



National Audit Office

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## **Report**

by the Comptroller  
and Auditor General

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## **Ministry of Defence**

# The Equipment Plan 2017 to 2027

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Ministry of Defence

# The Equipment Plan 2017 to 2027

Report by the Comptroller and Auditor General

Ordered by the House of Commons  
to be printed on 31 January 2018

This report has been prepared under Section 6 of the  
National Audit Act 1983 for presentation to the House of  
Commons in accordance with Section 9 of the Act

Sir Amyas Morse KCB  
Comptroller and Auditor General  
National Audit Office

30 January 2018

This report assesses the affordability of the Ministry of Defence's 10-year Equipment Plan to buy and support the equipment that the Armed Forces require to meet their objectives.

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The National Audit Office study team  
consisted of:

Olufisayo Akinwunmi-Ladega,  
Alex Black, Ewan Candlish,  
Jemma Dunne, David Evans,  
Greg Hannah, Lee Nicholson,  
Matt Ryder, Lee Staley, Kaye Sullivan,  
Thomas White, and James Wilkinson,  
under the direction of Keith Lloyd.

This report can be found on the  
National Audit Office website at  
[www.nao.org.uk](http://www.nao.org.uk)

For further information about the  
National Audit Office please contact:

National Audit Office  
Press Office  
157–197 Buckingham Palace Road  
Victoria  
London  
SW1W 9SP

Tel: 020 7798 7400

Enquiries: [www.nao.org.uk/contact-us](http://www.nao.org.uk/contact-us)

Website: [www.nao.org.uk](http://www.nao.org.uk)

Twitter: @NAOorguk

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## Key facts

### Affordability gap range

**£179.7bn**

total size of the Ministry of Defence's (the Department's) 10-year equipment and support budget, including contingency

**£4.9bn**

the minimum size of the affordability gap in the Department's Equipment Plan, after contingency

**£15.9bn**

additional affordability gap if all identified financial risks materialise and no assumed savings are achieved

**£20.8bn**

potential affordability gap (£4.9 billion + £15.9 billion)

#### Costs not included in the Plan

**£9.6 billion** excess of the Department's forecast project costs over the 2017 budget, that are not included in the Plan

**£1.3 billion** the Department's forecast cost of buying five Type 31e frigates not included in the Plan

**(£6 billion)** centrally held contingency

**£4.9 billion** **minimum affordability gap**

#### Further risks to affordability

**£3.2 billion** estimated potential understatement of costs in the Plan as calculated by the Department's Cost Assurance and Analysis Service

**£4.6 billion** potential increase in costs if the Department had used the exchange rate prevailing at the start of the Plan period (1 April 2017) to forecast costs

**£8.1 billion** remaining savings assumed within the Plan that the Department must achieve over the next 10 years

**£15.9 billion** **additional affordability gap if all identified financial risks materialise and no assumed savings are achieved**

**£20.8 billion** **potential affordability gap**

# Summary

## Scope of the report

**1** More than 40% of the Ministry of Defence's (the Department's) planned spending over the next 10 years will be on buying new equipment and the support needed to maintain its equipment. Equipment and support budgets cover equipment already in use as well as in development. Forecasting costs and future support needs, particularly where equipment is still being built and tested, can be challenging and requires expert judgement. Despite this, managing the equipment and support budget effectively is critical to maintaining the stability of the wider defence budget and ensuring that the Armed Forces have the equipment they need to meet their objectives.

**2** Since 2012, the Department has published an annual Statement on the affordability of its 10-year Equipment Plan (the Plan). It began to report this after a period of poor financial management, during which a significant gap had developed between its forecast funding and the cost of the defence programme as a whole. This resulted in a cycle of over-committed plans, short-term cuts, and re-profiling expenditure, which led to poor value for money and less funding being available to support front-line military activities.

**3** At the Secretary of State's request, we report on the robustness of the assumptions underlying the Plan and provide commentary to Parliament. When forecasting costs, the Department makes assumptions that will inevitably change. The Department's forecast covers spend for 10 years and is updated annually. For the 10-year period 1 April 2017 to 31 March 2027, the Department has set an equipment budget of £179.7 billion. This is made up of procurement (£84.8 billion) and support (£88.9 billion) budgets, and a central contingency provision (£6 billion).

**4** In this report we look at forecast costs within the Plan (Part Two) and funding for the Plan, including the Department's progress in achieving assumed financial savings (Part Three). We also set out our observations on the affordability of the Plan in the context of the wider defence budget (Part Four). We do not assess the value for money of the various projects mentioned in this report. Appendices One and Two contain full details of our audit procedures. Summaries of the equipment projects we reviewed are included in Appendix Three.

**5** In July 2017, the government announced a review of national security capabilities in support of the ongoing implementation of the National Security Strategy and the Strategic Defence and Security Review 2015. On 25 January 2018, the Secretary of State announced that the high-level findings of that Review has recommended that a programme of further work to modernise defence is undertaken, including a review of defence capabilities. The Department aims to publish the outcome of this programme in summer 2018. The Department's future plans for equipment may be impacted by the outcome of the review.

## **Key findings**

**6 The Equipment Plan is not affordable.** After assuming that the £6 billion of contingency funds set aside in the Plan to supplement budgets will be utilised, the Department is facing a minimum affordability gap of £4.9 billion. There is an additional affordability gap of £15.9 billion if all identified financial risks of cost growth materialise and the Department does not achieve any of the savings assumed in the Plan. Overall, the potential affordability gap is £20.8 billion (paragraphs 4.5 and 4.7).

**7 The Plan does not include £9.6 billion of forecast equipment and support project costs.** For each equipment and support project, the Department estimates the expected cost over the next 10 years. When combining these to form the Equipment Plan, the Department has not accounted for £9.6 billion of forecast costs in the Plan. This variance arose as a result of the Department's 2017 budget setting process not being able to match costs to available budgets (paragraphs 4.2 and 4.3).

**8 The Department has understated forecast costs of equipment and support projects by a further £1.3 billion.** Our review of the Department's approach to forecasting costs found that not all costs are included in the Plan. At least £1.3 billion of planned costs associated with buying five general purpose frigates (Type 31e) are not included in the Equipment Plan (paragraph 2.2).

**9 In addition, there are significant financial risks to the cost of the Equipment Plan:**

- **Exchange rates used to forecast costs do not reflect market rates at the date of the Plan.** The rates the Department has used to forecast costs in the Plan are 24% above the US dollar rate at 1 April 2017, and 2% above the rate for the euro. Using exchange rates at 1 April 2017 (the date the 10-year Plan starts), we estimate that costs in the Plan could be understated by up to £4.6 billion, although exchange rates continue to fluctuate (paragraphs 2.10 and 2.11).
- **Project costings are optimistic and may increase.** Some projects do not yet have a detailed cost forecast. For others, the forecast costs are immature. The Department's Cost Assurance and Analysis Service (CAAS) has completed an independent review of forecast costs. It found that, when compared with its own assessment, the Department's forecast project costs could be understated by £3.2 billion (paragraphs 2.3, 2.4 and 2.6).

**10 Nuclear-related project costs continue to grow and forecast costs are higher than those shown in the Plan.** Nuclear-related projects could destabilise the Plan because of their size and complexity. Our project testing has shown that costs for the Dreadnought and Astute projects have increased by £941 million since the 2016 Plan. The Department is reviewing the reliability of forecast costs for all of its nuclear projects and expects that updated costs as a result of this exercise will be incorporated into the 2018 to 2028 Plan (paragraphs 2.12 to 2.14).



**11 Underlying project forecasts that go into the Plan could change because of weaknesses in cost modelling.** Our review of a sample of equipment projects within the Plan identified areas of weakness in the cost models used to forecast costs. There was insufficient evidence to support some of the assumptions about costs. The costing of project risks was inconsistent. Also, the Department's costing policy means that estimated costs do not take sufficient account of greater uncertainty in complex or new projects (paragraphs 2.5 and 2.7 to 2.9).

**12 To manage affordability of the Plan, the Department has reduced support costs at a time when uncertainty and demand are increasing.** As a consequence of changes introduced by the Strategic Defence and Security Review 2015, forecast costs for supporting new equipment, such as the F-35 Lightning II jets, are inherently immature. In addition, the useful life of existing equipment has been extended, which means that costs are likely to increase but have not been included in the Plan. Our past work has shown that the Navy is increasingly cannibalising parts from ships to maintain capability because of pressure on its budget (paragraphs 2.15 and 2.16).

**13 The affordability gap could widen if the Department's new approach to achieving assumed savings does not work.** The Department reports that it has achieved savings of approximately £7.9 billion against an increased savings target of £16 billion (49%), with approximately £8.1 billion (51%) still to be achieved by 2027. However, in the past, the Department has not managed savings effectively. The full amount of savings included in the Plan is not clear and the Department does not have evidence that shows how it has achieved all the savings it has claimed to have made to date. The Department has started to develop a more rigorous approach to identifying and managing the £8.1 billion of outstanding savings assumed in the Plan. The Department has identified potential savings of approximately £7.6 billion, £0.5 billion below the required savings target. However, the majority of these are at an early stage of development, with implementation plans still to be developed (paragraphs 3.4 to 3.12).

**14 The Department has limited flexibility to use other budgets to address the funding shortfall for equipment and support.** It was unable to agree a balanced defence budget for 2017-18 and is now managing a significant projected overspend in 2017-18. As a result, the Commands have undertaken detailed reviews of their programmes, supplemented by the introduction of stringent controls on non-contractual spending. Our past work has identified an £8.5 billion funding gap for managing the Department's estate. Also, the Department faces challenges in managing its staff budget. It is seeking to increase the number of military personnel which would increase costs, while at the same time, it has made limited progress in reducing civilian workforce costs (paragraphs 4.10 to 4.14).

## **Conclusion**

**15** The Department's Equipment Plan is not affordable. It does not provide a realistic forecast of the costs of buying and supporting the equipment that the Armed Forces will need over the next 10 years. The Department has not included all estimated costs in the Plan and it is facing a considerable affordability gap. There are significant financial risks that this affordability gap will widen because the Department's assumptions about future costs are optimistic. In addition, the Department has also assumed that ambitious savings will be achieved in future years. The Department has a mixed track record of achieving savings and still needs to identify how it will meet its savings targets.

**16** We recognise the significant challenges the Department faces in managing both its equipment and its wider budget and the efforts it is making to respond to them. However, it has not demonstrated that it can afford its plans for equipment and support. The Department risks returning to the situation it was in before the Equipment Plan was first introduced. Unless the Department takes urgent action to close the gap in affordability, it will find that spending on equipment can only be made affordable by reducing the scope of projects, delaying them, or cancelling them altogether. Such an approach risks destabilising the Plan, compromising value for money, and undermining operational capability.

## **Recommendations**

**17** The Department needs to be able to demonstrate, backed by appropriate evidence, the realistic choices open to it in terms of capability and affordability. It needs to be able to support a debate on critical prioritisation choices, both internally and in dialogue with HM Treasury about funding.

**18** The Department must also address the following weaknesses in the current Plan when developing its Plan for 2018 to 2028:

- a** Demonstrate that all equipment and support projects are costed within the Plan, and develop detailed cost estimates for those projects in the Plan that still do not have them.
- b** Complete its current nuclear programme costing exercise to ensure that all affected projects reflect the most up-to-date cost baselines.
- c** Update its assessment of the cost of those projects denominated in foreign currencies by adopting exchange rates that better reflect the current market rate for all 10 years of the Plan.

- d** Ensure greater consistency in how risk and uncertainty are reflected in project costs. The Department must also improve its understanding of the impact of risks across the Equipment Plan portfolio and use this to inform decisions about the size of its contingency budget.
- e** Explore the potential for greater flexibility in how forecast costs are shown in the Plan and set out in the Plan the range of possible costs for projects, rather than the current approach of providing point estimates.
- f** Conclude its work to identify the full extent of savings assumed within the Plan and set out clear accountabilities for delivering these savings. The Department should transparently set out in its Equipment Plan Statement, an assessment of all equipment savings included in the Plan and its progress towards achieving these.
- g** Ensure that any critical prioritisation decisions are supported by a full and transparent evidence base.

