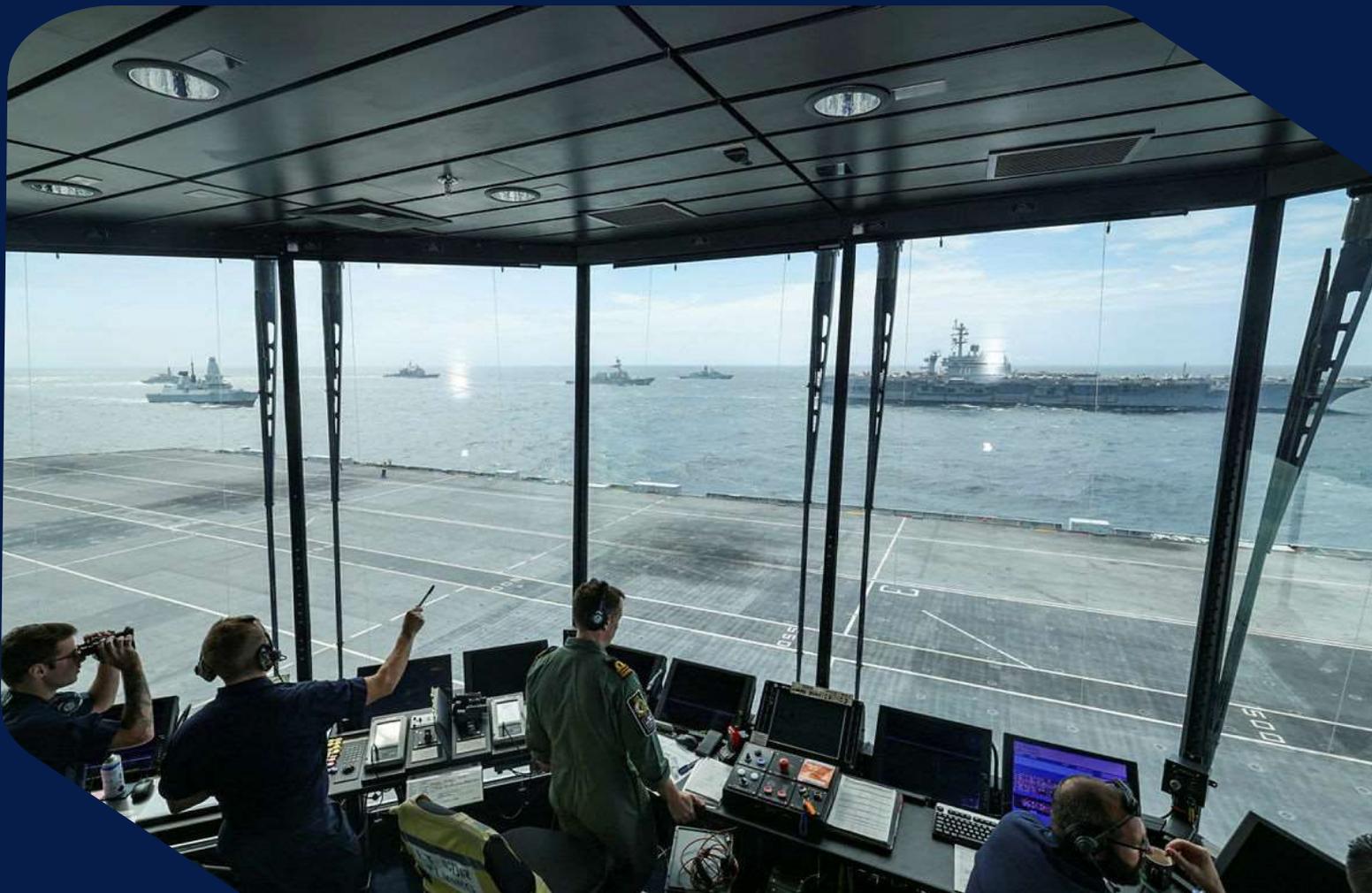




Ministry  
of Defence

# The Defence Equipment Plan 2021 - 2031





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# Secretary of State Foreword

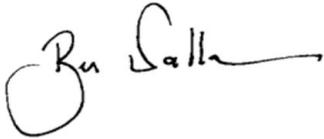
This year's equipment plan report is one of the most important in recent years as it follows the strategy and financial reset provided by the Integrated Review and Spending Review. Those Reviews reflected the government's determination to properly fund Defence to deliver the UK's ambitions.

We have entered a new 'competitive age' of resurgent authoritarian states and diversifying threats. History shows us, time and time again, that failing to change risks irrelevance and defeat. As the threat changes, we must adapt, remaining clear-eyed about what capabilities we need, retire those that are less relevant, and invest in areas that will give us a strategic advantage. Our ['Integrated Operating Concept'](#) sets out how Defence will adapt to the new threats, including in the domains of space and cyber.

