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Ministry of Defence

Management of the Typhoon Project

Summary

Introduction

1 The Eurofighter Typhoon (Typhoon) will form the core of the Royal Air Force's (RAF's) combat aircraft capability until at least 2030. The Ministry of Defence (the Department) is buying 160 aircraft with the first one delivered in 2003 and the last expected to come into service in 2015. On current plans, the Department is likely to spend £37 billion on the capability. Sixty per cent of this is likely to be incurred procuring and upgrading the aircraft with the remainder on support and enabling activities.

2 The United Kingdom is procuring Typhoon in collaboration with Germany, Italy and Spain. Together the four partners have contracted to buy 472 Typhoon aircraft in three stages, or tranches, along with a further 87 purchased by Saudi Arabia and Austria. The collaborative project began in the mid-1980s and, as one of the partners making the most significant investment in the project, the Department played a central role in establishing the collaborative management structures. These arrangements have proved complex and inefficient, but the Department recognises the shortcomings and is working with partner nations to streamline decision-making. The arrangements are replicated by industry with contractors from each nation forming consortia to manage the development, production and support of the aircraft and engine. There are also complicated arrangements for sharing work between countries. Some elements of support of the aircraft are contracted for on a collaborative basis by all four partner nations. The Department is working to improve the efficiency of industry arrangements to make upgrades and support of the aircraft more cost-effective and agile, with some recent improvements in arrangements.

Scope of the report

3 This report assesses how effectively the Department is managing the Typhoon project to achieve full cost and operational value from its continuing investment. Key areas we examined are:

a **The capability Typhoon provides** – how the Department is progressively enhancing the capability of Typhoon and how it is managing the factors which affect its ability to make full and timely use of the aircraft as they are delivered (Part One).

b **Cost control** – why the Department has found it difficult to control costs on the project in the past and whether it is now better positioned to manage costs and make well informed decisions in the future (Part Two).

c **Governance and decision-making** – the effectiveness of the collaborative management arrangements and United Kingdom governance and whether they enable timely and cost-effective decision-making to progress the project (Part Three).

Main findings

The capability Typhoon provides

Typhoon is performing important operational tasks

4 The 70 Typhoons already in service are protecting the air space around the United Kingdom and the Falkland Islands. Typhoon was conceived in the 1980s during the Cold War, mainly for use as an air-to-air fighter and the aircraft is highly capable in this role. But the operational environment has changed significantly, making the ground attack role more important and so the Department is upgrading Typhoon to become a fully multi-role aircraft which can conduct both air-to-air and ground attack missions.

The full multi-role capability will not be available for some years

5 In 2004, the Department decided to withdraw its Jaguar aircraft. In the same year, it decided to spend £119 million to upgrade its early Typhoons to replace the Jaguar's ground attack capability. The upgrade was successfully introduced in July 2008. In 2009, a corporate decision was taken to retire early the other air defence fighter, the Tornado F3, to save money. As a result, Typhoon aircraft have been prioritised to take over the air defence role that the Tornado F3 fulfilled. The Department can currently deploy a small number of Typhoon multi-role aircraft but in the majority of cases, such as Afghanistan, the Tornado GR4 remains the Department's preferred ground attack aircraft. Newer Typhoon aircraft will have progressively enhanced multi-role capability with, for example, laser guided Paveway IV bombs and Storm Shadow cruise missiles by 2018. By this time Typhoon is likely to be the aircraft of choice for both ground attack and air defence.

Problems with spares availability and flying hours must be addressed if Typhoon capability is to be fully utilised

6 Some elements of the aircraft support such as the supply of spares and repair of equipment are done within the collaborative arrangements. In parallel, each nation also has individual contracts to support and maintain the aircraft and these are independent of the other three partner nations. The Department has built on its experience introducing innovative commercial support arrangements for its Tornado and Harrier fleet and placed an independent United Kingdom only contract for the maintenance of the aircraft with BAE Systems. The contract requires BAE Systems to provide maintenance and support services to deliver a set number of aircraft to the RAF and the performance targets are largely being achieved. The Department has a similar arrangement with Rolls-Royce for engine support including the supply of engine spares and again the company is largely meeting the performance targets. Separate to these two support contracts, there are indications of problems with the collaborative contracts for the supply of spares and repair of equipment. There have been shortages of spares and long timescales for equipment repairs on some of these contracts. To compensate, the Department has had to take parts from some of its Typhoon aircraft to make other aircraft available to fly.

