



National Audit Office

**REPORT BY THE
COMPTROLLER AND
AUDITOR GENERAL**

**HC 1092
SESSION 2010–2012**

7 JULY 2011

Ministry of Defence

Carrier Strike

Key facts

£6.2bn

to procure one operational carrier and one unable to launch or recover aircraft

9 years

without any United Kingdom Carrier Strike capability 2011-20

£3.4bn*

savings over the next ten years from changes to current and future carrier and associated aircraft projects

| | Main investment decision (2007) | Pre-Strategic Defence and Security Review (July 2010) | Post-Strategic Defence and Security Review (October 2010) |
|--|---|---|---|
| Estimated cost of carriers | £3.65 billion | £5.24 billion | £6.24 billion ¹ |
| Operational Queen Elizabeth Class Carriers ² | 2 | 2 | 1 |
| Carrier availability | Continuous | Continuous | 150-200 days at sea a year, on average |
| Launching and landing equipment | Ski slope and flat deck | Ski slope and flat deck | Catapults and arrestors |
| Types of Joint Strike Fighter (JSF) | JSF Short Take-Off and Vertical Landing | JSF Short Take-Off and Vertical Landing | JSF carrier variant |
| JSF weapons bay capacity | 1,000lb class weapon | 1,000lb class weapon | 2,000lb class weapon |
| Combat radius of JSF (nautical miles) | 480 | 480 | 650 |
| Carrier capacity | Max capacity 36 JSF | Max capacity 36 JSF | Max capacity 36 JSF, initially 12 embarked |
| * Additional benefits of selecting the carrier variant of the Joint Strike Fighter | | | £1 billion of funding for Deep and Persistent Offensive Capability deleted. Carrier variant able to cover what would otherwise have been a capability gap |

¹ This includes costs of £1 billion for conversion of one carrier.

² Queen Elizabeth and Prince of Wales.

Summary

1 The core of Carrier Strike capability³ comprises aircraft carriers and the aircraft that operate from them. The 1998 Strategic Defence Review committed to the replacement of the three existing Invincible Class aircraft carriers “from around 2012 by two larger, more versatile, carriers capable of carrying a more powerful force, including a future carrier-borne aircraft to replace the Harrier”. In 2002, the Ministry of Defence (the Department) selected the Short Take-Off and Vertical Landing (STOVL) version of the United States-led Joint Strike Fighter as the preferred aircraft to replace the Harrier. The policy decisions in the 2010 Strategic Defence and Security Review have significantly affected the delivery of Carrier Strike and the role it will be expected to fulfil over the next 50 years. The Key Facts (opposite page) set out the main differences between Carrier Strike as it was envisaged before the Strategic Defence Security Review and the solution the Department is now progressing.

2 When the main investment decision was taken on the carriers in 2007, the 1998 Strategic Defence Review still set the policy baseline. Assessed against the parameters set out in the 2007 decision, the Department is delivering a lower scale of carrier capability, later than planned, and at significantly higher cost. In the past we have concluded that the effects of previous decisions on the carrier project were not value for money. The Department will not make a final decision on the number of Joint Strike Fighters to be procured until after the next Strategic Defence and Security Review in 2015, but, against its previous budgetary assumptions, it now plans to spend less over the next ten years and deliver more capable aircraft later than planned. The 2010 Review radically changed the Carrier Strike concept to make it relevant to the anticipated future security environment. Our test of value for money in this report is therefore whether the strategic decision to re-focus investment in both the carriers and the linked combat aircraft was well informed, and whether the Department is now well-placed to cost-effectively deliver the Carrier Strike capability now required.

3 Our report is in three Parts:

- a** the status of Carrier Strike before the Strategic Defence and Security Review began;
- b** whether the Department undertook sufficient, robust analysis to support strategic level decisions taken as part of the Strategic Defence and Security Review, and what the cost and capability implications of the decisions taken are; and
- c** changed risks and uncertainties to delivering the carriers and Joint Strike Fighters as a result of the Strategic Defence and Security Review decision.

4 Our methodology is described in Appendix One.

³ The Ministry of Defence (the Department) defines the principal role for Carrier Strike as being to provide an expeditionary offensive air capability to contribute to focused intervention, power projection and peace enforcement operations.

The evidence base for our conclusions

5 The 2010 Strategic Defence and Security Review was different to previous reviews which were run largely by the Department and covered only defence-related issues. The Review was cross-departmental. Leadership rested with the newly formed National Security Council, a Cabinet Committee chaired by the Prime Minister. The key Strategic Defence and Security Review policy decisions relating to Carrier Strike were taken by this Committee. The Department's inputs were principally supported through the Defence Strategy Group, chaired by the Secretary of State for Defence.

