



National Audit Office

---

## **Report**

by the Comptroller  
and Auditor General

---

## **Ministry of Defence**

# Carrier Strike – Preparing for deployment

# Key facts

£6.4bn

forecast build costs of two new Queen Elizabeth Class aircraft carriers, £193 million (3%) above the revised budget

£6.0bn

expenditure to date on new Lightning II jets, out of an approved project budget of £10.5 billion

Not  
forecast

the Ministry of Defence (the Department) has not estimated the full future costs of Carrier Strike

<b>December 2020</b>	date when the Department expects to declare initial Carrier Strike capability
<b>December 2023</b>	date the Department expects to declare full operating capability for Carrier Strike
<b>March 2026</b>	date the Department expects to declare that Carrier Enabled Power Projection has full operating capability
<b>18 months</b>	expected delay to developing the initial operating capability for the new airborne radar system, critical for protecting a carrier strike group
<b>48</b>	number of Lightning II jets the Department expects to have by 2025, out of its intention to buy 138 jets
<b>1</b>	number of solid support ships available to resupply a carrier strike group for the foreseeable future, instead of the three that will be required at full operating capability

Two milestones which we discuss in this report are Initial Operating Capability (IOC) and Full Operating Capability (FOC). The definitions are:

- **IOC** is the minimum level at which the capability or service is usefully deployable.
- **FOC** is the level of military capability which is intended for a particular project.

# Summary

**1** Carrier Strike provides the ability to launch fixed-wing aircraft from a ship to undertake a range of military tasks. It is central to the government's plans for the country's armed forces and the first step towards Carrier Enabled Power Projection (CEPP), which is the government's ambition to be able to respond to conflicts and support humanitarian relief efforts anywhere in the world at short notice. It intends Carrier Strike to be interoperable with NATO allies. The UK has been without such a capability since 2010, when the Ministry of Defence (the Department) retired the Harrier aircraft that had operated from its Invincible Class aircraft carriers.

**2** Carrier Strike will be based around two Queen Elizabeth Class aircraft carriers – the largest warships ever built for the Royal Navy – together with Lightning II jets, which are being bought through the United States (US) Department of Defense's international programme. The Department is also buying a new airborne radar system, Crowsnest, to help protect a carrier strike group. Depending on the type of deployment, the carriers will be accompanied by at least one destroyer, an anti-submarine warfare frigate, and ships for support and resupply.

**3** As at April 2020, the Department had two new aircraft carriers and 18 Lightning II jets. It has conducted sea trials to ensure its new aircraft and helicopter fleet (including those used for Crowsnest) can operate safely from the carriers. The Department expects to have an initial Carrier Strike capability by December 2020 and is working towards its first operational deployment, with the US, in 2021. Its next milestone is to achieve full operating capability for Carrier Strike in 2023 – at which point it will be able to support two UK Lightning II squadrons (up to 24 jets) from one of the carriers. The Department's longer-term aim is that, by 2026, it can undertake a wide range of air operations and support amphibious operations worldwide.

**4** Since 2011, we have reported four times on the Department's progress on Carrier Strike.<sup>1</sup> Our early reports covered the decisions about the type of carrier and jets that the Department bought. In 2017, we highlighted that the phase to 2020 would be crucial and there was little room for manoeuvre in the delivery schedule. In this report, we examine how the Department has managed the programme since 2017 and how it is addressing the risks towards achieving the full capabilities of a carrier strike group. We set out:

- the background to Carrier Strike and what the Department has achieved since we last reported (Part One);
- the Department's progress in managing the elements of the programme that are still needed to provide the full Carrier Strike capabilities (Part Two); and
- how the Department is addressing the challenges to achieving its ambitions for Carrier Strike (Part Three).

**5** Our report focuses on the Department's approach to addressing the risks to achieving the capabilities of Carrier Strike. We do not evaluate the military or wider capabilities that Carrier Strike will provide, or the plans for its operational use.

## Key findings

### Progress since 2017

**6 The Department has made considerable progress since 2017.** It has built two new carriers in line with its overall timetable and at a forecast cost of £6.4 billion, which is £193 million (3%) above the revised budget agreed in 2013. It has successfully applied lessons from building *HMS Queen Elizabeth* to *HMS Prince of Wales* and has accepted both aircraft carriers into service. As at April 2020, the Department had spent £6.0 billion on the Lightning II project and received 18 jets, in line with its delivery schedule.<sup>2</sup> It has also completed the infrastructure necessary to berth both carriers simultaneously at Portsmouth, and most of the facilities for the Lightning II jets at RAF Marham (paragraphs 1.9 to 1.16 and 1.20).