# Part One

## Introduction

**1.1** Since 2012, the Ministry of Defence (the Department) has published an annual Statement on the affordability of its 10-year Equipment Plan (the Plan). The Plan sets out how the Department will deliver and support the equipment that the Armed Forces require to meet their objectives over the next 10 years (although many of these projects will be delivered over a longer period).<sup>1</sup> The Department began this process as a way of assuring Parliament that its spending plans are affordable. From 1 April 2017 to 31 March 2027, the Plan has a budget of £179.7 billion (**Figure 1**) for:

- equipment procurement (£84.8 billion);
- equipment support (£88.9 billion); and
- contingency provision (£6.0 billion, of which £0.8 billion is ring-fenced for use on nuclear-related projects<sup>2</sup>).

**1.2** The Department increased the 2017 to 2027 Plan's budget by nearly £2 billion compared with the 2016 to 2026 Plan (£177.9 billion). This 1% increase contrasts with the 6.9% increase it made to the value of the Plan between 2015 and 2016 when, as a consequence of the Strategic Defence and Security Review 2015, it added £24.4 billion of additional expenditure to the Plan.

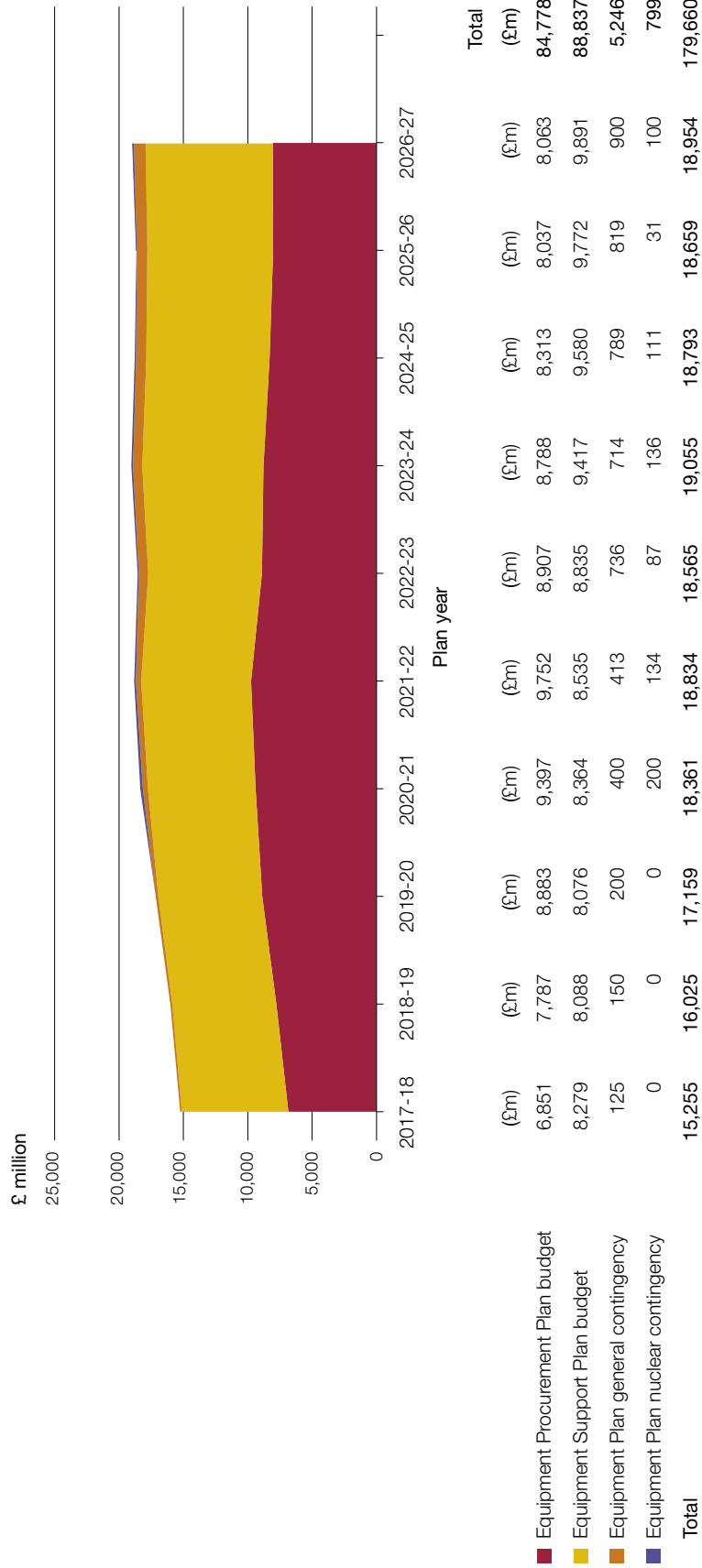
**1.3** The Department's Head Office is responsible for overseeing the Equipment Plan. Fiscal responsibility for projects within the Plan is delegated to the four front-line military commands of Air, Army, Navy and Joint Forces, and the Strategic Programmes and Nuclear Directorates within the Department's Head Office (collectively known as 'the Commands').<sup>3</sup> The Commands are effectively the 'customers'. They specify their equipment requirements and manage equipment budgets to secure those requirements. Head Office adjusts costs and budgets to achieve a balanced position across defence.

<sup>1</sup> These objectives are set out in HM Government, *National Security Strategy and Strategic Defence and Security Review 2015*, Cm 9161, November 2015.

<sup>2</sup> This covers a range of projects, including the Dreadnought and Astute projects.

<sup>3</sup> In April 2016, the Director General Nuclear organisation was set up within Head Office. The transfer of functions was not completed fully by 1 April 2017.

**Figure 1**  
Breakdown of planned spending on equipment, 2017 to 2027  
Equipment procurement and support budgets are supplemented by contingency



**Notes**

- 1 'Nuclear contingency' is ring-fenced for nuclear-related projects.
- 2 Figures have been rounded to the nearest £ million.

Source: Ministry of Defence

**1.4** Defence Equipment and Support (DE&S) and Information Systems and Services (ISS) manage equipment projects on behalf of the Commands, acting as the 'delivery agents'.<sup>4</sup> The delivery agents manage relationships with industry to meet the needs of the Commands and provide information and commercial advice to support decision-making. From August 2017, the parts of DE&S responsible for the procurement, in-service support and decommissioning of the UK's nuclear submarines transferred to a newly created Submarine Delivery Agency.<sup>5</sup> In November 2017, the parts of DE&S responsible for the Nuclear Warhead Programme were transferred to the Director General Nuclear organisation.

### **Ongoing reviews of equipment and support requirements**

**1.5** In July 2017, the government announced a review of national security capabilities in support of the ongoing implementation of the National Security Strategy and the Strategic Defence and Security Review 2015. The National Security Adviser, supported by cross-departmental teams, is leading the review. On 25 January 2018, the Secretary of State announced that the high-level findings of that Review has recommended that a programme of further work to modernise defence is undertaken, including a review of defence capabilities. The Department aims to publish the outcome of this programme in summer 2018. The Department's future plans for equipment may be impacted by the outcomes of the programme.

**1.6** At the time of our audit, the Department was setting its budget for the 2018 to 2028 Plan. The Department was seeking to address the growing imbalance between its equipment programme and available budgets as part of this budget-setting exercise.

### **Our review of the Plan**

**1.7** In this report we set out our observations on the Department's 2017 to 2027 Equipment Plan. We examine:

- forecast costs within the Plan (Part Two);
- funding for the Equipment Plan, including the savings assumed within the Department's budgets (Part Three); and
- affordability of the Plan within the wider defence budget (Part Four).

The Department did not produce a timely Equipment Plan for audit, and in some areas, was not able to provide a full audit trail to support its assumptions about costings and savings.

<sup>4</sup> Information Systems and Services is part of Joint Forces Command.

<sup>5</sup> The Submarine Delivery Agency will assume full executive agency status on 1 April 2018.

## **Our approach**

**1.8** Our audit approach is set out in Appendix One and our evidence base in Appendix Two. We examined cost assumptions that the Department has factored into the Plan. To support this, we reviewed the cost estimates for nine of the Department's largest procurement projects and 10 of its support projects. Together, these constitute 40% of the value of the Plan. Summaries of our findings on these projects are set out in Appendix Three. We do not assess the value for money of the various projects mentioned in this report. We reviewed central adjustments made as part of the Department's management of the Plan.

**1.9** To support our review of assumptions about funding for the Plan, we interviewed finance staff in the Department and reviewed budgetary papers. We also visited the four front-line military Commands to understand their role in managing the affordability of the Plan. We analysed the savings assumed within the Plan and tested evidence to support the Department's progress towards achieving these targets. To set our findings on the Plan in context, we also set out observations on the defence budget more broadly.

**1.10** We have not looked at changes to the Plan that may result from the review of national security capabilities, or any changes agreed as part of the Department's budget setting exercise for 2018 to 2028.

## Part Two

### Forecast costs within the Equipment Plan

**2.1** This part considers how the Ministry of Defence (the Department) has forecast the costs of equipment and support projects in the Equipment Plan (the Plan).

#### **Costs not included in the Plan**

**2.2** As a consequence of the Strategic Defence and Security Review 2015, the Department introduced a number of new equipment commitments into the Plan. The Department was unable to demonstrate that all equipment requirements are now included within the Plan. We have established that the Plan does not include the costs of buying five Type 31e frigates. The Department aims to introduce the first of these ships into service in 2023. To control costs, the Department has set a £250 million cap on each frigate. Based on this cost, at least £1.3 billion of forecast costs are not included in the Plan.<sup>6</sup>

#### **Immaturity of forecast project costs**

**2.3** The Strategic Defence and Security Review 2015 increased uncertainty about the costs in the Plan. This increased the Plan's exposure to future growth in costs. The forecast costs of the £24.4 billion of additional commitments added to the Plan last year are still at an earlier stage of maturity. Analysis by the Department's Cost Assurance and Analysis Service (CAAS) has shown that the forecast cost of projects increases by 10% from the start of the design phase of a project to the equipment entering service.<sup>7,8</sup>

**2.4** The Department has set aside £12 billion of the budget in the Plan for early stage projects where there is an identified requirement. The Department has not yet carried out detailed costing that would permit distribution to individual project budgets. Therefore, there is greater uncertainty in the cost of these projects.

6 The Plan is likely to be understated by a larger amount because the £1.3 billion estimate does not include support costs or provision for project risks, which the Department routinely includes within forecast costs.

7 CAAS is part of the Defence Equipment and Support organisation and provides independent assurance to the Department on costing and pricing work carried out by project teams and others.

8 CAAS has carried out analyses based on data it has been collecting since 2009. CAAS analysed the overall performance of a historical data set of 344 procurement projects which shows forecast cost of projects increase by 21%. However, when excluding those projects with an in-service date before 2009 the forecast cost of the remaining projects (278) increase by 10%.



## Estimating costs

### Cost estimating at the 50th percentile

**2.5** Estimating future costs requires judgement because of uncertainty about the future. The Department continually updates its estimates of forecast costs as projects evolve and progress through the equipment life cycle.<sup>9</sup> However, the Department's current practice in costing can lead to optimism bias. Where costs are modelled to calculate a range of possible costs, the Department normally determines project cost estimates in the Plan to be set at the median of the potential cost range (50th percentile).<sup>10</sup> Following this approach, irrespective of complexity and the level of project maturity, may not always be appropriate and it is not followed universally across government.<sup>11</sup> Budgeting for costs at higher percentiles may be appropriate for projects involving greater innovation, new and unproven technologies, or a tight manufacturing schedule. For 72 projects where CAAS conducted an independent cost estimate in 2016-17, its 'realistic outturn' project cost was higher than the 50th percentile in 27 cases (38%). After setting the 2017 to 2027 Plan, the cost of manufacturing the first batch of Type 26 frigates was contracted at a price that is equivalent to an 83rd percentile. This reflected industry being unwilling to accept an estimate with a lower probability of being achieved under a target cost incentive fee arrangement.<sup>12</sup>

**2.6** Each year CAAS estimates the extent to which project teams may be underestimating the forecast costs that make up the 10-year Plan. CAAS considers that the Department could have under estimated the cost of the 2017 to 2027 Plan as a whole by £3.2 billion, when compared with its own assessment (**Figure 2** overleaf). The decrease from the prior year figure of £4.8 billion is partly due to a change in methodology, meaning that comparisons between the years cannot be made (Appendix Two). In addition, some costs are assessed by CAAS as being likely to occur beyond the 10-year period of the Plan, and therefore are not included in its estimate.

### Maturity of cost modelling

**2.7** Our review of a sample of projects in the Plan showed varying levels of sophistication in cost forecast modelling (Appendix Three).<sup>13</sup> Some project teams did not provide sufficient evidence for us to conclude that the assumptions made in their costings were robust. There were cases where the initial evidence provided by project teams was inconsistent with the information on which the Equipment Plan is based.