In this context, we have developed a plan for an affordable equipment plan which prepares us for future threats. This has been supported by the record multi-year financial settlement announced for Defence in November 2020, but it has also been achieved by a hard-headed and unsentimental review of the capabilities that are required for the future and by taking decisions to reduce spend in some areas. Prior to this reset, we had seen the consequences of shortfalls in funding, with last year's report showing a £7.3 billion shortfall over ten years. The reset has allowed us to fund that shortfall, but we have also made the significant investments required to address new threats and to ensure that our armed forces remain capable and credible. This includes continuing to deliver the Dreadnought class of submarines to renew the nuclear deterrent, building new ships for the Royal Navy, a major modernisation and upgrade programme for the Army, developing the Future Combat Air System, and investing in space, cyber and digital.

The plan is not without challenges. Issues cannot be reversed overnight, and the plans set out here show there is further work to do. Our financial plans still require the delivery of efficiencies and savings targets, but the Department is now better placed to manage financial risks. The Department also faces a challenge to deliver the significant changes required by the settlement. This makes the reform of our financial, commercial and project delivery functions, described in this report, even more important.

The Defence settlement gives us the opportunity to ensure that ambition and resources are in balance. We must seize that opportunity on behalf of those serving in the armed forces and throughout Defence, as well the people of the United Kingdom, our allies and friends.

A handwritten signature in black ink, appearing to read 'Ben Wallace', with a stylized flourish at the end.

**The Rt Hon Ben Wallace MP, Secretary of State for Defence**

February 2022

# Contents

<b>Executive Summary</b> .....	<b>5</b>
<b>Strategic Context</b> .....	<b>7</b>
Key Background .....	7
Policy Context and the Integrated Review .....	8
How Defence Takes Decisions About Investment in Military Capability .....	9
Fiscal Context and Spending Review .....	10
<b>Affordability and Financial Risk</b> .....	<b>12</b>
Assessment of Affordability .....	12
Budget Planning Assumptions.....	13
Forecast Cost of Equipment Spending .....	15
Risks to Affordability .....	19
Levers to Manage Affordability .....	23
<b>Changes to the Management of the Equipment Plan</b> .....	<b>26</b>
Better Data Quality and Assurance .....	26
Training and Qualifications .....	28
Improving Defence Processes.....	30
<b>Sector Analysis</b> .....	<b>32</b>
Navy Command.....	33
Army Command .....	36
Air Command .....	38
UK Strategic Command.....	40
Defence Nuclear Organisation .....	42
Strategic Programmes.....	44
<b>Annex A: Project Performance Summary Table</b> .....	<b>47</b>
<b>Annex B: Project Overviews</b> .....	<b>50</b>
<b>Annex C: Changes to the Defence programme</b> .....	<b>62</b>

# Executive Summary



*Carrier Strike Group 2021*

In November 2020, the Prime Minister announced an increase in Defence spending of £16.5 billion over four years. The multi-year budget settlement provides medium-term certainty for the Department and supports better planning and decision making.

This report reflects the outcome of that increase in funding and of the Government's Integrated Review, which has informed the Department's strategy and policy goals. The equipment plan therefore reflects plans for significant new investments in capability but also reductions in areas which align less closely with our strategic direction.

Defence is embarking on a radical programme to modernise its forces and develop the capabilities to counter future threats.

The Department has an equipment plan which balances cost and budget. Over the ten years from 21/22 we plan to spend £238 billion on equipment procurement and support, an increase of £48 billion from last year's report. At April 2021, we assessed the equipment plan to have £4.3 billion of headroom over ten-years, compared to a shortfall of £7.3 billion in the previous report.

The equipment plan is still evolving. In a complex plan with many large programmes, forecasts will change as delivery schedules and cost estimates develop. This is particularly true of new programmes, where a contractor may not yet have been selected or those which rely on novel technologies. There are also other risks to delivery of the plan, including the ability of the Department to deliver the efficiencies and savings targets described in this report.

The Department therefore needs to be able to manage change without resorting to poorer value for money measures or cuts to capability. Part two of this report sets out the Department's strategy and levers. For example, this year is the first since 2018 when we have entered a new financial year with a funded contingency for the equipment plan and the department has set aside funding in later years to allow it to introduce new capabilities without having to cut spend in other programmes.

While there are risks to the affordability of the plan, underspends within Parliament's annual spending framework are also a realistic risk that the Department is developing contingency plans to mitigate. The significant step-up in capital spending and the large number of new programmes will be challenging to deliver. The performance of our industrial partners will be critical.

