAAW competition with its Brimstone weapon, and would be awarded the contract to develop and produce the weapon system.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	23	2.8%
Approved Cost at Initial Gate	20	2.4%
Variation	+3	

5c. Duration of Assessment Phase

Date of Main Gate Approval	March 1996
Target Date for Main Gate Approval at Initial Gate	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	849	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	-	September 2001	-
Forecast ISD at Initial Gate	-	December 1991	

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POST-MAIN GATE PROJECT SUMMARY SHEET

ADVANCED SHORT RANGE AIR-TO-AIR MISSILE (ASRAAM)

Integrated Project Team Responsible:
Advanced Short Range Air-to-Air Missile (ASRAAM)

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

ASRAAM is required to be a fast, highly agile, fire and forget missile for short range air-to-air combat, able to counter intermittent target obscurity in cloud and severe Infra Red countermeasures. It will be carried on Eurofighter, Harrier GR7/9, Tornado F3 and the Royal Navy's Sea Harrier FA2. It will replace Sidewinder AIM-9L albeit that this will remain in service in parallel for a period.

Following competition, a contract for full development and production was placed with British Aerospace Defence Division (now Matra BAe Dynamics (UK) Ltd) (MBD)) in March 1992, with deliveries originally scheduled from 1998. The contract was amended in June 1995 to increase the number of missiles. Following an Equipment Approvals Committee (EAC) decision in August 1999 the contract on MBD was rescheduled. The programme had slipped by 18 months for technical reasons, but revised platform availability necessitated a further six months slippage.

Since rescheduling of the contract, MBD has continued its efforts to meet the missile performance requirements. However, further slippage has occurred on the programme since 31 March 2000 and shortfalls in the missile's performance have been identified which make ASRAAM unacceptable to the Department's Customer at present. The Department and MBD are working together to achieve a way forward and a revised in-service date (ISD). An EAC Review Note is currently scheduled for July 2001 when approval of a new ISD will be sought. Meanwhile the forecast ISD has not been changed.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
-	-	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
Matra BAe Dynamics (UK) Ltd	Development & Production Package	Fixed to 1 September 1999 Firm from 2 September 1999	International Competition

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	857
Approved Cost at Main Gate	866*
Variation	-9
In-year changes in 2000/2001	-4

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Technical Factors	25		Technical problems have led to slippage in the programme, which has resulted in an increase in the Interest on Capital (IOC) (+£25m).
Changed Requirement	45	31	Requirement to carry out Service Evaluation Trials (+£30m); Environmental Round to measure the on-board environment of ASRAAM on various aircraft (+£2m); various studies to clarify the project requirement (+£1m); the purchase of Buffer Connectors providing an interface between the missile and aircraft electronics (+£1m); the decision to convert operational missiles to telemetered missiles (+£2m); an increase in Defence Evaluation and Research Agency support to the development and production package (+£9m); reduction in cost following selection of a conventional rocket motor (-£9m); ***
Inflation		3	Variation due to changes in inflation assumptions (-£3m).
Receipts		19	Liquidated Damages and Consideration Payments due to late delivery of missiles (-£19m).

* The approved cost has changed from the Major Projects Report 2000 because more accurate information on notional interest on capital charges has been used in converting the cash approval to a resource basis. The actual amount approved to be spent on the project has not changed.

Factor	Increase £m	Decrease £m	Explanation
Contracting Process	3	46	Reduction in prices as a result of contractual negotiations (-£38m); Re-negotiation of the contract to convert from fixed to firm price, introduction of a Smart gainshare incentivisation and integration of a new processor (+£3m); Failure to meet gainshare incentivisation (-£8m).
Accounting Adjustments and Re-definitions	17		Derivation of the approved cost on a resource basis (+£17m).
Total	+90	-99	
Net Variation		-9	

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	512

2d. Years of peak procurement expenditure

2001/02	2002/03

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
0.2	0.2	***	***

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	Acceptance of the Certificate of Design and the performance Statement with the subsequent delivery of 60 missiles that are fit for purpose.

3b. Performance against approved in-service date

Current forecast ISD	June 2001*
Approved ISD at Main Gate	December 1998
Variation (Months)	+30
In-year changes in 2000/2001	+6

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Technical Factors	24		Missile hardware and software technical difficulties (+18 months); failure of the missile to meet contracted performance (+6 months).
Changed Requirement	6		To align missile production deliveries with candidate aircraft availability (+6 months).
Total	+30		
Net Variation	+30		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	-	-	-
Other	-	1	The delay to ISD has meant that only minimal Post Design Services have been undertaken (-£1m).
Total	-	-1	

3e. Operational impact of ISD variation

The Royal Air Force will continue to use stocks of Sidewinder AIM-9L and improved derivatives for their short range air-to-air missile capability. Whilst the consequence of the slippage to ASRAAM is continued use of a lesser capability for longer, this is partially mitigated in the short term by the upgrade of a significant proportion of the Sidewinder stockpile to AIM-9Li standard which has improved capability in stressing engagements. The platform suffering the greatest impact of ISD slippage will be Tornado F3, where the range, manoeuvring and seeker capability required of ASRAAM will provide considerable effectiveness and survivability enhancements over Sidewinder. There is no anticipated impact on Eurofighter capability in the short term.

* This was the ISD Forecast by the Department in February 2001, the latest position reported by the Department pending the outcome of negotiations with the Contractor over the missile's performance. The ISD will be revised when a way forward is agreed.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	Target Discrimination	Yes
2	Fire and Forget	Yes
3	All Aspect Acquisition and Track	No
4	Reliability	Yes
5	Average Missile Velocity	Yes
6	Launch Time	Yes
7	Probability of Kill	No
8	Countermeasures Resistance	No
9	Multi-Aircraft Interoperability	Yes
10	Off-boresight Acquisition and Launch	No
	Percentage currently forecast to be met	60%
	Change since previous MPR	-40%

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
3. All Aspect Acquisition and Track	Technical Factors	***
7. Probability of Kill	Technical Factors	***
8. Countermeasures Resistance	Technical Factors	***
10. Off boresight Acquisition and Launch	Technical Factors	***

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

ASRAAM was originally a collaborative project under the Family of Weapons Memorandum of Understanding, signed in 1980. However, the programme encountered difficulties in the missile configuration, the establishment of effective collaborative arrangements in industry and the identification of an affordable solution. Our partner nations finally withdrew from the programme during 1989 and 1990 following which ASRAAM was re-endorsed as a National programme in 1990. A competition was then held, the results of which were submitted to the EAC in March 1992.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	72	8%
Approved Cost at Initial Gate	83	9%
Variation	-11	

5c. Duration of Assessment Phase

Date of Main Gate Approval	March 1992
Target Date for Main Gate Approval at Initial Gate	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	866	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	-	December 1998	-
Forecast ISD at Initial Gate	-	December 1994	-

POST-MAIN GATE PROJECT SUMMARY SHEET

AIRBORNE STAND-OFF RADAR (ASTOR)

Integrated Project Team Responsible:
Airborne Stand-Off Radar (ASTOR)

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

ASTOR is a new capability, which will provide a long range all-weather theatre surveillance and target acquisition system, capable of detecting moving, fixed and static targets. It is designed to meet a joint Army and RAF requirement. The system comprises a fleet of air platforms, each with a radar sensor, and a number of ground stations.

Following a competition with Lockheed Martin and Northrop Grumman, Raytheon Systems Limited was selected as the preferred bidder for ASTOR in June 1999. Subsequently, contract award was achieved in December 1999. The Prime Contract with Raytheon Systems Limited is for the full development and production of 5 aircraft and the 8 mobile and transportable ground stations. The contract also covers the provision of 10 years contractor logistic support the costs of which are not reported below but amount to around £140m. Bombardier is the major sub-contractor providing the 5 Global Express aircraft.

In March 2001, a Preliminary Design Review (PDR) for the ASTOR system was held. The PDR identified a number of areas needing attention by the contractor, including safety and requirements compliance. Flight validation trials are due to take place mid-year. A Critical Design Review (CDR) for the ASTOR System is scheduled for November 2001.

The first aircraft and ground stations are due to be delivered in 2004 with final deliveries being made in 2008.

1b. Associated projects

Critical to Achievement of ISD		**Critical to Meet Initial Gate Requirement**	
Project Title	Forecast ISD	Project Title	Forecast ISD
-	-	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
Raytheon Systems Limited (Prime Contractor)	Full Development and Production	Firm	Competitive (International)
Bombardier Aerospace (Sub-contractor)	Production	Firm	Competitive (International)

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	930
Approved Cost at Main Gate	938
Variation	-8
In-year changes in 2000/2001	+4

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Exchange Rate	3		Change in the Dollar/Pound exchange rate (+£3m).
Contracting Process	7	16	Delay in contract award and reduced costs during Best and Final offers and contract negotiation (-£16m) and requirement for additional Technical Documentation (+£7m).
Accounting Adjustments and Re-definitions		2	Derivation of the approved cost on a resource basis (-£2m).
Total	+10	-18	
Net Variation		-8	

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	148

2d. Years of peak procurement expenditure

2001/02	2002/03

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
-	76.9	5 Aircraft	5 Aircraft
-	14.7	8 Groundstations	8 Groundstations

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	2 aircraft and 2 ground stations accepted into service and supported by the provision of an adequate logistic and training support.

3b. Performance against approved in-service date

Current forecast ISD	September 2005
Approved ISD at Main Gate	September 2005
Variation (Months)	0
In-year changes in 2000/2001	0

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
-	-	-	-
Total	-	-	
Net Variation	-	-	

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	-	-	-
Other	-	-	-
Total	-	-	

3e. Operational impact of ISD variation

-

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	Endurance : Minimum of *** *hrs*, within which *** *hrs* at best endurance speed above *** *ft* above mean sea level. *** *hrs* at best cruise height and speed	Yes
2	Altitude and Range : *xft* and *xkm*[3]	Yes
3	Ground Station Transportability : C130K/J	Yes
4	Ground Station Responsiveness : Pre-planned tasks within *** *hrs* of sortie closure	Yes
5	Radar Range : Radar Range bracket *xkm* (Min far range) – *xkm* (Max near radar range)	Yes
6	Air Platform Reaction Time : Turnaround > *** *hrs*	Yes
7	Air Segment Battlefield Mission : *Moving Target Indicator scan rate x per min*	Yes
8	Air Segment Battlefield Mission(1) : *x Synthetic Aperture Radar Spot xkms*[4]	Yes
9	Air segment Battlefield Mission (2) : *x Swathe Images* per mission	Yes
10	Ground segment Battlefield Mission : *x days crisis and x days war*	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	None

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

In 1989 a technology demonstration programme (TDP) worth £12m (at 1999/00 prices) was agreed with Research Establishments now incorporated into Defence Evaluation Research Agency (DERA). This intramural work ran for two years and demonstrated that the concepts used in ASTOR were practicable. A move into Project definition (PD) was approved in September 1993. This is now deemed to be the equivalent of Initial Gate.

Following open competition, two parallel contracts for an 18 month PD programme were let in February 1995. After assessment of the PD proposals it was considered that the optimum solution would be to invite the two PD consortia to submit Best and Final Offers (BAFOs) for the Development, Production and In-Service Support. This revised Procurement Strategy was approved by the then Minister for Defence procurement in March 1997.

During the preparation to invite the two PD consortia to submit BAFOs in September 1997 programming decisions were taken which delayed the availability of funding, particularly in the early years, and the in-service date for the ASTOR capability was delayed by 15 months. During the BAFO phase a decision was taken to consider a third bid based upon the US Joint Surveillance Target Attack radar system (JSTARS) upgrade programme, the Radar Technology Insertion programme (RTIP). As a result various unsolicited revisions to the bids were received during the assessment process, further delaying the in-service date by 14 months. Approval for the implementation phase was given after down selection in June 1999.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	13	1.4%
Approved Cost at Initial Gate	12	1.3%
Variation	+1	

5c. Duration of Assessment Phase

Date of Main Gate Approval	June 1999
Target Date for Main Gate Approval at Initial Gate	March 1998
Variation (Months)	+15

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	938	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	-	June 2005	September 2005
Forecast ISD at Initial Gate	-	April 2003	-

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POST-MAIN GATE PROJECT SUMMARY SHEET

ASTUTE CLASS SUBMARINE

Integrated Project Team Responsible:
Attack Submarine (ASM)

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

The Astute Class of submarines is the planned replacement for the Swiftsure Class SSNs (Sub-Surface Nuclear). Invitations to tender for the first three submarines of the class were issued in July 1994 with competitive bids received in June 1995. GEC-Marconi (now BAE SYSTEMS Astute Class Ltd) was identified as the MOD's preferred bidder in December of the same year. Following protracted negotiations, using the policy of No Acceptable Price No Contract (NAPNOC), a prime contract was placed and announced on 17 March 1997. The contract put in place the first whole boat, Prime Contract for UK nuclear powered submarines. The Prime Contract is for the design, build, and initial support of three submarines. The support task will be undertaken by the Prime Contractor for a total of eight submarine years (4.5 calendar years). The Prime Contract requires an integrated Tactical Weapons System with a performance at least as good as the Swiftsure & Trafalgar (S&T) Update Final Phase. As a risk reduction measure, the former Departmental contracts for the Final Phase of the S&T Update have been novated into the Prime Contract for Astute. Forthcoming key dates are detailed below. As at 31 March 2001, the Astute project is progressing satisfactorily and is on target to achieve these dates:

1. Start fabrication of Boat 2, HMS AMBUSH August 2001.
2. Complete whole boat design freeze review January 2003.

Expenditure in clear prospect - It is anticipated that an order for a further three Astute class submarines will be placed in late 2002. This order will be subject to approval by the EAC, Ministers and Treasury. Estimated cost is £1.7bn.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
S&T Update Final Phase	2004	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
BAE SYSTEMS Astute Class Ltd (formally GEC Marconi)	Full development, production and initial support	Fixed price incentive fee with a maximum price	Competitive (UK)

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	2698
Approved Cost at Main Gate	2726
Variation	-28
In-year changes in 2000/2001	-70

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Changed requirement	32		Includes change to fore end design, completion of land attack missile capability and improved tactical data link capability (+£32m).
Inflation	14		Variation between anticipated rates for GDP and VOP on contract (sunk costs only) (+£14m).
Accounting adjustments		74	Variation reflects difference between anticipated resource profile at approval and current profile (EP2001) (-£74m).
Total	+46	-74	
Net Variation		-28	

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	490

2d. Years of peak procurement expenditure

2002/03	2004/05

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	At Main Gate	Current
-	-	3	3

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	Stage 1 acceptance from the contractor (safe operation and start of operational work-up).

3b. Performance against approved in-service date

	Date
Current forecast ISD	June 2005
Approved ISD at Main Gate	June 2005
Variation (Months)	0
In-year changes in 2000/2001	0

3c. Reasons for variation from approved ISD

Factor	**Increase**	**Decrease**	**Explanation**
Total	-	-	-
Net Variation	-	-	

3d. Cost resulting from ISD variation

Type of Cost/Saving	**Cost £m**	**Saving £m**	**Explanation**
Support costs of current equipment	-	-	-
Other	-	-	-
Total	-	-	

3e. Operational impact of ISD variation

-

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently Forecast to be met (Yes or No)
1	Weapon system effectiveness	Yes
2	Sonar performance	Yes
3	Hull strength (survivability)	Yes
4	Top speed	Yes
5	Endurance, 70 days deeply submerged	Yes
6	Acoustic signature	Yes
7	Complement	Yes
8	Land attack capability	Yes
9	Special forces capability	Yes
	Percentage currently forecast to be met	100 %
	Change since previous MPR	None

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the assessment phase

The Astute Class of submarines is the planned replacement for the Swiftsure Class (Sub-Surface Nuclear (SSNs). In June 1991, approval to proceed with a programme of studies at an estimated cost of £6m (1991/92 prices) to define the Batch 2 Trafalgar Class Boat (now known as the Astute Class). This programme of studies led to the issue of an Invitation to Tender for the design and build of an initial batch of three Astute Class SSNs and a further approval of £2m (1992/93 prices) for contractor and Defence Research Agency support to MOD during the tendering exercise in 1994.

In July 1994, as a result of concerns over the overall affordability of the programme, Minister (Defence Procurement) and the Treasury approved a further £23.5m (at 1993/94 prices) for risk reduction studies to be undertaken in parallel with the formal bid phase of the project. To maintain an effective competition, contracts for risk reduction work were awarded to both bidders, GEC Marconi and Vickers Shipbuilding and Engineering Limited. The successful outcome of these studies led to EAC approval (the equivalent of Main Gate) in March 1997 to place a contract for the design, build and initial support of three Astute Class submarines with GEC Marconi, now BAE SYSTEMS.

5b. Cost of the assessment phase

£m	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	29	1%
Approved Cost at Initial Gate	33	1%
Variation	-4	

5c. Duration of assessment phase

Date of Main Gate Approval	March 1997
Target Date for Main Gate Approval	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	2570	2727	2887
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e.ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	-	June 2005	-
Forecast ISD at Initial Gate	-	December 2001	-

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POST-MAIN GATE PROJECT SUMMARY SHEET

ATTACK HELICOPTER WAH-64 APACHE

Integrated Project Team Responsible:
Attack Helicopter

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

WAH-64 Apache Attack Helicopter (AH), a version of the US Army AH-64D, will replace the ageing Lynx Mk7 system in the anti-armour role. It is equipped with Rolls Royce Turbomeca (RTM)322 engines; the Longbow Fire Control Radar; Semi-Active Laser and Radio Frequency versions of the Hellfire missile; CRV-7 (Canadian Rocket Vehicle-7) ground suppression rockets; and 30mm cannon.

The procurement strategy was based on an "off-the-shelf" buy of the complete weapons system through a Prime Contractor. Following an international competition, a Prime Contract for the supply of 67 WAH-64s and the integration of its complete weapons systems was placed with GKN-Westland Helicopters Ltd. (now Westland Helicopters Ltd.) of Yeovil in March 1996. The project is in the production phase. Boeing is the major sub-contractor. A separate contract for the procurement of munitions stocks was placed with Hunting Engineering Ltd. in March 1996. Equipments to meet key user requirements were added to the Prime Contract in 1999 (i.e. Health and Usage Monitoring System and Communications upgrade).

The first aircraft was delivered in April 2000. The in-service date was achieved in January 2001. Final delivery is due in December 2003.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
*	*	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
Westland Helicopters Ltd. (formerly GKN Westland Helicopters Ltd).	Prime Contractor for aircraft production and weapon system integration	Fixed price	International competition
Boeing, USA	Sub-contractor	Fixed price	Sub-contractor

* The 30-year AH PFI Training service was reported in MPR 2000 as being critical to achievement of ISD. However, the AH ISD was declared without the PFI Training package ISD being met, now due in 2001. In parallel with the development of the PFI Training package, a total of some 16 aircrew have been qualified to fly the WAH-64, having been trained to fly the Apache in the USA. The declaration of aircraft ISD in January 2001 was based on the availability of this sufficient number of trained aircrew.

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	2997
Approved Cost at Main Gate	2997*
Variation	0
In-year changes in 2000/2001	+98*

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Changed Requirement	57	137	Reduction of air-to-air missile quantity (-£4m); deletion of funding for US Helmet solution (-£44m); deletion of M36 training round (-£8m); de-scoping of helmet requirement (-£9m); deletion of funding for generic air-to-air missile (-£72m); Extra funding for Defensive Aids Suite (+£12m); Interest on Capital on revised deliveries (+£3m); incorporation of Health & Usage Monitoring System (+£35m); Introduction of enhancements to Radar Frequency Interferometer (RFI); increased helmet range & scale, and Ground Support System link to Ptarmigan (+£4m); Introduction of Voice and Data Recorders on aircraft 1-29 (+£3m).

* The approved cost has changed from the Major Projects Report 2000 because more accurate information on notional interest on capital charges has been used in converting the cash approval to a resource basis. The actual amount approved to be spent on the project has not changed. The in-year change takes account of this adjustment.

Factor	Increase £m	Decrease £m	Explanation
Changed Budgetary Priorities	129	63	Increased estimate to incorporate necessary communications upgrade (+£31m); inclusion of funding for Low Height Warning System (+£9m); for Ordnance Board approval of munitions (+£10m); for Static Code Analysis of software (+£8m); for Arc radios (+£4m); for configuration changes (+£7m); Reassessment of costs for Foreign Military Sales cases (+£6m); for Bowman integration study (-£2m); for support to missile trials (-£1m) and for Defence Evaluation Research Agency (DERA) and Communications Electronics Security Group (CESG) support (+£26m); Reduction in VAT applicability on Prime Contract (-£60m); Increased costs for the Helicopter Integrated Defensive Aids Suite (HIDAS)(+£10m); for Hellfire missiles (+£1m); Increased cost of Ship Helicopter Operating Limits (SHOL) trial (+£7m); Increased cost for Programme option (+£5m); Additional Testing & Instrumentation (+£4m); Additional miscellaneous equipment costs (+£1m).
Inflation	5		Changes in Variation of Price compared with GDP Deflator (+£5m).
Exchange Rate	1	35	Movement in US Exchange Rate (ER) for sunk costs on Prime Contract compared with the rate assumed at contract award (-£35m); Movement in French Franc ER on Prime Contract compared with the rate assumed at contract (+£1m).
Contracting Process	14		Outcome of tendering and contractual negotiations (+£14m)
Accounting Adjustments and Re-definitions	29		Inclusion of DERA/CESG costs disaggregated since approval (+£23m); Derivation of the approved cost on a resource basis (+£6m)
Total	+235	-235	
Net Variation		0	

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	1849

2d. Years of peak procurement expenditure

2000/2001	2001/2002

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
27.5	27.5	67	67

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	Delivery of the first 9 production standard WAH-64s.

3b. Performance against approved in-service date

Current forecast ISD	January 2001
Approved ISD at Main Gate	December 1999
Variation (Months)	+13
In-year changes in 2000/2001	+1

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Technical Factors	1		ISD declaration delayed 16 days to establish special procedures relating to the use of Technical Publications (+1 month).
Changed Requirement	6		Reflects the selection of a different engine (RTM322) (+6 months).
Changed Budgetary Priorities	12		Programme slipped by 12 months in order to match the programme to the available Departmental resources (+12 months).
Total	+13*		
Net Variation	+13*		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	47		Costs of running on Lynx Mk7 and TOW missile during the period of AH ISD slippage (+£47m).
Other		45	Apache support costs not expended due to AH ISD slippage (-£45m).
Total	+2		

* The 6 month slip acted concurrently with the 12 month slip.