<sup>9</sup> The Department manages the life cycle of projects in six stages referred to as CADMID: Concept, Assessment, Demonstration, Manufacture, In service, and Disposal.

<sup>10</sup> At this point, each project is considered to be equally likely to cost less or more than this estimate. Some variation against this estimate can therefore be expected.

<sup>11</sup> Network Rail costs its project portfolio at the 80th percentile.

<sup>12</sup> Target cost incentive fee contracts have a target cost, and any costs over or above this amount is shared between industry and the Department according to an agreed ratio.

<sup>13</sup> Our sample included 19 of the largest projects by value in the Plan: nine procurement and 10 support projects. The projects tested represent £72 billion (40%) of the overall value of the Plan.

**Figure 2**

## Estimated level of understatement of project costs in the Equipment Plan

The Cost Assurance and Analysis Service (CAAS) considers that the cost of the 2017 to 2027 Plan as a whole could be under estimated by £3.2 billion, when compared to its own assessment

		2016 (£bn)	2017 (£bn)
Equipment procurement projects		2.4	0.4
Equipment support projects		2.4	2.8
<b>Total</b>		<b>4.8</b>	<b>3.2</b>
Proportion of project costs covered by specific cost estimates (by 10-year value)	Procurement	60%	66%
	Support	56%	51%

**Notes**

- 1 CAAS has estimated an overall value for projects for which it has not undertaken an independent cost estimate, using modelling (for equipment procurement projects) and extrapolation (for equipment support projects).
- 2 For the 2017 to 2027 Plan, CAAS's estimate of individual projects forecast costs are compared against their equivalent project team forecast at the same point in time. An adjustment has been deducted from the final total for equipment and support projects to account for any movements in project team forecasts between the time of the estimate and the end of the year.

Source: CAAS's Annual Assurance Report 2017

**2.8** The forecast costs of projects in the Plan are based on estimates at a point in time. However, our review of a sample of project costs identified two cases where the forecast costs did not reflect the most accurate data available at the time the Plan was compiled. As a result, the forecast costs of these projects (6% of the Plan) are expected to change in the 2018 to 2028 Plan:

- The Type 26 Global Combat Ship is the highest-value non-nuclear procurement in the Plan. The Strategic Defence and Security Review 2015 significantly changed the requirement.<sup>14</sup> The forecast cost in the Plan does not fully reflect this change. Instead, the Department again rolled forward the forecast costing from before the Review.<sup>15</sup>
- During 2016-17, the Department continued to develop options for procuring the Mechanised Infantry Vehicle, which the Department committed to as part of the Review. The estimated cost for the project in the Plan does not reflect these options because a decision had not been reached on which option to pursue. Consequently, the project team rolled forward the estimated cost from that in last year's Plan.

<sup>14</sup> The Review reduced the number of Type 26s from 13 to eight. The shortfall in ship numbers is to be filled by creating a new class of frigate (Type 31e). Two extra offshore patrol vessels were also ordered.

<sup>15</sup> The small changes in cost estimate from last year relate to the project team reverting to the estimate from the 2015 to 2025 Plan, but with a £0.5 billion reduction over the first five years.

**2.9** Project teams' approach to reflecting risk in the cost models varies, but the rationale for these differences is not clear.<sup>16</sup> There was also a lack of an audit trail to support some project teams' treatment of risks. The Commands do not hold funds for additional risks not identified by project teams across their portfolios of projects. If costs increase because of risks that are not already factored into costs, the Commands must manage this by slowing their spending on projects or offsetting costs against other budgets, such as staff. This can create instability and divert management attention from focusing on in-year budgetary pressures.

### **Impact of movements in foreign exchange rates**

**2.10** Many of the Department's largest procurements are paid for in foreign currency. For example, the F-35 Lightning II (Joint Strike Fighter) is priced in US dollars and some Typhoon support costs are paid in euros. The Department has assessed that projects included within the Plan are forecast to spend \$35.6 billion and €3.6 billion over the 10-year period of the 2017 to 2027 Plan. This is a 24% increase in US dollar spend and a 13% increase in euro spend compared with the 2016 to 2026 Plan.

**2.11** The Department sets assumptions on sterling–dollar and sterling–euro exchange rates for project teams to use when forecasting costs. For the 2017 Plan, the Department set rates that are 24% above the exchange rate at the point when the Equipment Plan 10-year period started for the US dollar, and 2% above the exchange rate for the euro.<sup>17</sup> We have calculated that if exchange rates at 1 April 2017 (the start of the period covered by the Plan) are used to forecast costs over the duration of the Plan, then costs could be understated by up to £4.6 billion once the effect of current forward purchase contracts is taken into account.<sup>18</sup> While exchange rates can go up or down, with the sterling–dollar rate improving since 1 April 2017, our calculation illustrates the risk of cost growth in the Plan from movements in foreign exchange rates. Most of this increase relates to spend in dollars, with the biggest pressure occurring in the middle period of the Plan (**Figure 3** overleaf).

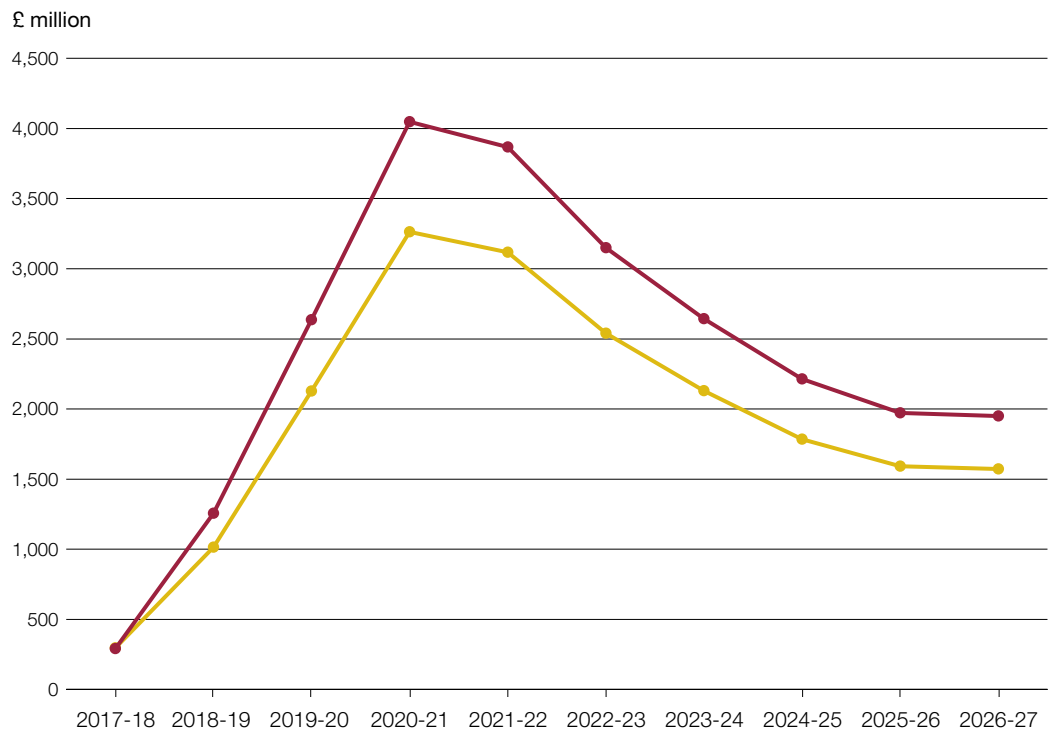
<sup>16</sup> When modelling forecast costs, project teams identify risks to the project and estimate the cost and likelihood of each risk occurring. Risks are factored into project costs depending on the assessed likelihood of the risk materialising.

<sup>17</sup> Assumed exchange rates over the 10 years of the 2017 to 2027 Plan: £1 is worth \$1.55 and €1.20, with the exception of 2017-18 where a rate of £1 is worth \$1.23 and €1.16.

<sup>18</sup> The Department manages the near-term risk of exchange rate exposure to the US dollar and euro by purchasing currency in advance, using forward purchase contracts with the Bank of England. The Department aims to hedge 80% of the currency risk of the first year of the Plan, 50% of the second year and 20% of the third.

**Figure 3**  
Potential increase in cost for projects paid in US dollars

Costs could increase where projects pay in US dollars due to the exchange rate used in the Equipment Plan



	Plan year									
	(£m)	(£m)	(£m)	(£m)	(£m)	(£m)	(£m)	(£m)	(£m)	(£m)
● Cost at 1 April 2017 rate	291	1,257	2,637	4,046	3,866	3,149	2,642	2,213	1,973	1,951
● Cost at rate used in the Plan	295	1,014	2,127	3,263	3,118	2,540	2,131	1,785	1,591	1,573

**Notes**

- 1 Chart shows the unhedged forecast cost in US dollars converted into sterling.
- 2 Rate used in the Equipment Plan is \$1.55 to £1, with the exception of 2017-18, in which £1 is worth \$1.23.
- 3 Rate on 1 April 2017 was \$1.25 to £1.

Source: National Audit Office analysis

## Cost increases in nuclear-related projects

**2.12** Nuclear-related projects (the nuclear enterprise) represent around a quarter of the Plan. They are inherently complex projects and, because of their size, have the potential to destabilise the wider plan.<sup>19</sup> In particular, the Dreadnought project accounts for a significant proportion of the estimated cost of buying equipment in the Plan. It is at an early stage in its life cycle and consequently forecast costs are immature and have continued to increase from the original estimation. Growth in costs in the early years of the project has created affordability pressures within the Plan. In July 2016, the Department approved costs to begin building the first Dreadnought submarine, even though it was unaffordable in the early years of the project.

**2.13** In 2016-17, the forecast 10-year costs of the Dreadnought and Astute projects increased again, rising by £575.5 million and £365.3 million, respectively (total of £941 million).<sup>20</sup> Cost growth in the Astute project has resulted in the final boat, Astute Boat 7, exceeding its existing budget. To reflect budgetary pressures, the Department has transferred £580 million of the ring-fenced nuclear contingency funding to project budgets.

**2.14** The Director General Nuclear has launched a review of the reliability of nuclear-related project costs. The Department expects that updated costs as a result of this exercise will be incorporated into the 2018 to 2028 Plan.

## Support costs

**2.15** The Department has set equipment support budgets totalling £88.9 billion, a reduction of £1.8 billion (2%) when compared with the 2016 to 2026 Plan.<sup>21</sup> This reduction has come at a time when commitments to buy new equipment and extend the life of existing equipment will increase the requirement for support. Costs associated with supporting naval equipment are under particular pressure. Keeping Type 23 frigates in service for longer because of delays in ordering Type 26 and Type 31e frigates have increased the cost of support requirements, but there is no provision in budgets for these costs. Our recent report found that Navy Command reduced its support budget by 6% in 2015-16 and 2016-17 to manage pressures in its wider budget. As a consequence, and to maintain capability, it is taking actions such as cannibalising parts from ships that are in service.<sup>22</sup>

<sup>19</sup> Projects include building the Astute Class nuclear-powered submarines, replacing the current nuclear-powered submarines providing the Continuous At Sea Deterrent (Dreadnought), and maintaining the nuclear warheads.

<sup>20</sup> In the 2016 to 2026 Equipment Plan the forecast costs of Dreadnought and Astute projects increased by £620 million and £216 million, respectively.

<sup>21</sup> The Department increased support budgets in its 2015 to 2025 and 2016 to 2026 Plans.

<sup>22</sup> Comptroller and Auditor General, *Investigation into equipment cannibalisation in the Royal Navy*, Session 2017–2019, HC 525, National Audit Office, November 2017.

**2.16** Commitments set out in the Strategic Defence and Security Review 2015 to buy new equipment have further increased uncertainty in the Plan because the Department has little experience of operating this new equipment to enable it to accurately forecast costs. For example, the first F-35 Lightning II aircraft is due to be in service in 2018, but there is not yet reliable data on which to forecast the costs of supporting the jets once they are operational. This means that the costs forecast in the Plan are uncertain. Also, support arrangements for the new aircraft carriers being procured and the fleet of Type 45 destroyers are moving to a new type of contractual arrangement ('the Common Support Model'). Forecast costs in the Plan assumed savings from this new arrangement at a time when the Department was still to finalise the relevant contracts.

# Part Three

## Funding for the Equipment Plan

**3.1** This part of the report sets out the Ministry of Defence's (the Department's) assumptions about the size of equipment and support budgets. It also sets out its progress towards achieving the savings it has assumed within budgets.