<sup>1</sup> Comptroller and Auditor General, Ministry of Defence, *Carrier Strike*, Session 2010–2012, HC 1092, National Audit Office, July 2011; Comptroller and Auditor General, Ministry of Defence, *Carrier Strike: Supplementary Report*, Session 2010–2012, HC 1657, National Audit Office, November 2011; Comptroller and Auditor General, Ministry of Defence, *Carrier Strike: The 2012 reversion decision*, Session 2013–14, HC 63, National Audit Office, May 2013; Comptroller and Auditor General, Ministry of Defence, *Delivering Carrier Strike*, Session 2016–17, HC 1057, National Audit Office, March 2017.

<sup>2</sup> This includes the design and development of the jets, infrastructure and training facilities.

Delivering the full capabilities of a carrier strike group

**7 The new Crowsnest system is 18 months late, which will affect Carrier Strike’s capabilities in its first two years.** The Crowsnest airborne radar system will provide a crucial element of protection for a carrier strike group, but the initial contracted capability will not be available until September 2021, 18 months later than planned. The Department did not oversee its contract with Lockheed Martin effectively and, despite earlier problems on the project, neither was aware of the sub-contractor’s lack of progress until it was too late to meet the target delivery date. It subsequently concluded that the sub-contractor working on the project, Thales, failed to meet its contractual commitments to develop the equipment and had not provided sufficient information on the project’s progress. The Department and its industry partners have since implemented a recovery plan and enhanced monitoring arrangements. However, further delays mean that it does not expect to have full airborne radar capability until May 2023 (paragraphs 2.2 to 2.8).

**8 The Department has not yet made funding available for enough Lightning II jets to sustain Carrier Strike operations over its life.** From 2015, its intention has been to buy 138 Lightning II jets, which will sustain Carrier Strike operations to the 2060s. The Department initially ordered 48 jets but has not yet committed to buying any more. In response to wider financial pressures, it will also receive seven of the 48 jets in 2025, a year later than planned. Since we reported in 2017, the approved cost of the Lightning II project has increased from £9.1 billion to £10.5 billion (15%), reflecting approvals for capability upgrades, integration of UK weapons and sustainment costs. There will be further cost approvals to upgrade the existing fleet with new software and weapons, and there is a continued risk of cost increases due to exchange rate fluctuations. The Department plans to reassess the number and type of Lightning II jets that it needs in the Integrated Review,<sup>3</sup> but its ability to use Carrier Strike will be constrained if it has fewer jets than planned (paragraphs 1.14 to 1.18).

<sup>3</sup> The Integrated Review of Security, Defence, Development and Foreign Policy.

**9 The Department has been slow to develop the solid support ships which are crucial to operating a carrier strike group.** Carrier Strike relies on the sustained availability of munitions and stores, such as ammunition and food. However, the Department has only one ship able to resupply a carrier group, which slows the tempo and reach at which this can be done. It has long been aware that this will restrict the operational freedom of Carrier Strike but has not yet developed a solution. In November 2019, the Department stopped the competition to build three new support ships due to concerns about value for money. It believes this will delay the introduction of new ships by between 18 and 36 months, making it uncertain the first new ship will be operational before the existing support ship leaves service in 2028. The Department will also incur additional maintenance costs while it uses its existing support ship as an interim solution (paragraphs 2.15 to 2.17).

**10 The Department has still not provided the necessary funding for logistics projects and munitions.** We highlighted the importance of these requirements in our 2017 report,<sup>4</sup> but the Department still does not have funding to develop a long-term capability to move people and goods, including Lightning II parts, to or within a carrier group. Nor has it developed a stockpile strategy capable of supporting CEPP, or identified the consequent funding requirements. The responsibilities for developing some support requirements have been unclear, while others are split across the front-line commands,<sup>5</sup> contributing to the slow progress in developing these capabilities. The creation of a logistics team increased awareness of these issues, but the team was established too late to influence the design of support requirements and has had no authority to develop solutions (paragraphs 2.10 to 2.14).