Progress continues in improving the Department's financial, commercial and project delivery skills and capabilities, including better tools for analysing and forecasting spend, work to improve the quality of financial data and a better qualified workforce. Further work is underway to address remaining areas for improvement in the Department's current planning processes. Part three of this report describes this work.

Part four of this report, the sector analysis, shows the key changes in each of the military commands and the organisations which manage the equipment plan.

# Strategic Context

## Key Background

The MOD's annual equipment plan report has been published since 2012. It explains to Parliament and the public how Defence plans to manage its funding to deliver its equipment programmes. The report sets out the Department's cost and budget forecasts, provides an update on progress in delivery of key programmes, and explains how the Department is making improvements to the management of the plan. The report is published in parallel with a review by the National Audit Office (NAO), who review our plans each year and provide feedback on areas for improvement. The NAO's report can be found on [their website](#).

## Time Period Covered by the Report

Defence forecasts its costs and budgets across a ten-year planning window. The ten-year spending forecasts and assessment of affordability in this report cover the period from April 2021 to March 2031 while the commentary on delivery in parts four and six focusses on performance in the previous financial year ending in March 2021.

## The Scope of the Equipment Plan

Defence's spending is split across three areas: the equipment plan, the infrastructure plan, and operating cost spending<sup>1</sup>, including workforce. The equipment plan, which is the focus of this report, is further divided between procurement and support costs, referred to as the 'Equipment Procurement Plan' and 'Equipment Support Plan' respectively.

## The Key Organisations Described in this Report

There are many organisations involved in the planning and delivery of the equipment plan, but these can be simplified into three key groups. Their roles and responsibilities are as follows:

- **Head Office:** Sets direction through strategy and policy, sets budgets, and provides oversight. Within head office several teams feed into these processes, including those with responsibility for financial planning, scrutiny and approvals of programmes, military capability planning, operations and strategy. Head office teams also support Ministers and the Department's Permanent Secretary.
- **Top Level Budget (TLB) Holders:** There are six TLBs with responsibility for the equipment plan: Navy, Army, Air, UK Strategic Command; the Defence Nuclear Organisation; and Strategic Programmes. Four of the TLBs are also military commands, but the others are not. The TLBs are responsible for delivering the outcomes directed by head office within their delegated budgets. Responsibility for managing the equipment

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<sup>1</sup> Internally referred to as the 'Top Level Budget Plan'

plan is within this delegated authority, although TLBs will work closely with head office and ministers on significant or contentious changes.

- **Delivery Organisations:** These organisations manage relationships with industrial suppliers and provide commercial support to TLBs. They run commercial and procurement activity on behalf of the TLBs and provide costing data to TLBs. These delivery organisations are Defence Equipment and Support (DE&S), Defence Digital, the Submarine Delivery Agency (SDA), the Defence Infrastructure Organisation, and the Warhead Delivery Team, which is part of the Defence Nuclear Organisation (DNO).

Further information about how Defence is organised and the roles of each organisation can be found in [The Defence Operating Model](#) and more detail about each of the TLBs is included in part four of this report.

## Policy Context and the Integrated Review

This report comes at a time of significant change for Defence. In March 2021, the government published the Integrated Review of Security, Defence, Development and Foreign Policy: [‘Global Britain in a Competitive Age’](#). This set out the Government’s current assessment of the major trends that will shape the national security and international environment to 2030. It describes the nature and distribution of global power changing as we move towards a more competitive and multipolar world. The Integrated Review was followed by the Defence Command Paper, [‘Defence in a Competitive Age’](#), which outlined the implications for Defence specifically, shown below.

### Key Priorities for Defence in a Competitive Age

Capability modernisation and retiring older legacy equipment.

Maximising investment in new equipment which can meet the threat in a competitive age.

A highly skilled workforce, with fewer personnel, more spent on availability and focussed on forward presence.

Agile and digitally enabled to support multi domain operations.

Investment across five domains – including a new domain in space.

Focus on investment in R&D.

Renewing the deterrent.

As the strategic context and operating environment changes, so must Defence. We set out in the Command Paper how we will transform our armed forces to adapt to the changing threat and our new tasks. Defence’s ‘Integrated Operating Concept’ requires our forces to be credible and capable to deter, and if necessary, defeat our adversaries in conflict as well as to allow us to compete below the threshold of armed conflict. It also requires our armed forces to be integrated across domains and across government, and to deliver a more dynamic posture

through persistent engagement across the globe. These requirements are at the heart of our future capability plans and investment choices. The specific measures we have taken are outlined in this report.