### Source of funding for the 2017 to 2027 Equipment Plan

**3.2** The Department has set a £179.7 billion, 10 year, budget for the 2017 to 2027 Equipment Plan (the Plan). This represents a 1% increase compared with the 2016 to 2026 Plan (£177.9 billion). However, within this small overall increase, the Department has reduced budgets over the early part of the Plan by £2.1 billion (2017-18 and 2022-23) (**Figure 4** overleaf). This reflects the immediate budget pressure the Department is experiencing in the early years of the Plan.

**3.3** In previous years, the Department maintained 'headroom' in its Plan to fund extra projects beyond the core programme according to emerging military priorities. The Department allocated the £10.7 billion headroom in the 2016 to 2026 Plan to fund commitments in the Strategic Defence and Security Review 2015 (the Review) and other projects within the core programme. Funding for any further emerging requirements will have to be found from within Commands' existing budgets, reducing the Department's flexibility to respond to future equipment needs.

### Savings required to fund the Plan

**3.4** Since 2013, the Department has increased the amount of savings that are required to fund the Plan (**Figure 5** on page 23). We found that the full amount of savings included within the Plan is not clear, as the Department's Equipment Plan Statement did not report all the savings assumed within the Plan, nor the Department's progress against these. We estimate that the Department built £8.3 billion of 'legacy' savings into the Plan before 2016 and, as a consequence of the Review, it introduced an additional £6.1 billion savings target.<sup>23</sup> This year, the Department has added £1.6 billion of further savings to the Plan. This means that a total requirement for £16 billion of savings has been set since the Equipment Plan reporting regime began in 2012.<sup>24</sup> While a number of these targets are based on a range of analyses and past experience, they have been introduced largely in response to shortfalls in the Department's budget.

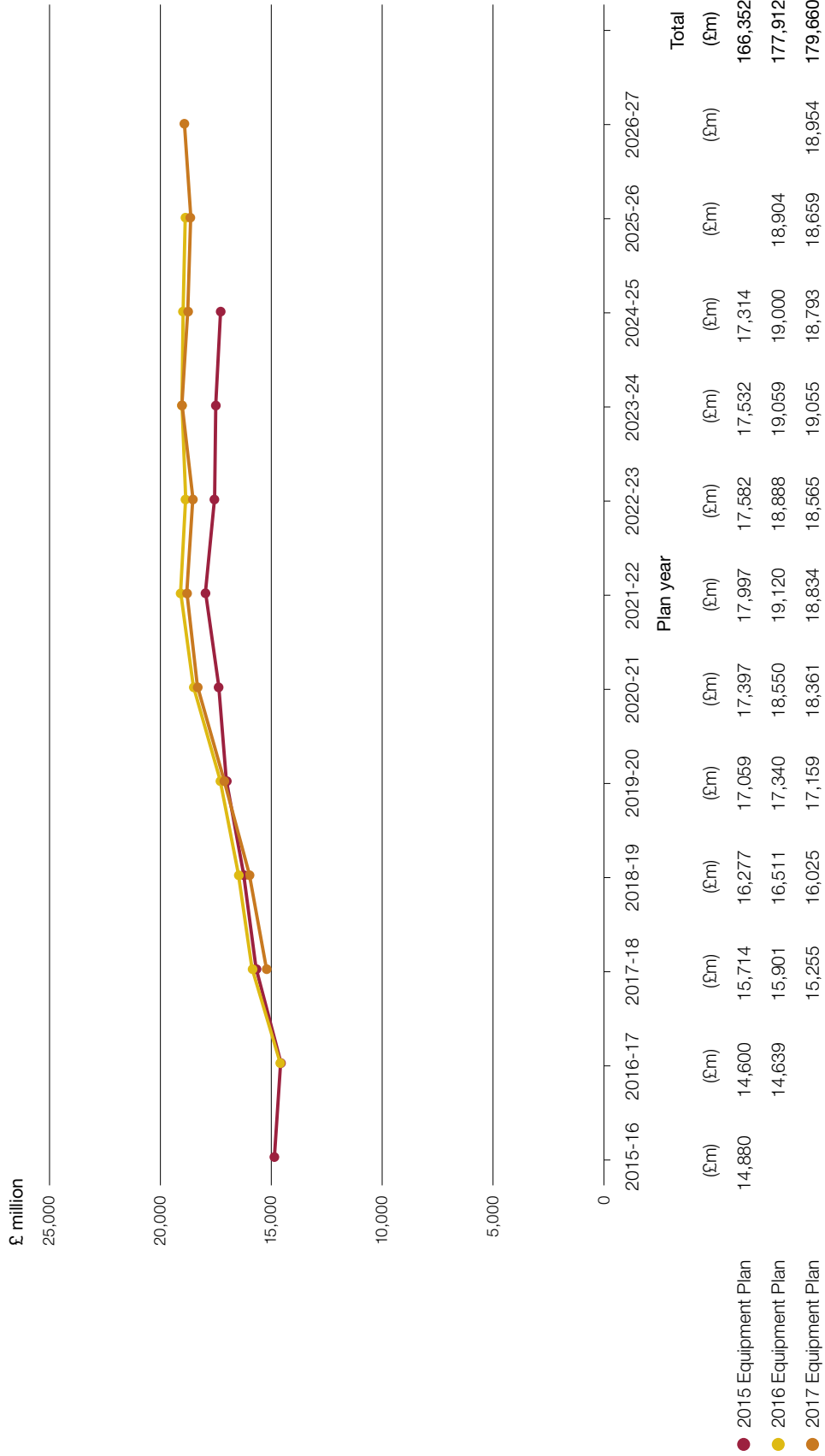
<sup>23</sup> This includes £325 million of additional savings from ICT projects over the period 2016-17 to 2026-27.

<sup>24</sup> For some savings, the Department has assumed savings will continue beyond the original saving target period.

**Figure 4**

The 10-year forecast cost of the Plan over time

The 2017 to 2027 Plan has reduced budgets over the first nine years compared with the 2016 to 2026 Plan



**Note**

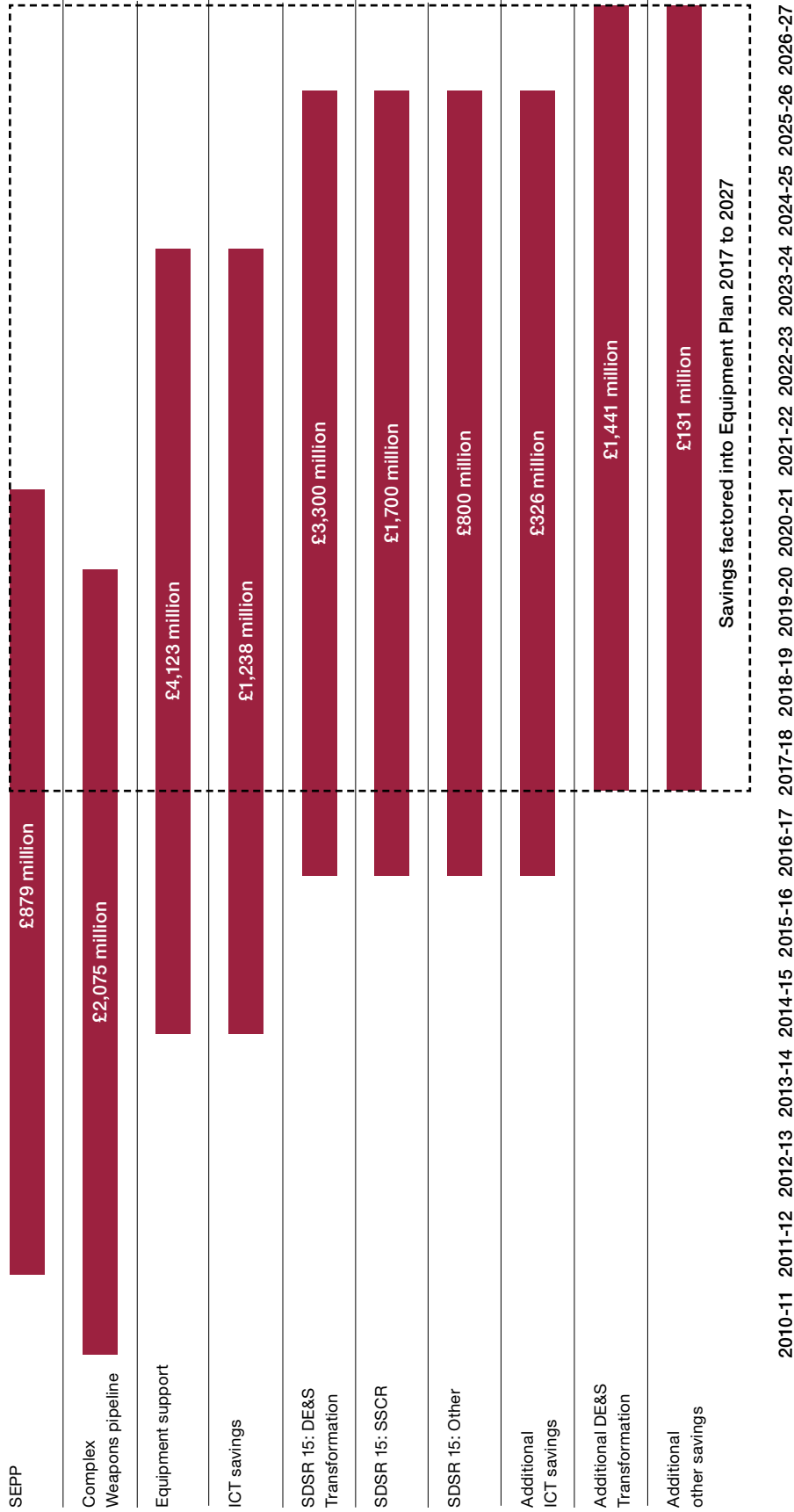
1 Financial years shown. For example, 2015-16 represents the financial year 1 April 2015 to 31 March 2016.

Source: Ministry of Defence



**Figure 5**  
Savings targets assumed within the 2017 to 2027 Plan

Since 2012, the Department has increased the amount of savings needed to fund the Equipment Plan



**Notes**

- 1 SEPP – Submarine Enterprise Performance Programme; ICT – Information and Communication Technology projects; SDSR 15 – Strategic Defence and Security Review 2015; DE&S – Defence Equipment and Support; SSCR – Single Source Contract Regulations.
- 2 Based on our estimate of savings factored into the Plan.
- 3 Refers to financial years. For example, 2010-11 refers to the financial year from 1 April 2010 to 31 March 2011.
- 4 Saving amounts shown do not follow a linear distribution and therefore do not have equal proportions of the target being required in each of the years.

Source: National Audit Office analysis

**3.5** The amount of savings factored into the Plan may increase. At the time of our audit the Department was undertaking a review of the total equipment savings in the Plan. This exercise was being led by Defence Equipment and Support (DE&S) and the Commands, to agree the savings assumptions in forecast costs.

**3.6** In some cases the Department has assumed savings against specific projects and has reduced forecast costs to reflect this, for example in relation to equipment support budgets. However, for most outstanding savings, the Department has not yet identified which projects will provide them. It has made a general adjustment to reduce the costs in the Plan. DE&S and Information Systems and Services, working with the Commands, are responsible for developing savings ideas. Once a saving idea has been sufficiently developed and the project team has confidence that it will be achieved, the forecast cost of the relevant project is reduced, with a corresponding reduction in the adjustment amount.

### **Progress in delivering savings**

**3.7** Our July 2015 report *Strategic financial management in the Ministry of Defence* found that the Department had not tracked savings in a way that had enabled them to be audited, or for it to fully demonstrate whether it had met its budgets through: efficiency measures; moving costs into future years; stopping projects; or transferring costs.<sup>25</sup> In 2016, the Department introduced an Efficiencies Delivery Board to monitor efficiencies. However, not all equipment savings are monitored by this board, and there is no central oversight within the Department of progress towards achieving assumed equipment savings. Efficiency savings have historically been managed by several teams within the Department. As a result, the Department has not always been able to provide evidence to verify claimed savings.

**3.8** The Department reports that it has achieved savings, or has sufficiently detailed plans that enable it to reduce costs, totalling £7.9 billion (49%) against the calculated target (**Figure 6** on page 26).<sup>26</sup> This reflects varied performance against the savings targets, in particular:

- **Submarine Enterprise Performance Programme**

The Department reports that it has achieved £0.7 billion (77%) of the £0.9 billion target, with four years remaining of the target period. The project team reported that there was a gap of £68 million in current plans to achieve the full target.