3e. Operational impact of ISD variation

The slip in WAH-64 ISD resulted in a requirement to extend the service of current Army aircraft: i.e. the Lynx, with its TOW (Tube-launched, Optically-tracked, Wire Guided) missile, for anti-armour, and Gazelle for reconnaissance and observation. However, whilst ISD is a key milestone for the Defence Procurement Agency, it is the Army's own Initial Operational Capability Date, currently planned for June 2003, which is on the critical path to achieving the "End State" delivery of the UK Air Manoeuvre Capability by July 2005. This remains achievable.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	Lethality	Yes
2	Survivability	Yes
3	Payload/Range - Anti-Armour Mission	Yes
4	Payload/Range - Ferry Mission (Internal Fuel)	Yes
5	Payload/Range - Ferry Mission (Internal and External Fuel)	Yes
6	Mission Management	Yes
7	Night/Adverse Weather Operations	Yes
8	Supportability (Attributable Fault Rate)	Yes
9	Supportability (Mission Failure Rate)	Yes
10	Supportability (Maintenance Man Hours/Flying Hour)	Yes
11	Supportability (Time to Rectify Faults)	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	None

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

The Attack Helicopter requirement was endorsed as a Cardinal Point Staff Target in June 1991 and called for a competitive Commercial Off-The-Shelf procurement. Six companies submitted bids in 1993 in response to an Invitation To Tender but only three were invited to submit Definitive Bids in 1995. Bids were assessed against four main criteria: operational effectiveness, life cycle costs, risk and industrial participation.

The supportability of each complete helicopter package proposed was evaluated within an Integrated Logistic Support approach to supportability, which included a training needs analysis and full evaluation of the training systems offered. The competition recommended to Ministers the selection of Apache to fulfil our AH requirement.

The variation of £3m between the approved cost at Staff Target (Initial Gate equivalent) and actual cost reflects spend on DERA paid by the project after Initial Gate approval.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	6	0.2%
Approved Cost at Initial Gate	3	0.1%
Variation	+3	

5c. Duration of Assessment Phase

Date of Main Gate Approval	July 1995
Target Date for Main Gate Approval (at IG)	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	2997	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	2751	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	-	December 1999	-
Forecast ISD at Initial Gate	-	December 1997	-

POST-MAIN GATE PROJECT SUMMARY SHEET

CONVENTIONALLY ARMED STAND-OFF MISSILE (CASOM)

Integrated Project Team Responsible:
Conventionally Armed Stand-Off Missile (CASOM)

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

Storm Shadow is a Conventionally Armed Stand-Off Missile which will enhance our stand-off precision attack capability against strategic, tactical and infrastructure targets without exposing our aircraft and crews to an unacceptably high level of aircraft attrition. In February 1997, following an international competition, a development and production contract was awarded to Matra BAe Dynamics (UK) Ltd. (MBDUK) for their Storm Shadow missile. Storm Shadow will be integrated onto Tornado GR4, Harrier GR9 and Eurofighter. While the programme is progressing satisfactorily with all development milestones being achieved on time, it has been necessary to delay the in-service date by six months to align with the availability of Tornado aircraft able to deliver this system.

The first guided weapon development firing was successfully achieved in December 2000. The first operational missiles are planned to be delivered in April 2002. Work is currently in progress on a new Advanced Mission Planning Aid (AMPA) for use on Harrier and Tornado aircraft. This software allows effective targeting of the missile, with initial delivery in late 2001.

Both the French and Italian Governments are also procuring Storm Shadow or SCALP EG (French Designation). The French contract was awarded to MBD (France) in December 1997. The Defence Procurement Agency (DPA) is procuring Storm Shadow on behalf of the Italian Government, through a UK contract which was placed with MBDUK in October 1999. MBD have harmonised all national requirements, where possible, to ensure coherency in development work. Environmental interoperability is under investigation to provide world-wide deployability.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
Tornado GR4 (Package 2)	2002	Tornado GR4 (MLU)	1998

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
Matra BAe Dynamics (UK) Ltd (MBDUK)	Development, Production and Initial Contractor Logistics Support	Firm Price until December 1998. Fixed Price from January 1999 onwards	International Competition

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	981
Approved Cost at Main Gate	1027
Variation	-46
In-year changes in 2000/2001	-6

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Changed Requirement	6	12	Removal of funding for dedicated storage facility (-£12m); provision for whole system trial (+£6m).
Changed Budgetary Priorities	8	42	Reassessed estimates for: Harrier Integration (-£4m); DERA support to DPA sponsored tasks (-£ 4m); Tornado Integration (-£1m); Loading Systems (-£3m); Government Furnished Equipment (GFE) Items (-£1m); Funding provision to support development programme (-£8m); Funding provision to support production programme (+£8m); Expected SMART Acquisition savings on DERA support and Service Evaluation Trials costs (-£21m).
Inflation	24	12	Difference between inflation assumed at contract award and GDP deflators used at the time of approval for development and production (+£24m); Difference between specific indices and GDP deflator in calculating annual price uplift (-£12m).
Exchange Rate		14	Reduction reflects better rate obtained by MATRA BAe in buying forward French Francs than originally estimated (-£14 m).
Accounting Adjustments and Re-definitions		3	Derivation of the approved cost on a resource basis (-£3m).
Technical Factors		1	Re-profiling of asset deliveries, leading to re-calculation of Interest on Capital (-£1m).
Total	+38	-84	
Net Variation		-46	

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	485

2d. Years of peak procurement expenditure

2000/01	2001/02

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
-	***	-	***

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	First *** Weapons in-service with support equipment

3b. Performance against approved in-service date

Current forecast ISD	August 2002
Approved ISD at Main Gate	December 2001
Variation (Months)	+ 8
In-year changes in 2000/2001	-

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Contracting Process	2		Contract placed later then planned due to final pricing negotiations (+2 months).
Changed Requirement	6		To align missile ISD with Tornado GR4 (Package 2) availability (+6 months).
Total	8		
Net Variation	+8		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	-	-	New Capability
Other	-	-	
Total	-	-	

3e. Operational impact of ISD variation

The operational impact of the delay is that the enhanced stand-off precision attack capability to be provided by Storm Shadow will be achieved 8 months later than planned. However, 6 months of the slippage was necessary to align with the availability of a Tornado GR4 Package 2 aircraft able to deliver this capability. This delay was seen as easing Matra BAe Dynamics' commercial programme risk, and negotiations commenced to ensure that the Department gained equivalent benefit by introducing, at no additional cost, some further development work enabling the inclusion of a number of essential operational modifications during the production phase, resulting in an improvement in the operational capability expected from Storm Shadow. These discussions were satisfactorily concluded, and the Storm Shadow contract was amended.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	Mission Planning: One individual to plan the contracted missile attacks in a specified period.	Yes
2	Mission Operation: Single Pass, multiple launch of missiles (2) from all contracted aircraft types.	Yes
3	Launch Aircraft Safety: The operational missile presents Self-Damage 3 Risk to the launch aircraft no greater than 1×10^{-3}	Yes
4	Stand-off Range: Contracted range at sea level.	Yes
5	Missile Survivability: Contracted probability of survival to target.	Yes
6	Target Acquisition: Contracted probability of successful target acquisition	Yes
7	Lethality: Warhead capable of perforating contracted thickness of steel reinforced concrete.	Yes
8	Terminal Accuracy: Contracted Circular error of probability.	Yes
9	Operational Availability: Storage to warhead initiation reliability as defined in the Customer Service Agreement.	Yes
10	Deployability: Carriage of 4 missiles and their containers in C-130 Aircraft.	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	None

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

In parallel with work being undertaken by NATO, the UK separately commissioned a study in 1982 to investigate the feasibility and cost effectiveness of a Long Range Stand-Off Missile (LRSOM) programme. In 1986, LRSOM was subsumed in favour of the Modular Stand-Off Weapon (MSOW) seven nation collaborative programme. The MSOW programme collapsed in 1989 when the US and UK withdrew. Following this withdrawal and the end of the Cold War, the continued military need to acquire a stand-off missile capability was reviewed as part of the "Options for Change" exercise and the requirement was confirmed. Approval was given in 1994 to issue a Request for Proposals, and responses were received from seven international companies. The assessment of the responses was undertaken against the requirement under the classical Procurement Cycle approach. The programme is now aligned to the new Smart Acquisition Cycle.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	4	0.4%
Approved Cost at Initial Gate	4	0.4%
Variation	0	

5c. Duration of Assessment Phase

Date of Main Gate Approval	August 1996
Target Date for Main Gate Approval at Initial Gate	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	1027	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	-	December 2001	-
Forecast ISD at Initial Gate	-	December 1994	-

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POST-MAIN GATE PROJECT SUMMARY SHEET

EUROFIGHTER

Integrated Project Team Responsible:
EUROFIGHTER

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

Eurofighter will be an agile fighter aircraft. Air superiority is the primary design driver, but the aircraft will also have an air-to-ground capability. Eurofighter will thus be able to offer operational capability in response to the uncertain demands of the post-Cold War strategic environment, and will enable the RAF to replace the Tornado F3 and Jaguar aircraft. An all Eurofighter fleet is substantially more cost-effective than any alternative aircraft option or aircraft mix when this multi-role capability is considered alongside costs. It is being developed in a collaborative project with Germany, Italy and Spain, and is managed on behalf of the nations by a NATO agency, NETMA (NATO Eurofighter and Tornado Management Agency).

The Memoranda of Understanding for the Production and Support Phases were signed on 22 December 1997 and contracts covering Production Investment and Production placed on 30 January 1998. The contracts for the first tranche of 148 aircraft, of which 55 are for the UK, valued at some £2.5bn to the UK, were signed on 18 September 1998. Final assembly of the first aircraft began in September 2000 with delivery of the first engine in June 2001. The first RAF aircraft is due to be delivered in June 2002.

Support of the aircraft throughout its life will be conducted using Integrated Logistic Support principles under a series of 11 separate contracts, valued at approximately £10.2bn. The first contracts, covering initial support, were placed in 1998 at the same time as the Production Investment and Production contracts. The remaining contracts are expected to be in place by June 2002.

A number of potential export customers have been identified. The Greek Government has recently announced it intends to postpone its procurement of Eurofighter until after 2004. Nevertheless, export interest continues to increase with a number of active export campaigns in Europe and the Far East.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
-	-	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
Eurofighter GmbH Airframe consortium comprising: Alenia BAE SYSTEMS EADS(CASA) EADS(Deutschland) Eurojet GmbH Engine consortium comprising: FIAT ITP MTU Rolls Royce	Development	Fixed Price for Airframe and equipments and Target Cost Incentive Arrangement for Aircraft Equipment Integration. Fixed Price.	Non-competitive but with international sub-contract competitive elements, the value of which amounts to some 30% of the overall value of the Prime Contract. Non-competitive but with international sub-contract competitive elements, the value of which amounts to some 10% of overall value of the Prime Contract.
Eurofighter GmbH Airframe consortium (see details under development above).	Production Investment/ Production	Overall Maximum Prices for Production Investment and Production of Airframes and overall Fixed Prices for Production Investment and Production of Aircraft Equipment. Fixed prices for production of 1st Tranche Airframe.	Non-competitive but with international sub-contract competitive elements, the value of which amounts to some 30% of the overall value of the Prime Contract.
Eurojet GmbH Engine consortium (see details under development above).	Production Investment/ Production	Overall Maximum Prices for Production Investment and Production of Engines. Fixed prices for Production Investment and Tranche 1 Production.	Non-competitive but with International sub-contract competitive elements, the value of which amounts to some 10% of the overall value of the Prime Contract.

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	18869
Approved Cost at Main Gate	17364
Variation	+1505
In-year changes in 2000/2001	+37

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Technical Factors	349	2	Higher than expected Development costs, notably for equipments (+£316m); Obsolescence costs resulting from rapid changes in computer hardware technology (+£33m); Slower than expected technical progress, reducing asset balances and thereby reducing Interest on Capital Charge (-£2m).
Changed Requirement	239	50	Provision for integration of new weapons and sensors not contained within original approval (includes Conventionally armed stand-off Missile (CASOM), Advanced Anti-Armour Weapon (AAAW), Low-Level Laser Guided Bomb (LLLGB) and Thermal Imaging Airborne Laser Designator (TIALD)) (+239m); Deletion of requirements for gun (-£32m); 1500 litre fuel tank (-£16m) & CRV7 Rocket (-£2m).
Changed Budgetary Priorities		5	Reprofiling of expenditure, reducing asset balances and thereby reducing Interest on Capital Charge(-£5m).
Inflation	366		Changes in inflation assumptions since approval: development (+£212m) and production (+£154m).
Exchange Rate		82	Changes in exchange rate assumptions since approval (-£82m).
Contracting Process	113	165	Reprofiling and adjustment of anticipated Tranche 2 and 3 Airframe, Equipment and Engine prices (+£103m); Introduction of benefits to be assumed from planned implementation of SMART Procurement processes (-£165m); Reassessment of the cost and timing of integrating new weapons (+£5m); Increased estimates for DERA test facilities in support of the development trials programme (+£5m).

Factor	Increase £m	Decrease £m	Explanation
Procurement Strategy	413		German withdrawal from certain equipments (+£106m); Reorientation: Development Assurance Programme to bridge gap between Development and Production Investment (+£28m); extension of Integrated Logistic Support programme (+£45m); Eurofighter/Eurojet GmbH management costs (+£30m); contract price increases (+£87m); risk provision (+£117m).
Accounting Adjustments and Re-definitions	547	218	Changes in accounting rules (inclusion of intramural costs) (+£275m); transfer costs of industrial consortia management activities from production phase to support phase (-£218); derivation of approved cost on a resource basis (+£202m); Increases in Interest on Capital resulting from changes in accounting treatment of the delivery of assets (+£70m).
Total	+2027	-522	
Net Variation	+1505		

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	5444

2d. Years of peak procurement expenditure

2001/02	2004/05

2e. Unit production cost

Unit Production Cost (£m)		**Quantities Required**	
at Main Gate	Current	at Main Gate	Current
-	57.9	232	232

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	Date of delivery of first aircraft to the Royal Air Force

3b. Performance against approved in-service date

Current forecast ISD	June 2002
Approved ISD at Main Gate	December 1998
Variation (Months)	+42
In-year changes in 2000/2001	0

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Technical Factors	20	-	Resulting from the application of complex technologies required to enable the equipment to meet the original Staff Requirement (+20 months).
Procurement Strategy	22	-	Reorientation of the Development phase in response to the changed strategic environment and budgetary pressures of the four nations and delays in signature of the Memoranda of Understanding for the Production and Support phases (+22 months).
Total	+42	-	
Net Variation	+42		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	836	-	Cost of running on Tornado and Jaguar (+836 months).
Other	-	668	Estimated support costs of Eurofighter not incurred (-668 months).
Total	+168		

3e. Operational impact of ISD variation

Key improvements in capability not realised until revised ISD are:

i) Agility and all altitude performance;
ii) Autonomous detection, identification and multiple engagement of air-to-air targets;
iii) Human computer interface to reduce operator workload;
iv) Multi-role capability;
v) Survivability through superior airframe and equipment performance;
vi) Low mean time between failure.

The 42 month delay has been mitigated to a small extent by compressing the entry into service period, but the net effect is a delay of three years.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	Take off Distance	Yes
2	Landing Distance	No
3	Attributable Failures per 1,000 Flying Hours	Yes
4	Life (Flying Hours)	Yes
5	Sustained Minimum Turn Radii at Sea Level, Max Reheat	Yes
6	Maximum speed at sea level	Yes
7	Maximum speed at 36,000 ft	Yes
8	Acceleration Time at Sea level from 200 knots to Mach 0.9	Yes
9	Instantaneous Turn Rate Sea Level, Max Reheat	Yes
10	Sustained Turn Rate at Mach 0.9 at 5,000ft, Max Dry	Yes
	Percentage currently forecast to be met	90%
	Change since previous MPR	None

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
2. Landing Distance	Technical Factors	Refined modelling carried out to support the 1994 reorientation submission indicated that in the most adverse conditions the specified landing distance would not be achieved – this was accepted by the Equipment Approvals Committee.

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

Pre-Development, which commenced with the approval of the feasibility study in 1984 comprised a number of activities. Following early concept studies, and various efforts at establishing a collaborative programme, there were two key Eurofighter demonstration activities completed by the UK before development: the Experimental Aircraft Programme (EAP), an airframe programme primarily aimed at proving the feasibility of the Eurofighter unstable flight control concepts, and the XG40 engine demonstrator programme at Rolls Royce. The results of these demonstrators and their associated studies, together with the results of similar work within the other Nations were harmonised in a Definition, Refinement and Risk Reduction phase that ran from the end of 1985 when four Nations signed the initial Memorandum of Understanding, until 1988 when the development contract was signed.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	78	0.4%
Approved Cost at Initial Gate	87	0.5%
Variation	-9	

5c. Duration of Assessment Phase

Date of Main Gate Approval	November 1987
Target Date for Main Gate Approval	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	17364	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	-	December 1998	-
Forecast ISD at Initial Gate	-	-	-

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POST-MAIN GATE PROJECT SUMMARY SHEET

EXTENDED RANGE ORDNANCE / MODULAR CHARGE SYSTEM (ERO/MCS)

Integrated Project Team Responsible:
Future Artillery Weapons Systems (FAWS)

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

Extended Range Ordnance/Modular Charge System (ERO/MCS) is a programme to upgrade the AS90 self-propelled Howitzer. The programme comprises two elements; ERO, a longer, 52 Calibre barrel and MCS, a Modular Charge System. When integrated into the AS90 gun platform the upgrade significantly increases range, giving improved lethality and survivability, together with operational and logistic benefits, especially reduced charge wastage.

Approval for development and production of ERO and initial production of the Unimodular Propelling Charge System (UPCS) was given in September 1993. Following technical difficulties with UPCS, the Equipment Approvals Committee approved development of the alternate MCS in July 1995.

Technical difficulties were encountered with barrel wear and durability and consequently, a risk reduction contract was placed with the AS90 Design Authority to examine the durability of both chromium plated and steel barrels and to select an MCS supplier.

The programme was re-approved in 1998 and the Prime Contract for the supply of ERO and an initial quantity of MCS was placed with Royal Ordnance Defence (BAE SYSTEMS) in May 1999. A contract for the second tranche of MCS was placed directly with Somchem and options for the balance of the War Reserve are currently being considered.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
-	-	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
BAE SYSTEMS (Formerly Vickers Shipbuilding and Engineering Ltd (VSEL Ltd))	Development & Production	Firm Price	Single Source
Somchem (Formerly Denel Int Ltd)	Production	Firm Price	Competition

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	188
Approved Cost at Main Gate	140
Variation	+48
In-year changes in 2000/2001	-

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Changed Requirement	22		Additional AS90 Modification kits (+£3m), MCS Operational Packaging (+£19m).
Technical Factors	33	8	Change From UPCS to MCS (-£8m) and modifications to ERO (+£22m); Increased Barrel Quantities (+£11m)
Accounting adjustments and re-definitions	1		Conversion of Cost Estimate and approval to resource basis (+£1m)
Total	+56	-8	
Net Variation	+48		

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	24

2d. Years of peak procurement expenditure

2002/2003	2003/2004

2e. Unit production cost

Unit Production Cost			Quantities Required	
at Main Gate		Current	at Main Gate	Current
ERO:	-	£0.4m	96 Systems (106 Barrels)	96 Systems (202 Barrels)
MCS:	£112	£85	950,000	1,169,130

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	Delivery of 32 converted AS90s and 150,000 charge modules

3b. Performance against approved in-service date

Current forecast ISD	July 2003
Approved ISD at Main Gate	May 1998
Variation (Months)	+62
In-year changes in 2000/2001	0

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Technical Factors	18		Change from UPCS to MCS (+18 months)
Changed Budgetary Priorities	36		Deliveries reprofiled to accommodate changed budgetary priorities (+36 months)
Contracting Process	8		Contract placement delayed pending Ministerial Decision on outcome of the HCDC enquiry into the future of Royal Ordnance Bishopton (+4 months); Delay in contract placement caused programme re-scheduling (+4 months)
Total	+62		
Net Variation	+62		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	-	-	No anticipated change in AS90 platform support costs when upgraded
Total	-	-	

3e. Operational impact of ISD variation

AS90 remains 'fit for purpose' while fitted with the current 39 calibre (short) barrels. It will continue to be outranged by enemy artillery systems with consequent penalties on survivability and limitations upon the ranges over which the AS90 can operate against enemy forces.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	When firing the L15A1/A2 shell, or a further development of this shell, using MCS at a maximum range of not less than 30,000m is achieved.	Yes
2	AS90 fitted with ERO shall be capable of firing 30 battlefield days having completed 20 years of peacetime usage.	Yes
3	The Introduction of ERO is not to reduce AS90's required reliability.	Yes
4	The use of MCS from different lots or batches, in combination with each other, shall not increase the Probable Error Muzzle Velocity (PE_{mv}) by more than 2m/s.	Yes
5	MCS & ERO shall be compatible with all UK fielded projectiles that comply with the Joint Ballistics Memorandum of Understanding (JBMOU).	Yes
6	ERO fitted to AS90 must be able to operate and be stored in the same climatic conditions as AS90.	Yes
7	MCS must be capable of being safely stored and operated in a variety of climatic conditions.	Yes
8	ERO, when fitted to AS90, to be provided with a thermal warning device capable of informing the detachment of the chamber temperature and warn them of the possibility of the gun being unsafe to load or fire	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	N/A

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

The AS90 was procured as a replacement for the Abbot self-propelled gun. The requirement specified that the new gun platform has stretch potential, specifically that extended range be achievable without major modification, except to the barrel. No assessment work was carried out prior to Main Gate approval.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	-	-
Approved Cost at Initial Gate	-	-
Variation	-	

5c. Duration of Assessment Phase

Date of Main Gate Approval	September 1993
Target Date for Main Gate Approval at Initial Gate	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	140	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	-	May 1998	-
Forecast ISD at Initial Gate	-	-	-

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POST-MAIN GATE PROJECT SUMMARY SHEET

HERCULES C-130J

Integrated Project Team Responsible:
HERCULES C-130J (HERCJ)

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

The Royal Air Force HERCULES tactical transport fleet is over 30 years old. Aircraft availability has declined and operating costs have risen. A decision was taken in December 1994 to replace the older aircraft and a fixed price contract was placed with Lockheed-Martin in March 1995 for the purchase of 25 Hercules C-130J aircraft together with comprehensive packages for Training and Contractor Logistic Support. The new aircraft embodies many improvements in electronics and propulsion and will return considerable benefits in costs of ownership.