6 We have seen the Department's submissions to the National Security Secretariat in the Cabinet Office and held a number of meetings with the Department and with National Security Secretariat officials who explained the Strategic Defence and Security Review approach. We were not given access to particular Cabinet Committee papers held by the Cabinet Office. We considered we needed access to these papers to understand the way in which the cost, affordability, military capability and industrial implications of the alternative Carrier Strike options were drawn together to support the Strategic Defence and Security Review decision.

7 The National Audit Act 1983 provides for the Comptroller and Auditor General to have a right of access to all such documents as he may reasonably require for carrying out value for money examinations. By convention the Comptroller and Auditor General does not have an automatic right of access to policy papers (including policy focused Cabinet Committee papers) and historically in cases where the Comptroller and Auditor General has needed to understand the policy intention in order to reach a judgement on value for money, access to policy papers has been discussed on a case by case basis. In this case, the Cabinet Office have told us that the papers which have been withheld were written to inform policy decisions and that they are confident we have seen sufficient information and analysis to inform our audit judgement.

8 Our judgements in this Report are not about the policy decisions taken by the National Security Council, but about the basis on which the Accounting Officer for defence was satisfied that the decisions represented value for money and were affordable.⁴ This follows from the Accounting Officer's personal responsibility to gain assurance on the way funds voted to the Department are spent. The Committee of Public Accounts has stated that "our interest is in the financial management and value for money secured from all departmental spending, and we expect Accounting Officers to put in place arrangements to provide us with the assurances we need. Parliament needs to be able to assure the public that value for money is obtained and Government must put in place arrangements to enable Parliament to do its job⁵". On the basis of the evidence we have seen, we cannot conclude on how the Accounting Officer was able to reach a strategic judgement on the value for money of the Carrier Strike decision.

⁴ Set out in *Managing Public Money*, HM Treasury, Chapter 3, Section 3.3.

⁵ Committee of Public Accounts, *Accountability for Public Money*, Twenty-eighth Report, Session 2010-11. HC 740. Conclusions and Recommendations, paragraph 2.

Key findings

The status of Carrier Strike before the Strategic Defence and Security Review began

9 The aircraft variant originally selected to fly off the carriers was not evaluated as the most cost- or operationally-effective choice. In 2002, the Department selected the STOVL variant of the Joint Striker Fighter being developed in cooperation with the United States as its preferred aircraft, but did not plan to finally confirm this decision until January 2011. The Department's quantitative analysis consistently showed that the carrier variant of the Joint Striker Fighter was more capable and cheaper to support throughout its operational life. The decision to select STOVL took into account a number of wider political, military and industrial factors. During the Strategic Defence and Security Review, the Department decided to buy the carrier variant of the Joint Striker Fighter.

10 The scale of the carrier project prompted the Department to form an alliance with industrial partners to deliver the carriers. The Alliance comprises BAE Systems, Thales, Babcock Marine, and the Department. The key principles underpinning the Alliance are transparency and incentivising partners to work together to minimise costs.

11 Commitment to the carrier project and the subsequent finalisation of the contract followed the Department's regular practices. The 2007 decision to invest in the two new carriers followed the Department's normal processes with the deal scrutinised by the Investment Approvals Board and Ministers. The project was approved to proceed by the then Prime Minister. The contract was negotiated by the then Defence Commercial Director⁶, with the terms of the contract typical of those in other large defence contracts.

12 The Department was aware of a £234 million affordability gap when it signed the contract to build the carriers in July 2008, but considered it could make these savings within its overall equipment programme. Subsequently, the cost of the project increased by some £1.6 billion and delivery was delayed by two years when the Department changed its funding profile to try and manage the mismatch between its overall expenditure plans and the available funding, as reported in our 2010 Major Projects Report.⁷

13 To meet the contracted Final Target Cost of £5.24 billion, the Alliance must deliver a further £219 million in savings. Under the terms of the incentivisation mechanism agreed at Final Target Cost negotiations, the Department and Industry share equally any gains from coming in below Target Cost. The Target Cost would have to be exceeded by £2.5 billion before industry profits were foregone. After this point the Department would meet all remaining costs.

⁶ Amyas Morse, subsequently appointed as Comptroller and Auditor General in June 2009. The inside front cover of this report sets out the governance of this examination by the National Audit Office.

⁷ Comptroller and Auditor General, *Ministry of Defence, Major Projects Report 2010* Session 2010-11, HC 489-I, National Audit Office, 15 October 2010.