7 The problems with spares have been a contributor to the Department's inability to meet its target for annual flying hours, with a 13 per cent shortfall in 2009-10. As a result, the Department has limited pilot training to maintaining Typhoon's primary role of air defence at the expense of training in more complex tasks. For example, between November 2009 and August 2010, an average of 15 per cent of pilots had sufficient training hours to perform tasks beyond air defence. While this is sufficient at present it will not be so in future. The Department's recently announced plan to accelerate the growth of RAF squadrons that fly Typhoon is likely to increase demand for pilots and place additional strains on the supply of spares. By 2016, the Department aims to deliver sufficient flying hours to train enough pilots to undertake the full range of planned tasks.

Delivering sufficient fast jet capability in future will require the Department to make tough choices

8 Following the Strategic Defence and Security Review the Department plans to move, by 2021, to a fast jet fleet comprising two aircraft types: Typhoon and Joint Strike Fighter. The number of Typhoons will fall to 107 as the older aircraft in the fleet are taken out of service by 2019. Deciding what the combined size of the two future fast jet fleets should be will require the Department to make difficult judgements on the balance between affordability and the operational risk it is prepared to accept. As this report highlights, such decisions are complicated by the number of factors influencing the delivery of fast jet capability. We plan to examine these strategic considerations in a future study.

Cost control

Costs have increased significantly

9 The development costs of Typhoon have more than doubled to £6.7 billion from the original approval in 1987. These costs are fixed regardless of the number of aircraft the Department buys. The production cost of Typhoon is £13.5 billion, which is within the original approval from 1996. However, the Department is buying 72 (30 per cent) fewer aircraft than it originally planned when the investment decision was made, reducing numbers of aircraft bought from 232 to 160. If the development and production costs are taken into account, the unit cost of each aircraft ordered has risen by 75 per cent. Since 2005, control on the parts of the project where the Department has entered into contractual commitments has improved with costs stable. The development and installation of progressively enhanced capability across the project is delivering a more capable aircraft than originally envisaged, and as a result, the Department is confident that it will meet required military tasks with fewer aircraft.

Key investment decisions were made on the basis of over-optimistic cost estimates

10 Analysis by our consultants shows that the current unit production costs (excluding the costs of the collaborative development phase) for the aircraft are similar to comparable types of aircraft. Part of the cost increase on the project can be explained by the fact that the production phase of the project started on an unrealistic basis. The balance between costs, numbers of equipments and the importance of the operational capability to be provided are important factors when the Department decides whether a project offers sufficient value for it to invest in. Not having a realistic understanding of any of these factors can adversely affect the perceived value of the project.

The collaborative arrangements and complexity of the technology have increased costs

11 Out of the £3.5 billion cost increase, £2.2 billion is due largely to the inefficient collaborative commercial and managerial arrangements, obligations to international partners and the complexity of the technologies being developed, a challenge compounded by the rigid collaborative workshare requirements. The Department did not anticipate the potential of these arrangements to drive additional cost into the project. A further £332 million of the cost increase reflects necessary steps to evolve the capability of the aircraft in the face of the changing operational needs. The remaining £1 billion largely reflects cost of capital charges mainly incurred due to delays in the project. Where the Department has contracts in place, cost control has improved in recent years.

The Department's understanding of future Typhoon costs drivers is improving

12 The Department now has a better grasp of the costs of the Typhoon project. By the time the aircraft goes out of service, on current plans, the Department estimates that it is likely to spend some £37 billion on the capability, although £2.6 billion of this has not yet gone through the Department's approval process and so is open to change.

13 The Strategic Defence and Security Review decisions to retire the Harrier aircraft and reduce the size of the Tornado fleet mean there will be less work for industry. There is a risk that the costs of under-utilised industry assets will be passed on to the Department on its remaining contracts – notably Typhoon. The Department is alert to the risk and has developed better financial and performance information than it has often had in the past to underpin its negotiations with industry.

Living within the support cost budget will be challenging

14 While the cost of supporting the aircraft has remained the same in overall terms, it has increased per aircraft. Funding was approved on the basis of immature estimates before there was any experience of operating the aircraft. The original approval did not include costs such as those for major maintenance and obsolescence which the Department estimates will cost £900 million. The Department is confident that it can deliver the full range of support for the reduced number of aircraft within the originally approved figure of £13.1 billion. The number of aircraft being bought has fallen by a third and compared on a like for like basis the unit cost of support per aircraft has risen by approximately a third. Risks remain as the aircraft will be in service for another 20 years and it is unsurprising that 84 per cent of forecast support costs are not yet on contract. The proportion of the commitments still to be entered into highlights the importance of the Department generating robust data upon which to make future investment decisions and negotiate with its international partners and industry.