The RAF took delivery of its first aircraft in November 1999, together with the training facility. A total of 18 aircraft had been delivered to RAF Lyneham by 31 March 2001. In addition two aircraft are at the Defence Evaluation & Research Agency (DERA) Boscombe Down for ongoing test and evaluation.

The in-service date (delivery of the 12th aircraft), was achieved in June 2000 - some 23 months late. These delays arose due to difficulties experienced in the Contractor's development programme, largely hardware and software integration problems. Liquidated damages are being recovered from Lockheed Martin and the cash is being used to cover the unplanned run-on costs of the current aircraft and other consequences of late delivery.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
-	-	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
Lockheed Martin Corporation (Lockheed Martin Aeronautics Company)	Development & Production	Fixed	International Competition

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	1049
Approved Cost at Main Gate	1045*
Variation	+4
In-year changes in 2000/2001	+21*

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Technical Factors	68	30	Delays to programme resulting in revised funding profile and reduced financing charges (-£30m); Re-profiled asset deliveries due to specification shortfall (+£11M); Wing Fatigue Test (+£7m); Cargo Handling System (+£7m); provision for funding transfers to Support Authority to cover run-on costs of C-130K fleet (+£42m); DERA Farnborough (+£1m).
Changed Requirement	8		Additional requirement for 8.33KHz Channel Spacing in VHF radio (+£3m); Reduced Vertical separation Minima (Air traffic control compliance measure) (+£3m) and Active noise reduction headsets/new winch (+£2m).
Inflation	50		The difference in annual price uplift between specific indices and the GDP indices (+£50m).
Exchange Rate		49	Variation in the value of Sterling against the US Dollar (-£49m).
Receipts		53	Forecast Liquidated Damages (-£50m) and Commercial Exploitation Levy (-£3m).
Contracting Process	5	14	Increased costs for Mission Planning System (+£3m); C-130K RAF peculiar modifications to J (+£2m); Offset by reduced costs for Communication Navigation and Identification System (-£6m);, fill Gun Port (-£2m); Re-assessment of aircraft payments (-£4m); and documentation (-£2m).

* The approved cost has changed from the Major Projects Report 2000 because more accurate information on notional interest on capital charges has been used in converting the cash approval to a resource basis. The actual amount approved to be spent on the project has not changed. The in-year change takes account of this adjustment.

Factor	Increase £m	Decrease £m	Explanation
Accounting Adjustments and Re-definitions	33	14	Inclusion of DERA Boscombe Down (BD) Costs dis-aggregated since approval (+£33m); Contracted Out Services Value Added Tax on DERA (BD) to be recovered (-£3m). Derivation of the approved cost on a resource basis (-£11m)
Total	+164	-160	
Net Variation	+4		

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	939

2d. Years of peak procurement expenditure

1998/99	1999/00

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
34.8	35.4	25	25

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	Delivery of the first twelve aircraft off contract

3b. Performance against approved in-service date

	Date
Current forecast ISD	June 2000
Approved ISD at Main Gate	July 1998
Variation (Months)	+23
In-year changes in 2000/2001	0

3c. Reasons for variation from approved ISD

Factor	Increase	Decrease	Explanation
Technical Factors	23		Late delivery of sub-contracted avionic equipments and difficulties with their integration which caused delay to start of the contractor's flight test programme. Further difficulties were experienced during the flight test programme and included: hardware/software integration problems, unacceptable stall characteristics, engine lubrication problems, cracking of wing web structure, insufficient de-icing coverage on the vertical tail fin, unsatisfactory throttle lever characteristics (+22 months); Minor shortfalls upon delivery of the training system also contributed to the delay (+1 month).
Total	+23		
Net Variation	+23		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	43*		C-130K Run on costs including additional maintenance, spares and aircraft operating costs (+£43m).
Other		50*	Receipts from Liquidated Damages (-£50m).
Total		-7	

3e. Operational impact of ISD variation

The 25 C-130J will replace 25 of the existing elderly C-130K. In terms of performance, the new aircraft provides essentially the same capability as its predecessor. The principal improvements on the new aircraft are the incorporation of a modern 2-pilot flight deck, integrated avionic systems and new engines and propellers. These enhancements will deliver substantial improvements in availability and enable a reduction in the existing 4-man flight crew on the C-130K to two. Consequently the main impact of the in-service date delay has been the continued reliance on the existing C-130K aircraft with its significantly poorer overall availability.

* These figures [except for the first £1M of support costs borne by the support authority] are also cited in the project costs [section 2b].

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently Forecast to be met (Yes or No)
1	Payload/Range.	Yes
2	Troop and pallet loads.	Yes
3	Capable of operation in world-wide climatic conditions.	Yes
4	Capable of world wide navigation.	Yes
5	Reliability.	Yes
6	Compliant with civil and military requirements for communications.	Yes
7	Capacity for future incorporation of: Radar warning receiver, Missile warning system, Chaff/Infra-Red dispenser, Infra-Red countermeasures.	Yes
8	Take-off and landing performance.	Yes
9	Capable of aerial delivery of troops and platforms.	Yes
10	Capable of operation by a crew normally comprising two pilots and one airloadmaster.	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	-

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

The Royal Air Force Hercules aircraft availability was declining and operating costs rising as the aircraft approached 30 years in service. In 1993, as an alternative to a new build aircraft, Marshall Aerospace were tasked with defining the refurbishment task for the existing RAF C-130Ks. In parallel with the refurbishment study, an Invitation to Tender was issued to Lockheed Martin Aeronautical Company for the supply of 30 new build Hercules aircraft (C-130H or C-130J), together with options for up to a further 25. Expenditure of £0.5 million was approved on studies in support of the above activities. The refurbishment option was subsequently assessed as being more expensive, involving greater technical risk and providing reduced availability both during refurbishment and after, than a new purchase. As a result the C-130J was chosen to meet the requirement.

The costs identified at 5b below relate to the definition of the refurbishment option and supporting studies.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	1.4	0.1%
Approved Cost at Initial Gate	1.6	0.2%
Variation	-0.2	

5c. Duration of Assessment Phase

Date of Main Gate Approval	January 1995
Target Date for Main Gate Approval (at IG)	September 1994
Variation (Months)	+4

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	1045	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	-	July 1998	-
Forecast ISD at Initial Gate	-	December 1998	-

POST-MAIN GATE PROJECT SUMMARY SHEET

HIGH VELOCITY MISSILE SYSTEM

Integrated Project Team Responsible:
Ground Based Air Defence

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

The High Velocity Missile (HVM) System, commercially known as Starstreak, is an Army Very Short Range Air Defence weapon designed to attack armoured helicopters and low-flying aircraft. Deployed in three variants; Self-Propelled (SP) on a launcher vehicle (STORMER), a Lightweight Multiple Launcher (LML) mounted on a tripod base and Shoulder Launched (SL); it is deployed with the Air Defence Alerting Device (ADAD), a passive 24-hour automatic surveillance device.

Following a competitive project definition phase between Shorts Missile Systems (SMS) (now known as Thales Air Defence Ltd. (TADL)) and British Aerospace, the contract for full development and production was placed with SMS in November 1986. In-service dates (ISD) for SP HVM and SL/LML HVM were achieved in September 1997 and September 2000 respectively.

Four follow-on orders for missiles have been placed the latest in December 1999, with a follow-on order of SL/LML systems and associated equipment in September 2000. The number of SL/LML systems procured was reduced from 72 to 40 although the costs for both quantities remained broadly the same. This was due to the non recurring element of the work required irrespective of quantities and because remaining Tranche 1 equipment was procured as part of this follow-on order which was also unaffected by the reduction in quantities. Approval was given in February 2001 for the Demonstration and Manufacture of Thermal Sighting Systems (TSS) for SP HVM. An order was placed for TSS for SP HVM in February 2001 and the equipment is planned to be brought into service in 2006.

Successor Identification Friend or Foe (SIFF) for the SP & LML HVM and TSS for LML HVM is planned for 2005 and 2006 respectively. Further expenditure in clear prospect for Missiles and SIFF for HVM is an estimated £270m and £45m respectively.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
Air Defence Alerting Device	1994	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
Thales Air Defence Ltd (TADL). (formerly Shorts Missile Systems)	Full development and production	Fixed Price	UK Competition
Thales Air Defence Ltd (TADL). (formerly Shorts Missile Systems)	Follow on production	Fixed Price	Single Tender. No acceptable price, no contract (NAPNOC)

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	933
Approved Cost at Main Gate	927*
Variation	6
In-year changes in 2000/2001	-10

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Technical Factors	7		Missile production problems caused a delay in the placement of latest missile contract (+£7m).
Changed Requirement		10	Reduction in Tranche 1 Practice Missile Kits (-£10m).
Changed Budgetary Priorities	12	9	SP TSS ISD deferred due to budgetary priorities resulting in increased resource cost (+£6m); Reprofile of SIFF for SL/LML deliveries due to budgetary priorities resulting in cost saving (-£9m); Reorganisation of HVM Tranche 3 Ground Equipment future capability (+£6m).

* The approved cost has changed from the Major Projects Report 2000 due to the addition of a recent planned approval for the Thermal Sighting System for SP HVM.

Factor	Increase £m	Decrease £m	Explanation
Contracting Process	22	23	Extra contractual payment in settlement of claim regarding provision of Government Furnished Equipment (+£11m). Discount obtained against contract for Tranche 1a/b Missiles (-£5m); Underestimation of funding provision for Tranche 1a/b/c missiles (+£1m); Increase in forecast expenditure on Tranche 3 based on latest estimates (+£7m); Recalculation of Interest on Capital for Tranche 3 based on revised delivery profile (-£12m); Decrease due to contract negotiations of Tranche 3 HVM Ground Equipment contract (-£6m); Re-approval of Tranche 3 SL/LML costs (+£3m).
Accounting Adjustments and Re-definitions	8	1	Inclusion of DERA support costs on Tranche 1 (+£8m); Derivation of the approved cost on a resource basis (-£1m).
Total	+49	-43	
Net Variation	+6		

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	574

2d. Years of peak procurement expenditure

1989/90	2002/03

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
-	***	135 SP HVM Systems	135 SP HVM Systems

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	One HVM battery, fully equipped, trained and supported.

3b. Performance against approved in-service date

Current forecast ISD	September 1997
Approved ISD at Main Gate	December 1990
Variation (Months)	+81
In-year changes in 2000/2001	0

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Technical Factors	69		Problems with the dart and carrier missile, including inconsistent performance in dart guidance and second stage motor ignition of the missile. Problems with the vehicle gearbox (+69 months).
Changed Budgetary Priorities	7		A delay at the outset of the project arising from the need to match the Very Short Range Air Defence Weapons Systems Programme (including HVM) with available resources (+7 months).
Change in Associated Project	3		Software problems encountered in integrating ADAD into SP HVM caused seven months delay. Four months of this was concurrent with the delays due to technical factors (+3 months).
Contracting Process	2		Prolonged contractual negotiations on some remaining small contracts, in part because Shorts Missile Systems (now known as Thales Air Defence Ltd.) underwent a major restructuring in 1993 and 1994 (+2 months).
Total	+81		
Net Variation	+81		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	-	-	
Other	-	-	
Total	-	-	

3e. Operational impact of ISD variation

SP HVM was intended to support units engaged in mobile operations and in particular counter strike forces. The delay in SP HVM in-service date from December 1990 to September 1997 resulted in the 1st (UK) Armoured Division having no specific Very Short Range Air Defence capability. A lesser capability was provided by Tracked Rapier and the manportable Javelin systems.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	SP HVM - essential effective range.	Yes
2	SP HVM - minimum unrestricted launcher traverse.	Yes
3	HVM Missile - overall missile reliability.	Yes
4	SP HVM - minimum probability of completing a battlefield day.	Yes
5	SP HVM - wide angle field of view.	Yes
6	HVM Missile - minimum safe missile drop height in launch canister.	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	None

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

Approval for the project definition phase (now taken to equate to Initial Gate) for a High Velocity Close Air Defence Weapon System was received in July 1984. The phase lasted 12 months and was conducted on the basis of parallel work by 2 contractors, Shorts Missile Systems (SMS) (now known as Thales Air Defence Ltd. (TADL)) and British Aerospace. The results of the work were accepted as a satisfactory basis for the full development and production phase submission (now taken to equate to Main Gate) that received approval in October 1986. A contract was subsequently placed for the Tranche 1 procurement of the High Velocity Missile (HVM) System with SMS in November 1986. Performance was determined against a variety of measures of effectiveness, surveillance and target acquisition, terrain and meteorological visibility.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	8	1%
Approved Cost at Initial Gate	10	1%
Variation	-2	

5c. Duration of Assessment Phase

Date of Main Gate Approval	October 1986
Target Date for Main Gate Approval at Initial Gate	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	927	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Lowest	Most Likely	Highest
Forecast ISD at Main Gate	-	December 1990	-
Forecast ISD at Initial Gate	-	December 1989	-

POST-MAIN GATE PROJECT SUMMARY SHEET

LANDING PLATFORM DOCK (REPLACEMENT) (LPD(R))

Integrated Project Team Responsible:
Landing Platform Dock (Replacement) (LPD(R))

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

The 2 Landing Platform Dock (Replacement) LPD(R), HMS Albion and HMS Bulwark, will replace the capability currently provided by HMS Fearless and HMS Intrepid. A Design and Build Prime Contract for the ship-build was awarded to BAE SYSTEMS Marine Ltd. (formerly Vickers Shipbuilding and Engineering Limited (VSEL)) in July 1996, following No Acceptable Price No Contract (NAPNOC) negotiations. As a risk reduction measure a separate contract for the design and production of the Integrated Communications System (ICS) had been placed with Thales Communications Ltd. (formerly Redifon MEL) in 1994. In May 1998, a further Prime Contract was let to BAE SYSTEMS (formerly BAe SEMA) for the production of six specialised Landing Craft Utility.

The ships, ICS and Landing Craft Utility are currently in production. A competitive tender for the procurement of four Landing Craft Vehicle and Personnel (LCVP) has been issued. Contract award is planned for Summer 2001. Both types of landing craft are required for HMS Albion's trials, which are due to begin in March 2002.

Industrial loading difficulties at the BAE SYSTEMS Marine Ltd. Barrow shipyard have caused forecast delays to the Programme Acceptance Dates for both ships. The current reported in-service date of March 2003 includes a consequential 12 months delay to HMS Albion. HMS Bulwark has also been delayed by nine months to December 2003. Opportunities to recover some of the slippage continue to be explored.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
Command Support System	1999	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
BAE SYSTEMS (formerly BAe SEMA)	Warship Design & Build & Command System	Fixed Price	No Acceptable Price, No Contract (NAPNOC)
Thales Communications Ltd (formerly Redifon MEL)	Integrated Communications System	Fixed Price	UK Competitive
BAE SYSTEMS	Landing Craft Utility	Firm Price	UK Competitive

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	786
Approved Cost at Main Gate	819
Variation	-33
In-year changes in 2000/2001	-24

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Technical Factors	22		Increase in Interest on Capital charge due to delayed ship delivery profile (+£22m).
Changed Requirement	8	10	Additional spares required to bring Bulwark's readiness into line with the 1997 assumption for the Marine Rapid Reaction force (+£8m); Smart Support spares savings achieved (-£10m).
Changed Budgetary Priorities		12	Re-assessment of project priorities in areas such as research and the scope of on-board equipment procured (-£1m); Re-assessment of the level of Risk Provision (-£11m).
Inflation	5	1	Variation of Price indices escalating faster than the GDP deflator (+£5m); Change in inflation assumptions used on BAE SYSTEMS contract (-£1m).
Procurement Strategy		32	Overall impact of changed procurement strategy between approval and contract award (-£32m).
Accounting Adjustments and Re-definitions		13	Derivation of the approved cost on a resource basis (-£7m); Accounting adjustments (-£6m).
Total	+26	-59	
Net Variation		-33	

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	439

2d. Years of peak procurement expenditure

2000/01	2001/02

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
-	381.8	2	2

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	The date by which HMS Albion acquires an Initial Operating Capability, taken as the Operational Date Inspection

3b. Performance against approved in-service date

Current forecast ISD	March 2003
Approved ISD at Main Gate	August 2000
Variation (Months)	31
In-year changes in 2000/2001	0

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Technical Factors	16		Information obtained from industry as part of the LPD(R) procurement investigation indicated that the original estimate for the warship build period was too short, and the programme was adjusted accordingly (+4 months); Computer design and industrial loading difficulties experienced by BAE SYSTEMS (VSEL) (+12 months).
Contracting Process	3		As a risk reduction measure and part of the NAPNOC contract negotiations, agreement was reached on a further extension to the build period to give BAE SYSTEMS (VSEL) further time to develop the warship design before starting fabrication (+3 months).
Procurement Strategy	12		The loss of competition at a late stage in the tendering process resulted in delay, as BAE SYSTEMS (VSEL) revisited their bid to reflect the revised NAPNOC situation (+12 months).
Total	+31		
Net Variation	+31		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	57*		Estimated additional costs incurred in running on HMS Fearless for 31 months (+£57m).
Forecast support costs of new equipment		26*	Estimated additional support costs of HMS Albion not incurred (-£26m).
Other		6*	Anticipated level of Liquidated Damages in respect of delay to Planned Acceptance Dates of HMS Albion and HMS Bulwark (-£6m).
Total	+25		

3e. Operational impact of ISD variation

On current plans, HMS Fearless will be extended in-service until HMS Albion's in-service date in March 2003 to mitigate the loss of capability resulting from the delays to the new ships. HMS Intrepid will remain at a low state of readiness and downgraded capability because of her material condition until her planned Out of Service Date (OSD) of June 2001.

The new ships will provide capability improvements in three key areas:

(i) considerably improved and increased Command, Control, Communications and Computer Information Systems (C4I system) which permits integrated command and control within the joint battlespace;
(ii) faster tactical offload of vehicles, troops and stores; and
(iii) increased range, payload and offload performance of the new MK 10 Landing Craft Utility and Mk5 LCVP.

* The costs shown relate to HMS FEARLESS and HMS ALBION only. Run -on costs for HMS INTREPID are minimal because of her low state of readiness.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	The Landing Platform Dock (Replacement) LPD(R) shall be able to transport a part of the amphibious landing force.	Yes
2	The LPD(R) shall be able to off load the Embarked Military Force in a fully combat ready state within the tactical time-scales required by the embarked commanders.	Yes
3	The LPD(R) shall have sufficient endurance that she does not limit the endurance of the Amphibious Task Force.	Yes
4	The LPD(R) shall provide a combat system that will effectively manage the operational tasks of the embarked commanders.	Yes
5	The LPD(R) shall provide availability to meet all its operational commitments in a 30 day operational period.	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	None

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

The notional Initial Gate approval of this project is taken to be December 1986; the date studies into extending the life of the current ships were approved. These studies concluded that replacement rather than life extension should be the preferred option. Additional feasibility and project definition work was commissioned, addressing affordability problems, before a final resolution was achieved in 1993 and a decision in principle to proceed with the procurement of two new ships was made.

Main Gate approval is taken to be June 1994. At this time competitive bids for design and build of 2 ships were invited. Due to the complexity of the Integrated Communications System and in order to reduce the risk to the ship programme, a competitive contract was awarded at the same time to Redifon MEL to ensure the start of essential design work. The assumption was that a competitive Design and Build contract for the ships would be awarded in 1995 but it quickly became apparent that only VSEL would bid. Approval was therefore given to proceed on a single tender basis. Joint Department/VSEL teams were formed to explore the realism of the cost estimates, VSEL's offer, and the scope for modifying the specification to reduce cost. These were successful. A substantial reduction in unit production cost was achieved and approval was given to enter formal NAPNOC negotiations. These negotiations were concluded with the award of a Design and Build contract for two ships in July 1996.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	21	3%
Approved Cost at Initial Gate	15	2%
Variation	-6	

5c. Duration of Assessment Phase

Date of Main Gate Approval	June 1994
Target Date for Main Gate Approval at Initial Gate	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	819	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	-	August 2000	-
Forecast ISD at Initial Gate	-	April 1995	-

POST-MAIN GATE PROJECT SUMMARY SHEET

MERLIN HC Mk3 HELICOPTER

Integrated Project Team Responsible:
Merlin

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

The Merlin Helicopter Cargo (HC) Mk3 helicopter (previously known as the EH101 Support Helicopter) is based on the Utility version of the Anglo-Italian EH101 helicopter. It is designed to carry 24 troops, or a range of vehicles and equipment internally or as underslung loads.

A fixed price contract for 22 Merlin HC Mk3 helicopters was signed on 9 June 1995 with GKN Westland Helicopters Limited (GKNWHL), following an earlier accounting officer direction on 24 March 1995 from Minister (Defence Procurement). This followed a parallel No Acceptable Price No Contract (NAPNOC) competition between GKNWHL and Boeing Helicopters (bidding the Chinook) for the RAF's Medium Support Helicopter requirement.

The in-service date has slipped due to a delay in the Anglo-Italian development programme following the loss of Pre-Production EH101 No.4 in an accident in 1995 and also as the result of resource problems with industry.

The in-service date was achieved in June 2000 with the delivery of the sixth aircraft. The final aircraft is expected to be delivered in June 2002.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
Merlin HM Mk1 helicopter	1999	-	-
Medium Support Helicopter Training Facility	2000	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
GKN Westland Helicopters Limited (GKNWHL)	Development & Production	Fixed Price	Parallel NAPNOC negotiations with GKNWHL for Merlin and Boeing Defense & Space Group for Chinook.*

* The competitive parallel NAPNOC procedure is judged to have ensured that GKNWHL maximised the use of competition for sub contracts.

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	755
Approved Cost at Main Gate	794[✣]
Variation	-39
In-year changes in 2000/2001	-2

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Technical Factors	51	46	Under-estimate of Spares Packaging (+£5m) and Ground Support Equipment (+£11m); under-estimation of costs of Directable Infra-Red Counter Measures (DIRCM) (+£13m); reduction in estimate of Continuing Design Services (-£7m), Risk provision (-£12m); Contractors trials (-£1m) and Directorate of Test and Evaluation Organisation (DTEO) provision (-£2m); reassessment of resources required to meet spares requirement (-£18m); additional Defensive Aids Suite changes (+9m); and reduced Government Furnished Equipment requirement (-£2m); extra minor requirements (+£4m); increase in Ground Support Equipment and Health and Usage Monitoring Systems (HUDS) (+£9m); reassessment of minor requirements (-£4m).
Changed Requirement	8		Revised specification to accommodate safety and airworthiness features covered by Staff Requirement but not in the original contract (+£3m); decision to deploy aircraft attachment to Cyprus (+£5m).
Changed Budgetary Priorities	4	89	Allocation of Integrated Logistic Support (ILS) funding to specific items (-£25m); correction of an overestimation of ILS provision in Financial Planning Year 1998/99 (-£10m); reduction in Initial Provisioning spares and non-prime contract items (-£33m); reprofile of Financial Planning Year 1998/99 (-£15m); reprofile from Financial Planning Year 1999/00 (-£6m); reprofile of deliveries (+4m).
Inflation	28		Difference in annual price uplifts between contract specific indices and GDP indices

[✣] The approved cost has changed from the Major Projects Report 2000 because more accurate information on notional interest on capital charges has been used in converting the cash approval to a resource basis. The actual amount approved to be spent on the project has not changed.

