



National Audit Office

MINISTRY OF DEFENCE
Providing Anti-Air Warfare Capability:
the Type 45 Destroyer

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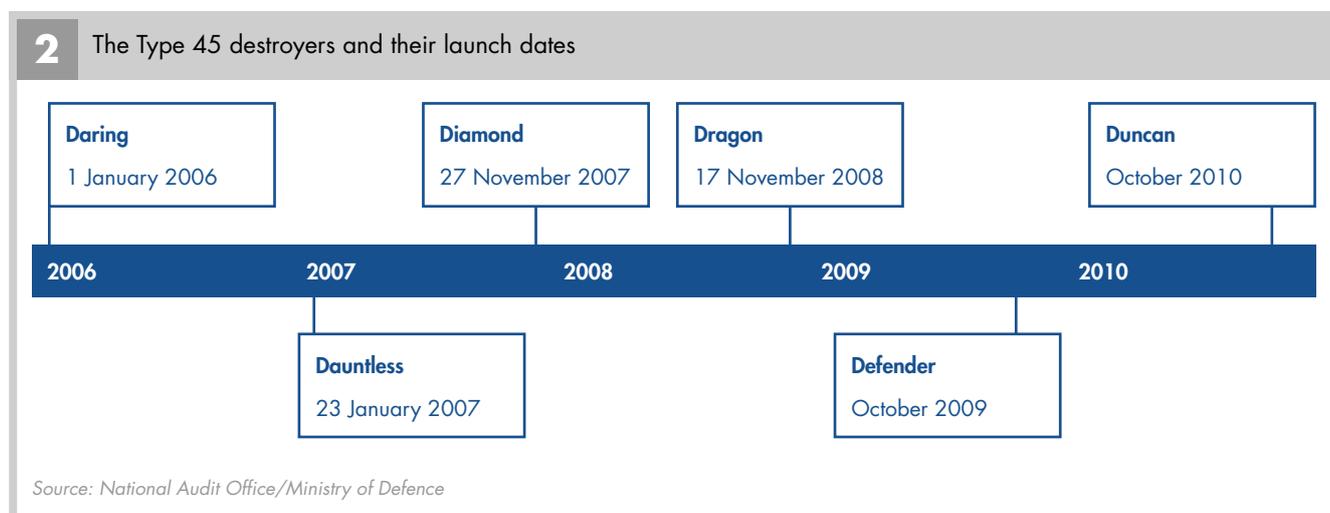
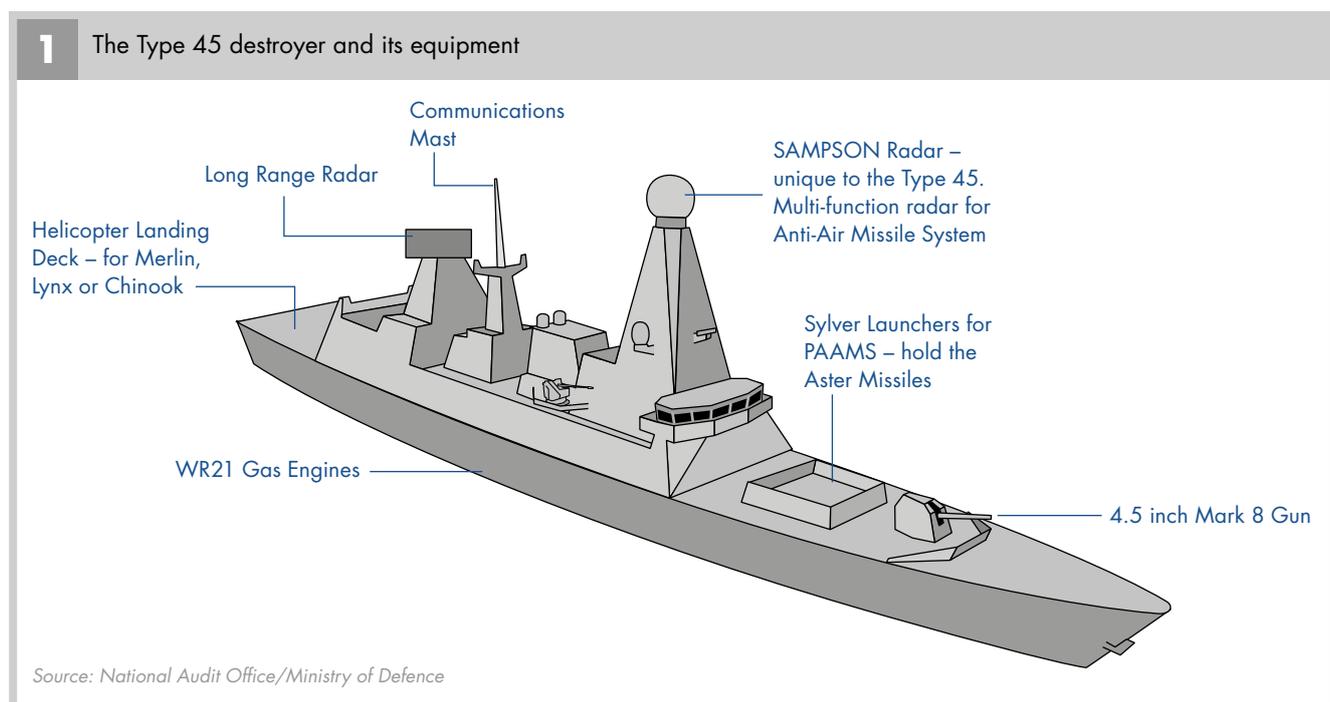
SUMMARY