- **Complex Weapons pipeline**

The Department reports that it has achieved approximately £1.4 billion (65%) of the £2.1 billion saving target after seven years of the 10-year target period.<sup>27</sup> This includes £0.7 billion of avoided costs, which will not be confirmed until the relevant contract has completed and the savings are fully assessed. The Department has counted these as being achieved, a change in approach to previous years.

<sup>25</sup> Comptroller and Auditor General, *Strategic financial management in the Ministry of Defence*, Session 2015-16, HC 268, National Audit Office, July 2015.

<sup>26</sup> Percentages quoted are calculated on the basis of £ millions as disclosed in Figure 6.

<sup>27</sup> The Department's Complex Weapons pipeline is an approach to defence acquisition that comprises a number of interrelated weapons projects. These projects are managed as a portfolio, which aims to be more effective and reduce costs. The target is £2.1 billion of gross savings, which gives £1.2 billion actual savings after netting off the notional additional cost of single-source procurement from the benefits of the extant procurement strategy.

- **Equipment support**

After consultancy advice, the Department set a target over a 10-year period between 2014-15 and 2023-24 to make savings from support budgets of £4.1 billion. The Department has reduced support contracts by £3.5 billion over the period. It has stopped tracking delivery of this target, deeming it to be achieved as fixed in the contract. The remaining £0.6 billion of the savings target has not yet been achieved, and the Department has yet to decide how to deliver this.

- **Information and communication technology savings**

The Department must deliver £1.6 billion of savings to ensure that its ICT programme is affordable. It has not demonstrated how it has achieved the £0.8 billion (49%) of ICT savings it has reported to date and has yet to identify how it will achieve the remaining £0.8 billion of savings.

- **Strategic Defence and Security Review 2015**

The Department reports that one year into a 10-year programme, it has achieved £1.6 billion of savings against a target of £5.8 billion (28%) set by the Review. These relate to savings achieved as a result of DE&S organisational change.<sup>28</sup>

**3.9** In addition, Plan budgets between 2017 and 2027 are also based on the Department making £1.5 billion of efficiency savings from the wider defence budget. The Department has reduced non-Equipment Plan budgets in anticipation of these savings. If the Department does not achieve this target, the Commands may be required to address the shortfall from their non-Equipment Plan budgets, including from staff budgets.

## **The new approach to managing savings**

**3.10** In 2016-17, the Department introduced a new process to improve how it identifies, achieves, and then tracks its savings targets. This process is managed on behalf of the wider Department by DE&S, and consists of project teams identifying savings ideas and developing these through a four-stage process, (**Figure 7** on page 27). DE&S has set project teams indicative target savings to incentivise them to come forward with savings ideas.<sup>29</sup>

<sup>28</sup> The Review set a target of £3.3 billion of savings to be made through transforming DE&S. The Department has since increased this to £4.7 billion.

<sup>29</sup> The Department is continuing to manage savings from the Complex Weapons pipeline using its existing approach.

**Figure 6**

## The Department's reported progress towards achieving equipment savings targets

**The Department's progress against savings targets has been inconsistent**

Area	Target as originally set (£m)	Years left to run	Savings achieved to date (£m)	Percentage of target achieved so far (%)
Submarine Enterprise Performance Programme	879	4 of 10 years	677	77
Complex Weapons pipeline <sup>3</sup>	2,075	3 of 10 years	1,349	65
Equipment support	4,123	7 of 10 years	3,462 <sup>1</sup>	84
Information and communication technology	1,564	Between 2 and 9 years	759 <sup>1</sup>	49
SDSR 15 efficiencies <sup>2</sup>	5,800	9 of 10 years	1,649	28
Additional DE&S transformation savings <sup>4</sup>	1,441	9 of 10 years	N/A <sup>5</sup>	N/A <sup>5</sup>
Additional savings	131	9 of 10 years	0	0
<b>Total</b>	<b>16,013</b>		<b>7,896</b>	<b>49</b>

**Notes**

- 1 We have been unable to verify the Department's claimed savings with supporting documentation or evidence.
- 2 SDSR 15 – Strategic Defence and Security Review 2015.
- 3 The Complex Weapons pipeline target is £2.1 billion of gross savings, which gives £1.2 billion actual savings after netting off the notional additional cost of single-source procurement from the benefits of the extant procurement strategy.
- 4 Additional DE&S transformation savings have been added to the Plan to reflect DE&S's latest assessment of the savings achievable through transformation.
- 5 Savings achieved against the additional DE&S target have been shown as part of SDSR 15 efficiencies.

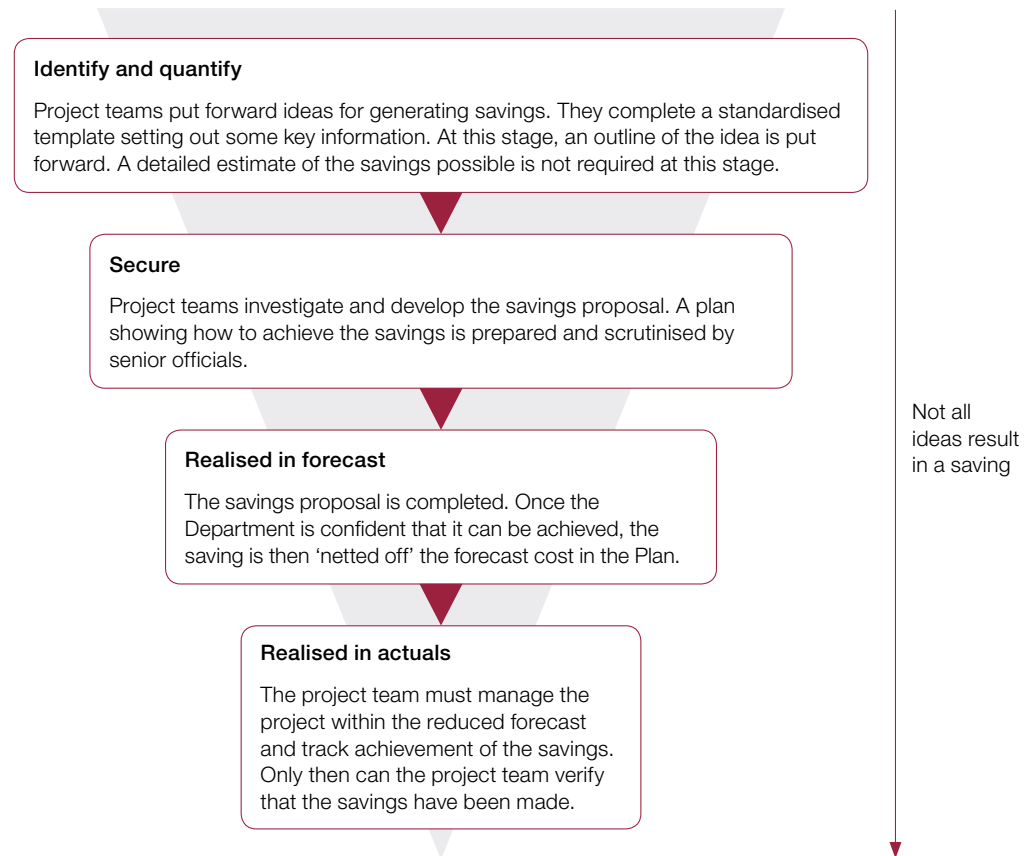
Source: National Audit Office analysis

**3.11** We reviewed a sample of the £1.6 billion achieved Strategic Defence and Security Review 2015 efficiencies that were managed through the new process. These were claimed at the end of March 2017 and relate to lower costs over the 10 years of the Plan. We found appropriate documentation supporting the value of the claimed savings. However, while these relate to reduced forecast costs of projects, project teams will need to manage the project to the revised budget so that the claimed savings can be realised. Although progress has been made against the overall savings target, the target remains ambitious, with £8.1 billion of savings (51% of the target) still to be met over the next 10 years to 2027. The Department has yet to identify how to make all the remaining savings.

**Figure 7**

Approach used by Defence Equipment and Support (DE&S) to manage achievement of savings

DE&S has introduced a four-stage process to manage the achievement of savings



Source: National Audit Office analysis

**3.12** At the end of September 2017, teams across the Department had put forward savings ideas totalling £6.3 billion. This is still £1.8 billion below the required target of £8.1 billion. Of this total, the majority of ideas were at an early stage with implementation plans to be developed ('identify and quantify' stage). Consequently, the final claimed saving is likely to be significantly lower than the ideas originally put forward by project teams, as ideas are scrutinised and some not progressed. While this new approach has added improved control, management and transparency to the Department's management of its savings target, it still remains relatively immature and unproven.

**3.13** The Department is managing savings from the Complex Weapons pipeline separately. The Department reports that it is forecasting additional savings of £1.3 billion from the pipeline over the remaining three years of the target. This forecast relates to project work yet to be placed on contract, or that which is on contract but is yet to complete. Overall, combining these forecast savings with those identified through the new approach, the Department has identified potential savings of approximately £7.6 billion, £0.5 billion below the required savings target.

## Part Four

### Affordability of the Equipment Plan within the wider defence budget

**4.1** This part of the report set outs our observations on how the Ministry of Defence (the Department) manages the affordability of the Equipment Plan (the Plan) within the context of the wider defence budget.

#### **Balancing the Plan**

**4.2** The Department sets the Plan as part of its annual budgeting exercise, which is undertaken to set budgets across defence for the next 10 year financial period. In 2017, the Plan was delayed because the Department did not complete the budgeting exercise until May 2017, two months after the start of the 2017-18 financial year. The delay was caused by significant difficulties in reaching agreement on the best approach to manage the affordability gap that had arisen in the defence programme.

**4.3** The Department acknowledges that it did not make the difficult decisions needed to reach a balanced position in 2017. For each equipment and support project, the Department estimates the expected cost over the next 10 years. When combining these to form the Plan, the Department has not accounted for £9.6 billion of forecast costs in the Plan. This variance arose as a result of the Department's 2017 budget setting process not being able to match costs to available budgets. Therefore, forecast costs on the Department's finance system are higher than those set out in the Plan. The Department has not been able to identify the specific projects which account for this difference, nor has it yet identified what changes it will make to equipment and support projects so that costs are affordable, but expects to take decisions as part of the budget setting exercise for 2018-19 to 2027-28. These difficulties also affected the Department's ability to produce a timely Equipment Plan for audit, and in some areas the Department was not able to provide a full audit trail to support the Plan.

**4.4** Over the 10-year period covered by the Plan, the Commands have reduced their anticipated spending on equipment by £3.4 billion, allocating this funding to their other responsibilities, such as staff. If the Commands are unable to identify ways of delivering their equipment projects to this lower budget, then they must reduce their plans elsewhere or reduce their equipment ambitions.

## Contingency included within the Plan to cope with cost growth

**4.5** The Department has set aside central contingency provision of £6 billion within the Plan (representing 3%).<sup>30</sup> This is to cover the risk of the Commands being unable to manage growth in costs because of:

- failures to meet savings targets;
- risks not already factored into costs materialising;
- unexpected events that have a financial impact; and
- over-optimism in project teams' costings (mainly based on the Cost Assurance and Analysis Service's assessment of project outturn costs).

**4.6** The Department has increased the amount of contingency in the 2017 to 2027 Plan compared with last year's Plan (£5.3 billion). It has set a profile of which years it may need to use the contingency to supplement project budgets. The Department expects to use the contingency sooner, profiling its use from the first year of the Plan (2017-18), instead of from year four of the Plan (2019-20) as assumed last year (**Figure 8** overleaf). This reflects the Department's view that budgets in the early years of the Plan are under significant pressure. Also, the Department has transferred £580 million of nuclear contingency assumed in the 2016 to 2026 Plan to project budgets, reflecting cost pressures in the nuclear-related projects (paragraph 2.13).