Factor	Increase £m	Decrease £m	Explanation
			(+£28m).
Exchange Rate		14	Increase in value of Sterling compared to Italian Lira and French Franc (-£14m).
Contracting Process	4		Reassessment of resources for Reverse Levy (+£4m).
Accounting Adjustments and Re-definitions	16	1	Cost of trials at the DTEO, previously intra mural (+£15m); disaggregation of Modular Data Acquisition System (MODAS) equipment (+£1m); Derivation of the approval cost on a resource basis (-£1m).
Total	+111	-150	
Net Variation		-39	

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	561

2d. Years of peak procurement expenditure

2000/01	2001/02

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
Not Available (Development and Production package)	Not Available (Development and Production package)	22	22

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	Delivery of six aircraft to the RAF.

3b. Performance against approved in-service date

Current forecast ISD	June 2000
Approved ISD at Main Gate	December 1999
Variation (Months)	+6
In-year changes in 2000/2001	0

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Technical Factors	6		Delay in the EH101 Development programme caused by the loss of Pre-Production aircraft No.4 in 1995 (+3months); Delays due to industrial resource problems (+3 months).
Total	+6		
Net Variation	+6		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	-	-	Merlin HC Mk3 will be a new capability.
Other	-	-	-
Total	-	-	

3e. Operational impact of ISD variation

The delay to the in-service date has reduced the Joint Helicopter Command's operational capability and flexibility for moving troops and stores. Merlin Mk3 will provide an additional capability. The Joint Helicopter Command continue to review their plans to manage this capability gap.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

The Key User Requirements have been set on the basis of the performance parameters defined in the contracted Support Helicopter Air Vehicle Specification (SHAVS). These reflect the technical capability of EH101 and what industry is contracted to deliver but differ from the performance requirements originally laid down in the Staff Requirement. In approving the EH101 option for the Medium Support Helicopter, it was recognised that the EH101 would not be able to satisfy the Reference Mission underpinning the original Staff Requirement. The shortfall in performance is due to its troop carrying, lift and loading capacity, and its ferrying and deployment range.

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	Probability of transporting a specified number of fully equipped infantry soldiers over a specific distance.	Yes
2	Probability of transporting a specified number of fully equipped infantry soldiers, to a maximum seating capacity of the aircraft, over a specified distance.	Yes
3	Probability of carrying a specified underslung load over a specified distance.	Yes
4	Probability of carrying a specified underslung load, to the maximum lift capacity, over a specified distance.	Yes
5	Probability of carrying a specified internal freight load over a specified distance.	Yes
6	Probability of achieving a specified range with specified payload and mission profile using normal internal fuel.	Yes
7	Probability of achieving a specified range and mission profile using normal internal and auxiliary fuel.	Yes
8	Probability of demonstrating the following by the end of the In Service Reliability Maintainability Demonstration (ISRMD): a Mean Time Between Attributable Faults (MTBAF)≥3.25 Flying Hours (FH).	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	None

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

Not Applicable for this Project. Following approval the project went directly to the Development and Production stages. There was no Project Definition phase.

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POST-MAIN GATE PROJECT SUMMARY SHEET

MERLIN HM Mk1 HELICOPTER

Integrated Project Team Responsible:
Merlin

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

Merlin Helicopter Maritime (HM) Mk1 is an anti-submarine variant of the Anglo-Italian EH101 helicopter. Deliveries commenced in 1998 and the helicopter will progressively replace the Anti-Submarine Warfare (ASW) Sea King. The collaborative programme began in 1979 through EH Industries (EHI) – the company formed by Agusta of Italy and GKN Westland Helicopters Ltd (GKNWHL) in the UK. In 1991 the United Kingdom selected IBM-ASIC (now Lockheed Martin UK Integrated Systems) as Prime Contractor to complete development of the Royal Navy variant, integration of the Mission System and production of 44 aircraft.

Progress on the project was initially hampered by delays on the collaborative programme caused by accidents to three prototype aircraft in 1993, 1995 and 1996. The first flight by a production Merlin was achieved on 6 December 1995 and the first mission system-fitted Merlin flew in January 1997. The Royal Navy Intensive Flight Trials Unit (IFTU) was commissioned in December 1998. The latest endorsed in-service date was met in March 1999 with delivery of the twelfth aircraft.

As at 31 March 2001, 29 aircraft had been delivered and the final aircraft delivery is programmed for late 2002, notwithstanding a crash to RN24 in October 2000.

The most significant future activity is to achieve the embarked operational capability of 814 Squadron by the end of 2001.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
-	-	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
EH Industries Ltd.	Collaborative Development EH101.	Target Cost plus Incentive Fee with a maximum price.	Non-competitive with no competition for principal sub-contracts. Reflects 50/50 workshare agreement between Westland and Agusta.
GKN Westland Helicopters Ltd. (GKNWHL)	Aircraft Development.	Target Cost plus Incentive Fee with a maximum price.	Workshare agreement principal EHI sub-contractor.
EH Industries Ltd.	Production Investment EH101.	Target Cost plus Incentive Fee with a maximum price.	Non-competitive, with competition for sub-contracts below Partner Company Principal sub – contracts.
Lockheed Martin UK Integrated Systems (formerly IBM-ASIC)	Completion of Specific Development, Integration of Mission Systems and Aircraft Production.	Firm Price (Initially Fixed Price, subsequently converted in February 2000).	International Competition.
Lockheed Martin UK Integrated Systems (formerly IBM-ASIC)	Development & Production, Merlin Training System.	Firm Price (Initially Fixed Price, subsequently converted in February 2000).	Non-competitive.
Lockheed Martin UK Integrated Systems (formerly IBM-ASIC)	Merlin Support and Spares Availability System (MSSAS).	Firm Price (Initially Fixed Price, subsequently converted in February 2000).	Non-competitive.

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	4183
Approved Cost at Main Gate	3213*
Variation	970
In-year changes in 2000/2001	-18*

* The approved cost has changed from the Major Projects Report 2000 because more accurate information on notional interest on capital charges has been used in converting the cash approval to a resource basis. The actual amount approved to be spent on the project has not changed. The in-year change takes account of this adjustment.

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Technical Factors	513		Over-optimism in the collaborative development programme, specific technical problems, the loss of pre-production aircraft No.2 and substantial restructuring of the development programme caused by accidents to pre-production aircraft No. 4 and No.7 (+£379m); Accidents to pre-production aircraft No.4 (+£32m) and No.7 (+£90m); Safety Critical Software Analysis (+£12m).
Changed Requirement	232		Procurement of safety enhancements: specialised Emergency Lighting (+£7m) and the purchase and integration of an Accident Data Recorder (+£15m); Additional funding for Aircraft Special Servicing Equipment and Ground Support Equipment (+£6m); and Merlin Support and Spares Availability System (MSSAS) (+£33m); MSSAS redeployment (+£11m); Revised deployment pattern resulting from cancellation of Batch 2 (+£160m).
Changed Budgetary Priorities	41	46	Revised Communications and Electronics Security Group (CESG) proposal (-£5m); Military Aircraft Release (MAR) revisions to fund task to MAR5 on time to maintain Merlin Operational Capability (+£11m); Revision of Defence Evaluation & Research Agency (DERA) and Defence Test & Evaluation Organisation (DTEO) costs (+£6m); Reduced spares risk provision, MSSAS (-£6m); 5% cut in uncommitted production (-£9m); Reduction in risk provision, Merlin Prime Contract (MPC) (-£8m); Reduction in MPC contract savings (+£8m); Forecast Integrated Development Programme (IDP) savings not achieved (+£11m); Reassessment of Production Investment Operating Expenses (+£1m); reprofiling of financial planning year 1999/00 (-£6m); Change in profiling for Aircraft Serving & Support Equipment (ASSE) (+£4m); Change in profiling for the Merlin Training System (MTS) (-£1m); reprofiled deliveries (-£11m).
Inflation	281		Difference in annual price uplift between specific indices and the GDP indices (+£281m).

Factor	Increase £m	Decrease £m	Explanation
Contracting Process	183	167	Reassessment of the expected cost of the MPC (+£44m); and the Merlin Training System (MTS) contract (+£81m); Reassessment of costs and contract negotiations across the project (-£104m); Revised costing for Reverse Levy (+£23m); Change in contract pricing base from Fixed to Firm (-£2m); Concurrency risk provision (+£30m); EH101 Target and Maximum Price agreements (-£54m); Review of the Specific Development programme (-£3m); Profile changes due to programme slippage against contract milestones (+£5m); conclusion of fixed to firm price negotiations on MTS (-£4m).
Accounting Adjustments and Re-definitions	75	142	Correction of an error in the 1997 budget in the calculation of variation of price and VAT on the MPC (+£35m); VAT on Reverse Levy (+£10m); The introduction of funding (previously intramural) for DTEO work (+£26m); and CESG work (+£2m); Disaggregation of Modular Data Acquisition System costs in order to meet Resource Accounting and Budgeting requirements (+£2m); Derivation of the approved cost on a resource basis (-£142m).
Total	+1325	-355	
Net Variation	+970		

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	3507

2d. Years of peak procurement expenditure

1995/96	1996/97

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
Not Available (Development & Production Package)	Not Available (Development & Production Package)	44	44

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	The date by which the twelfth helicopter is delivered to the Royal Navy.

3b. Performance against approved in-service date

Current forecast ISD	March 1999
Approved ISD at Main Gate	December 1993
Variation (Months)	+63
In-year changes in 2000/2001	0

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Technical Factors	32		Technical problems in the early stages of the collaborative programme, the integration of the Automatic Flight Control System and the engine proving more complex than originally expected (+29 months); The accident to Pre-production Aircraft No. 7 (+3 months).
Changed Budgetary Priorities	12		The need to match the programme to the available Departmental resources (+12 months).
Contracting Process	24		Restructuring the collaborative development programme and the competition to select a Prime Contractor (+24 months).
Re-definitions		5	Redefinition of the in-service date (ISD) from 17 to 12 Aircraft. The National Audit Office has agreed to reflect this as an ISD variation decrease (-5 months).
Total	+68	-5	
Net Variation	+63		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	260		Estimated costs associated with the run-on of Sea King Mk5 & Mk6 (+£260m).
Forecast support costs of new equipment.		233	Estimated support costs of Merlin Mk1 not incurred (-£233m).
Total	+260	-233	
Net Variance	+27		

3e. Operational impact of ISD variation

Because the Royal Navy has been able to run on the Sea King Mk6 aircraft, an Anti-Surface Warfare (ASW) capability has been available to the fleet, albeit at a lower level than that expected from the Merlin Mk1. This cover has limited the operational impact of the delay in achieving the ISD of the Merlin Mk1 helicopter.

The Sea King Mk6, however is at the end of its service life and the operational cover is not as effective when compared with the capability of the newly manufactured and technologically advanced Merlin air vehicle. There are capability shortfalls in the Sea King when compared with the performance levels expected from the Merlin particularly in the area of Anti-Submarine Warfare and ASW operations.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	Weapon Splash Point Error Range (WSER) from all attacks shall not exceed a specified accuracy.	Yes
2	Probability of achieving passive localisation of the intended target, to the point of gaining an attack solution leading to weapon delivery. WSER shall not exceed a specified accuracy.	Yes
3	Reporting to a specified level of accuracy the position, course and speed of a target ship at a specified range.	Yes
4	Probability of achieving detection of the intended target within a sonobouy field.	Yes
5	Probability of achieving detection of the intended target on a sonobouy barrier.	Yes
6	Probability of detecting all specified operational targets within a specified area.	Yes
7	Probability of recovering a survivor or survivors within a specified accuracy and without undue delay.	Yes
8	Probability of transporting an underslung load, lifting troops, stores or injured personnel over a specified distance and up to a defined maximum number or weight.	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	None

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

In January 1975 (the equivalent of Initial Gate) two feasibility studies were launched into a suitable replacement for the Sea King helicopter and its equipment fit. The feasibility studies considered a wide range of avionics fits and airframe development and concluded that, in order to accommodate the avionics system and to provide the long endurance requirements, a helicopter of broadly Sea King size was needed.

In March 1978, approval was given for initial project definition work on a new helicopter. Also around this time a Memorandum of Understanding was set up to look at the prospect of European collaboration.

In February 1983 (the equivalent of Main Gate) the Staff Requirement was endorsed and approval was given for the development of the EH 101 with an in-service date of December 1993. A collaborative development contract was awarded to EH Industries Ltd with the assumption that the development costs would be shared with a European collaborative partner.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	98	2.3%
Approved Cost at Initial Gate	73	1.7%
Variation	+25	

5c. Duration of Assessment Phase

Date of Main Gate Approval	February 1983
Target Date for Main Gate Approval at Initial Gate	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	3213	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	-	November 1993	-
Forecast ISD at Initial Gate	-	December 1982	-

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POST-MAIN GATE PROJECT SUMMARY SHEET

MULTI-ROLE ARMOURED VEHICLE (MRAV)

Integrated Project Team Responsible:
Multi-Role Armoured Vehicle (MRAV)

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

The Multi-Role Armoured Vehicle (MRAV) programme will provide the British Army with a modern and flexible family of armoured utility vehicles that can operate in both high intensity conflict and in rapid reaction peace support and humanitarian operations world-wide. The vehicle affords enhanced protection, larger capacity and greater operational and tactical mobility than the ageing Fighting Vehicle 430 series, Combat Vehicle Reconnaissance (Tracked) utility variants and Saxon General War Role vehicles it replaces. A dismountable mission module atop an 8-wheel drive, 4-wheel steer drive module ensures maximum commonality, whilst allowing the flexibility to design and fit separate mission modules to meet the demands of the multi-role fleet.

MRAV is a trilateral collaborative programme between Germany, the Netherlands and the UK. France were also initially involved but withdrew from the programme in September 1999 to pursue a national approach to meet its diverging aspirations. On 5 November 1999, Germany and the UK signed a bilateral development contract with ARTEC GmbH. On 5 February 2001 the contract was amended to incorporate the Netherlands. The contract includes an option to manufacture a first batch of 600 vehicles to be split equally between the nations. The UK is expected to procure more than 1,000 MRAV with a total procurement cost of over £1bn. Following the development phase, between 2002 and 2004, the vehicle will undergo an intensive trials and reliability programme with vehicle deliveries planned to begin in 2006.

The integration of the MRAV programme into the Organisation for Joint Armament Co-operation (OCCAR) was confirmed by the OCCAR Board of Supervisors on 10 December 1999.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
-	-	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
ARTEC GmbH (a consortium comprising Alvis Vehicles Ltd, Krauss-Maffei Wegmann, Rheinmetall Landsysteme (RLS) and STORK PWV	Full Development with an option for Initial Production	Firm Price	International Competition

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	335
Approved Cost at Main Gate	428
Variation	-93
In-year changes in 2000/2001	-116

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Changed Budgetary Priorities		4	Reassessment of the cost of the joint project office (-£3m) and development of national variants (-£1m).
Inflation		2	Variation between GDP indices and contract VOP indices (-£2m).
Contracting Process	32		The cost variation has resulted from extensive contract negotiations where a number of UK specific requirements were added to the contract as an option (+£32m).
Procurement Strategy		118	Reduction in development costs associated with the Netherlands joining the programme and the UK share of initial production reducing from 300 to 200 vehicles (-£118m).
Accounting Adjustments and Re-definitions		1	Derivation of the approved cost on a resource basis (-£1m).
Total	+32	-125	
Net Variation		-93	

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	17

2d. Years of peak procurement expenditure

2007/08	2008/09

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
1.0	1.1	***	***

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	**Original ISD definition:** The operational capability to deploy a Mechanised Brigade HQ and Mechanised Infantry Battalion. **Current ISD definition:** An initial Operational Capability comprising 54 Armoured Personnel Carriers and 21 Command Vehicles fully operational in a Mechanised Infantry Battalion and Brigade Headquarters. **Reason for Change:** The development contract delivers Armoured Personnel Carriers and Command Vehicles only and in-service date definition has been amended to reflect this.

3b. Performance against approved in-service date

Current forecast ISD	August 2008
Approved ISD at Main Gate	March 2011
Variation (Months)	-31
In-year changes in 2000/2001	0

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Risk Differential		31	Difference between the 50% and 90% probability dates reflecting the perceived risk in the programme rather than an actual change in the programme timescales (-31 months).
Total		-31	
Net Variation		-31	

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	-	-	-
Other	-	-	-
Total	-	-	

3e. Operational impact of ISD variation*

-

* As there has been no change in the ISD the Department is planning to achieve, there are no cost or operational implications due to the variation.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently Forecast to be met (Yes or No)
1	Capacity: Multi-Role Armoured vehicle (MRAV) will have the minimum useable capacity to carry up to 10 personnel plus adequate supplies to operate over a 48 hour battlefield mission.	Yes
2	Mobility: It is essential that MRAV can be transported by outsize airlift (such as C5, C17 and Future Large Aircraft).	Yes
3	Survivability: MRAV, without add-on armour, must be protected against 20mm fragment simulating projectile.	Yes
4	Survivability: Occupants must be protected against effects of blast mine attack containing up to ***kg of explosive.	Yes
5	Survivability: MRAV must be fitted with Enhanced Protection overhead protection (top-attack armour).	Yes
6	Survivability: At night the Commander should be able to identify a NATO standard Target at ***m in poor conditions.	Yes
7	Reliability: Each design version shall have a basic reliability of 45% against the UK Battlefield Mission.	Yes
8	Armoured Treatment and Evacuation Vehicle (ATEV): To meet the treatment and evacuation roles, two configurations of ATEV are required. MRAV will be able to convert from one configuration to the other at first line.	Yes
9	Armoured Mortar Vehicle (AMV): AMV must mount the in-service mortar and it must be possible to fire that mortar throughout 6400 mils (360 degrees).	Yes
10	Communications Variants (ComV): Com(V) must be able to mount and fully integrate all future communications equipment standard to role.	Yes
11	Anti-Tank Platoon Vehicle (ATPV): ATPV must be able to carry 2 Firing Posts, 6 personnel and 16 anti-armour missiles.	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	None

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

There was no approval equivalent to Initial Gate for Multi-Role Armoured Vehicle (MRAV) as the UK joined a Franco-German programme after France and Germany had conducted national Feasibility Studies. However, the UK did spend approximately £2m in formulating the Staff Requirement, conducting a Combined Operational Effectiveness and Investment Appraisal (COEIA) and tender assessment. The COEIA assessed the cost and operational effectiveness of the collaborative solution against a range of alternative options. This expenditure has been subsumed by the Main Gate approval.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	-	-
Approved Cost at Initial Gate	-	-
Variation	-	

5c. Duration of Assessment Phase

Date of Main Gate Approval	March 1998
Target Date for Main Gate Approval at Initial Gate	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	428	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	April 2008	August 2008	March 2011
Forecast ISD at Initial Gate	-	-	-

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POST-MAIN GATE PROJECT SUMMARY SHEET

NIMROD MARITIME RECONNAISSANCE & ATTACK Mk4 (NIMROD MRA4)

Integrated Project Team Responsible:
Nimrod MRA4

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

The Nimrod Maritime Reconnaissance & Attack Mk4 (MRA4) will replace the current Nimrod MR2 as the RAF's new maritime patrol aircraft, providing significantly enhanced Anti-Submarine and Anti-Surface Unit Warfare capability through improved aircraft and sensor performance, a greater degree of system integration and better Human Machine Interface design. The new aircraft will also provide a substantial improvement in availability and supportability. The aircraft, training system and initial support is being procured from BAE SYSTEMS as Prime Contractor. The contract was placed in December 1996 and following difficulties encountered by BAE SYSTEMS in meeting the contractual programme, the contract was re-negotiated in May 1999.

BAE SYSTEMS are now pursuing an internal stretch programme, which seeks to improve contracted aircraft delivery timescales. Responsibility for aircraft build moved from FR Aviation to BAE SYSTEMS Woodford in October 1999 as part of the drive for programme improvements. The aircraft completed a detailed design phase in February 2000, and build and qualification activities are well underway (as part of a concurrent approach to development and production).

The next major programme milestone is first flight of the first development aircraft (PA1), which is scheduled for June 2002. This target is six months behind the contract date and there is thus a risk that the in-service date may not be achieved. In addition to risk mitigation measures, discussions with the company are currently taking place to explore the potential for incrementally delivering MRA4 capability.

In December 2000, under a Memorandum of Capability Partnering, the Department appointed BAE SYSTEMS as Prime Contractor for future support activity conducted by industry. Studies taking place during 2001 will define the support packages for Nimrod MRA4.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
-	-	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
BAE SYSTEMS (formerly British Aerospace Defence Ltd., Military Aircraft Division)	Development and Production package	Fixed Price	Prime Contractor International competition
Boeing Defence & Aerospace Group, USA	Tactical Command System and Sensors	Fixed Price	Sub-contractor to BAE SYSTEMS

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	2835
Approved Cost at Main Gate	2982*
Variation	-147
In-year changes in 2000/01	-4*

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Technical Factors	13	15	Increase in DERA estimate (+£13m); reduction in study requirements (-£6m); slower technical progress than originally envisaged, particularly with wing mass, leading to reduced interest on capital charges (-£9m).
Changed Budgetary Priorities		17	Reduction in Risk provision (-£17m).
Inflation	39		Variation in inflation assumptions (+£39m).
Receipts		46	Forecast recovery of Liquidated Damages (-£46m).
Contracting Process	16	119	Reduction in Risk provision (-£56m); and reductions following re-negotiation of contract (-£26m); reduction in programme costs between Main Gate approval and original contract placement (-£37m); original contract let at provisional indices that were below actual indices (+£16m).

* The approved cost has changed from the Major Projects Report 2000 because more accurate information on notional interest on capital charges has been used in converting the cash approval to a resource basis. The actual amount approved to be spent on the project has not changed. The in-year change takes account of this adjustment.