*Flight of the Protector remotely piloted aircraft*

## How Defence Takes Decisions About Investment in Military Capability

When taking decisions about the allocation of funding across military equipment, the Department is guided by the Government's policy and strategy. Through the Integrated Review, the Government sets the overarching policy and strategy framework that Defence needs to operate within, including an assessment of the tasks and activities that Defence is expected to be capable of conducting. Defence then needs to assess how it best uses the resources available to deliver these outcomes.

To understand the capabilities required to deliver Defence activities, we carry out a range of assessments. Head office sets the framework for these assessments<sup>2</sup> and coordinates inputs from the military commands. Head office produces hypothetical scenarios which represent the tasks Defence is expected to carry out based on the latest strategic review. The military commands map our existing capabilities against those scenarios and current operational requirements. This allows us to assess where there are capability gaps or risks. The military commands' assessments are reviewed and challenged through formal engagements with head office. This includes an assessment of the capabilities of the UK and potential adversaries and how they may be used in the reference scenario. The results of this work show where Defence is carrying capability risk and is considered against the cost of addressing each risk. This evidence supports senior officials and ministers to take informed decisions about the prioritisation of investment to mitigate risk within a fixed budget. Through the Integrated Review we have aimed to close or mitigate as many of the most significant risks as possible through new investment. These exercises are typically run on an annual basis<sup>2</sup> to inform our financial planning and future strategic reviews. They are supplemented by wargaming exercises which all military commands participate in and allow us to test the strengths and vulnerabilities of

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<sup>2</sup> The two principal assessments are the Defence Capability Assessment Register (DCAR) which assesses longer term capability risk and the Capability Risk Assessment Framework (CRAF) which assesses shorter term risks to operations.

proposed force structures. For the Integrated Review, additional bespoke evidence was also commissioned. The Defence Science and Technology Laboratory (Dstl) supports this work with analytical, scientific and modelling expertise. These processes generate the evidence to guide decisions taken by the Department and its ministers and will continue to inform the direction of Defence investment.

## **Fiscal Context and Spending Review**

Following the last major Defence review, the Strategic Defence and Security Review 2015, the Department faced financial difficulties arising in part from undelivered efficiencies and savings assumptions. Our previous equipment plan reports explained that the equipment plan was unaffordable over the ten-years of the plan. Addressing such a significant pressure would have required major changes to Defence. In our 2020 update to the Public Accounts Committee, we explained that in recent years we had tried to defer longer term spending decisions to allow the government to take them in the context of a strategic review.<sup>3</sup> This meant the Department made savings decisions to ensure short term affordability which did not necessarily deliver value for money, such as some programme deferrals.

The Integrated Review has now allowed us to make those longer-term policy and spending decisions, including substantial savings, and to set a plan which balances cost and budget further into the future.

In November 2020, the Prime Minister announced an increase in Defence spending over four years of £16.5 billion above the Department's previous planning assumption of 0.5% real growth.<sup>4</sup> Beyond the four years of the HM Treasury settlement, we use a planning assumption agreed with HM Treasury of 0.5% real growth in the Defence budget up to the end of our ten-year planning period. This means that across the remaining six years of the ten-year period there is a further £17.7 billion increase over our previous planning assumption, giving a total of £34.2 billion.

Last year, the programme already included many of the important investments needed to modernise Defence such as the Dreadnought class submarines, Replacement Warhead, Type 31 Frigates and initial funding for the National Cyber Force. However, as our previous reports made clear, we had a shortfall in funding. Although the previous plan already included many important modernisation programmes, it did not include a number of important areas, such as the next phase of the Future Combat Air System programme. The combination of new funding and savings have allowed us to make £10.7 billion of investment in the four years of the Spending Review period in measures which were not in our costed plans last year. These measures are listed in Annex C of the report and include investment to improve readiness and availability, new equipment programmes, increased investment in research and development,

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<sup>3</sup> Stephen Lovegrove to Dame Meg Hillier MP, Equipment Plan 2020-2030: Update on Affordability

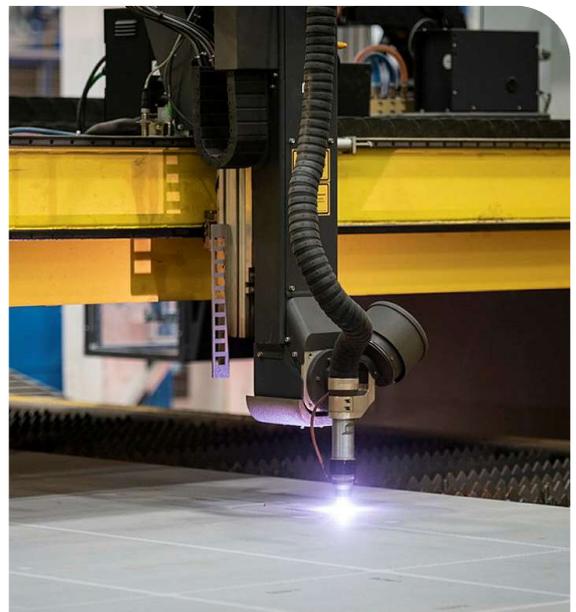
<sup>4</sup> This increase has also been presented as £24 billion over four years, relative to a flat cash funding assumption. In other words, this is the difference between the Defence settlement and an alternative scenario with no increase between any years from 20/21 to 24/25

enhancements to existing programmes such as a second tranche of Lightning II aircraft, and entirely new transformative capabilities.