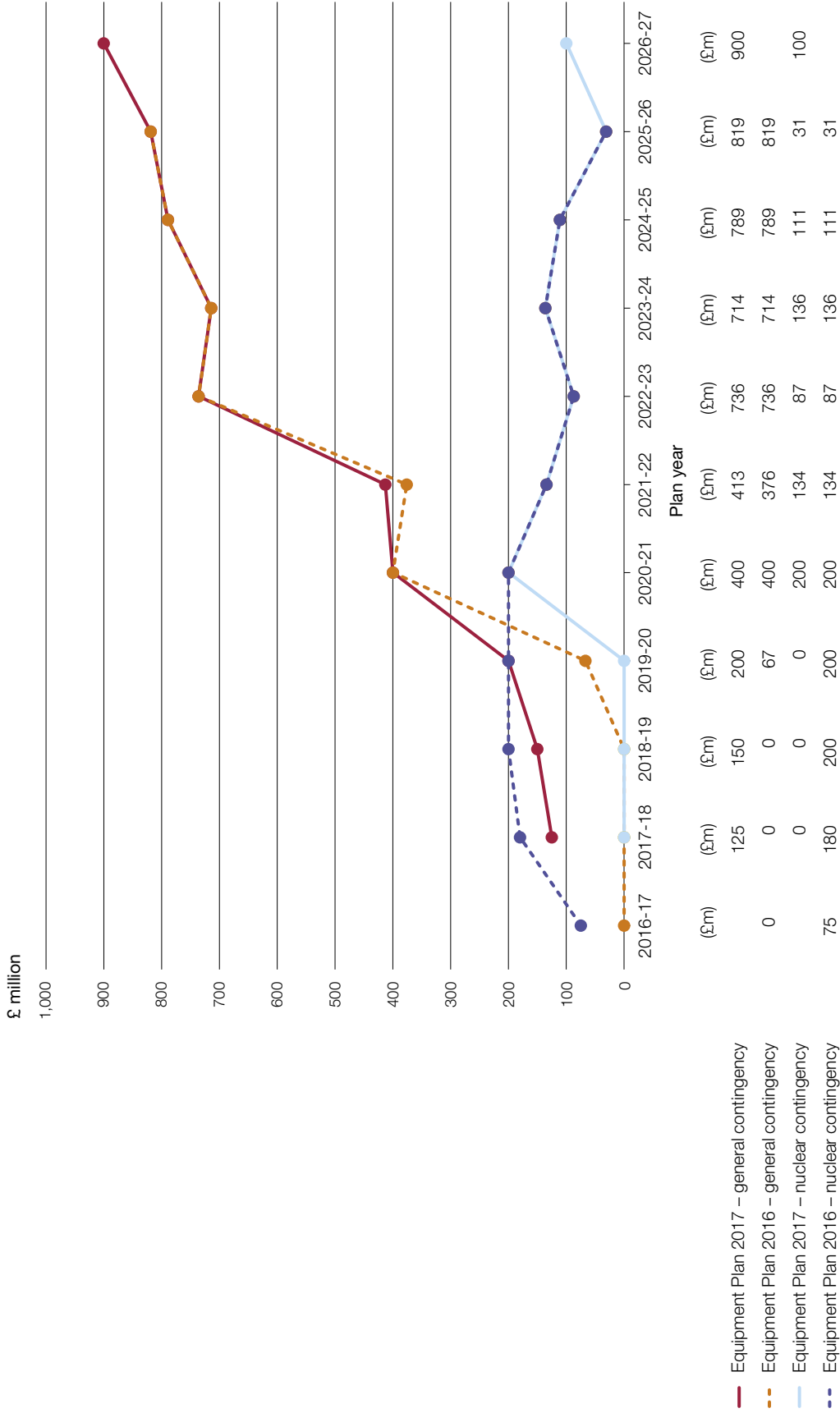
**4.7** Although the Plan's contingency budget has increased since last year, it is insufficient to cover the difference between likely costs and available funding. Including the Department's £9.6 billion forecast costs not accounted for in the Plan would alone exceed the contingency. In addition, costs are understated by a further £1.3 billion as a result of the forecast cost of buying five Type 31e frigates not being included in the Plan. The Department therefore faces a minimum affordability gap of £4.9 billion. There is an additional affordability gap of £15.9 billion if all identified financial risks materialise (movements in foreign exchange rates; and over-optimism in forecast costs) and the Department does not achieve any of the £8.1 billion savings already assumed in the Plan to 2027. Overall, the Department faces a potential affordability gap of £20.8 billion (**Figure 9** on page 31).

<sup>30</sup> Of the £6 billion contingency, £0.8 billion is ring-fenced for nuclear-related projects.

**Figure 8**

Contingency included within the Plan

The Department expects to use the contingency from the first year of the 2017 to 2027 Plan

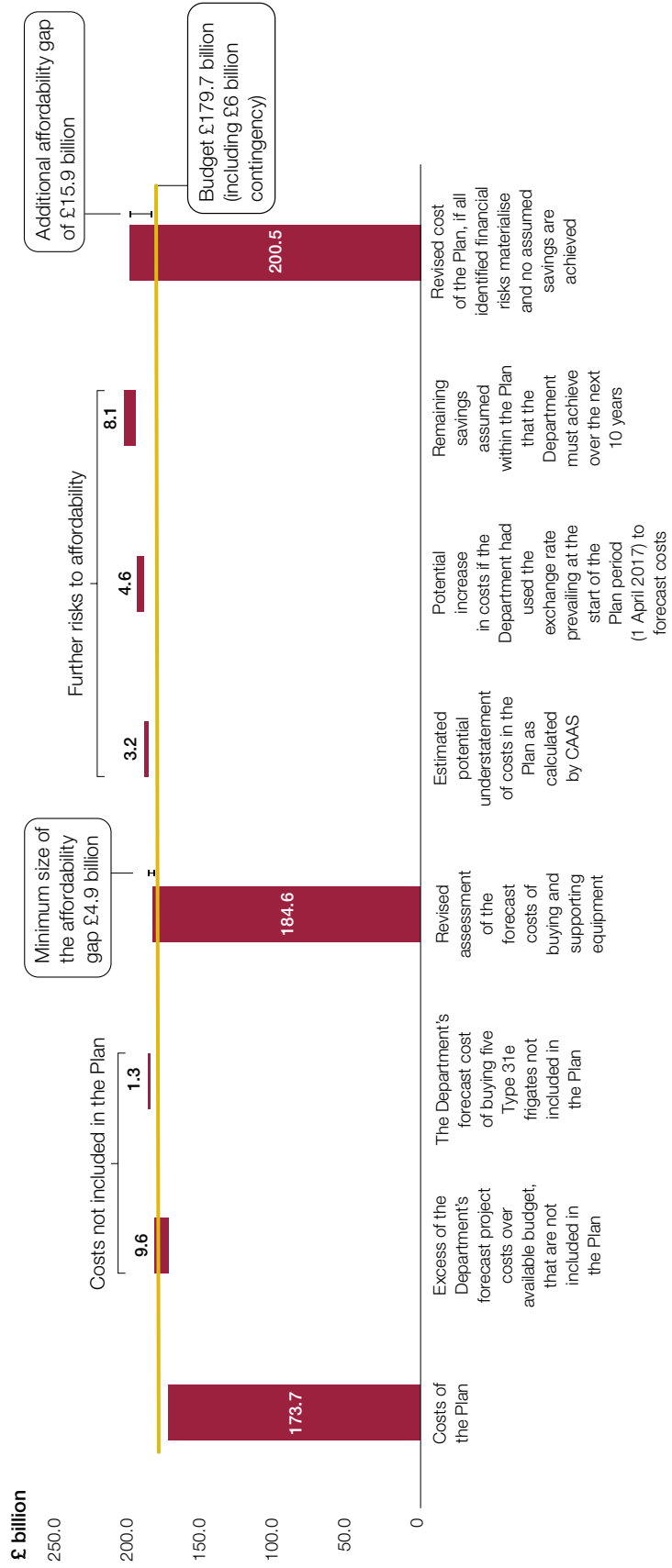


Source: Ministry of Defence



**Figure 9**  
Affordability of the Plan

The Department faces a potential affordability gap of £20.8 billion



Source: National Audit Office analysis

## The Department's Equipment Plan 2017 Statement

**4.8** The Department's Equipment Plan Statement does not provide sufficient information about the affordability challenges it faces in relation to: adjustments to reflect full costs; and likely cost growth in the Plan that could result from risks such as foreign exchange fluctuations. Also, there is insufficient detail to understand the Department's progress in identifying the source of the savings assumed within the Plan.

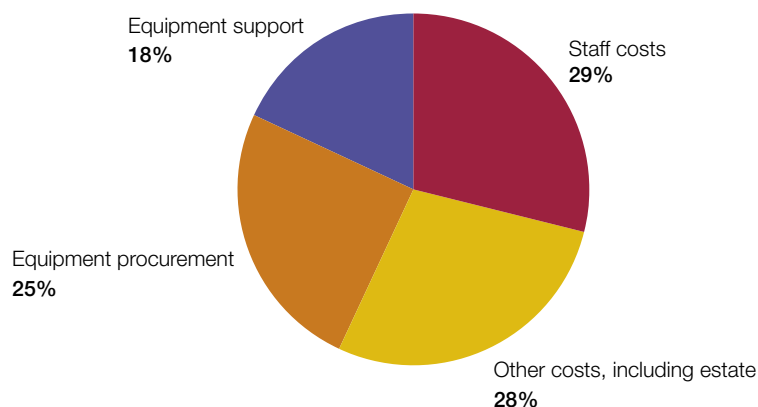
## The wider defence budget

**4.9** The Department spends the majority of its budget on three areas, with the cost of buying and supporting equipment accounting for 43% of total spend in 2016-17 (**Figure 10**). **Figure 11** shows that the percentage of the defence budget devoted to the Plan will increase from 42% in 2017-18 to 48% in 2021-22, before falling back to 42% at the end of the period. In the Strategic Defence and Security Review 2015 the government committed to increasing the defence budget in real terms (i.e. by more than inflation) every year of the current Parliament. It also re-committed its earlier pledge to increase the equipment budget by at least 1% in real terms (i.e. inflation plus 1%).

### Figure 10

Breakdown of where the Department spent its budget in 2016–17

The Department spends 43% of its budget on equipment procurement and support

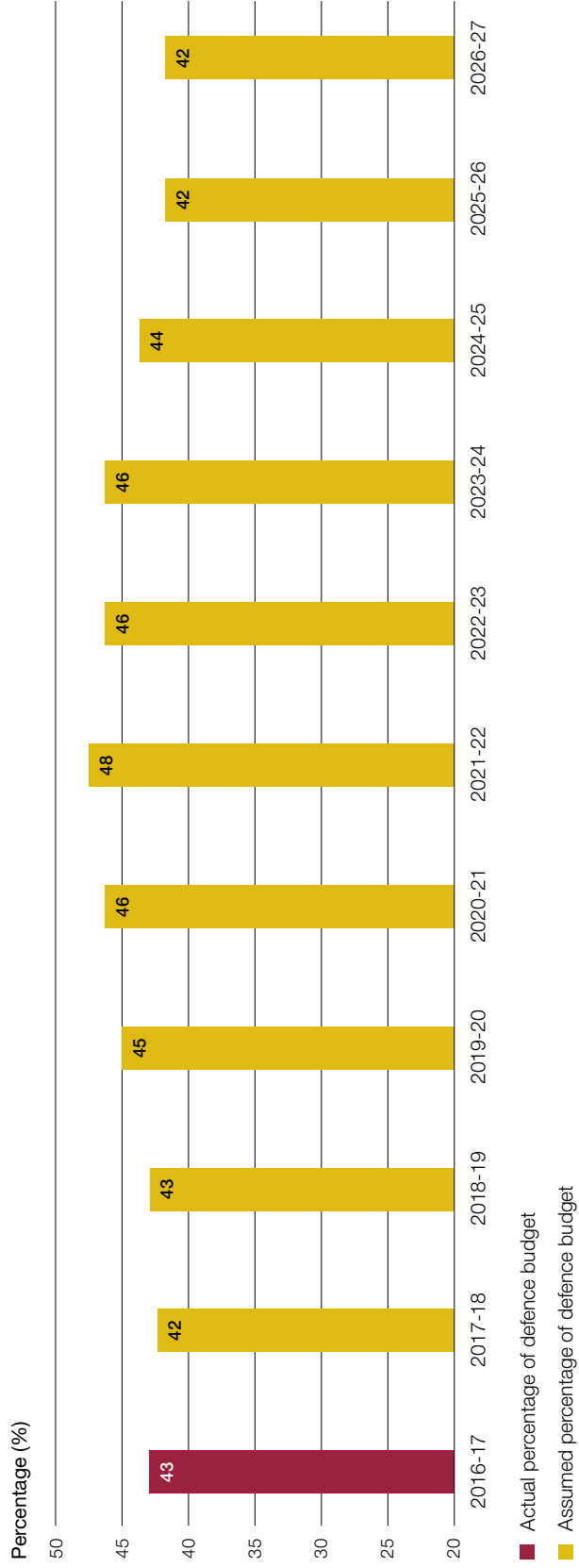


#### Notes

- 1 In 2016-17 'total defence spending' was £35.3 billion. This includes both resource and capital delegated expenditure limit (DEL) spending such as civilian and military staff costs, infrastructure costs and equipment support costs. It also includes investment in military equipment. It does not include annually managed expenditure (AME), spending not easily controlled by the Department. It also excludes non-cash depreciation costs. Together this expenditure totalled £8.6 billion in 2016-17. The 'total defence outturn', which includes all these elements, totalled £43.9 billion in 2016-17.
- 2 Equipment procurement is not shown separately in the Department's accounts and is assumed to be all capital expenditure. On this basis, the Department spent £8.8 billion on equipment procurement. Equipment support spend was £6.4 billion.
- 3 Staff costs includes civilian and service personnel costs.