Factor	Increase £m	Decrease £m	Explanation
Accounting Adjustments and Re-definitions	1	19	Increase in cost owing to the creation of a trading fund for the Communications Electronic Security Group (CESG) after original approval had been granted (+£1m); derivation of the approved cost on a resource basis (-£19m).
Total	+ 69	-216	
Net Variation		-147	

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	730

2d. Years of peak procurement expenditure

2002/03	2005/06

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
Development and Production package	Development and Production package	21	21

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	Delivery of the seventh production standard aircraft to the Royal Air Force

3b. Performance against approved in-service date

	Date
Current forecast ISD	December 2004
Approved ISD at Main Gate	April 2003*
Variation (Months)	+20
In-year changes in 2000/01	0

* This was the in-service date endorsed by the Equipment Approvals Committee

3c. Reasons for variation from approved ISD

Factor	Increase	Decrease	Explanation
Technical Factors	23	3	Resource and technical problems at BAE SYSTEMS (+23 months); difference between forecast date reported in MPR99 based upon the 1999 re-approval at 90% confidence (March 2005) and forecast date reported in MPR 2000 based upon the current plan at 50% confidence (-3 months)
Total	+ 23	- 3	
Net Variation	+ 20		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	61		Additional cost of running on Nimrod MR2 (+£61m).
Other		61	MRA4 support costs not incurred over the same period (-£61m)
Total		0	

3e. Operational impact of ISD variation

The consequence of the Nimrod MRA4 in-service date slip is that the Nimrod MR2 will remain in service until mid-2008. This slip will delay introduction of the improved Anti-Submarine and Anti-Surface Unit Warfare capability of the Nimrod MRA4 and will require the ageing Nimrod MR2 fleet to be maintained in service longer than expected. The operational impact of this slippage will be partly mitigated by measures already in hand to introduce upgrades to some Nimrod MR2 systems, notably Replacement Acoustic Processors (RAP), navigation systems, datalinks and other communications to address interoperability issues. The RAP programme has benefited by making use of acoustic processors procured for Nimrod MRA4.

SECTION 4: KEY REQUIREMENTS

4a. Performance against approved key requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	Anti-Submarine Warfare (ASW) Barrier Search – Probability of Detection (PD)	Yes
2	ASW Area Search - Probability of Detection (PD)	Yes
3	ASW Passive Localisation & Attack - Weapon Splashpoint Error Range (WSER)	Yes
4	ASW Passive Localisation & Attack - Probability of Localisation (PL)	Yes
5	ASW Active Localisation & Attack - Weapon Splashpoint Error Range (WSER)	Yes
6	Anti-Submarine Warfare (ASW) - Time on Station (ToS)	Yes
7	Anti-Surface Warfare (ASuW) - Time on Station (ToS)	Yes
8	ASuW Area Search - Probability of detecting operational targets within a specified area	Yes
9	ASuW Third Party Targeting - Determination of target position, course and speed for third party targeting	Yes
10	Airfield Performance - achieving defined take off performance	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	None

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the assessment phase

In November 1992, the Equipment Approvals Committee (EAC) approved a Request for Information exercise whereby 17 companies were invited to provide responses to the draft Replacement Maritime Patrol Aircraft (RMPA) Staff Requirement.

Following analysis of the industry responses, the EAC endorsed the requirement and approved an Invitation to Tender phase whereby four companies (BAe, Lockheed Martin, Loral and Dassault) were invited to provide detailed technical and commercial proposals for an aircraft to meet the endorsed Staff Requirement. Dassault withdrew from the competition in January 1996, and whilst Lockheed Martin and Loral merged in May 1996, they maintained the two separate proposals until the competition concluded.

Following assessment of these responses, selection of BAe's Nimrod 2000 (later to be re-designated Nimrod MRA4) offer was approved by EAC and Ministers in July 1996. This was the equivalent of Main Gate approval.

5b. Cost of the assessment phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	5	0.2%
Approved Cost at Initial Gate	4	0.1%
Variation	+1	

5c. Duration of assessment phase

Date of Main Gate Approval	July 1996
Target Date for Main Gate Approval	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	2982	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	April 2003	January 2005	-
Forecast ISD at Initial Gate	-	December 2000	-

POST-MAIN GATE PROJECT SUMMARY SHEET

SEAWOLF MID-LIFE UPDATE

Integrated Project Team Responsible:
Ship Missile Systems

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

Seawolf is the only Point Defence missile System currently in-service with the Royal Navy and is fitted to Type 22 and Type 23 Frigates. The Seawolf Mid-life Update (SWMLU) will maintain the performance of the Seawolf system against the evolving Anti-Surface Ship Missile threat. Additions and modifications to the existing systems are primarily aimed at the Tracking and Guidance Sub-Systems and computer processing. The package of improvements is intended to improve ship survivability against threats well into this century and will ensure that the UK remains at the forefront of close-range naval missile technology.

The approval to proceed to Main Gate (Full Development and Production) was achieved in May 1999. The assessment from the Project Definition phase indicated that competition between the two design authorities, Matra BAE Dynamics UK Ltd (MBD) and Alenia Marconi Systems, would not result in a value for money solution as neither company would have the necessary expertise in all areas of the programme. Therefore, an alternative strategy of a single source procurement from an alliance between the two companies was formulated, however, due to a rescoping of the requirement the MBD element was significantly reduced. As a result they stated that they wished to only participate in the contract on a sub-contractor basis.

The main contract was placed in December 2000, and was subject to a Target Cost Incentive Fee arrangement, which incentivises Industry to seek efficiency savings, in which the MOD will share. The Logistic Support Date for the First of Class is May 2005 and the in-service date for the First of Class ship fitted is January 2006.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
-	-	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
Alenia Marconi Systems	Demonstration and Manufacture.	Target Cost plus Incentive Fee with a Maximum Price.	Non-competitive, but with competition for 50% of sub-contracts, the value of which amounts to 15% of overall value of prime contract.

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	284
Approved Cost at Main Gate	288
Variation	-4
In-year changes in 2000/2001	-2

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Changed Budgetary Priorities	15	2	Customer re-profiling of the programme, due to budgetary constraints, resulting in changes to the delivery profile of the programme in years 1999/00 (+£15m) and 2000/01 (-£2m).
Inflation		17	A commercial decision in 1999/00 to change from using input indices to using the most appropriate output indices reduced anticipated Variation on Price (VOP) inflation estimate from 3.3% to 2.2% (-£17m).
Total	+15	-19	
Net Variation		-4	

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	10

2d. Years of peak procurement expenditure

2003/04	2004/05

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
***	***	46	46

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	The date by which the first ship system becomes operational with the improved capability having successfully completed Naval Weapon Sea Trials.

3b. Performance against approved in-service date

Current forecast ISD	January 2006
Approved ISD at Main Gate	December 2004
Variation (Months)	+13
In-year changes in 2000/2001	+10

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Changed Budgetary Priorities	16		Slippage by customer organisation due to budgetary constraints in years 1999/00 (+6 months) and 2000/01 (+10 months).
Risk Differential		3	Difference between the 50% and 90% probability dates reflecting perceived risk in the programme rather than an actual change in the programme timescale (-3 months).
Total	+16	-3	
Net Variation	+13		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment.	+6		Additional costs of support to the existing ship systems falling to the Warship Support Agency in 1999/00 (+£2m) and an estimate for 2000/01 (+£4m).
Support costs associated with Compression of Ship Fitting Programme		-6	Estimated savings in the support costs of existing ship systems resulting from a 3 year compression of the new ship system fit programme (-£6m).
Total	+6	-6	
Net Variation		0	

3e. Operational impact of ISD variation

Type 22 and Type 23 platforms will have to support the existing system for longer, resulting in a decreased capability against the evolving threat from the current generation of sea skimming missiles and other anti-ship missile threats in all environments, for the period of in-service date (ISD) slippage. ISD slippage will however, allow for a revised Ship Fitting programme, taking at least 3 years and possibly 5 years out of the overall fitting programme, thus bringing the increased capability to the total fleet earlier with an associated reduction in support costs.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently Forecast to Be met (Yes or No)
1	To provide specified Probability of Escaping ship Hit (PEH) against Threat Project Definition 1 (PD1).	Yes
2	To provide specified Probability of Escaping ship Hit (PEH) against Threat PD2.	Yes
3	To provide specified Probability of Escaping ship Hit (PEH) against Threat PD3.	Yes
4	Provide performance specified in the presence of self-screening/self-protection jammer.	Yes
5	SWMLU equipments and their installation shall comply with the Electro-Magnetic Compatibility (EMC) requirements of Defence Standard 59-41.	Yes
6	Baseline Performance – retain all Guided Weapons Systems (GWS) 25 MOD3 and GWS26 MOD1 current functionality and performance.	Yes
7	Availability, Reliability & Maintainability performance parameters necessary to meet the major operational role.	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	None

Note: KURs formally agreed October 2000 and have been condensed since MPR2000.

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

The Feasibility Study (FS) stage of the Seawolf Mid-Life Update programme was approved in 1989. FS set out to provide a number of options to maintain system performance against the future threat. Twenty five options were considered covering missile improvements through a variety of sub-systems and whole system changes under two feasibility contracts with British Aerospace and GEC-Marconi Radar Defence Systems (GMRDS now Alenia Marconi Systems).

The results, taken into the Project Definition phase (PD), concluded that the Mid-life Update should feature upgraded target acquisition, sensor data fusion, high speed computer processing to provide improved target tracking and missile guidance, with the addition of an electro-optic subsystem to provide an enhanced all weather capability.

It was intended to seek approval for PD in 1991, however, due to programme delays approval was not granted until 1994. A non-competitive contract was placed with the Design Authority of the conventional launch Seawolf system, GMRDS, in 1996 and the final report was completed in May 98.

The PD report endorsed the programme predictions from the FS stage, by means of a comprehensive system modelling programme and provided a set of requirement documentation for the Development phase, to enable the MOD to obtain re-endorsement of the Staff Requirement and approval for Main Gate.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	16	5%
Approved Cost at Initial Gate	18	6%
Variation	-2	

5c. Duration of Assessment Phase

Date of Main Gate Approval	May 1999
Target Date for Main Gate Approval at Initial Gate	December 1993
Variation (Months)	+65

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	288	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Lowest	Most Likely	Highest
Forecast ISD at Main Gate	-	September 2004	December 2004
Forecast ISD at Initial Gate	-	August 1998	-

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POST-MAIN GATE PROJECT SUMMARY SHEET

SPEARFISH HEAVYWEIGHT TORPEDO

Integrated Project Team Responsible:
TORPEDO

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

Spearfish Heavyweight Torpedo is an advanced anti-submarine and anti-ship torpedo. Designed primarily to counter the threat from fast, deep manoeuvring submarines, its speed and endurance enable it to out-manoeuvre fast and deep diving targets. It will replace the Tigerfish torpedo in all Royal Navy submarines.

A contract for the Development and Initial Production (D&IP) of 100 torpedoes was placed with GEC-Marconi in 1982. Deliveries were subsequently suspended for 62 months until 1993, when reliability problems with the torpedo were resolved. In 1994 the design was accepted and Spearfish entered service.

In December 1994 a contract was placed with GEC-Marconi Underwater Systems Group (now BAE SYSTEMS Electronics Ltd) for the Spearfish Main Production Order (MPO). To minimise MoD liability and risk, GEC Marconi are responsible for the in-service support (ISS) of the Initial Production Order (IPO) and MPO weapons until 2004. The Defence Munitions Depot at Beith is the major sub-contractor for this element of the contract. The first MPO deliveries were achieved in July 1999.

The Royal Navy's requirements have been met to date using a combination of IPO and MPO torpedo warshot deliveries.

Significant future milestones:

Fleet Weapon Acceptance	June 2003
Last Weapon Delivery	December 2003

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
-	-	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
BAE SYSTEMS Electronics Ltd. (formerly GEC-Marconi Underwater Systems Group).	Main Production Order	Predominately Fixed Price	Non-Competitive (Competition for sub-contracts amounting to 24% of the overall value of the prime contract).

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	1347
Approved Cost at Main Gate	1246
Variation	+101
In-year changes in 2000/2001	-1

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Technical Factors	26		Programme delays required support costs of first torpedoes to be accounted for against the Project until in-service date had been achieved (+£26m).
Changed Requirement	3	20	Approved work added to contract (+£2m); Contract let for less than original approval (-£13m); Change of items from fixed to firm price (-£1m); Post Contract Award Audit adjustment in respect of sub-contract pricing (+£1m); Deletion of production acceptance trials (-£6m).
Changed Budgetary Priorities		8	Re-profiling of stage payment plan, leading to reduction in interest on capital (-£8m).
Inflation	101		Variation due to changes in inflation assumptions (Development & Initial Production +£92m; MPO +£9m).
Accounting Adjustments and Re-definitions		1	Derivation of the approved cost on a resource basis (-£1m).
Total	+130	-29	
Net Variation	+101		

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	1149

2d. Years of peak procurement expenditure

1987/88	1998/99

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
Dev & IP 1.2	1.5	D&IP 100	100
MPO 2.2	2.2	MPO ***	***

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	The availability of the first outload of weapons with Certified Design to a RN submarine.

3b. Performance against approved in-service date

Current forecast ISD	March 1994
Approved ISD at Main Gate	December 1987
Variation (Months)	+75
In-year changes in 2000/2001	0

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Technical Factors	75		Problems with the propulsion system (+9 months); During contract acceptance trials it became evident that the reliability requirements of the contract were not being met. Following a design audit, a Reliability Assurance Programme was implemented (+62 months); Problems during environmental trials required for safety acceptance (+4 months).
Total	+75		
Net Variation	+75		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	47	-	Additional support of Tigerfish torpedo (+£47m).
Other	-	17	Lower cost of Royal Navy crew certification trials through use of Tigerfish in lieu of Spearfish weapons (-£17m).
Total	+30		

3e. Operational impact of ISD variation

The delay to Spearfish ISD from 1987 until 1994 resulted in a significant and extended capability gap in anti-submarine warfare (ASW) and anti-surface warfare (ASuW) weapons for the submarine flotilla and necessitated the retention of the less capable Tigerfish torpedo, (introduced into service in 1973). ***

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently Forecast to be met (Yes or No)
1	Torpedo Reliability	***
2	Torpedo Anti-Submarine Warfare (ASW) Performance – Fast	***
3	Torpedo ASW Performance – Slow	***
4	Torpedo Countermeasure Performance	***
5	Torpedo Speed & Endurance	***
6	Torpedo Radiated Noise Performance	***
7	Torpedo Anti-Surface Warfare (ASuW) Performance	***
	Percentage currently forecast to be met	71%
	Change since previous MPR	-15%

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
***	***	***
***	***	***

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

By the mid 1970's there was a requirement to replace the Mk 24 heavyweight torpedo with a weapon of increased capability. Approval was given by the Operational Requirements Committee in March 1977 for a Feasibility Study and in February 1980 for Project Definition work. The Feasibility Study was undertaken between May 1977 and June 1979 and examined the potential for developing a new torpedo. This was followed in February 1980 by parallel studies of two options, namely the development of a new UK torpedo and the purchase of the American Mk48 with additional capability. The studies covered aspects such as torpedo noise, speed, warhead capability and endurance.

A Technical Review Committee subsequently prepared an overall technical judgement. Their 1981 report concluded that both the British and American weapon systems would satisfy the requirement. A final decision was taken by the Cabinet Defence and Overseas Policy Committee (OD), who accepted a fixed price package for both the heavyweight and lightweight torpedo development and initial production from GEC-Marconi. The contract was placed in 1982, combining Departmental and industry expertise from the Sting Ray lightweight torpedo programme.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	37	2.7%
Approved Cost at Initial Gate	34	2.7%
Variation	+3	

5c. Duration of Assessment Phase

Date of Main Gate Approval	1982
Target Date for Main Gate Approval at Initial Gate	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	1246	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	-	December 1987	-
Forecast ISD at Initial Gate	-	December 1986	-

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POST-MAIN GATE PROJECT SUMMARY SHEET

STING RAY LIGHTWEIGHT TORPEDO
Life Extension and Capability Upgrade

Integrated Project Team Responsible:
TORPEDO

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

The Sting Ray lightweight torpedo is the main anti-submarine weapon for ships and aircraft. It entered operational service in 1983 with a planned service-life of around 20 years. To provide an opportunity for international collaboration on a replacement, Sting Ray will remain in-service until around 2025 when it is envisaged that other nations will require replacement lightweight torpedoes. Accordingly, the Sting Ray torpedo needs to be life-extended and its capability enhanced.

The Sting Ray Life Extension (SRLE) programme was approved in May 1995 and a contract for full development was awarded to GEC-Marconi Underwater Systems Group (now BAE SYSTEMS Electronics Ltd) on 10 July 1996. The design is progressing well with the sonar sub-system in-water testing completing in December 1999. Some torpedo in-water trials have also been successfully completed. The trials programme is expected to complete with Contract Acceptance Trials in 2003.

Separately in February 2001, as a result of a study into a less sensitive warhead for the life-extended Sting Ray, a new Insensitive Munition warhead was included in the SRLE programme. The warhead is required to comply with new Departmental safety policy. Initially, an assessment will be undertaken on a variety of options including both a new development and a modified commercial off-the-shelf warhead.

Future milestones: place warhead assessment contract in August 2001; submission for SRLE main production approval in May 2002; place SRLE main production contract by April 2003; complete warhead assessment and decide way forward by early 2004; SRLE in-service date (ISD) of May 2006. There is further expenditure in clear prospect for the SRLE main production contract.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
-	-	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
BAE SYSTEMS Electronics Ltd. (formerly GEC-Marconi Underwater Systems Group)	Full Development & Pre-Production	Fixed Price	Non-competitive contract with design authority of equipment. No sub-contract competition at first tier level.

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	189
Approved Cost at Main Gate	147
Variation	+42
In-year changes in 2000/2001	+5

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Changed Requirement	13	3	Assessment work on a new Insensitive Munition Warhead, resulting from change in Departmental munitions safety policy (+£12m); Removal of warhead life extension funds (-£3m); Addition of safety case to comply with new Health & Safety regulations for warships (+£1m).
Changed Budgetary Priorities	10		Increase to Interest on Capital due to 12 month in-service date delay (+£8m); Revised estimate for trials activities (+£2m).
Inflation		2	Variation due to revised estimate for contract Variation of Price clauses (-£2m).
Contracting Process	4		Contract price exceeded estimate at approval (+£4m).
Accounting Adjustments and Re-definitions	20		Inclusion of Defence Evaluation and Research Agency (DERA) support previously treated as an intramural charge (+£11m); Re-assessment of DERA support expenditure (+£5m); Derivation of the approved cost on a resource basis (+£4m).
Total	+47	-5	
Net Variation	+42		

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	97

2d. Years of peak procurement expenditure

2007/08	2008/09

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
0.3	0.4	***	***

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	The date when the first 100 production standard weapons have been modified and are ready for issue to an operational unit.

3b. Performance against approved in-service date

Current forecast ISD	May 2006
Approved ISD at Main Gate	December 2002
Variation (Months)	+41
In-year changes in 2000/2001	0

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Changed Budgetary Priorities	24		The need to match the departmental programme to available resources in the overall pattern of departmental priorities (+24 months).
Contracting Process	17		Delay due to contract negotiations taking longer than expected (+9 months) and reassessment of programme timescales following negotiations (+8 months).
Total	+41		
Net Variation	+41		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	19		Additional in-service support of present Sting Ray torpedo (+£19m).
Other		14	Reduced in-service support for updated torpedo (-£14m).
Total	+5		

3e. Operational impact of ISD variation

The in-service date delay has enabled additional requirements to be incorporated into the weapon. However, the delay has the potential to cause a capability gap with the older and less effective Sting Ray weapon being retained in service with ongoing consequences for reliability. This capability gap should not be critical. ***

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	Overall Torpedo Effectiveness	Yes
2	Hit Probability	Yes
3	Automobile Performance	Yes
4	Torpedo Counter Countermeasure Capability	Yes
5	Operational Environment	Yes
6	Water Depth	Yes
7	Acoustic Environment Capability	Yes
8	Warhead & Firing Chain	Yes
9	Availability, Reliability & Maintainability	Yes
10	Maintenance & Transport Environment	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	None

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

The equivalent of the Assessment Phase took place within a number of Definition Studies undertaken between 1993 and 1995 under Sting Ray Post-Design Services at a cost of £2.6m. These studies considered six options which formed part of the dossier submitted to the Equipment Approvals Committee for Full Development and Pre-Production (FDPP) approval. Technical, engineering and environmental specifications together with FDPP, production and in-service support cost plans were also produced.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	-	-
Approved Cost at Initial Gate	-	-
Variation	-	

5c. Duration of Assessment Phase

Date of Main Gate Approval	May 1995
Target Date for Main Gate Approval at Initial Gate	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	***	***	***
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	Most Likely	Latest Acceptable
Forecast ISD at Main Gate	-	December 2002	-
Forecast ISD at Initial Gate	-	-	-

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POST-MAIN GATE PROJECT SUMMARY SHEET

SWIFTSURE AND TRAFALGAR CLASS SUBMARINE UPDATE (S&T Update)

Integrated Project Team Responsible:
Attack Submarine

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

The Swiftsure & Trafalgar Update (S&T Update) is a four stage incremental project to overcome sonar obsolescence and deliver enhanced military capability to in-service attack submarines.

The Initial Phase (Stages 1 & 2) successfully achieved its in-service date (ISD) in June 1996. This phase resolves sonar obsolescence, integrates the new submarine command system (SMCS), and delivers an incremental improvement in weapon system performance to the Swiftsure Class and older Trafalgar Class submarines.

The Final Phase (Stages 3 &4) delivers enhanced military capability to the newest four Trafalgar Class submarines, principally via a new integrated sonar suite, SMCS, and significant signature (noise) reduction measures.

BAE SYSTEMS Astute Class Ltd (BACL) is Prime Contractor for both Astute and the S&T Final Phase, and has selected derivatives of the main Final Phase sub-systems for Astute. The new sonar suite (Sonar 2076) is a software intensive system that represents a major step change in both technology and military capability. The sonar contractor (Thomson Marconi Sonar Limited (TMSL) formerly GEC-Marconi Naval Systems Sonar Systems Division) has experienced major difficulties and continues to struggle to meet the required programme. In particular, TMSL is facing major challenges with software engineering and associated signal and data processing. An integrated product team approach between BACL, TMSL and the Defence Procurement Agency in consultation with the departmental key customers, is now focused on following a lower risk incremental Stage 4 programme that contains the slippage in ISD to a further 12 months.