In addition to the equipment measures detailed in this report, this figure also includes investment outside the equipment plan, where we have prioritised funding to manage infrastructure risks and to deliver the government's manifesto commitment on childcare provision for service personnel.<sup>5</sup>

To allow us to fund the existing shortfall and other cost changes while also investing in new capabilities, we have released further funding by making savings from the existing programme. These savings are summarised in Annex C.

The budget settlement is weighted towards capital spending to support the modernisation of our equipment. Capital investment will rise from 26% of the Department's expenditure in 2020/21 to 34% in 2024/25. Resource spend<sup>6</sup> will remain broadly flat in real terms over the period, which is supported by reductions in running costs expected following the retirement of equipment and, outside the equipment plan, the impact of changes to the Defence workforce and the public sector pay policy announced by the Chancellor.<sup>7</sup> The capital investment will also help to drive productivity and efficiency improvements.



*First steel cut for the Type 31 frigate*

The Spending Review also committed the Department to spend at least £6.6 billion on Research and Development (R&D) over four years,<sup>8</sup> consistent with the government's commitment to increasing investment in science and technology and the need to maintain our technological advantage. This target is inclusive of existing planned spend on R&D.

<sup>5</sup> We have funded risks that have materialised since last year including updated costings in areas including the nuclear enterprise, previously unfunded increases in pensions costs which the NAO discussed in their report last year and the effect of revised inflation forecasts on the Department's budget planning assumption.

<sup>6</sup> Non-ringfenced Resource Departmental Expenditure Limit (RDEL)

<sup>7</sup> The 2020 Spending Review announced a policy of public sector pay restraint which is reflected in the plan set out in this report. The 2021 Spending Review has since announced public sector workers will see pay rises over the next three years as the recovery in the economy and labour market allows a return to a normal pay setting process. SR21 included additional resource funding for Defence to implement this change.

<sup>8</sup> using the OECD 'Frascati' definition of research and development

# Affordability and Financial Risk

## Assessment of Affordability

This section of the report explains the costing and budgeting assumptions for the forward-looking equipment plan, our approach to managing uncertainty and risk and how we will improve this through changes to our finance strategy and culture.

Over the ten years from 21/22 we plan to spend £238 billion on equipment procurement and support, compared to £190 billion planned in last year's update.<sup>9</sup> At April 2021, we assessed the cost of our plans to be £234 billion over ten years resulting in £4.3 billion headroom. This compares with a shortfall of £7.3 billion reported last year.

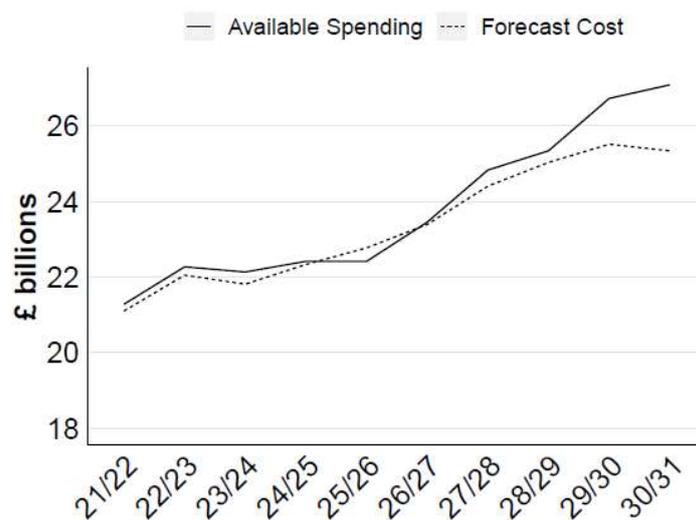


Figure 1: Forecast equipment plan cost and budget over ten years

While the programme is affordable over the ten-year planning period, we judge that contingency holdings are currently inadequate in years five and six of the plan. We aim to address this through the coming planning cycles by smoothing delivery schedules, rebalancing across other parts of the Defence programme and, if necessary, looking at further savings measures. In the current financial year, we are focussed on further developing delivery plans and improving cost forecasts. Programmes within the equipment plan are at different stages of maturity and their delivery schedules and costings will evolve over time. We have levers to manage changes in forecast cost if they materialise, while still delivering the priorities of the Integrated Review and these are described in this section.