1 The Ministry of Defence (the Department) is procuring a fleet of six Type 45 destroyers to replace the ageing Type 42 destroyers. The Type 45 destroyers will be fitted with the new Principal Anti-Air Missile System (PAAMS) able to engage multiple hostile aircraft or missiles simultaneously and, compared with the Type 42 destroyers, will have better accommodation for personnel, more fuel efficient engines, and be able to operate Lynx, Merlin and Chinook helicopters. **Figure 1** outlines its key equipments. The Type 45 destroyers anti-air warfare capability allows the ship to operate in a hostile environment, either to provide a protective umbrella over a force of landing ships, an aircraft carrier or a group of merchant ships, or to conduct a wide range of other tasks such as maintaining a United Kingdom presence, embargoes or supporting forces ashore.

2 In July 2000 Defence Ministers approved expenditure of £5 billion (with a maximum acceptable cost of £5.47 billion) to procure six (out of a planned class of 12) Type 45 destroyers with the first ship to enter service in November 2007. The project has experienced significant cost increases and delays. The current forecast cost for the procurement of six ships is £6.46 billion (a 29 per cent increase compared with the most likely approved cost of £5 billion). The Major Projects Report records that the destroyer is now expected to enter service in November 2010 (36 months later than planned). The Department however, is working towards a more challenging “target” date for delivery of December 2009. We use this “target” date throughout the report. The contract was renegotiated in 2007 and management of the project is now much improved and no delays or cost increases have been reported since. The first of class Daring successfully completed contractor led sea trials in September 2008, and the fourth destroyer Dragon was launched two months later. The launch dates of the Type 45 destroyers are detailed in **Figure 2**.

3 Our report examines the impact of the problems on the project on the provision of anti-air warfare capability, the causes of the procurement difficulties, how the Department has overcome these, and whether the Department is managing all of the other elements – such as support and training – necessary for it to make full use of the equipment capability. It is a detailed case study examination of a project that features annually in our Major Projects Report and as such allows us to examine procurement and capability issues in much greater detail. Specifically we considered:

- a what capability has been available to the Department during the procurement of the Type 45 destroyers, and how it has set about managing the transition to the new class of ships;
- b how the Department has managed the procurement to date, including its ability to meet the original requirements for time, cost and capability, and what action it has taken to deal with problems where these have occurred;
- c how well prepared the Department is to support the class of Type 45 destroyers through their operational life as they come into service.



The provision of anti-air capability

4 The delays on the Type 45 destroyer project mean that the Department is still actively operating five Type 42 destroyers which offer a much more limited capability. Even allowing for the success of a number of cost reduction measures undertaken by the Department, we calculate that extending the life of the Type 42 destroyers to cover the delays to the Type 45s is costing a total of some £195 million. This is not an additional cost to the Department because operating costs for the Type 45 destroyers would have been incurred instead had they been delivered to their original timescales. The Department cannot yet estimate these operating costs with confidence.