The next significant milestone is the completion of HMS Torbay's Naval Weapons Harbour Trial (Tactical Weapon System), with Stage 3 operational capability, which is currently forecast for January 2002.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
Ship Submersible Nuclear Upkeep Programme – HMS TORBAY's Revalidation Assisted Maintenance Period	2004	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
BAE SYSTEMS Astute Class Ltd (BACL) **For S&T Update Final Phase**	Management of novated individual equipment development and production contracts	Fixed/Firm Price	UK Competitive
GEC-Marconi Naval Systems Sonar Systems Division (now trading as Thomson Marconi Sonar Systems Ltd.(TMSL)) **For S&T Update Initial Phase**	Sonar 2074 development and production	Fixed/Firm Price	UK Competitive

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	687
Approved Cost at Main Gate	619
Variation	+68
In-year changes in 2000/2001	+18

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Changed Requirement	31		Additions following Alternative Assumption/ Options action (+£31m).
Inflation		18	Variation due to changes in inflation assumptions (-£18m).
Change in Associated Project	62		Additional costs resulting from refit date changes (+£62m).
Technical Factors	9	15	Revisions to payment profiles in line with programme variations (-£15m); Software engineering problems on sonar system (+£9m).
Accounting Adjustments	47	48	Disaggregation of the Defence Evaluation and Research Agency (DERA) trials funding (+£28m); Derivation of the approved cost on a resource basis (+£19m); Changed assessment of what is required reflecting better understanding and definition of the programme (-£48m).
Total	+149	-81	
Net Variation	+68		

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	421

2d. Years of peak procurement expenditure

1997/98	2001/2002

2e. Unit production cost

Initial Phase

Unit Production Cost (£m)		**Quantities Required**	
at Main Gate	Current	at Main Gate	Current
-	5.7	8	8

Final Phase

Unit Production Cost (£m)		**Quantities Required**	
at Main Gate	Current	at Main Gate	Current
-	85.0	4	4

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	Final Phase in-service date is based on the successful completion of sea trials following HMS Torbay's first Revalidation Assisted Maintenance Period (RAMP) (formerly known as the second Dockyard Assistance Maintenance Period), when a Stage 4 upgrade will be complete.

3b. Performance against approved in-service date

	Initial Phase	**Final Phase**
Current forecast ISD	June 1996	May 2004
Approved ISD at Main Gate	October 1994	May 2002
Variation (Months)	+20	+24
In-year changes in 2000/2001	-	+12

3c. Reasons for variation from approved ISD

Initial Phase

Factor	**Increase**	**Decrease**	**Explanation**
Contracting Process	12		Financial constraints delayed the placement of contracts (+12 months).
Delays in Associated Projects	12	2	Changes to fit opportunities resulting from changes to the submarine refit programme (+12 months and -2 months).
Total	+22*	-2	
Net Variation	+20		

* A proportion of the procurement delays and delays to associated projects acted concurrently.

Final Phase

Factor	Increase	Decrease	Explanation
Technical Factors	12		Sonar system development has been delayed due to software engineering problems (+12 months).
Contracting Process	5		Financial constraints delayed the placement of contracts (+5 months).
Delays in Associated Projects	7		Changes to fit opportunities resulting from changes to the submarine refit programme (+7 months).
Total	+24		
Net Variation	+24		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	-	-	The ISD delays should not result in additional costs incurred in maintaining and repairing obsolescent equipment, due to the fact that the Department believe the support task for the upgraded submarines to be equivalent to that for the legacy submarines.
Other	-	-	-
Total	-	-	

3e. Operational impact of ISD variation

The full capability enhancements will be unavailable for a further two years from May 2002. The capability improvements are the detection and prosecution of quiet submarine targets and the avoidance and evasion of hostile anti-submarine warfare attacks. These enhancements are needed to provide improved effectiveness of submarines in modern demanding missions.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	Weapon System Effectiveness	Yes
2	Survivability	Yes
3	Sonar Performance	Yes
4	Radiated Narrowband Acoustic Signature	Yes
5	Target Echo Strength	Yes
6	Tactical Information Management	Yes
7	Weapon Effectiveness	Yes
	Percentage currently forecast to be met	100%
	Change since previous MPR	None

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the assessment phase

The Ship Submersible Nuclear (SSN) is a multi-role platform with a number of unique capabilities, which allow flexibility in its employment. The Swiftsure & Trafalgar (S&T) Class Update programme began in 1986 with the aim of matching the rapidly improving performance of the threat of that time. Pre-Main Gate studies assessed requirements for updates to System Engineering, Submarine Layout, Sonar, Submarine Command System and the introduction of a Tactical Weapon System Highway.

Feasibility studies were completed in November 1990, following cost/capability trade-off investigations and concluded that a phased approach, in four stages, would progressively satisfy the operational requirement in a way that would reduce technical and programme risk and would fully exploit remaining submarine hull lives.

5b. Cost of the assessment phase

£m (outturn prices)	**Assessment Phase cost**	**Proportion of total estimated procurement expenditure**
Actual Cost	51	8%
Approved Cost at Initial Gate	74	12%
Variation	-23	

5c. Duration of assessment phase

	Initial Phase	**Final Phase**
Date of Main Gate Approval	February 1991	January 1994
Target Date for Main Gate Approval	-	-
Variation (Months)	-	-

5d. Cost at Initial Gate and Main Gate Approvals

£m (outturn prices)	**Lowest**	**Most Likely**	**Highest**
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	619	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Earliest	**Most Likely**	**Latest Acceptable**
Initial Phase Forecast ISD at Main Gate	-	October 1994	-
Initial Phase Forecast ISD at Initial Gate	-	-	-
Final Phase Forecast ISD at Main Gate	-	May 2002	-
Final Phase Forecast ISD at Initial Gate	-	December 1998	-

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POST-MAIN GATE PROJECT SUMMARY SHEET

TORNADO GR1 MID-LIFE UPDATE (MLU)

Integrated Project Team Responsible:
Tornado

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

The Tornado GR1 Mid-Life Update (MLU) programme originated in 1984 to enhance the capabilities of the Tornado aircraft to find and successfully attack its targets in all weathers, and reduce its vulnerability to counter attack. The updated aircraft is designated Tornado GR4.

Following substantial slippage to the in-service date, and significant cost growth, the Department reviewed the MLU programme and concluded that a reduced scope programme, designated MLU 93, represented a more cost-effective way forward. After endorsement in July 1994, contracts for development and production planning were placed via the Tornado Tri - National arrangements, with a production contract being let nationally with BAE SYSTEMS (formerly British Aerospace).

The main production programme agreed in 1994 has proceeded to time and cost baselines, save for price changes due to inflation and exchange rate variations. The revised in-service date was met in September 1998 when the first Tornado GR4 was delivered. Of the 142 aircraft being upgraded, 85 have now been delivered to the RAF and a further 20 are currently in work at BAE SYSTEMS.

Two follow-on upgrade contracts, Packages 1 and 2 (with respective in-service dates of July 2000 and December 2002), will provide new weapons systems and improved functionality. During the Tornado MLU, the integration of the Thermal Imaging and Laser Designation (TIALD) pod had proved problematic due to a number of technical problems. The Department sought to overcome these difficulties by using the Package 1 upgrade programme to resolve the outstanding issues. This report focuses solely on the baseline MLU programme and does not cover any of the follow-on capability enhancement contracts.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
Forward Looking Infra Red (FLIR)	1991	-	-
Night Vision Goggles	1993	-	-
Thermal Imaging Laser Designator (TIALD)	1993	-	-
Defensive Aids Sub-System	1994	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
PANAVIA (Consortium comprising BAE SYSTEMS [formerly BAe], EADS [formerly DASA], and Alenia)	Development/ Production Investment	Firm Price	Prime Contract non-competitive, but with international competition for sub-contracts.
BAE SYSTEMS (formerly BAe)	Production	Fixed Price	Prime Contract under No Acceptable Price No Contract (NAPNOC) conditions for production of mod-kits and for their embodiment. Competition for sub-contracts amounts to 30% of the total.

SECTION 2: PROJECT COSTS

2a. Performance against approved cost

£m (outturn prices)	Procurement Cost
Current Forecast Cost	943
Approved Cost at Main Gate	613
Variation	+330
In-year changes in 2000/2001	0

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Technical Factors	210	17	The technical complexity of the overall programme was underestimated (+£210m); but there has been a subsequent reduction in technical risk contingency (-£17m).
Changed Requirement	213	113	Quantity The original programme assumed 161 aircraft would be updated. Because of losses during Operation GRANBY, the update of 161 aircraft would have required early (1st batch) and unsuitable aircraft to have been brought to an acceptable standard. This gave rise to affordability problems. The requirement was therefore reduced to 142 aircraft, with a consequential reduction in the value of the contract. (-£113m); Cancellation of the 8th Production Batch resulted in an increased level of design work falling to the development contract. (+£123m).

Factor	Increase £m	Decrease £m	Explanation
			Specification Some tasks were originally excluded from the Mid-Life Update specification, as they could not be adequately defined at the time. In particular: more Government Furnished Equipment was required; additions to the operational requirement (Thermal Imaging Laser Designator (TIALD) and a Digital Processing & Preparation Station); increased trials support required as a result of the cancellation of the 8th Production Batch aircraft have added to the value of the contract. (+£90m).
Inflation	52		Due to the difference in annual price uplifts between industry specific indices and the GDP indices (+£52m).
Exchange Rate	14		Due to variations in the value of Sterling against the Deutschmark and Italian Lira since the project was approved (+£14m).
Accounting Adjustments and Re-definitions		29	Derivation of approved cost on a resource basis (-£29m).
Total	+489	-159	
Net Variation	+330		

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	789

2d. Years of peak procurement expenditure

2000/01	2001/02

2e. Unit production cost

Unit Production Cost (£m)		**Quantities Required**	
at Main Gate	Current	at Main Gate	Current
-	3.8	161	142

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	Delivery of first aircraft

3b. Performance against approved in-service date

Current forecast ISD	September 1998
Approved ISD at Main Gate	June 1993
Variation (Months)	+63 months
In-year changes in 2000/2001	0

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Technical Factors	12		Underestimation of the technical complexity of the programme (+12 months).
Changed Requirement	39		Revision of the Mid-Life Update (MLU) programme following cancellation of the 8th batch (+11 months); time taken to re-specify and re-approve a more expensive programme (+28 months).
Contracting Process	12		Additional time taken in competitive tendering for MLU equipments (+12 months).
Total	+63		
Net Variation	+63		

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Support costs of current equipment	-*	-*	-
Other	-*	-*	-
Total	-*	-*	

3e. Operational impact of ISD variation

During the period of in-service date variation, operating commitments continued to be met by the Tornado GR1. However, potential effectiveness was less than it could have been in that the Tornado GR4 provides a more capable all-weather, covert platform than the GR1.

* Support costs are only available for the Tornado fleet as a whole. The Department believe that the support task for GR4 is equivalent to that for GR1 and therefore there is no cost impact.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	Weapons interfaces.	Yes
2	Integration of a Government Furnished Equipment Forward Looking Infra Red (FLIR) to provide a day/night medium and low level electro-optic capability with associated displays in the front and rear cockpits.	Yes
3	The integration of a new digital multi-functional Head Up Display (HUD).	Yes
4	Integration of a dedicated Computer Symbol Generator (CSG) to drive the front and rear displays.	Yes
5	Integration of a Night Vision Goggle (NVG) compatible cockpit for use at medium and low level.	Yes
6	Operation of a night capable Advanced Airborne Laser Designator System (AALDS).	Yes
7	Integration of a digital map and multi-function display surface in the front cockpit.	Yes
8	Integration of a Computer Loading System (CLS) to provide a mission data and software loading capability, whilst retaining the option to revert to the Cockpit Voice Recorder (CVR).	Yes
9	Post-mission debriefing and evaluation.	Yes
10	Integration of a Terrain Reference Navigation (TRN) System to provide an all-weather, covert and passive low-level navigation, terrain following and weapon-aiming capability.	No
11	Integration of a Government Furnished Equipment (GFE) tail-mounted, rear facing Missile Approach Warner (MAW).	No
12	Application of stealth materials to reduce the aircraft's radar cross-section and reflection.	No
13	Incorporation of a TFR/TRN cross-monitor for terrain following flight.	No
14	Integration of a new terrain following display for simultaneous display of TFR returns and the TRN prediction.	No
	Percentage currently forecast to be met	64%
	Change since previous MPR	Not Applicable

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
6. Operation of a night capable AALDS	Changed Requirement	The original requirement was to allow operation of an unspecified AALDS on MLU aircraft. The 1994 re-approval changed the requirement to the full integration of the Thermal Imaging Airborne Laser Designator (TIALD) pod.
10. Integration of a TRN System	Changed Budgetary Priorities and Technical Factors	The requirement for TRN was deleted in the 1994 re-approval on the grounds of cost and technological risk.
11. Integration of a GFE tail-mounted, rear facing MAW.	Changed Budgetary Priorities and Technical Factors	The requirement for MAW was deleted in the 1994 re-approval on the grounds of cost and technological risk.
12. Application of stealth materials to reduce the aircraft's radar cross-section and reflection.	Changed Budgetary Priorities	The requirement for the addition of stealth materials was deleted in the 1994 re-approval on the grounds of affordability.
13. Incorporation of a TFR/TRN cross-monitor for terrain following flight.	Changed Budgetary Priorities and Technical Factors	The requirement for TFR/TRN cross-monitor was deleted in the 1994 re-approval due to the deletion of TRN.
14. Integration of a new terrain following display for simultaneous display of TFR returns and the TRN prediction.	Changed Budgetary Priorities and Technical Factors	The requirement for the new TFD was deleted in the 1994 re-approval due to the deletion of TRN and as a cost-saving measure.

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

Pre-development comprised a number of activities, beginning with a Feasibility Study in 1984 (the equivalent of Initial Gate). The Feasibility Study (worth £1.5m at April 1984 prices) considered a number of modification options and included an assessment of Tornado's possible maritime role. Three years later, in February 1987, the Equipment Policy Committee approved a six month Project Definition phase (worth £2m at September 1985 prices) together with funds for the initial development, associated activities and airframe integration (£3.7m at September 1985 prices). All of the above work was placed non-competitively with the PANAVIA Consortium.

In September 1988, following difficulties with the development selection programmes and activities to support preparation for a firm price development programme, the Department received £12.7m of additional interim funding from the Treasury (at September 1988 prices). These funds, above those initially envisaged for the equivalent assessment work, included provision for more detailed design work on airframe integration.

The results of the Assessment Phase work formed the basis of the Tornado Mid-Life Update Development and Production submissions (the equivalent of Main Gate) at the end of 1988.

5b. Cost of the Assessment Phase*

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	-	-
Approved Cost at Initial Gate	-	-
Variation	-	

5c. Duration of Assessment Phase

Date of Main Gate Approval	November 1988
Target Date for Main Gate Approval at Initial Gate	-
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	613	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	-	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Lowest	Most Likely	Highest
Forecast ISD at Main Gate	-	June 1993	-
Forecast ISD at Initial Gate	-	-	-

* Full resource costs for Assessment Phase work are not available.

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CANCELLED POST-MAIN GATE PROJECT SUMMARY SHEET

MEDIUM RANGE TRIGAT

Integrated Project Team Responsible:
Infantry Guided Weapons

SECTION 1: ABOUT THE PROJECT

1a. Project description, progress and key future events

Medium Range (MR) TRIGAT was to be a crew-portable anti-tank guided weapon system for the infantry and Royal Marines, capable of defeating improved enemy armour at a maximum range of 2,400 metres. It was to replace MILAN and it comprised a firing post, missile and thermal sight, allowing effective operation at night and in adverse weather conditions. MR TRIGAT was a multilateral project involving the UK, France and Germany as Pilot Nations with Belgium and the Netherlands as Associate Nations.

Industrial qualification trials began in February 1994 and were completed in Spring 1998. Multi-national evaluation/user trials and national trials were completed in early 1999, testing the performance of the missile system and demonstrating its capability against potential targets. UK approval for Industrialisation and Production (I&P) was secured in June 1999; France and Germany had already confirmed their intent to proceed with the programme.

As a result of continuing and open ended delays it became clear that the basis on which the UK had agreed to proceed to the I&P phase of MR TRIGAT could no longer be sustained. The Secretary of State announced the UK's withdrawal from the I&P phase of MR TRIGAT on 28 July 2000. See section 5F for further details.

This Project Summary Sheet shows the position at 31 March 2001, following withdrawal from the I&P Phase of the project.

1b. Associated projects

Critical to Achievement of ISD		Critical to Meet Initial Gate Requirement	
Project Title	Forecast ISD	Project Title	Forecast ISD
-	-	-	-

1c. Procurement strategy

Contractor(s)	Contract Scope	Contract Type	Procurement Route
EMDG [EuroMissile Dynamics Group], comprising: Matra BAe Dynamics (UK) Ltd (MBD), Aerospatiale and Lenkflugkorpersysteme	Full Development	Fixed Price	Single source, non-competitive Development Contract (French MoD are the Contracting Authority)

SECTION 2: PROJECT COSTS

2a. Performance against approved cost*

£m (outturn prices)	Procurement Cost
Current Forecast Cost	109*
Approved Cost at Main Gate	134*
Variation	-25
In-year changes in 2000/2001	-20

2b. Reasons for variation from approved cost

Factor	Increase £m	Decrease £m	Explanation
Changed Requirement		46	Reduction in trials and contingency costs reflecting evolution of the programme (-£26m); Reduction in Development costs for Crew Carriage, High Tripod and Charging Equipment Pure Air (CEPA) replacement (-£4m); Reduction in Development costs for Vehicle Integration (-£3m); Reduction of Interest on Capital charge (-£13m).
Changed Budgetary Priorities		9	Realism adjustment from 1999 Long Term Planning round reflecting expected future Development expenditure (-£9m).
Inflation		8	Difference in annual price uplifts between specific indices and Approval Assumption [GDP] (-£8m).
Exchange Rate	12		Fluctuation of Sterling against the Deutschmark and the French Franc since Development Approval (+£12m).
Procurement Strategy	22		Greece, Spain and Italy did not join the programme as had been expected at the time of Approval (+£22m).
Accounting Adjustments and Re-definitions	4		Derivation of the approved cost on a resource basis (+£4m).
Total	+38	-63	
Net Variation		-25	

2c. Expenditure to date

Expenditure to 31 March 2001 (£m)	109

* The costs shown are for Development only, following the decision not to proceed with the I&P phase of the project on 28 July 2000.

2d. Years of peak procurement expenditure

*	*

2e. Unit production cost

Unit Production Cost (£m)		Quantities Required	
at Main Gate	Current	at Main Gate	Current
*	*	*	*

SECTION 3: PROJECT TIMESCALE

3a. Definition of in-service date

ISD Definition:	Was defined as First Battalion fully equipped with all Firing Posts and first-line missile stocks.

3b. Performance against approved in-service date

Current forecast ISD	*
Approved ISD at Main Gate	December 1995
Variation (Months)	*
In-year changes in 2000/2001	*

3c. Reasons for variation from approved ISD

Factor	Increase (months)	Decrease (months)	Explanation
Total	-	-	
Net Variation	-	-	

3d. Cost resulting from ISD variation

Type of Cost/Saving	Cost £m	Saving £m	Explanation
Total	-	-	

3e. Operational impact of ISD variation

-

* Project cancelled – see Section 5f.

SECTION 4: KEY USER REQUIREMENTS

4a. Performance against approved key user requirements

Serial	Key Requirement	Currently forecast to be met (Yes or No)
1	Meet minimum Single Shot Kill Probability (SSKP)	*
2	Crew-portable system; no part of firing post to weigh more than 15.5kg and munition to be less than 17kg	*
3	An effective range of at least 200 - 2,000 metres	*
4	The ability to be fired from within buildings	*
5	The agility to engage moving helicopters	*
6	The potential for improved performance to match improved target protection	*
	Percentage currently forecast to be met	*
	Change since previous MPR	*

4b. Reasons for variation against approved key requirements

Key Requirement	Factor	Explanation
-	-	-

SECTION 5: HISTORY UP TO MAIN GATE APPROVAL

5a. Description of the Assessment Phase

Feasibility Study and Project Definition were combined for both Medium Range and Long Range TRIGAT projects and meaningful separation is not possible for these phases. This has been the accepted assumption in previous MPRs.

5b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost	Proportion of total estimated procurement expenditure
Actual Cost	Not separable	(See above)
Approved Cost at Initial Gate	Not separable	(See above)
Variation	Not separable	

* Project cancelled – see Section 5f.

5c. Duration of Assessment Phase

Date of Main Gate Approval	June 1987
Target Date for Main Gate Approval at Initial Gate	Not separable (See above)
Variation (Months)	-

5d. Cost boundaries at Initial Gate and Main Gate Approvals

£m (outturn prices)	Lowest	Most Likely	Highest
Cost of Demonstration and Manufacture Phase forecast at Main Gate	-	920	-
Cost of Demonstration and Manufacture Phase forecast at Initial Gate	-	Not separable (See above)	-

5e. ISD boundaries at Initial Gate and Main Gate Approvals

	Lowest	Most Likely	Highest
Forecast ISD at Main Gate	-	December 1995	-
Forecast ISD at Initial Gate	-	Not separable (See above)	-

5f. Reasons for Cancellation

When the UK signed the MR TRIGAT Memorandum of Understanding in July 1999, indicating our intention to proceed to Industrialisation and Production (I&P), we believed Belgium and the Netherlands would sign the Memorandum of Understanding in a similar timescale, allowing the programme to proceed to meet the ISD of June 2005. By July 2000 the Memorandum of Understanding signature process had not been completed while the uncertainty and the open ended delay had increased further, this deterioration of the programme's prospects led the UK to decide not to proceed into the Industrialisation and Production phase.

At the time of withdrawal the MPR2000 cost and performance information was still valid and the in-service date (ISD), as shown in MPR2000, could not be formally reassessed because of the open ended nature of the continuing delays. MPR2000 showed a cost overrun of £21m against an approval of £920m, a delay in ISD of 114 months against the approval at Main Gate and an achievement of 5 of the 6 Key User Requirements.

Following the UK's withdrawal from MR TRIGAT, the Army is conducting an Anti-Armour Balance of Investment study. This study will establish the capability required from short, medium and long range anti-armour systems in updated operational scenarios for the Army's Mechanised and Armoured Battlegroups. It is due to report in September 2001.