<sup>9</sup> Note that the ten-year figures cover different time periods, as MOD sets budgets for a ten-year planning window. The figures in last year's update cover FY20/21 to FY29/30 and the new figures cover FY21/22 to FY30/31. Over the nine common years from 21/22 to 29/30, planned spending has increased from £173 billion to £211 billion.

Overall, we have confidence that we have a plan to deliver the ambitions set out in the Defence Command Paper within the budget available and that we have the necessary flexibility to manage risks. Our priority now is to deliver these plans and use the new investment in Defence as effectively as possible.

## **Budget Planning Assumptions**

The Spending Review in November 2020 confirmed the Department's budget for the four years from 21/22 to 24/25. The Department's settlement includes access to up to a further £1.3 billion across the four years from the HM Treasury reserve for the Dreadnought programme.<sup>10</sup> For the six years beyond 24/25, the Department has a planning assumption of 0.5% growth in the core budget, and we have not assumed any additional reserve funding for Dreadnought.<sup>11</sup>

We have high confidence in the total budget available to Defence in the four years from 21/22, given the Spending Review settlement. Beyond the current Spending Review period we have agreed with HM Treasury an assumption of a 0.5% real increases each year. In line with our plans to invest more in equipment and reduce running costs, we have assumed most of this growth will be in our capital budget, with our resource budget remaining flat in real terms. We recognise that future governments may choose to make different assumptions and that a broad range of potential outcomes are possible. While we have not planned for other outcomes explicitly, the levers we have established to manage risk to affordability would also help the Department manage less favourable future settlements.

Within the total budget the Department has allocated £238 billion over ten years to spending on equipment procurement and support through the annual budget planning process. This allocation is 47% of the total Defence budget and an increase of £48 billion from last year. It represents average real year-on-year increases of 6% from 20/21 to 24/25. This increase is consistent with the ambitions of the Integrated Review, with new funding prioritised for new equipment and research and development spending. A greater proportion of the total budget is planned to be spent on equipment than previously, as shown in figure 2 below.

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<sup>10</sup> The financial risk to the Dreadnought programme is partly carried by HM Treasury through a contingency facility established at the 2015 Spending Review which allocated £10 billion for contingency on top of the £31 billion programme funded in the Defence budget. The contingency is available to ensure that the programme can be delivered to schedule, by allowing for changes in the spending profile or total funding without resorting to cutting spend in the wider Defence programme.

<sup>11</sup> This assumption was agreed with HM Treasury to enable Defence to plan over ten years.

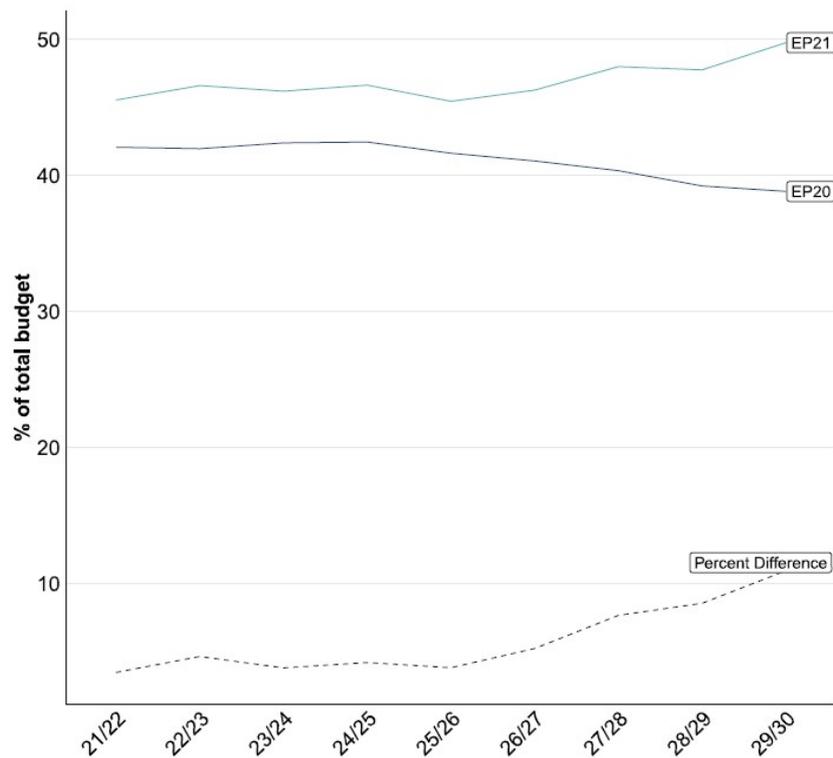


Figure 2: Proportion of the Defence budget planned for the equipment plan

New investment and increases in the cost of existing programmes such as Dreadnought have resulted in a significant increase in equipment spending above 20/21 levels. In the later years, planned spend on equipment continues to grow and savings elsewhere in the Defence programme take effect, such as cost reductions in workforce, resulting in equipment taking a greater share of total Defence spend in line with our strategy.