Source: National Audit Office analysis of Ministry of Defence Annual Report and Accounts, 2016 to 2017

**Figure 11**  
 Proportion of defence budget to be spent on the Equipment Plan  
 The proportion of the defence budget to be spent on equipment will peak in the early 2020s



**Note**

1 Figures have been rounded to the nearest whole number.

Source: National Audit Office analysis of the Department's data

**4.10** The overall defence budget is under considerable pressure. As part of the overall budget-setting exercise for the financial years 2017-18 to 2026-27, the Department identified that the proposed defence programme was not affordable. It could not reach agreement across defence on how to bring this back within budget. It therefore cut the Commands' allocations by £1.3 billion and instructed them to identify ways of reducing spending to achieve this reduction. The Commands told us that they were undertaking detailed reviews of their programmes and operating within stringent controls on non-contractual spending. At the time of our audit, the Department was managing a potential projected overspend in 2017-18.

**4.11** Our recent review of the Department's management of the defence estate found that constraints on funding were leading to deterioration in the condition of the estate. Demand outstripped funding, and to manage the estate within its budget the Department made decisions that offered poor value for money in the longer term. The Department faces a shortfall of at least £8.5 billion in its future funding for 'life cycle replacement costs', based on the expected size and condition of its estate, over the next 30 years. It had introduced a new strategy, in part to better align its estate with available funding, by reducing the size of its built estate by 30% by 2040.<sup>31,32</sup> It will take the Department many years to reduce the estate's size to make it more affordable.

**4.12** The Department is under pressure to make savings within its overall staff budget. The Strategic Defence and Security Review 2015 announced plans to reduce the Department's civilian headcount by 30% to 41,000 members of staff by 2020, reducing the annual civilian pay bill by around £150 million.<sup>33</sup> The Department has made limited progress against this target, with a current headcount at 1 April 2017 of 56,860, a 3% reduction from when the target was announced.<sup>34</sup> In addition, any release of constraints on public sector pay is likely to add further pressure to the staff budget.

**4.13** The Department's military headcount has historically been below its manpower requirement. At 1 April 2017 the full-time strength of the Army, Navy and Air Force was 138,840, which was 6,410 (4%) below the required regular strength. The Review set a target for 2020 of 144,200.<sup>35</sup> Obtaining these targets will place increasing pressure on the staff costs budget.

**4.14** Given these pressures on the wider defence budget, there is little scope for the Department to offset equipment and support budgetary pressures against other budgets.

31 Alongside contributing to government targets to reduce the size of the government estate, the strategy aims to release land for housing and secure disposal receipts for reinvesting in the estate.

32 Comptroller and Auditor General, *Delivering the defence estate*, Session 2016-17, HC 782, National Audit Office, November 2016.

33 Baseline civilian personnel headcount for calculating reduction was set at 58,571.

34 Ministry of Defence, *Annual Report and Accounts 2016 to 2017*, HC 21, July 2017.

35 National Audit Office, *A Short Guide to the Ministry of Defence*, September 2017.

# Appendix One

## Our audit approach

### Affordability of the Equipment Plan

**1** This study assessed the affordability of the Ministry of Defence's (the Department's) 10-year Equipment Plan (the Plan) to buy and support the equipment that the Armed Forces require to meet their objectives.<sup>36</sup> We examined the robustness of assumptions underpinning the Plan and commented on whether the:

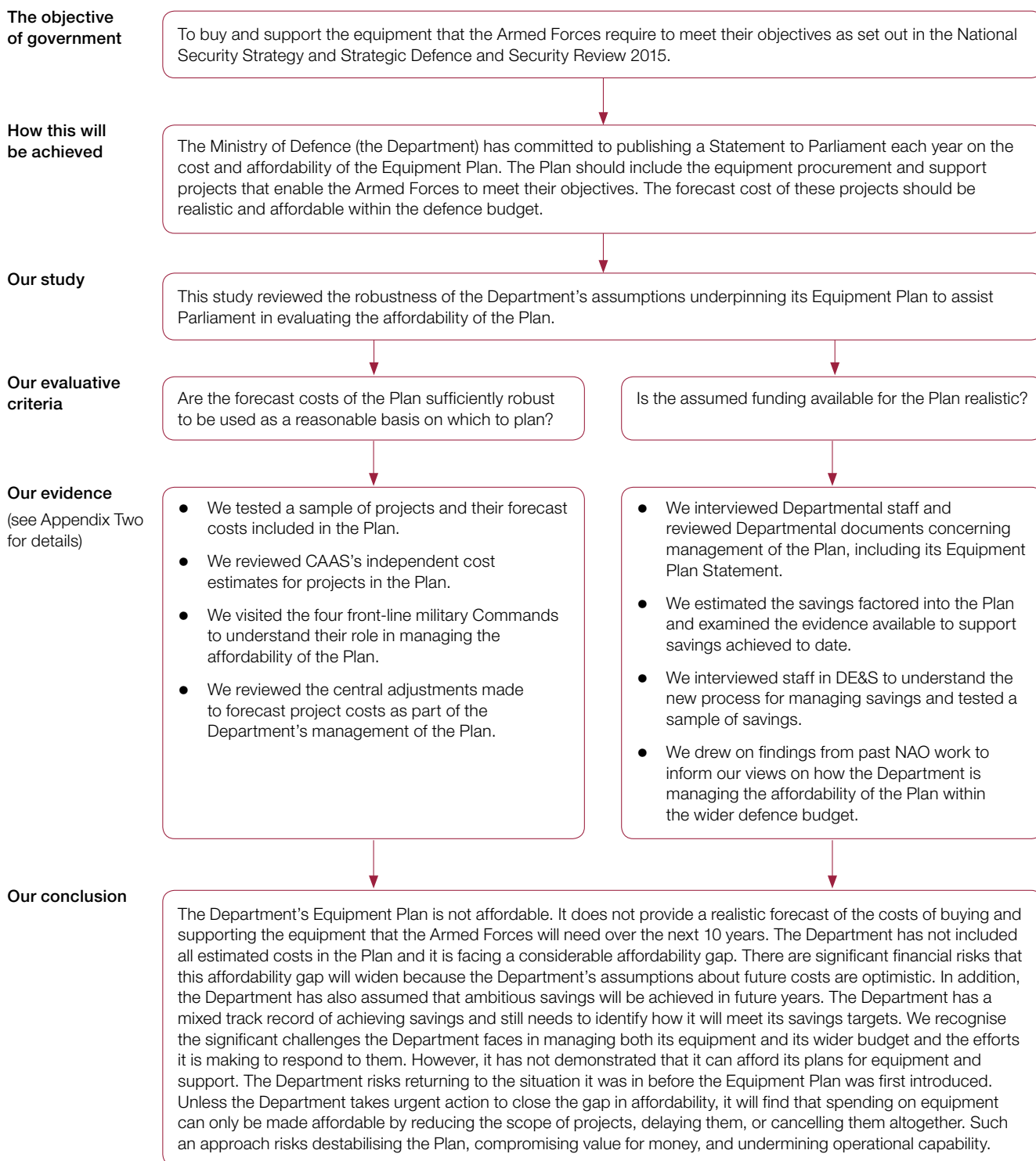
- forecast costs within the Plan are sufficiently robust to be used as a reasonable basis on which to plan; and
- funding available for the Plan, including assumed savings, is realistic.

**2** As in our previous reports, we constructed a programme of work to test the Department's assertions within its assessment of the costs of the Plan and the funding available. When concluding on the affordability of the Plan, we assessed whether a realistic assessment of the costs of the Plan shows that the costs are less than, or equal to, the assumed funding for the Plan. When setting budgets, the Department has assumed that it will achieve savings from equipment projects and we have examined the Department's progress towards achieving those savings. The Department may choose to use other parts of the defence budget, not allocated to funding equipment, to offset pressures on affordability. We have therefore considered how the Department is managing the Plan's affordability within the wider defence budget and provided some commentary on the budgetary pressures that the Department is facing, drawing on our previous work.

**3** Our judgements about affordability are informed by the work of the Department's Cost Assurance and Analysis Service (CAAS), including its 'independent cost estimates' for equipment and support projects within the Plan. We do not assess the value for money of the various projects mentioned in this report.

**4** Our audit approach is summarised in **Figure 12** overleaf. Our evidence base is described in Appendix Two.

<sup>36</sup> These objectives are set out in: HM Government, *National Security and Strategy and Strategic Defence and Security Review 2015*, Cm 9161, November 2015.

**Figure 12****Our audit approach**

# Appendix Two

## Our evidence base

1 We reached our conclusions based on our analysis of evidence collected during fieldwork between July and November 2017. We had difficulty obtaining and validating evidence in a number of areas and therefore our assessment is based on the information provided. Our audit approach is set out in Appendix One.

### **We examined whether forecast costs within the Plan are sufficiently robust to be used as a reasonable basis on which to plan**

#### The sample of projects

2 To support our review of the assumptions that underpin the forecast costs of the Equipment Plan (the Plan), we looked in detail at a sample of nine of the Ministry of Defence's (the Department's) largest procurement projects and 10 support projects, which together constitute 40% by value of the expenditure in the Plan. Appendix Three sets out the results of this review.

3 We selected our sample of projects primarily based on size, since failure to control cost growth on the largest projects would present the greatest threat to the affordability of the Plan. In addition, we took into account our understanding, and that of the Department's internal Cost Assurance and Analysis Service (CAAS), of the level of risk in the projects.

4 For each of the projects we sampled, we reviewed:

- how much of the cost is on contract to assess the stability of forecast costs;
- the application of Head Office guidance on how to treat inflation and foreign exchange, and assessed the reasonableness of alternative approaches;
- historical data on actual costs against planned spending, which enabled us to assess the Department's ability to forecast costs accurately;
- changes to cost forecasts compared with the prior year, including the profile of costs, which allowed us to assess the reliability of forecasts;

- the cost models and cost-estimating techniques used to generate cost forecasts, together with risk management and how uncertainty and risk are built into costings, which allowed us to assess the reasonableness of costs; and
- alternative cost estimates generated by CAAS, and where there were significant differences between the CAAS and the project teams' estimates, we evaluated the risk to the affordability assertion.

## CAAS

**5** CAAS provided us with an overall view of the accuracy of cost estimates at Plan-level, based partly on its independent cost estimates of major projects and partly on modelling of future costs for the balance of the portfolio.

**6** In 2017, CAAS carried out in-depth independent cost estimates of 66% by value of the Equipment Procurement Plan and 51% of the Equipment Support Plan projects in the portfolio. CAAS produces an overall view on affordability by modelling the remainder of the project procurement portfolio, and applying a cost adjustment factor to the support portfolio.

**7** This year, CAAS has compared the forecasts at the same point in time, i.e. at the quarter that the independent cost estimate was produced. This means that the scope of the estimates compared are matched, and all variances are due to differences between estimates, rather than changes over time in the project team's forecasts. However, this makes it difficult to make comparisons with the prior year.

## Front-line Commands

**8** We visited the four front-line military Commands to understand their role in managing the affordability of the Plan. We interviewed key staff involved in managing the Commands' overall portfolio of projects and reviewed supporting documentation. We did not undertake a comprehensive assessment of the Commands' role in managing the Plan.

## Central adjustments

**9** The Department supplied us with a breakdown of adjustments to the Plan at Operating Centre and top-level budget-holder level. Given the number of adjustments, we reviewed the Department's information for reasonableness.



## **We examined whether funding available for the Plan, including assumed savings, is realistic**

### Management of the Plan

**10** We interviewed Departmental staff about the budget setting process. We also reviewed the Department's published Equipment Plan Statement for consistency with the information we collected as part of our audit. We did not seek to audit all disclosures within the Department's Statement. We gathered evidence on the process for collating data for the Project Performance Summary Table part of the Equipment Plan Statement. The approach is consistent with the prior year, and CAAS provided assurance on the numbers presented.