5 The Department plans to introduce the Type 45 destroyers into service between 2009 and 2013. The Department has always intended to introduce capabilities incrementally on ships after they have come into service. On current plans *Daring*, the first ship of class, will enter into service with the Anti-Air Warfare performance having been tested but before the missile is first fired from a destroyer and before the full on-board PAAMS training package is complete in mid 2011 (although the missiles will have been tested elsewhere). The Department believes that, if necessary, it could deploy *Daring* and make use of PAAMS when the ship enters service in 2009. It was always planned that several other equipments that contribute to providing the full capability envisaged for the Type 45 destroyers would be installed incrementally after *Daring* enters service. These equipments include communications and the United States' developed Co-operative Engagement Capability (CEC) which can provide a clearer picture of the battle space and improve the ability of a task force to undertake anti-air warfare operations, particularly in coalition with the United States. The current target date to install CEC is 2014 – five years after *Daring* enters service but before the new Carriers, which Type 45 destroyer will protect, are planned to be ready.

6 The UK's current Aircraft Carrier capability is provided by the Invincible Class of Carriers HMS *Ark Royal* and HMS *Illustrious* which are planned to be retired in 2012 and 2015 respectively. This class, originally designed for Cold War anti-submarine warfare, operates helicopters and Harrier aircraft. In 2008, the Department confirmed that it will procure two new Aircraft Carriers. Part of the Type 45's role will be to protect the new Carriers.

7 When the Type 45 destroyer project was approved in 2000, the Department planned to buy 12 ships. A reduction from 12 to eight ships was announced in 2004 and was attributed to a reduced threat, revised planning assumptions and a planned improved network capability (the intended introduction of CEC in 2014). In 2008, the Department decided not to procure a further two ships and instead to conclude the Type 45 build programme before the major Carrier build programme. Once the carriers are completed, the intention is to procure a new class of ships, with an air defence capability, called the Future Surface Combatant. This new project is in the early stages of procurement and is planned to come into service between 2018 and 2020. The Department's policy requirement is to have five ships available for tasking at any time. It will be challenging to meet this requirement, established when the Department intended to buy eight ships, with the reduced number of destroyers being procured. The Department judges however that the benefits of new technology and improved efficiency mean that it will be able to deliver the necessary capabilities with fewer ships. The Department is looking to optimise the way it supports the destroyers to maximise the time "at sea" and aims to have five available at varying states of readiness.

Procurement

8 In 1999 the Department signed a contract with MDBA to procure the PAAMS weapons system for the proposed fleet of destroyers. The following year the Department committed to procure six Type 45 destroyers from BVT (formerly BAE Systems). When the shipbuilding project was established, the Department's estimates of the extent of the work needed to complete the ship design and development, and of the initial costs and timescales involved were over-optimistic. The associated commercial arrangements did not reflect the risks and uncertainty remaining, project control and decision making were poor, governance structures were ineffective, and relationships between the Department and BVT broke down.

9 In 2006, the Department undertook a far reaching review of the project and in 2007 the Department renegotiated the ship contract with BVT and established new, more effective ways of working with industry, including more extensive co-location. The Department also strengthened its governance arrangements.

10 Early evidence suggests these actions have helped the project to progress more smoothly, and there have been no cost increases or further delays since the contract was renegotiated. Some risks to the project remain. Notably, the Department has separated responsibility for the delivery of the ships and PAAMS. These are now being managed by separate teams which specialise in destroyers and weapons respectively whereas before they were managed within one team. This separation aims to bring benefits to the Department through more coherent management of weapons, but could increase the difficulties of managing all aspects of the delivery and support of the Type 45 destroyer capability. The Department is aware of this risk and has developed a strategy to manage both projects coherently as two separate but aligned projects with a single senior champion.

11 The Department is working to a detailed timetable for the delivery of the ships. This timetable has challenging “target” dates for all milestones, such as the destroyers entering into service. Corporate reporting, external reports such as the Major Projects Report and long term financial planning use later dates based on a “most likely” timescale calculated using a quantified analysis of the risks remaining to the project. The Department accepts that using two different dates could cause confusion, which we saw to a limited extent in the early stages of our work. The Department also monitors progress on the project and its ability to meet successfully the “target” or the “most likely” date. These dates are under review and will be revised according to how much risk remains in the project.

Support and training

12 The Department is developing support arrangements for when the Type 45 destroyers come into service. Learning from other defence projects, it intends to use BVT and MBDA to provide the bulk of the support using a commercial arrangement in which the Department specifies a level of availability it needs and pays industry to deliver it. The support arrangements are planned to be introduced in two phases reflecting the complexity of the ship and that 80 per cent of its systems are new. The Department is putting these arrangements in place later than originally planned, partly because of delays and difficulties with the procurement and a need to realign the level of funding to meet the ship’s introduction to operations. The Department has put interim arrangements in place to support the first ship Daring during its sea trials. These interim activities could be extended to provide support for the destroyers for operational use if the main support solution is late although such an extension would likely be costly and therefore used only as a fallback position.