Governance and decision-making

Collaborative decision-making is inefficient

15 The main aim of collaboration was to reduce the cost to each partner nation in designing, producing and supporting a highly complex and technologically advanced new aircraft. While there have been some successes in achieving these aims, the objectives of the partner nations on the project are not fully aligned and decision-making is slow, for example, key decisions require consensus from all four partner nations. It has taken up to seven years to agree and deliver some key upgrades. The problems pose a particular risk to the United Kingdom because the RAF is flying more hours in its Typhoons than the other partner nations and the RAF is more likely to use the full multi-role capability in the future. The track record of the procurement phase of the project suggests that, unless partner nations find new ways to work together, the collaborative arrangements present serious challenges if the Department is to upgrade and support the aircraft quickly and cost-effectively.

The Department's decision-making structures are operating well but risks remain as accountability, budgetary and managerial authority are not aligned

16 The Department has appointed a Senior Responsible Owner for Typhoon who chairs a Programme Board which brings together those responsible for delivering all the components of capability that must be in place if Typhoon is to operate effectively. These components are training, equipment, personnel, infrastructure, doctrine and concepts, organisation, information and logistics. While the introduction of the Programme Board is a step forward, there remain risks to effective cost control and decision-making. Budgetary and managerial responsibility is split between different parts of the Department. The Senior Responsible Owner is accountable but can only influence these groups and cannot compel them to take action or to make cost or performance trade-offs between components. Nor does the Senior Responsible Owner attend key meetings making strategic decisions, such as those related to exports, which affect the delivery of Typhoon operational capability.

Conclusion on value for money

17 The Department has not yet secured value for money from its investment in Typhoon. The aircraft are fulfilling some key defence tasks but is unlikely to become the aircraft of choice for most ground attack missions for some years. Key investment decisions were taken on an over-optimistic basis, the project has been adversely affected by corporate decisions to try to balance the defence budget and costs have risen substantially and at a rate the Department did not predict. None of these factors suggest good cost control, a key determinant of value for money. Where there are contracts in place, costs have been stable in recent years.

18 There is the opportunity to secure increased value for money in future. The Department has successfully put some of the building blocks in place to enable this. But there is more to do to improve the collaborative support arrangements, develop a timely and cost-effective way of upgrading the aircraft and to ensure greater certainty over national cash flows to enable sensible long-term planning. The measure of success will be that the full multi-role capability can be deployed and supported affordably and when required.

Recommendations

19 Procuring and supporting expensive defence equipments jointly with other nations is a sensible way to reduce costs in a time of constrained budgets. But such agreements will only deliver the benefits if management and decision-making arrangements are timely and cost-effective. On Typhoon, the Department and its partners set up arrangements which did not meet these criteria. To support the establishment of future collaborative projects and to inform its attempts to reform the Typhoon arrangements, the Department should build on the analysis in our report and undertake a more comprehensive analysis looking across its portfolio of collaborative projects to understand what has worked and the effect of shortcomings with existing collaborative arrangements.

20 The Department is making progress generating better financial data to support decisions. However, the reporting of key performance data is more patchy, particularly for flying hours achieved. The Department should determine exactly why flying hours are falling short even though aircraft are available and establish meaningful metrics to enable the Board to instigate corrective actions including exploring options to incentivise industry to take a broader role in addressing the underlying causes.

21 Typhoon investment decisions were made using over-optimistic and immature cost data. The Department should use the current learning phase of its national support contracts to generate robust cost and performance data to build cost models before it approves and contracts the next phase of support.

22 Governance arrangements on the project follow the Department's standard approach and the introduction of a Programme Board is a step forward. But the Department needs to better empower those charged with delivery to enable more timely and cost-effective decision-making. In particular it should:

- simplify decision-making and improve the Department's ability to respond to changing needs in an agile way by clarifying the respective roles of the project sponsor and the Senior Responsible Owner so that each has sufficient managerial and budgetary authority to decide investment priorities within a set budget and across all of the components of capability within their area of responsibility; and
- increase the tenure of officials in key posts to ensure they see through the implementation of their decisions.

23 Typhoon has been successfully exported to two countries, and industry, with the support of government, is seeking further opportunities. To help effective decision-making, exports need to be considered as an integral element of each project from the outset, a ninth component of capability. Doing so would require closer consultation with industry and other parts of government to make sure the benefits and potential downsides of decisions are clearly understood and the project managed to maximise returns.