Figure 3 below shows how the current planned spend compares to assumptions from the five previous iterations of this report. The Department has been forecasting a step up in spend in this period since the previous Spending Review in 2015. Unlike previous reports, this year's forecast shows continued growth beyond 21/22 reflecting the substantial uplift in funding allocated at the Spending Review and the new investments added to the programme.

Of the £238 billion allocated for the equipment plan over ten years, £230.2 billion is held by TLBs and £7.7 billion is held by head office centrally. Head office holds funding for contingency and specific measures not budgeted for by TLBs. This breaks down as:

- £5.9 billion for contingency for the equipment plan. Our contingency holdings are informed by our understanding of risks, described in more detail in this section;
- A -£1.9 billion adjustment to align planned spending with the available Defence budget;
- £2.3 billion funding allocated for new equipment investments not yet delegated to TLBs.

£1.4 billion funding held centrally to be released to the Defence Nuclear Organisation for Dreadnought. This includes the draw down from the HM Treasury contingency described at the start of this section. If the Dreadnought programme spends less than its current plans, then the

funding available from the contingency would reduce by the same amount as it would not be required.

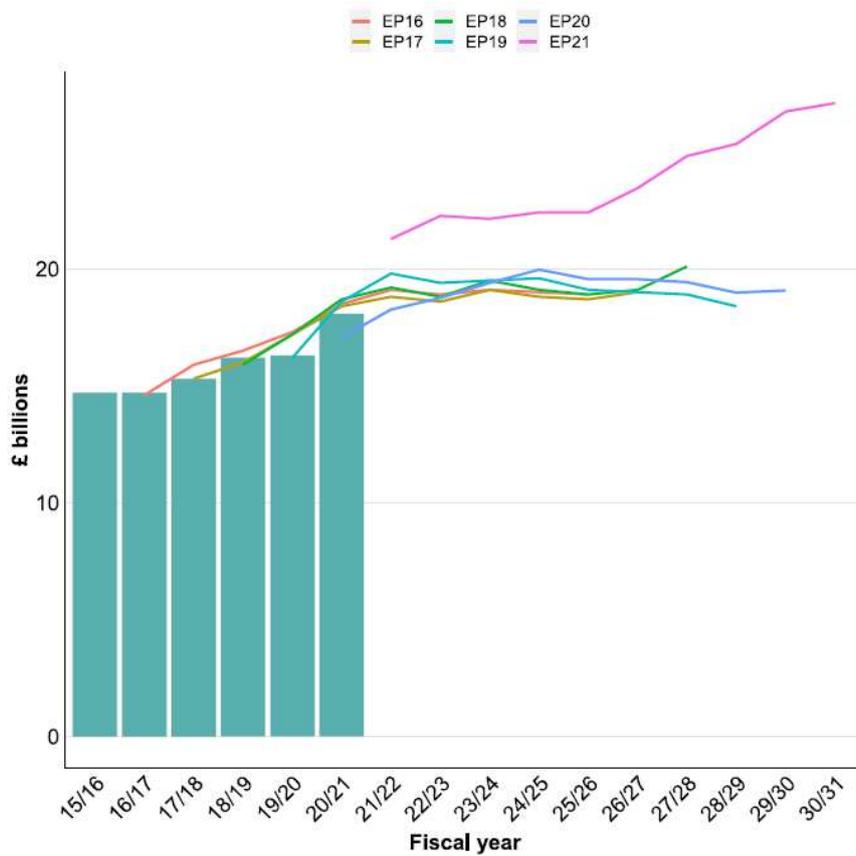


Figure 3: Comparison of assumptions in previous reports for planned spending and outturn (actual spend) up to 20/21.

From 2025/26 onward, the Department is holding a further £4.1 billion to allow us to exploit the investment we are making in research and development and to continue to develop new and innovative capability. This funding is part of Defence’s programme, but we have not categorised it as equipment spend and it is therefore not part of the planned spend figures in this report, although it is likely that a significant but as yet unknown proportion will ultimately become equipment spend. This funding has been set aside in recognition of the pace of technological change and to ensure that Defence has the flexibility to address emerging capability requirements without having to make cuts to existing programmes. This helps to address one of the key criticisms of recent Public Accounts Committee and NAO reports and we will update on this in each subsequent annual report.