#### Progress towards programme milestones

**11 The Department expects to meet its target of declaring initial operating capability for Carrier Strike in December 2020, but with a basic radar capability.** ‘Initial operating capability’ is a single, trained Lightning II squadron (up to 12 jets), able to embark on a joint warfighting mission with appropriate support and maritime protection. The Department has undertaken a successful programme of sea trials and conducted significant work with its counterparts from the US to prepare for the first joint deployment in 2021. However, as stated in paragraph 7, Carrier Strike will not have the level of airborne radar capability that it originally expected at this point (paragraphs 1.3, 1.9, 1.10, 2.7 and 2.18 to 2.20).

<sup>4</sup> Comptroller and Auditor General, Ministry of Defence, *Delivering Carrier Strike*, Session 2016-17, HC 1057, National Audit Office, March 2017.

<sup>5</sup> The Royal Navy (Navy Command), Royal Air Force (Air Command) and Strategic Command manage projects in the CEPP programme.

**12 The Department faces a tight schedule in developing the full capability of Carrier Strike.** Achieving the initial operating capability is the first step to developing the full capabilities of Carrier Strike. The Department faces a tight timetable to develop full operating capability by 2023. It needs to monitor the delivery of multiple projects and coordinate the integration of supporting capabilities at times when the ships are operational, with more limited time available in the UK for maintenance and enhancement works. It will also have to respond to ongoing challenges and financial pressures, which create uncertainty in developing and enhancing the range of capabilities that are needed. The Department is developing a programme plan to manage the new challenges it faces and achieve full operating capability. It expects to endorse this in September 2020 and is assessing the impact of the COVID-19 pandemic on future capability milestones (paragraphs 1.4, 2.21 to 2.24 and 3.5 to 3.8).

Achieving the ambition for Carrier Strike

**13 The Department's policy ambition for Carrier Strike will be reviewed.**

The 2015 Strategic Defence and Security Review set out the long-term ambition for Carrier Strike. The Department translated this into plans and an operating model to guide its development and use. It planned to publish a policy statement but subsequently decided to reassess its ambition as part of the Integrated Review which, due to the COVID-19 pandemic, has now been delayed. The Department expects to set out its ambitions for Carrier Strike as part of a new defence strategy. It will assess the impact of ongoing financial pressures and determine its defence priorities, including whether it can fund all the original roles of Carrier Strike, including supporting amphibious capabilities (paragraphs 3.2 to 3.4).

**14 The Department faces investment prioritisation decisions to maintain and enhance the Carrier Strike capability over the longer term.** The aircraft carriers have a 50-year lifespan but many capabilities in a carrier strike group will retire before then. However, the Department has not established a consolidated view of the enhancements that are needed to continue to develop Carrier Strike's capabilities, or their cost. It will need to make funding decisions in the next 10 years, such as deciding how to replace or extend Merlin helicopters, which are due to go out of service in 2030. These decisions will create added funding pressures at a time when the Equipment Plan is already unaffordable.<sup>6</sup> We have seen examples of commands reassessing their investment in capabilities due to financial pressures (paragraphs 3.5 to 3.8).

<sup>6</sup> Comptroller and Auditor General, Ministry of Defence, *The Equipment Plan 2019 to 2029*, Session 2019-20, HC 111, National Audit Office, February 2020.

**15 The Department is developing a fuller understanding of what Carrier Strike will cost to operate and support in the future.** Given the strategic importance of Carrier Strike, we would expect the Department to develop a clear view of support and operating costs. It estimated the additional costs of Carrier Strike in 2017, but this did not include all elements of a carrier strike group. It plans to update this estimate after the first deployment in 2021 and is developing a better understanding of the maintenance and logistics activities that are needed. The commands routinely include forecasts of operating and support costs for the different elements of a strike group in their future budgets. However, we found:

- the initial budget for the carriers' spare parts was set too low and recent trials have shown that demand is likely to be higher than expected. In 2020, it began a 'support improvement' programme to improve its approach to maintenance and provision of spares;
- the forecasts of future support costs for some equipment may be underestimates. We identified issues with the quality of some data and the optimistic treatment of risks; and
- the Department has modelled scenarios for using Carrier Strike according to its baseline planning assumption. It explored the costs of other deployment patterns in 2017, and plans to update this analysis in 2021 (paragraphs 3.9 to 3.20).