13 The Department is bringing in the capability taking into account the Defence Lines of Development. This approach aims to ensure that all elements of the capability such as the necessary training and infrastructure, not just the ships themselves, are introduced coherently. The Department has responded flexibly to the delays in the delivery of some training facilities, in particular by planning to run more training on board Daring during sea trials. Training more personnel on the ship creates a risk that there may not be enough room or time available on board the ship to train fully the companies for Daring and the second destroyer, Dauntless. The Department is investigating alternative training solutions.

Conclusion on value for money

14 The existing Type 42 destroyers provide only a limited capability. The replacement, the Type 45 destroyer is planned to offer a much greater capability but has experienced considerable delays of over two years and cost increases of £1.5 billion because of over-optimism about what could be achieved, inappropriate commercial arrangements and, in the early stages, poor project management. The Department has taken action to resolve these problems and the project is now more mature and making better progress. As the Department had always planned, several pieces of equipment will be fitted to the destroyers incrementally after they come into service meaning that the full capability will not be available until the middle of the next decade. The development of the long term support solution is running later than planned and the Department may have to extend interim support measures as a fall back measure which could have operational and cost implications. Taken together, these factors mean that, although the programme is on course to meet all Key User Requirements when the first of class enters into service, the Department has not yet demonstrated that it will be able to achieve the full range of benefits that the Department originally envisaged could be achieved from spending £6.5 billion procuring the Type 45 destroyer.

Recommendations

In managing the project to a successful conclusion

15 The Type 45 destroyer Programme Board formally assesses progress on the Defence Lines of Development. Progress on the overarching Defence Line of Development – inter-operability between the services and with other nations – is not specifically reported. The Department should report progress against the inter-operability Line of Development to the Programme Board.

On designing support arrangements which deliver the required levels of ship availability cost-effectively

16 The Department aims to deliver cost-effective solutions and avoid becoming trapped in costly and inflexible arrangements. Its phased approach to the introduction of long-term support is intended to exploit its growing understanding of the relevant factors affecting cost and availability as the ships enter service. To make the most of this approach the Department should routinely communicate to all stakeholders the responsibilities, behaviours, motivations and expected contributions of the different parts of the Department and its industry partners involved in delivering and sustaining the capabilities offered by the Type 45 destroyer.

17 The Department will need accurate and reliable data if it is to model effectively the trade-off between the different ways to sustain or enhance the capability and availability of the destroyers throughout their life. Learning from its experience with the existing Type 42 destroyers, where it has a limited understanding of the combined costs of maintaining and operating the ships, the Department and its industry partners should develop a standardised method to gather this data.

18 Many of the problems encountered during the Type 45 destroyer project stemmed from the Department's poor working relationship with industry. The re-basing of the project in 2007 helped address the underlying issues and the relationship is now on a much firmer footing. The project team has already begun work to develop stronger relationships informally as the project enters into the support stage. The Department and its industry partners should build on this work, and undertake regular surveys to measure the strengths and weaknesses of the relationships between various parts of the Department involved and the industrial partners.

Managing projects on a corporate level

19 The Department is managing the project to a set of challenging “target” dates. These dates assume no risks will materialise and are earlier than those reported corporately. Corporate reporting, external reports such as the Major Projects Report and long term financial planning uses later dates based on “most likely” timescales calculated using a quantified analysis of the risks remaining to the project. **The use of two timelines can create a mismatch between planned timescales for the activity and the provision of funds for that activity.** When project teams make use of “target” and “most likely” dates the Department should:

- a** regularly review the risks outstanding on its procurement projects and assess whether any variance between challenging “target” dates and those reported corporately remains valid;
- b** manage all aspects of the delivery of a given capability to a single consistent timeline and communicate it to all responsible parties within the Department;
- c** explicitly include in corporate reports progress against any “target” dates used by teams in addition to corporately approved dates so that senior management have the fullest and most accurate information available about target dates; and
- d** corporate assurance processes and senior management reviews should focus on the success, or otherwise, of teams in mitigating risks and converging “target” and corporate management dates as projects mature.