14 Decisions on the carrier project are closely interlinked with the rationalisation of the United Kingdom warship building industry. The Department agreed a 15-year Terms of Business Agreement (ToBA) with BAE Systems in July 2009. The Agreement is designed so that industry will rationalise, reduce overheads and improve its performance. In order to enable its long-term requirements for complex naval shipbuilding to be met, the Department undertook to sustain certain Key Industrial Capabilities, either by providing a sufficient volume of work, or by making payments to compensate for any lack of work. If the workload was insufficient to sustain these Key Industrial Capabilities, the Department would be liable for payments of up to £230 million per annum for shipbuilding and support. The work provided by the carriers is integral to the delivery of the core workload assumed in this agreement. In its absence, the risk is that the Department would have a funding liability for which it would receive no outputs unless it could substitute alternative work.

The Strategic Defence and Security Review

15 Key decisions in the 2010 Strategic Defence and Security Review were taken against a backdrop of reduced funding. The Review was conducted in parallel with the Spending Review that set the level of defence funding for the next four years. Taken together with the major challenge to address the imbalance in its existing budget, the 7.5 per cent reduction in funding agreed in the 2010 Spending Review required approximately a 20 per cent reduction in expenditure over the four years to March 2015. The level of funding was only agreed at the end of the process, and during the Strategic Defence and Security Review process the Department has considered the implications of funding reductions of between 10 and 30 per cent. All more pessimistic than the final outcome. A primary focus of the Strategic Defence and Security Review was to bring the defence budget in to balance. The Department recognises that the force structures envisaged in the Strategic Defence and Security Review (known as Future Force 2020) will only be achievable with real term increases in the defence budget from 2015 after the current Spending Review period.

16 There was a complex set of interrelated cost, affordability, military and industrial issues which influenced decision-making. In addition to balancing the need to identify savings with delivering military capability to meet the new National Security Strategy, the decisions taken could adversely impact the United Kingdom warship-building industry and there were significant costs associated with cancelling contracts. Choices also had to be made regarding type and numbers of aircraft to be flown from the carriers initially, which in turn could affect the design and cost of the carriers.

17 The Department generated an evidence base against which to make strategic decisions on carriers and associated aircraft. Between June and September 2010, the Department undertook a series of studies to arrive at a view of the military priorities for the next ten years, and various scenarios for delivering these. It presented four cost-assured options, with a recommendation to the National Security Council on 14 September 2010. Subsequently, further options were costed and provided as requested by the National Security Council.

18 The Department balanced its military preferences with its contractual commitments, anticipated affordability constraints and the impact on the warship-building industry. In the face of what, in August 2010, was anticipated to be a significantly reduced budgetary provision, the military view was that the carriers were judged to be of secondary priority to other maritime capabilities. The military view, therefore, would have been to cancel the carriers before eliminating amphibious capabilities or making significant further reductions in destroyers or frigates. Although the Department also considered cancellation, which was feasible and offered significant medium-term savings, it concluded that this would have been unaffordable in the short term.

19 The variant of Joint Strike Fighter aircraft now being procured is more capable than the previous preferred option. The relative cost and capability advantages of the carrier variant of the Joint Strike Fighter have been demonstrated consistently by analysis undertaken by the Department over the last decade. In July 2010, the Department decided to delete the existing budgetary provision of £1 billion for its Deep and Persistent Offensive Capability requirement. The subsequent decision to change to the more capable carrier variant of the Joint Strike Fighter meant that it could also use the aircraft to address what would have been a capability gap for an aircraft to meet its Deep and Persistent Offensive Capability requirement if it had continued to buy the STOVL aircraft.

20 The Carrier Strike solution announced in Strategic Defence and Security Review was judged to offer a better balance of capabilities. The solution was first proposed by the Secretary of State for Defence at the National Security Council meeting taking the final decision on 7 October and had not been cost-assured. The outcome was to build both carriers, convert one to fly the carrier variant of the Joint Striker Fighter and leave the second carrier unconverted and therefore unable to launch or recover the carrier variant aircraft, with a gap in Carrier Strike capability of nine years. The financial impact of these changes over ten years would be a net saving of £3.4 billion against pre-Strategic Defence and Security Review financial projections for the new carriers and aircraft and the existing carriers and Harriers to be taken out of service.

21 A risk-based judgement was taken to go without Carrier Strike capability for almost a decade. The decision reflected the need to rationalise the existing fleets of fast jets to save money and also judgements about strategic context. The choice was between retaining the Harrier or the Tornado. The latter was chosen because it offered key capability advantages, notably for operations in Afghanistan. The decision will increase the challenge facing the Department, as it will have to regenerate a wider range of operating skills before the new carrier enters service.

Implementing the Strategic Defence and Security Review decision

22 The Department will take final investment decisions on Carrier Strike in 18 months. Under its current plans, the Department will be in a position to take final investment decisions on Carrier Strike in late 2012. If at this time it assesses that the approach being pursued is not the optimal balance of cost and capability to achieve value for money, it will revisit its approach to delivering Carrier Strike or decide which other elements of Future Force 2020 to forego.