### Savings

**11** We reviewed Departmental information to estimate the totality of savings factored into the Plan. We were unable to confirm the totality of savings included and the Department was undertaking a review of savings at the time of our audit. We interviewed Departmental staff and reviewed Departmental information to assess progress against assumed savings. The Department did not provide us with sufficient information to demonstrate that it has achieved all claimed savings.

**12** We interviewed staff at Defence Equipment and Support (DE&S) to understand the new process for identifying and managing savings (paragraphs 3.10 and 3.11). To gain assurance about the appropriateness of the savings target and methods that DE&S is using to validate savings, we took a sample of 10 different Equipment Plan savings managed through this new approach and analysed the veracity and completeness of the evidence provided.

### Affordability of the Equipment Plan

**13** We analysed information received through our audit and identified costs that were not included within the Equipment Plan. Some of these were taken from Departmental documents, and others, such as the potential increase in costs due to foreign exchange rates, were calculated based on Departmental data. We then compared this to the budget available for equipment procurement and support.

**14** To set our findings on the Plan in context, we also drew on past NAO work on management of the defence budget. We did not undertake a detailed review of how the Department is managing the overall defence budget.

# Appendix Three

## Our findings: cost estimates of a sample of projects

Project title and description	Project spend in 2016-17 (£m)	Stage reached
<p><b>A400M support</b></p> <p>'Atlas' – four-engine, propeller-driven transport aircraft. Intended to replace the C130 'Hercules' fleet. The UK is part of a multinational programme of seven partners.</p>	97	New equipment
<p><b>Ajax</b></p> <p>A fleet of fully digitised armoured reconnaissance vehicles. Formerly known as Scout SV.</p>	313	Manufacture
<p><b>Astute</b></p> <p>Procurement programme for seven nuclear-powered attack submarines. The sample covers boats 4–7.</p>	518	Manufacture
<p><b>Atomic Weapons Establishment management and operations contract</b></p> <p>Programme to maintain and renew the UK's stockpile of nuclear warheads.</p>	815	In service
<p><b>Dreadnought</b></p> <p>Procurement programme for four deterrent submarines (formerly the Successor programme). Sample includes submarines, core production capability and next generation nuclear propulsion plant projects.</p>	881	Assessment

Increase (decrease) in 10-year cost estimate during year (£m)	Cost Assurance and Analysis Service (CAAS) view of 'realistic outturn' over the next 10 years: £m over (under) project team estimate	Maturity of cost estimate
7	138	The process for forecasting costs is robust. But there is immature data on maintaining the aircraft because it is new. Also, under a third of costs are on contract so they are less certain. The CAAS estimate of realistic outturn includes costs which the project team has treated as a risk and not included in its estimate.
6	1	Project cost estimates are stable and a large proportion of the project is on a firm-price contract and therefore forecast costs are more certain.
365	52 <sup>1</sup>	The project has a robust cost model, but the forecast costs for the entire nuclear enterprise exceed the current budget in the Plan. There is a substantial increase to the estimate from last year (£365 million).
(176)	0	The project does not yet have a detailed costing model to estimate future costs. There remains uncertainty about the future of the project which could impact on forecasts. Management of project risks is not robust and CAAS has raised issues about the quality of contractor data used by the project team to forecast costs.
576	(192)	The projects have robust cost models, but the forecast costs for the entire nuclear enterprise exceed the current budget in the Plan. There is a substantial increase to the estimate from last year (£576 million). CAAS estimates that delays to the projects mean both increased costs and also delays to some planned spending. The CAAS estimate of realistic outturn arises from its assumption that costs will need to be deferred to future years, rather than reflecting a reduction in forecast costs.

Project title and description	Project spend in 2016-17 (£m)	Stage reached
<p><b>Future Beyond Line of Sight (FBLOS)</b></p> <p>Also known as Skynet 6 – the replacement for current Skynet 5 satellite communication system. Will provide long-range communications for defence.</p>	5	Assessment
<p><b>Grapevine 2: global connectivity sub-project</b></p> <p>Provides the systems, services and support to run the Department's Wide Area and Local Area Networks and other telecommunication links.</p>	111	In service
<p><b>F-35 Lightning II procurement</b></p> <p>Multi-role combat aircraft intended for operation from airbases and aircraft carriers. The UK is a 'Tier 1 partner' in a US-led procurement.</p>	711	Manufacture
<p><b>F-35 Lightning II support</b></p> <p>Multi-role combat aircraft intended for operation from airbases and aircraft carriers. The UK is a 'Tier 1 partner' in a US-led procurement.</p>	100	New equipment
<p><b>Maritime Patrol Aircraft</b></p> <p>Also known as 'Poseidon'. Purchase of nine aircraft under a Foreign Military Sales contract with the US Navy to fill a maritime patrol capability gap.</p>	13	Manufacture
<p><b>Maritime Support Delivery Framework (MSDF)</b></p> <p>The approach used to contract out support services at UK Naval bases. Our sample covers: Portsmouth naval base; Devonport naval base; and some fixed costs associated with the submarine support programme.</p>	309	In service

Increase (decrease) in 10-year cost estimate during year (£m)	Cost Assurance and Analysis Service (CAAS) view of 'realistic outturn' over the next 10 years: £m over (under) project team estimate	Maturity of cost estimate
(229)	466	<p>The project is in its early stage with estimates evolving to reflect the latest developments. This has meant a decrease in forecast costs from the prior year and is also reflected in the difference to CAAS realistic outturn. This is a unique project requiring specific skills and, as such, there is a risk of project delays and increases in costs if suitably qualified personnel are not available in the supply chain.</p> <p>The approach used to factor project risks into estimates has weaknesses.</p>
245	124 <sup>1</sup>	<p>Much of the cost is fixed. However, costs are likely to increase due to delays in the migration to the new supplier. The contract ends in 2020-21 and costs beyond this point are uncertain. The project team has not factored into future cost estimates the impact of project risks.</p>
78	151	<p>Costs fed into the forecasting model are taken from the Joint Program Office (JPO) managing the F-35 programme in the US. The project team has little visibility of risks factored into these costs by the JPO.</p> <p>The high percentage of dollar spend means this project is at risk of cost growth from movement in the sterling-dollar exchange rate.</p> <p>Decisions by other partner nations on the number they intend on buying could affect future unit cost per aircraft. This is reflected in the variance to CAAS realistic outturn.</p>
40	192	<p>Forecast costs not yet on contract and the project is managing a number of complex software risks that could increase support costs. CAAS's review found that support costs could be understated.</p>
(905) <sup>2</sup>	(5) <sup>1</sup>	<p>The forecast costs in the Plan are based on modelling by CAAS. These use US costing data and contracted costs, so variability is expected to be low. At the time of our audit, the project team was developing a new cost model. The reduction in costs mainly relates to separating support costs from the procurement element this year.</p>
(57)	n/a	<p>Underlying cost models for the three MSDF elements all appear robust and reasonable. The models are based on underlying fixed price contracts and therefore costs are less volatile.</p> <p>Risk is not treated consistently between the three MSDF elements, but this is unlikely have a material impact.</p>

Project title and description	Project spend in 2016-17 (£m)	Stage reached
<p><b>Mechanised Infantry Vehicle</b></p> <p>Procurement of 'off the shelf' adaptable 8x8 armoured vehicles.</p>	0.1	Concept
<p><b>Merlin Helicopters support</b></p> <p>Our sample covers the forecast cost of both the integrated operational support, and the engine support contract, from 2020-21 and 2019-20, respectively.</p>	0	In service
<p><b>Morpheus</b></p> <p>Delivery of the next generation of secure voice and data communications on the battlefield.</p>	36	Assessment
<p><b>Queen Elizabeth Class (QEC) carrier support</b></p> <p>First of a new class of aircraft carriers. Majority of support costs are now included in the Department's new arrangement for supporting complex surface warships ('Common Support Model').<sup>3</sup></p>	17	New equipment
<p><b>Skynet 5 support</b></p> <p>A private finance initiative (PFI) arrangement with Airbus to provide satellite communications to defence.</p>	246	In service
<p><b>Type 26</b></p> <p>Next-generation of anti-submarine warfare frigate.</p>	260	Design/manufacture

Increase (decrease) in 10-year cost estimate during year (£m)	Cost Assurance and Analysis Service (CAAS) view of 'realistic outturn' over the next 10 years: £m over (under) project team estimate	Maturity of cost estimate
0	n/a	The procurement route had not been selected and pending a decision the cost estimate model had been rolled forward from the prior year. Although improved information was available on the forecast cost of the project, this was not included in the Equipment Plan 2017 due to ongoing commercial activity, and therefore the forecast costs are likely to change in the Equipment Plan 2018.
(1)	(210) <sup>1</sup>	No costs are on contract, but are closely linked to expected flying hours. The project team had developed a basic cost model and expects to develop more sophisticated estimates closer to the support period. Inclusion of project risks in estimated cost is limited.
11	(2)	The project team has made significant progress in-year in developing the project. However, there remains a high level of uncertainty about the profiling of costs because not much is yet on contract.
(1,089)	(19) <sup>4</sup>	<p>The reduction in forecast costs in the year reflects the majority of QEC support costs now being included within the Common Support Model, rather than a separate support project.</p> <p>The Department has undertaken some initial modelling on the forecast costs of its Common Support Model, based on historical support costs. Not all contracts have been agreed and estimated costs assume that savings will be made.</p> <p>Estimates are uncertain because the Department does not have data on the costs of operating the new carriers.</p>
(23)	n/a	Mature project with no significant historical deviations from the forecast cost. A significant proportion of costs are fixed by the PFI contract.
(74) <sup>5</sup>	0	Assumptions have changed (13 ships to 8) and a more up-to-date cost model was available when the Equipment Plan 2017 was produced. But pending revision of costings, the project team has instead rolled forward the outdated estimate from previous years. Information on project risks was also out of date.

Project title and description	Project spend in 2016-17 (£m)	Stage reached
<p><b>Type 45 Destroyer support</b></p> <p>Support costs for the fleet of Type 45 destroyers. A large proportion of support costs are now included in the Department's new arrangement for supporting complex surface warships ('Common Support Model').<sup>3</sup></p>	124	In service
<p><b>Typhoon support</b></p> <p>Support contracts procured through international collaboration for Typhoon (Eurofighter) aircraft.</p>	447	In service

**Notes**

- 1 CAAS's view of realistic outturn for each project are, in the following cases, based on a wider scope: Astute covers boats 1-7; Grapevine 2 includes integrated user services sub-project; Maritime Patrol Aircraft includes the support cost element; and Merlin includes the current pricing periods.
- 2 Maritime Patrol Aircraft – decrease in 10-year cost estimate due to separation of support costs from estimate and an update of delivery profiles for aircraft.
- 3 Through the 'Common Support Model', the Department aims to bring together separate support arrangements for individual ship types under a single, more efficient, and more manageable model.
- 4 CAAS undertook its cost estimation work before forecast costs were incorporated into the Common Support Model.
- 5 Type 26 – the small changes in cost estimate from last year relate to the project team reverting to the estimate from the 2015 to 2025 Plan, but with a £0.5 billion reduction over the first five years.
- 6 Typhoon support – decrease in 10-year cost estimate due to re-contracting of multiple contracts into one major contract.

Source: National Audit Office analysis



Increase (decrease) in 10-year cost estimate during year (£m)	Cost Assurance and Analysis Service (CAAS) view of 'realistic outturn' over the next 10 years: £m over (under) project team estimate	Maturity of cost estimate
(872)	(195) <sup>4</sup>	<p>The reduction in forecast costs in the year reflects the majority of Type 45 support costs now being included within the Common Support Model, rather than a separate support project.</p> <p>The Department has undertaken some initial modelling on the forecast costs of its Common Support Model, based on historical support costs. Not all contracts have been agreed and estimated costs assume that savings will be made.</p> <p>Forecast costs for support not yet included in the Common Support Model are not supported by a robust cost model.</p>
(416) <sup>6</sup>	400	<p>There are multiple contracts in relation to this project and no overarching cost model. The largest contract is reflected in the estimate at a target price, but the supplier forecast is higher than this. This is reflected in the difference in CAAS's realistic outturn. The treatment of project risks is immature.</p>

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National Audit Office

Design and Production by NAO External Relations  
DP Ref: 11675-001

£10.00

ISBN 978-1-78604-172-2