In parallel with the Balance of Investment study the procurement to meet the Light Forces Anti Tank Guided Weapon requirement is progressing towards an ISD currently forecast as June 2005, based on an Off the Shelf solution. The Balance of Investment study will consider the utility of procuring additional Light Forces systems, to meet the medium range requirement alongside the capability offered by other candidate solutions. While the potential solution based on procuring additional Light Forces systems for other parts of the Infantry is likely to result in the June 2005 ISD being maintained the alternative solutions may result in a later ISD.

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PRE-MAIN GATE PROJECT SUMMARY SHEET

BEYOND VISUAL RANGE AIR-TO-AIR MISSILE (BVRAAM)

Integrated Project Team Responsible:
Beyond Visual Range Air-To-Air Missile (BVRAAM)

SECTION 1: ABOUT THE REQUIREMENT

The Beyond Visual Range Air-to-Air Missile (BVRAAM) will provide Eurofighter with the capability to combat projected air-to-air threats throughout the life of the aircraft and contribute to the air superiority requirements of UK and NATO operations. The weapon is required to operate in all weather conditions and will complement the Advanced Short Range Air-to-Air Missile (ASRAAM) already in procurement for Eurofighter.

The key features of the requirement include stealthy launch, enhanced kinematics, which will provide the missile with sufficient energy to chase and destroy a highly agile manoeuvring target, robust performance in countermeasures and the ability for the launch aircraft to fire and disengage at the earliest opportunity thus enhancing survivability.

Eurofighter partner nations (Germany, Italy, Spain), Sweden (for the JAS 39 Gripen) and France (for Rafale) have a similar requirement and discussions are at an advanced stage in agreeing a co-operative programme.

SECTION 2: THE ASSESSMENT PHASE

2a. Description of the Assessment Phase

On 2 October 1995, Minister (Defence Procurement) gave approval for the issue of an Invitation to Tender (ITT) for BVRAAM. The ITT was issued on 5 December 1995. Two bids were received; one from a consortium led by Matra BAe Dynamics (MBD) UK Ltd, and one from Raytheon Systems Ltd. After extensive analysis, it was decided that both bids contained areas of risk which needed to be addressed before a development and production contract could be placed. In May 1997, a Project Definition & Risk Reduction (PDRR) Phase was approved and contracts were placed on both bidders for a period of one year with the results to be technically and operationally assessed before a final decision was made. Both PDRR contracts were let in August 1997 and revised bids were received in May 1998.

Due to the complexity of the BVRAAM assessment, the need to accommodate the requirements of the Prospective Partner Nations and the need to go for Best And Final Offers (BAFOs) primarily as a result of the French request to join the programme, Main Gate Approval was not achieved until May 2000*. In his statement to the House of Commons on 16 May 2000, Secretary of State announced the MBD Meteor missile to be the winning bid in the competition. It is hoped to place a demonstration and manufacture contract around November 2001.

* The project population for MPR2001 was defined at 1 April 2000, before the BVRAAM project achieved Main Gate approval. Therefore, for MPR2001 purposes, BVRAAM is reported as a pre-Main Gate project.

2b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost
Forecast Cost	20
Approved Cost at Initial Gate	14
Variation	+6

2c. Duration of Assessment Phase

Current forecast date of Main Gate Approval	May 2000
Target date for Main Gate Approval	March 1997
Variation (Months)	+38

2d. Boundaries of future Demonstration and Manufacture phase costs

£m (outturn prices)	Lowest	Most Likely	Maximum	Range
Current forecast cost of Demonstration and Manufacture phase	1296	1368	1444	148
Forecast cost of Demonstration and Manufacture phase at Initial Gate	-	1264	-	-
% Change	-	+8%	-	-

2e. Boundaries of future project in-service dates

	Earliest	Most Likely	Latest	Range
Current forecast ISD	June 2010	September 2011	August 2012	26 months
Forecast ISD at Initial Gate	-	March 2005	-	-
% Change	-	+81%	-	-

PRE-MAIN GATE PROJECT SUMMARY SHEET

BOWMAN

Integrated Project Team Responsible:
Bowman & Land Digitization

SECTION 1: ABOUT THE REQUIREMENT

Bowman will provide the armed forces with a tactical communications system for all three Services in support of land and littoral (sea-to-shore) operations. It will replace the Clansman combat radio, in service since the mid 1970's and now becoming increasingly obsolete, and the Headquarters infrastructure element of the PTARMIGAN trunk system.

SECTION 2: THE ASSESSMENT PHASE

2a. Description of the Assessment Phase

Bowman was first approved in 1988. At this stage, approval for full Development and Production (the equivalent of Main Gate), was expected in 1993 with an in-service date (ISD) of 1995. Feasibility studies were split into two stages, with Feasibility Stage one (FS1) being completed in August 1993. Following an international competition in 1993, contracts were placed with two competing consortia; Yeoman (Siemens Plessey Systems Ltd and Racal) and Crossbow (led by ITT Defence (UK) Ltd), for Feasibility Stage two (FS2) and the first Project Definition Stage (PD1).

FS2 indicated that the risk of procuring and integrating the communications harness for Bowman, known as the Local Area sub System (LAS) (previously Vehicle Integrated Communications and Distribution System), would be best managed by placing the responsibility on the Bowman contractors, rather than developing a Departmental solution. This change in procurement strategy was approved in February 1997, when approval was also given for Bowman Core Risk Reduction Work.

In November 1996, the two consortia formed a Joint Venture Company (JVC) known as Archer Communications Systems Ltd (ACSL) to bid jointly for the Bowman supply contract. Following a review of the procurement options open to the Department, approval for a revised, single source, procurement strategy for Bowman and the remainder of the risk reduction work was granted in March 1997. A risk reduction contract was placed with ACSL in July 1997.

A further package of work (Package 0) valued at £185m was placed with ACSL in October 1998 to enable them to build on current work to define systems integration requirements and demonstrate technical progress prior to production commitment at Main Gate planned for November 2000.

In July 2000, the Department decided to reject the ACSL interim bid, to remove the company's preferred supplier status, and to re-launch the competition. The Department was not convinced that ACSL could deliver a system that met the requirement in the time required or represented value for money. Achieving an early in-service date was key to the Department's decision. In October 2000, the Equipment Approval Committee approved further risk reduction work with three potential prime contractors (TRW Ltd, Computing Devices Canada Ltd and Thales Defence Ltd) and two key sub-contractors (ITT Defence Ltd and Cogent). These contracts, with a total value of £68m, were placed in November 2000. Three new bids for the Bowman requirement were received in February 2001, the assessment of which will inform the Main Gate submission planned for June 2001.

2b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost
Forecast Cost	405
Approved Cost at Initial Gate	130
Variation	+275

2c. Duration of Assessment Phase

Current forecast date of Main Gate Approval	July 2001
Target date for Main Gate Approval	December 1993
Variation (Months)	+91

2d. Boundaries of future Demonstration and Manufacture phase costs

£m (outturn prices)	Lowest	Most Likely	Maximum	Range
Current forecast cost of Demonstration and Manufacture phase	*	1832	*	*
Forecast cost of Demonstration and Manufacture phase at Initial Gate	-	-	-	-
% Change	-	-	-	-

2e. Boundaries of future project in-service dates

	Earliest	Most Likely	Latest	Range
Current forecast ISD	*	*	*	*
Forecast ISD at Initial Gate	-	December 1995	-	-
% Change	-	-	-	-

In December 1999, having reviewed progress on the Bowman project, the Department decided that they could not confirm a revised in-service date until Main Gate approval, but they are seeking to maintain the current planned ISD of late 2003 early 2004.

* Lowest and maximum boundary figures were not available as at 31st March 2001. They are expected to be available in July 2001 and will be confirmed separately to the Public Accounts Committee.

PRE-MAIN GATE PROJECT SUMMARY SHEET

FUTURE AIRCRAFT CARRIER (CVF)

Integrated Project Team Responsible:
CVF

SECTION 1: ABOUT THE REQUIREMENT

The requirement for the Future Aircraft Carrier (CVF) was endorsed in the Strategic Defence Review (SDR) which identified a continuing need for rapidly deployable forces with the reach and self-sufficiency to act independently of host-nation support. SDR concluded that the ability to deploy offensive air-power would be central to future force projection operations, with carriers able to operate the largest possible range of aircraft in the widest possible range of roles. The current Invincible Class of carriers were designed for Cold War anti-submarine warfare operations. With helicopters and a limited air-defence capability provided by a relatively small number of embarked Sea Harriers, it was judged that this capability would no longer meet future UK requirements. It was therefore decided to replace the Invincible Class with two larger and more capable aircraft carriers able to operate up to 50 aircraft, both fixed-wing and helicopters. CVF's offensive air-power will be provided primarily by the Future Carrier Borne Aircraft (FCBA). The carrier air group will also operate the Future Organic Airborne Early Warning (FOAEW) system together with helicopters from all three Services in a variety of roles that could include anti-submarine/anti-surface warfare, attack and support.

SECTION 2: THE ASSESSMENT PHASE

2a. Description of the Assessment Phase

CVF received Initial Gate approval in December 1998 and Invitations to Tender were issued in January 1999. Responses were received in May 1999 from industry teams led by British Aerospace (now BAE SYSTEMS) and Thomson-CSF (now Thales). Following tender evaluation, competitive firm price contracts for the Assessment Phase, each potentially worth some £30m, were awarded to both teams in November 1999.

The Assessment Phase breaks down into two stages. The first has involved the examination of carrier designs, and helped inform the decision in January 2001, to select the US Joint Strike Fighter (JSF) as the option with best potential to meet the FCBA requirement. The second stage, scheduled to start in June 2001, will involve parallel generic design work on carrier options capable of supporting the operation of JSF. This will be followed by more detailed work, following a decision on JSF variant selection, to finalise the design parameters and reduce technological risk for the carrier option to be taken forward. The progress of BAE SYSTEMS and Thales to the second stage will be subject to their performance during stage one and their proposals for stage two. The Assessment Phase will conclude in 2003 when bids for Demonstration and Manufacture are expected.

2b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost
Forecast Cost	105
Approved Cost at Initial Gate	118
Variation	-13

2c. Duration of Assessment Phase

Current forecast date of Main Gate Approval	December 2003
Target date for Main Gate Approval	December 2003
Variation (Months)	0

2d. Boundaries of future Demonstration and Manufacture phase costs✶

£m (outturn prices)	Lowest	Most Likely	Maximum	Range
Current forecast cost of Demonstration and Manufacture phase	-✣	***	-✣	-
Forecast cost of Demonstration and Manufacture phase at Initial Gate	2654	3047	3363	709
% Change		-1.2%		

2e. Boundaries of future project in-service dates

	Earliest	Most Likely	Latest	Range
Current forecast ISD	February 2012	August 2012	August 2012	6 months
Forecast ISD at Initial Gate	-	August 2012	-	-
% Change	-	0%	-	-

✶ The forecast costs have changed from the Major Projects Report 2000 because of more accurate information on the later years spend profile, and the notional interest on capital charges used in converting the cash approval to a resource basis.

✣ Lowest and maximum boundary figures for the forecast cost of Demonstration and Manufacture were not available at 31 March 2001.

PRE-MAIN GATE PROJECT SUMMARY SHEET

EUROFIGHTER AIRCREW SYNTHETIC TRAINING AIDS (ASTA)

Integrated Project Team Responsible:
Eurofighter

SECTION 1: ABOUT THE REQUIREMENT

Eurofighter Aircrew Synthetic Training Aids (ASTA) will deliver a ground-based synthetic aircrew training capability to supplement aircraft-based training for the Eurofighter fleet. ASTA will comprise two training devices: a Full Mission Simulator (FMS) and a Cockpit Trainer (CT). The FMS will immerse the pilot in a high-resolution visual environment and replicate sensor performance against interactive threats. The CT will be a lower level device used mainly to introduce pilots to the cockpit environment and associated procedures.

SECTION 2: THE ASSESSMENT PHASE

2a. Description of the Assessment Phase

Initial approval of the ASTA requirement, to fund preparation work and allow industry to inform an Invitation to Tender (ITT), was obtained in January 1995 as part of the approval for the EF2000 development phase re-orientation. In May 1996, following a Combined Operational Effectiveness and Investment Appraisal (COEIA), the Department obtained Equipment Approvals Committee (EAC) approval to release the ITT to industry.

The Department initially sought to satisfy the full ASTA requirement through a collaborative programme based on a single source contract placed by NATO Eurofighter and Tornado Management Agency (NETMA). Due to the complexities of the international collaborative proposal, the Department decided to investigate a national Private Finance Initiative (PFI) solution. After full consideration, returning to a collaborative approach was deemed to represent the lowest risk option to the Eurofighter programme as a whole. This approach was endorsed by the EAC in October 2000, when approval was granted for ASTA Demonstration and Manufacture (Main Gate)*.

* The project population for MPR2001 was defined at 1 April 2000, before the Eurofighter ASTA project achieved Main Gate approval. Therefore, for MPR2001 purposes, Eurofighter ASTA is reported as a pre-Main Gate project.

2b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost
Forecast Cost	3.8
Approved Cost at Initial Gate	2.9
Variation	+0.9

2c. Duration of Assessment Phase

Current forecast date of Main Gate Approval	October 2000
Target date for Main Gate Approval	December 1995
Variation (Months)	+58

2d. Boundaries of future Demonstration and Manufacture phase costs

£m (outturn prices)	Lowest	Most Likely	Maximum	Range
Current forecast cost of Demonstration and Manufacture Phase	-*	399	-*	-*
Forecast cost of Demonstration and Manufacture phase at Initial Gate	305	314	351	46
% Change	-	+27%	-	-

2e. Boundaries of future project in-service dates

	Earliest	Most Likely	Latest	Range
Current forecast ISD	-	June 2004	September 2004	-
Forecast ISD at Initial Gate	-	September 2001	-	-
% Change	-	+48%	-	-

* ASTA is being procured in three tranches, under the principles of Incremental Acquisition. The Department has set a requirement for three-point estimating only on tranches for which funds have been approved. At 31 March 2001, funding had only been approved for Tranche 1.

PRE-MAIN GATE PROJECT SUMMARY SHEET

FUTURE CARRIER-BORNE AIRCRAFT (FCBA)

(Future Joint Combat Aircraft (FJCA) since May 2001)

Integrated Project Team Responsible:

JCA

SECTION 1: ABOUT THE REQUIREMENT

Following the Strategic Defence Review, options have been examined for a successor to the Royal Navy Sea Harrier and the Royal Air Force Harrier GR7 from 2012. The requirement is to provide the Joint Force 2000 (joint command for all Harrier forces) with a multi-role fighter/attack aircraft and the Joint Strike Fighter (JSF) has been identified as having the best potential to meet the requirement. The in-service date will coincide with the first of the new aircraft carriers Future Aircraft Carrier (CVF) to enter service, which is currently expected to be 2012.

SECTION 2: THE ASSESSMENT PHASE

2a. Description of the Assessment Phase

Following approvals given in November 1996, the UK has contributed $200m as a full collaborative partner to the $2bn JSF Concept Demonstration Phase (CDP) under a Memorandum of Understanding (MOU) signed in December 1995. The phase began in November 1996, and is expected to last until October 2001 when the Engineering and Manufacturing Development (EMD) phase is due to commence.

During CDP, the two competing US Prime Contractors (Boeing and Lockheed Martin) for the EMD phase have been designing and flying demonstration aircraft in order to evolve their preferred weapon system concepts for the production designs and submit competing proposals for EMD. The CDP prime contracts are Cost Plus Fixed Fee, subject to a Maximum Price.

Approval was granted in January 2001 for signature of the MOU covering UK participation in the EMD phase, at a cost of £1.3bn, together with £600m on associated UK national work. The EMD down-selection process commenced in February 2001 and the current planning assumption is for choice of the Short Take-Off and Vertical Landing (STOVL) variant of JSF although the Carrier Variant is also an option. Variant selection will be timed to coincide with the requirements of CVF.

Studies into alternative options to JSF to meet the requirement were also conducted but were rejected on cost-effectiveness grounds. The other options considered were the US F/A18E, the French Rafale M, a "navalised" Eurofighter and an advanced Harrier.*

* The project population for MPR2001 was defined at 1 April 2000, before the Eurofighter ASTA project achieved Main Gate approval. Therefore, for MPR2001 purposes, Eurofighter ASTA is reported as a pre-Main Gate project.

2b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost
Forecast Cost	143
Approved Cost at Initial Gate	150
Variation	-7

2c. Duration of Assessment Phase

Current forecast date of Main Gate Approval*	January 2001
Target date for Main Gate Approval	-
Variation (Months)	-

2d. Boundaries of future Demonstration and Manufacture phase costs

£m (outturn prices)	Lowest	Most Likely	Maximum	Range
Current forecast cost of Demonstration and Manufacture phase	-✣	***✣	-✣	-
Forecast cost of Demonstration and Manufacture phase at Initial Gate	-	-	-	-
% Change	-	-	-	-

2e. Boundaries of future project in-service dates

	Earliest	Most Likely	Latest	Range
Current forecast ISD	-	December 2012	April 2014	-
Forecast ISD at Initial Gate	-	December 2012	-	-
% Change	-	-	-	-

* The Main Gate was 'tailored' for a development approval only. The Main Gate production approval will be sought in 2005/6, to line up with US decision points.

✣ Three point estimates for the production phase have yet to be determined as costs are dependant on the outcome of the JSF EMD source selection process, CV or STOVL variant choice and final aircraft numbers. However, three point estimates do exist for the cost of the Development Phase. They are as follows: Lowest - £2079m; Most Likely – £2145m; and Maximum – £2358m.

PRE-MAIN GATE PROJECT SUMMARY SHEET

FUTURE TRANSPORT AIRCRAFT (FTA)

(A400M since April 2001)

Integrated Project Team Responsible:
A400M

SECTION 1: ABOUT THE REQUIREMENT

The aircraft that fulfils the Future Transport Aircraft (FTA) requirement will provide tactical and strategic mobility to all three Services. The capabilities required of FTA include: the ability to operate from well established airfields and semi-prepared rough landing areas in extreme climates and all weather by day and night; to carry a variety of vehicles and other equipment, freight, and troops over extended ranges; to be capable of air dropping paratroops and equipment; and to be capable of being unloaded with the minimum of ground handling equipment. Furthermore, the Strategic Defence Review strategic lift work confirmed a requirement for an airlift capability to move large single items such as attack helicopters and some Royal Engineers' equipment and concluded that this requirement would be met, in the latter part of this decade, by FTA.

SECTION 2: THE ASSESSMENT PHASE

2a. Description of the assessment phase

The Government announced in December 1994 that it would replace its ageing C-130K Hercules fleet, in part by procuring 25 C-130J's from Lockheed Martin and in addition, , subject to certain conditions, by rejoining the next phase of the collaborative Future Large Aircraft (FLA) programme (now known as A400M). Initial Gate approval was achieved in July 1997, and in the same year the solution assumed for costing purposes was changed to an initial lease of four C-17 and subsequent procurement of 25 FLA. A Request For Proposals (RFP) was issued to Airbus in September 1997 on behalf of the seven FLA nations (UK, France, Germany, Italy, Spain, Belgium, Turkey). Subsequently, in July 1998, four nations (UK, France, Spain, Belgium) issued a "competitive RFP" for a FTA to Airbus Military Company (A400M), Boeing (C-17) and Lockheed Martin (C-130J).

Proposals were received on 29 January 1999 and parallel national and international assessments were undertaken. These covered Combined Operational Effectiveness & Investment Appraisal, technical and commercial compliance, risk assessment, and an appraisal of the international and industrial dimensions. This work also led to parallel negotiations and clarification with the three bidders. At the direction of the Equipment Approvals Committee (EAC) in December 1999, additional work was undertaken to inform the Main Gate submission. Main Gate approval was subsequently granted and on 16 May 2000 the Government announced their decision to procure 25 A400M aircraft to meet the FTA requirement.*

* The project population for MPR2001 was defined at 1 April 2000, before the FTA project achieved Main Gate approval. Therefore, for MPR2001 purposes, FTA is reported as a pre-Main Gate project.

2b. Cost of the assessment phase

£m (outturn prices)	Assessment phase cost
Forecast Cost	1.4
Approved Cost at Initial Gate	2.0
Variation	-0.6

2c. Duration of assessment phase

Current forecast date of Main Gate Approval	May 2000
Target date for Main Gate Approval	June 1999
Variation (Months)	+11

2d. Boundaries of future Demonstration and Manufacture phase costs

£m (outturn prices)	Lowest	Most Likely	Maximum	Range
Current forecast cost of Demonstration and Manufacture phase	-	***	***	118
Forecast cost of Demonstration and Manufacture phase at Initial Gate	-	-	-	-
% Change	-	-	-	-

2e. Boundaries of future project in-service dates

	Earliest	Most Likely	Latest	Range
Current forecast ISD	-	***[❖]	***	10 months
Forecast ISD at Initial Gate	-	December 2007[❖]	-	-
Variation (%)	-	14%	-	-

[❖] The current forecast ISD and the forecast ISD at Initial Gate are both based on the A400M solution which was selected at Main Gate.

PRE-MAIN GATE PROJECT SUMMARY SHEET

LIGHTWEIGHT MOBILE ARTILLERY WEAPON SYSTEM (GUN) (LIMAWS(G))

Picture
Not
Available

Integrated Project Team Responsible:
Future Artillery Weapon Systems

SECTION 1: ABOUT THE REQUIREMENT

LIMAWS will provide an indirect fire capability to support light and rapid effect forces. Initial studies showed that the requirement is likely to be best met by a mix of lightweight towed gun systems (LIMAWS(G)) and lightweight rocket launchers (LIMAWS(R)). The two elements of LIMAWS are currently at different stages – the Gun is in assessment, whilst the Rocket launcher is in the concept phase. Most of the data in this Project Summary Sheet therefore relates to the Gun element.

As regards the Rocket requirement, two parallel risk reduction studies are currently being conducted, at a cost of approximately £2m each. The studies are investigating risks in four key areas: - launcher stability, mobility, reload methodology, and weight. The studies will report in early 2002, and the outputs will support the preparation of the LIMAWS(R) Business Case, including setting performance, time, and cost parameters, to take the programme towards the Assessment Phase. The Business Case will inform a LIMAWS System (Gun and Rocket) Main Gate –planned for December 2002 (50% confidence).

It is envisaged that the System Main Gate will approve Demonstration and Manufacture of the Gun, and Assessment work on the Rocket launcher, and that this will be followed by a further approval for the Demonstration and Manufacture of the Rocket launcher.