23 The Alliance approach being used to build the Carriers is sensible and the build project is progressing well. The Alliance model has worked well with the design and build of the carriers progressing despite the significant changes the project has faced because of broader corporate decisions taken by the Department and during the Strategic Defence and Security Review. Evidence suggests that the incentives in the contracts are encouraging the Alliance partners to work together constructively.

24 The Department has been developing its thinking about how it will utilise the operational carrier to best effect to meet a wider range of military needs. Its emerging thinking is called Carrier Enabled Power Projection. To be successfully applied, the concept will require the Department to achieve a level of flexibility not seen elsewhere in the world with comparable carriers. If the Department is able to deliver this outcome, it is confident it would provide a potent combination of air and amphibious forces.

25 The Department has not yet generated quantitative assessments of a variety of uncertainties associated with the Strategic Defence and Security Review decisions. The uncertainties surround a variety of cost, technical, safety and commercial issues. The Department expects to have fully costed the aircraft-based risks and put in place mitigation plans by late 2011. For the carrier, the Department has embarked upon an 18-month Conversion Development Phase to understand the costs and risks associated with the installation of launch and recovery equipment for the new variant of aircraft. This is estimated to cost £76 million and the Department has so far committed £5 million. This will cover the work until the outcome of the Department's three-month exercise to match military assumptions from the Strategic Defence and Security Review with its spending settlement to balance Defence priorities and the budget over the long term. This exercise is due to finish in July 2011.

26 The Department has an incomplete understanding of the costs of the carrier decision. The Department's estimates are still immature but it now considers the cost of converting one carrier ranges from £800 million to £1,200 million. The next Strategic Defence and Security Review in 2015 will make a decision on what to do with the non-operational carrier. As yet the Department does not have a clear view on the costs and significant military risks associated with regenerating Carrier Strike capability.

27 There are risks with carrier conversion which the Department is working to mitigate. The current planning assumption is that the carrier will be fitted with the United States' new Electromagnetic Aircraft Launch System and other equipment. Risks include technical immaturity, safety issues, access to data from the United States and cost risks given lack of competition for the equipment.

28 There are risks associated with the integration of United Kingdom capabilities with the carrier variant of Joint Strike Fighter. The risks cover the interface between the carrier and the aircraft, the need for air-to-air refuelling, integration of United Kingdom specific weapons, absence of defined user requirements, the dependency on the United States for initial training, and the sufficiency of flight test assets to certify United Kingdom specific capabilities. In addition, cost risks remain as there are not yet firm prices for production aircraft.

Conclusion on value for money

29 The Strategic Defence and Security Review was conducted over a period of five months. Relatively early on during the Review, the National Security Strategy provided a policy baseline against which to plan future force structures. The Review was conducted in parallel with the Spending Review and the likely level of funding was only agreed at the end of the process. The Department therefore had to identify, cost and prioritise alternative capability options in an environment of considerable uncertainty. In our view, this is not an ideal situation in which to have to take strategic decisions – including those relating to Carrier Strike.

30 The outcome of the Strategic Defence and Security Review affects Carrier Strike in two ways, both of which could adversely affect the achievement of value for money. First, the Review is unaffordable unless there is a real terms increase in defence funding in the latter half of the decade. We are worried that the continuing difficulties the Department is facing in balancing its budget leaves Carrier Strike vulnerable to further changes in strategic direction as a result of broader corporate decisions taken to address this generic problem.

31 Second, the Review decision radically changed the Carrier Strike concept and introduced a decade long capability gap. We do not question the merits of this policy judgement. As part of the Review, the Department produced quantified analysis of the cost and short-term affordability implications of alternative Carrier Strike options to support strategic decisions. Quantification of military and industrial factors and the completeness of the financial data presented on some options was weaker. The inter-relationship between the various factors involved in the Carrier Strike decision is complex. It is not clear to us from the papers we have seen how, even at a strategic level, they were brought together to enable the Accounting Officer to reach a judgement on value for money.

32 As we look forward, taking these two elements together, we are deeply concerned about the risks to the achievement of value for money on what were previously relatively mature projects with understood risks and funded mitigation plans. The Strategic Defence and Security Review decision introduced significant levels of technical, cost and schedule uncertainty, thinking on the way the carriers will be used in operation is still evolving and there are major risks reconstituting Carrier Strike capability after a decade without it. We note that the Department will not have matured its understanding of the consequences of implementing the Review decision until two years after it was taken. At that point, it will more fully understand whether it has been able to develop delivery plans to enable it to achieve value for money from an investment in Carrier Strike which will significantly exceed £10 billion.