**16 The Department may not have made sufficient provision in later years' budgets to reflect the full costs of operating Carrier Strike.** Failure to make realistic cost estimates creates a risk that the Department will face increased financial pressure in the future, perpetuating the cycle of short-term decision-making that we have seen in our reports on the Equipment Plan.<sup>7</sup> Navy and Air Commands have made provision for Carrier Strike through their normal budgeting process and the Department is confident that it can fund Carrier Strike's deployment in 2021. However, there is a risk that budget provisions may not cover all of Carrier Strike's future needs; for instance, there are doubts that budgets for future years will be sufficient to fund routine deployments and keep both carriers ready for use at short notice (paragraph 3.19).

<sup>7</sup> Most recently, Comptroller and Auditor General, Ministry of Defence, *The Equipment Plan 2019 to 2029*, Session 2019-20, HC 111, National Audit Office, February 2020.

**17 The Department needs to ensure the revised governance arrangements establish clear responsibilities and cross-command coherence for developing Carrier Strike.** The Department's small programme team has provided effective oversight of the programme to date, reporting risks to the Defence Board and engaging commands to take the actions needed. It has enabled the Department to better understand the progress towards programme milestones. However, the team relies on the commands to manage and fund individual projects and, as the programme transitions into the operational phase in 2021, the Department will face new challenges. It will be important that the new governance arrangements support the long-term development of Carrier Strike by providing strategic oversight of commands' equipment and support plans, and manage the practical challenges of developing and maintaining Carrier Strike alongside its operational deployments (paragraphs 3.21 to 3.24).

### **Conclusion on value for money**

**18** Since we last reported, the Department has received two new aircraft carriers into service, now has 18 Lightning II jets and has developed much of the UK infrastructure to support them. It has delivered the carriers for £6.4 billion, which is just 3% above the revised figure announced to Parliament in 2013. The Department has conducted successful sea trials and is working closely with the US to be ready for its first joint deployment in 2021. It has also established plans for using Carrier Strike in its early years.

**19** The Department is, however, making slower progress in developing the crucial supporting activities that are needed to make full use of a carrier strike group, such as the Crowsnest radar system and the ability to resupply the carriers. In addition, it has not established a clear view on the future cost of enhancing, operating and supporting Carrier Strike, which creates the risk of future affordability pressures. The Department will not achieve value for money from its investment to date unless it provides clarity on its future ambitions; develops its understanding of future development and operating costs; and ensures cross-command coherence and collaboration to develop the full capabilities of Carrier Strike.

## Recommendations

**20** The Department faces significant challenges if it is to build on its progress since 2017 and develop the full capabilities of a carrier strike group. Our recommendations are intended to support the Department in the next phase of the programme. It should:

- a develop a full understanding of the costs of running and supporting Carrier Strike.** This should be updated to reflect data from forthcoming deployments and include modelling on a range of operational scenarios. It should use these estimates to inform major decisions and understand the consequential impact on the Armed Forces as a whole. It should also test whether future funding provisions are realistic, including by improving the quality and governance of its financial planning forecasts;
- b restate its ambition and objectives for Carrier Strike when the Integrated Review is published.** It should use this Review to form a revised plan to achieve its milestone of full operating capability for the Carrier Enabled Power Projection programme in 2026. At the strategic level, it should consider the extent of interoperability with allies and ensure its priorities are reflected in command plans. At an operational level, it should develop a detailed programme schedule, identifying interdependencies and critical path;
- c establish a clear view on the future enhancement costs of a carrier strike group.** It should develop a consolidated long-term investment plan covering all capabilities in a carrier strike group, identifying out-of-service dates and when decisions are needed. It should also ensure commands are making coherent investment decisions to support the continued development of Carrier Strike. This should include identifying funding shortfalls that inhibit achieving its ambition and making strategic cross-command decisions about how to resolve them;
- d monitor the new governance arrangements for the Carrier Enabled Power Projection programme to ensure they are working effectively.** The new arrangements need to provide cross-command oversight of funding commitments, a coherent approach to managing developments, and clear responsibilities for decision-making on Carrier Strike operations. These arrangements should address any potential conflicts within or between commands, and ensure long-term development or operational needs are not undermined by short-term financial pressures; and
- e conduct in-depth lessons-learned exercises on the Carrier Enabled Power Projection projects.** The Department should ensure that it assesses the factors that lead projects to succeed or fail, including the root causes, and disseminate the lessons so that they are reflected in its management of other programmes. It should also look to disseminate lessons more widely across government.