SECTION 2: THE ASSESSMENT PHASE

2a. Description of the Assessment Phase *(LIMAWS(G) only)*

There are several elements to the LIMAWS(G) Assessment Phase, which is based on a systems engineering approach, and aims to ensure that accurate information regarding time, cost, performance and risk is available for the Main Gate Business Case, as follows:

1) Participation in the US Lightweight 155mm Howitzer Engineering and Manufacturing Development Phase approved in August 1998, at a cost of £4m at 1998/99 prices.

2) Market surveys by Qinetiq (formerly part of the Defence Evaluation and Research Agency (DERA)) of candidate gun platforms and 120mm mortar platforms; a Defence Procurement Agency assessment of candidate towing and support vehicles; and a contract with Royal Ordnance Defence to cover assessment of Vehicle Legislation Compliance, Assisted Ramming/Ammunition Handling, Fire Control System and improved 105mm Ammunition. A Review Note covering these packages of work was submitted to the approving authorities in March 2001 and subsequently approved at a cost of £6m at outturn prices. Together, the two approvals above form the Initial Gate baseline.

2b. Cost of the Assessment Phase *(LIMAWS(G) only)*

£m (outturn prices)	Assessment Phase cost
Forecast Cost	7
Approved Cost at Initial Gate	10
Variation	-3

2c. Duration of Assessment Phase *(LIMAWS(G) only)*

Current forecast date of Main Gate Approval	December 2002
Target date for Main Gate Approval	-
Variation (Months)	-

2d. Boundaries of future Demonstration and Manufacture phase costs *(LIMAWS(G) only)*

£m (outturn prices)	Lowest	Most Likely	Maximum	Range
Current forecast cost of Demonstration and Manufacture phase	666	729	821	155
Forecast cost of Demonstration and Manufacture phase at Initial Gate	-	-	-	-
% Change	-	-	-	-

2e. Boundaries of future project in-service dates *(LIMAWS(G) only)*

	Earliest	Most Likely	Latest	Range
Current forecast ISD	December 2005	June 2006	October 2007	22 months
Forecast ISD at Initial Gate	-	-	-	-
% Change	-	-	-	-

PRE-MAIN GATE PROJECT SUMMARY SHEET

SKYNET 5

Picture
Not
Available

Integrated Project Team Responsible:
Satellite Communications

SECTION 1: ABOUT THE REQUIREMENT

SKYNET 5 will provide the next generation of flexible and survivable satellite communications services for military use and will replace the SKYNET 4 constellation at the end of its predicted life. Robust military satellite communications services are essential to support inter and intra-theatre information exchange requirements and ensure that deployed and mobile forces are not constrained by the need to remain within the range of terrestrial communications.

SECTION 2: THE ASSESSMENT PHASE

2a. Description of the Assessment Phase

Assessment Phase work on SKYNET 5 commenced in 1993 and explored 3 possible solutions to the requirement – a collaborative programme with France and Germany (TRIMILSATCOM), conventional asset procurement and a Private Finance Initiative (PFI) solution. Evaluation of the proposals put forward demonstrated that TRIMILSATCOM would be unable to meet the UK's requirements in a timely and affordable way, whereas a national PFI approach offered the potential to do so. The UK therefore decided in August 1998 not to proceed with TRIMILSATCOM.

Competitive PFI Design Study contracts of 20 months duration (each valued at £30m Firm price) were awarded to Matra-Marconi Space UK (now Astrium) and Lockheed Martin in March 1999. The PFI Design Studies enabled the two contractors to consider the merits of a range of candidate SATCOM architectures. The Department stakeholders assessed the viability of the contractors' outline PFI proposals in June 2000 and concluded that there were good prospects for the PFI approach to be successful. Accordingly, industry were directed to discontinue work being undertaken, as a fallback, on conventional approaches. An Invitation to Negotiate (ITN) for the PFI Service Delivery Phase was issued to both companies in July 2000.

The PFI Design Studies culminated in January 2001 with service delivery proposals from Paradigm (the service delivery entity established by Astrium) and Rosetta (the service delivery entity established by Lockheed Martin, BAE SYSTEMS and British Telecommunications). These proposals are currently under evaluation.

Significant future milestones on this project include:

Placing of Implementation Phase Contract	End 2002
Commencement of Enhanced Military Satellite Communications Service	2007

2b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost
Forecast Cost	113
Approved Cost at Initial Gate	113
Variation	0

2c. Duration of Assessment Phase

Current forecast date of Main Gate Approval	January 2002
Target date for Main Gate Approval	-
Variation (Months)	-

2d. Boundaries of future Demonstration and Manufacture phase costs

£m (outturn prices)	Lowest	Most Likely	Maximum	Range
Current forecast cost of Demonstration and Manufacture phase	***	***	***	***
Forecast cost of Demonstration and Manufacture phase at Initial Gate	-	-	-	-
% Change	-	-	-	-

2e. Boundaries of future project in-service dates

	Earliest	Most Likely	Latest	Range
Current forecast ISD	*	March 2007	*	
Forecast ISD at Initial Gate	-	May 2003	-	
% Change				

* The actual ISD will be adjusted as the life of the SKYNET 4 constellation is re-assessed over time. The aim is to achieve an optimal date, which balances the run down of SKYNET 4 capability with the introduction of new SKYNET 5 services to achieve service continuity in a cost effective manner.

PRE-MAIN GATE PROJECT SUMMARY SHEET

TACTICAL RECONNAISSANCE ARMOURED COMBAT EQUIPMENT REQUIREMENT (TRACER)

Picture Not Available

Integrated Project Team Responsible:
TRACER

SECTION 1: ABOUT THE REQUIREMENT

Tactical Reconnaissance Armoured Combat Equipment Requirement (TRACER) is the land-based reconnaissance component of the Information, Surveillance, Target Acquisition and Reconnaissance (ISTAR) capability required to meet the land commander's critical information requirements.

TRACER will provide a highly mobile ISTAR capability. It will provide detailed combat intelligence and will cue and direct offensive action by direct and indirect fire systems, ground attack aircraft and attack helicopters. It will have utility in both high intensity conflict and operations other than war by virtue of its deployability, mobility, presence and deterrent effect.

TRACER will include a sophisticated sensor suite to enable it to be deployed at varying ranges and in all conditions. It will also include a balanced survivability package including stealth technology, Defensive Aids Suites and physical protection in the form of advanced armour technologies. TRACER will replace the ageing Combat Vehicle Reconnaissance (Tracked) which entered service in 1972.

Operational Analysis has demonstrated that Unmanned Air Vehicle (UAV) technology promises to deliver a significant portion of the required ISTAR capability. A Balance of Investment Study, scheduled to complete in September 2001, will inform a decision on the most appropriate mix of sensors required to deliver the capability and the most appropriate platform, manned or unmanned, on which to deploy them.

SECTION 2: THE ASSESSMENT PHASE

2a. Description of the Assessment Phase

The initial Feasibility Study for TRACER was approved in May 1992 and reported in 1994. In July 1995, a cost and risk study was approved to review project cost and address areas of programme risk. As this study neared completion in 1996 it emerged that the requirement for TRACER was in line with the US requirement for a Future Scout and Cavalry System (FSCS).

In July 1998, with the signing of a Memorandum of Understanding, the UK and US formally entered a collaborative Project Definition (PD) phase for TRACER. On 29 January 1999, Firm Price contracts were awarded non-competitively to two UK/US industrial consortia. During the TRACER PD phase, scheduled to last 42 months, the consortia are undertaking independent work aimed at winning a single Demonstration and Manufacture contract, scheduled to be awarded in early 2003.

In October 1999, the Chief of Staff of the US Army announced that the US intended to move to lighter and more deployable armoured forces. This led to the development of the US requirement known as the Future Combat System. The emergence of this new requirement, which was to be funded out of existing programmes, resulted in the removal of US funds for future phases of the collaborative TRACER programme with effect from October 2000. In light of this development, a strategy to define a way forward for the UK is being developed and is expected to be finalised in the autumn. In the meantime, the project definition work is continuing.

2b. Cost of the Assessment Phase

£m (outturn prices)	Assessment Phase cost
Forecast Cost	131
Approved Cost at Initial Gate	130
Variation	+1

2c. Duration of Assessment Phase

Current forecast date of Main Gate Approval	January 2003
Target date for Main Gate Approval	-
Variation (Months)	-

2d. Boundaries of future Demonstration and Manufacture phase costs

£m (outturn prices)	Lowest	Most Likely	Maximum	Range
Current forecast cost of Demonstration and Manufacture phase	-*	2225*	-*	-*
Forecast cost of Demonstration and Manufacture phase at Initial Gate	-	-	-	-
% Change	-	-	-	-

2e. Boundaries of future project in-service dates

	Earliest	Most Likely	Latest	Range
Current forecast ISD	May 2008	October 2008	May 2009	12 months
Forecast ISD at Initial Gate	-	December 2004	-	-
% Change	-	-	-	-

* The figure shown in 2d covers the cost of Demonstration and Manufacture of both the TRACER and WATCHKEEPER programmes. A Balance of Investment Study, which will be completed in September 2001, will inform a decision on the optimum mix of TRACER and UAVs and determine the capability levels and the numbers of the respective platforms. Only when this study has reported will full three point cost estimates for the Demonstration and Manufacture Phases be available.

PRE-MAIN GATE PROJECT SUMMARY SHEET

TYPE 45 DESTROYER

Integrated Project Team Responsible:
Type 45 Destroyer

SECTION 1: ABOUT THE REQUIREMENT

The Type 45 is a new class of Anti-Air Warfare Destroyer to replace the Royal Navy's existing Type 42s. It will carry the Principal Anti-Air Missile System (PAAMS) capable of protecting the vessels themselves and ships in their company against aircraft and missiles, satisfying the Fleet's need for area air defence capability into the 2030s. PAAMS is being procured collaboratively with France and Italy. The warship itself will be procured nationally.

SECTION 2: THE ASSESSMENT PHASE

2a. Description of the Assessment Phase

The Type 45 Destroyer programme builds on the Assessment work carried out in Phase 1 of the collaborative HORIZON project, the warship element of the Common New Generation Frigate programme. Following the decision of the three HORIZON partners (France, Italy and the UK) to proceed with PAAMS, but to pursue national warship programmes, BAE SYSTEMS was appointed Prime Contractor for the Type 45 in November 1999. The Assessment Phase is now complete. The contract for PAAMS Full Scale Engineering Development and Initial Production was placed in August 1999. Main Gate approval for the warship was achieved in July 2000*, and a contract for Demonstration and First of Class Manufacture was placed in December 2000.

2b. Cost of the Assessment Phase❖

£m (outturn prices)	Assessment Phase cost
Forecast Cost	242
Approved Cost at Initial Gate	213
Variation	+29

* The project population for MPR 2001 was defined at 1 April 2000, before the Type 45 Destroyer project achieved Main Gate approval. Therefore for MPR 2001 purposes, Type 45 Destroyer is reported as a pre-Main Gate project.

❖ Includes expenditure on HORIZON. Excludes Post-Main Gate costs (PAAMS Full Scale Engineering Development and Initial Production, and Warship Demonstration and First of Class Manufacture).

2c. Duration of Assessment Phase

Current forecast date of Main Gate Approval	July 2000
Target date for Main Gate Approval	-
Variation (Months)	-

2d. Boundaries of future Demonstration and Manufacture phase costs

£m (outturn prices)	Lowest	Most Likely	Maximum	Range
Current forecast cost of Demonstration and Manufacture phase	7440	8087	8855	1415
Forecast cost of Demonstration and Manufacture phase at Initial Gate	-	8198	-	-
% Change	-	-1.4%	-	-

2e. Boundaries of future project in-service dates

	Earliest	Most Likely	Latest	Range
Current forecast ISD	-	May 2007	November 2007	-
Forecast ISD at Initial Gate	-	December 2002	-	-
% Change	-	-	-	-

Appendix 3 Project Glossary

POST-MAIN GATE PROJECTS

ADVANCED AIR-LAUNCHED ANTI-ARMOUR WEAPON (AAAW)

Air-launched missile with a limited stand-off capability to attack armoured vehicles, that will be carried by Harrier GR7, Eurofighter and Tornado GR4 aircraft.

ADVANCED SHORT RANGE AIR-TO-AIR MISSILE (ASRAAM)

Air-launched missile with an infra-red seeker that will replace the Sidewinder AIM-9L missile and will be carried by Eurofighter, Harrier GR7/9, Tornado F3 and the Royal Navy's Sea Harrier FA2.

AIRBORNE STAND-OFF RADAR (ASTOR)

Long-range theatre surveillance and target acquisition system to detect fixed, static, and moving ground targets, in all weathers by day and night.

ASTUTE CLASS SUBMARINE

Nuclear-powered attack submarines to replace the Swiftsure class.

ATTACK HELICOPTER (WAH64 APACHE)

Version of the United States Army's AH-64D helicopter, equipped with Longbow radar, Hellfire missiles, ground suppression rockets, 30mm cannon and powered by RTM322 engines.

CONVENTIONALLY ARMED STAND-OFF MISSILE (CASOM)

Air-launched stand-off missile for precision attacks against strategic, tactical and infrastructure targets that will be carried by Harrier GR7, Eurofighter and Tornado GR4 aircraft.

EXTENDED RANGE ORDNANCE/ MODULAR CHARGE SYSTEM (ERO/MCS)

Upgrade of the AS90 self-propelled Howitzer gun to enable improved range, lethality and survivability, together with operational and logistic benefits such as reduced charge wastage. The programme comprises two elements: a 52 calibre barrel (ERO) and a modular charge system (MCS).

EUROFIGHTER

Agile fighter aircraft with an offensive support capability.

HERCULES C-130J

Replacement fleet of transport aircraft for part of the existing Hercules fleet.

HIGH VELOCITY MISSILE SYSTEM (HVM)

Very Short-Range Air Defence weapon designed to attack armoured helicopters and low flying aircraft from the ground.

LANDING PLATFORM DOCK (REPLACEMENT) (LPD(R))

Replacements for the amphibious assault ships Fearless and Intrepid. LPD(R) will be used to launch and co-ordinate amphibious operations.

MERLIN MK1 HELICOPTER

Anti-submarine warfare variant of the Anglo-Italian EH-101 helicopter, which will operate from Type 23 frigates, and Invincible class aircraft carriers.

MERLIN MK 3 HELICOPTER

Support helicopter based on the Anglo-Italian EH-101 utility helicopter. Designed to carry 24 troops or a range of vehicles or underslung loads.

MULTI-ROLE ARMOURED VEHICLE (MRAV)

Armoured utility vehicle that will replace the Fighting Vehicle 430 series, Combat Vehicle Reconnaissance (Tracked) and Saxon General War Role vehicles for use in high intensity conflict, rapid reaction peace support and humanitarian operations.

NIMROD MARITIME RECONNAISSANCE & ATTACK MK 4 (NIMROD MRA MK4)

Replacement for the current fleet of Nimrod MR Mk2 patrol aircraft, whose principal war roles are anti-submarine and anti-surface ship warfare.

SEAWOLF MID-LIFE UPDATE

Upgrade to the existing Seawolf system to maintain performance against the evolving Anti-Surface Ship Missile threat.

SPEARFISH HEAVYWEIGHT TORPEDO

Submarine-launched heavyweight torpedo with both anti-submarine and anti-surface ship capabilities.

STING RAY LIGHTWEIGHT TORPEDO LIFE EXTENSION

Life extension and capability enhancement programme for the Sting Ray lightweight torpedo to allow it to remain in-service until 2025.

SWIFTSURE & TRAFALGAR CLASS SUBMARINE UPDATE (S&T UPDATE)

Update to Swiftsure and Trafalgar class submarines to improve the sonar, command and tactical weapons systems.

TORNADO MID-LIFE UPDATE (TORNADO MLU)

Update of the aircraft's avionics and armament to enhance its ability to find and successfully attack targets in all weathers while reducing vulnerability to counter-attack.

PRE-MAIN GATE PROJECTS

BEYOND VISUAL RANGE AIR-TO-AIR MISSILE (BVRAAM)

Air-to-Air missile, to be carried by Eurofighter, for engagement of targets at beyond visual range.

BOWMAN

Combat net tactical communications system to replace the existing CLANSMAN radio and support battlefield digitisation.

FUTURE AIRCRAFT CARRIER (CVF)

Aircraft carrier capable of rapidly deploying forces with the reach and self-sufficiency to act independently of host nation support. The requirement for carriers with the ability to deploy offensive air power was endorsed in the Strategic Defence Review.

EUROFIGHTER AIRCREW SYNTHETIC TRAINING AIDS (EUROFIGHTER ASTA)

A ground-based synthetic aircrew training capability to supplement aircraft-based training for the Eurofighter fleet.

FUTURE CARRIER BORNE AIRCRAFT (FCBA)

Multi-role combat aircraft to replace Sea Harrier and, following the Strategic Defence Review announcement, Harrier GR7. A range of options are being investigated, including collaboration with the United States on the Joint Strike Fighter.

FUTURE TRANSPORT AIRCRAFT (FTA)

Transport aircraft providing tactical and strategic mobility to all three services to replace the remainder of the Hercules fleet.

LIGHTWEIGHT MOBILE ARTILLERY WEAPON SYSTEM (LIMAWS)

An indirect fire capability to support light and rapid effect forces.

SKYNET 5

Satellite communications system to replace the SKYNET 4 constellation at the end of its predicted life.

TACTICAL RECONNAISSANCE ARMOURED COMBAT EQUIPMENT REQUIREMENT (TRACER)

Manned, armoured reconnaissance vehicle, which is one of the options under consideration to meet information, surveillance, target acquisition and reconnaissance (ISTAR) requirements.

TYPE 45 DESTROYER

New class of Anti-Air Warfare Destroyer to replace the existing Type 42 Anti-Air Warfare Destroyer.

Appendix 4 Glossary of contractual and acquisition terms

Assessment Phase

The second phase in the acquisition cycle beginning after the Concept Phase and Initial Gate Approval. During the Assessment Phase, the Integrated Project Team (IPT) produces a System Requirement Document (SRD) and identifies the most cost-effective technological and procurement solution. Risk is reduced to a level consistent with delivering an acceptable level of performance to a tightly controlled time and cost. By the end of the Assessment Phase a business case will have been assembled for Main Gate Approval.

Commercial Exploitation Levy (CEL)

Payments made by the contractor to the Department for any commercial use made of a defence equipment's design where the Department originally funded the equipment's development.

Demonstration and Manufacture Phases

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 within time and cost limits appropriate to this stage.

Equipment Capability Customer

The Customer with responsibility for developing and managing a balanced and affordable equipment programme; including requirements definition, equipment planning, seeking approvals and authorising acceptance. The Equipment Capability Customer (ECC) also has through life responsibility for the equipment capability.

Equipment Programme (EP)

The Department's budgeting plan for expenditure on the equipment programme. It examines costs over the 10 year plan, creates and considers options to match the required spend profile and defence priorities.

Firm Price

An agreed price which is not subject to variation for inflation.

Fixed Price

An agreed price which is subject to variation to take account of inflationary and/or exchange rate movements.

Initial Gate

The approval point preceding the Assessment Phase. At Initial Gate, a Business Case is put to the Equipment Approvals Committee 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 customer has proposed.

Interest on Capital

Interest on Capital represents the opportunity cost to the Government of employing money in capital expenditure instead of alternative investment opportunities. For the public sector, Interest on Capital is charged at 6 per cent of the average capital employed during each year.

Investment Appraisal

A comparison of the alternative investment options on a purely financial basis.

Key User Requirements

Requirements or constraints identified from within the wider set of user requirements, assessed as key to the achievement of the mission.

Liquidated Damages

A contractually pre-agreed sum payable in the event of a specific breach of contract (e.g. late delivery) by way of compensation.

Main Gate

The approval point between the Assessment and Demonstration and Manufacture Phases. At Main Gate, a Business Case, which should recommend a single technical and procurement option, is presented. By Main Gate, risk should have been reduced to the extent that the Director of Equipment Capability and IPT Leader can, with a high degree of confidence, undertake to deliver the project to narrowly defined time, cost (whole-life and procurement) and performance parameters.

NAPNOC (No Acceptable Price No Contract)

The Department's policy for non-competitive pricing which seeks to replicate the pressures of competitive procurement in which a price is secured at the outset through the tendering process. Under the NAPNOC policy, non-competitive contracts should only be placed when a price has been agreed which reflects what it would cost an efficient contractor to carry out the work. NAPNOC contracts should, therefore, be priced before a contract is placed.

OCCAR (Organisme Conjoint de Co-operation en Matiere d'Armement)

A quadrilateral agency for the management of co-operative acquisition programmes. The member nations are the United Kingdom, France, Germany and Italy.

Prime Contractor

A contractor having responsibility for co-ordinating and integrating the activities of a number of sub-systems contractors to meet the overall system specification efficiently, economically and to time.

Request for Proposals (RFP)

A request by the Department for the contractor to supply proposals on how it would meet the requirement.

Technology Demonstrator Programme

A programme designed to demonstrate unproven technology using practical demonstrations, prior to its incorporation into a defence equipment programme.

Whole Life Costs

The total resource required to assemble, equip, sustain and operate a specified military capability at agreed levels of readiness, performance and safety.

Appendix 5 Definition of cost, time and performance variance categories

Category	Definition	Used to explain variations in
Technical		
Technical Factors	Variations due to changes in technical ability to deliver project	Time, Cost and Performance
Customer Requirement		
Changed Requirement	Variations due to changes in the customer's requirement for the equipment, flowing from operational reassessment rather than budgetary priority	Time, Cost and Performance
Changed Budgetary Priorities	Variations due to changes in the customer's requirement for equipment, flowing from changed budgetary priorities	Time, Cost and Performance
Economic Conditions		
Inflation	Variations due to changes in inflation assumptions	Cost
Exchange Rate	Variations due to changes in exchange rate assumptions	Cost
Procurement Management		
Receipts	Variations due to changes in expectation of receipts, (e.g. liquidation damages, commercial exploitation levy)	Cost
Contracting Process	Variations due to changes associated with the contractual process, including time taken in contract negotiations and placing contracts, and effect of contractor bids compared to estimates	Cost and Time
Procurement Strategy	Variations due to changes in overall procurement strategy (e.g. change to collaborative options), or from competitive to single-source	Cost and Time
Reporting Conventions		
Accounting Adjustments and Re-definitions	Variations that do not reflect any substantive change: including imported or exported costs arising from changes in accounting rules and adjustments to reflect changes in the definition of terms	Cost and Time
Risk Differential	Variations arising from the difference between risk allowed for in the current estimate and risk allowed for in the approval	Cost and Time
Associated Projects		
Change in associated project	Variations due to changes in an associated project (e.g. availability of equipment from another project for trials)	Cost and Time