### Forecast Cost of Equipment Spending

To assess affordability, we compare the budgeting assumptions explained in the previous section with our assessment of the cost of the programme. This section explains the cost assumptions and how they have changed over the last year. The forecast cost of equipment procurement and support over the ten years from April 2021 is £233.6 billion, an increase of

£36.2 billion over the ten years from April 2020, including new investment. This leaves £4.3 billion of headroom against the £238 billion equipment budget explained in the previous section. The cost forecast is made up of estimates for many hundreds of individual projects.

The ten-year cost of the equipment plan is presented in figure 4 below which is followed by more detail on each component.

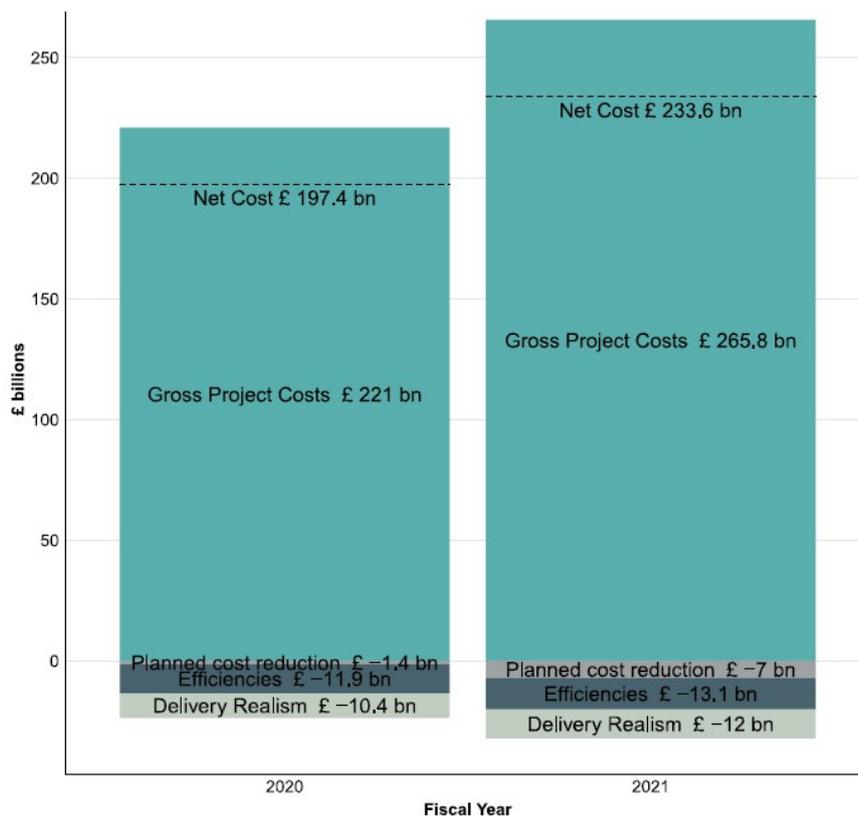


Figure 4: Ten-year forecast cost of the equipment plan compared to assumptions in last year's report

### Net Programme Cost, £233.6 billion

The net programme cost is based on gross project costs of £265.8 billion minus cost reductions totalling £32.2 billion over ten years. Cost reductions reflect our plans for further savings and efficiencies based on our analysis of spend and previous outturn. This ensures that the Department incentivises further efficiencies and has a taut but realistic spending plan.

### Gross Project Costings, £265.8 billion<sup>12</sup>

The total cost of the equipment plan projects (before the adjustments set out below) is £265.8 billion, increased from £221.0 billion last year, reflecting in large part the new investments in the equipment plan such as the renewal of the nuclear deterrent, shipbuilding, and the next phase of the Future Combat Air System.

<sup>12</sup> Of which £225.2 billion is managed by delivery organisations on behalf of TLBs and £40.6 billion is managed by TLBs directly, much of which is for newer programmes which have not yet been delegated to delivery organisations. Delivery organisation costings are inclusive of foreign exchange and fuel adjustments which were broken out separately in last year's analysis.

Delivery organisations, such as Defence Equipment and Support (DE&S), Defence Digital and the Submarine Delivery Agency, are responsible for costing a large part of the equipment plan. Project teams in the delivery organisations forecast costs using quantitative models to understand costs under a range of possible outcomes. Project cost forecasts include the base cost and the expected financial impact of risks.<sup>13</sup> Delivery organisations regularly review cost forecasts and work with industrial suppliers to provide assurance that they are realistic and that the level and profile of risk funding held is appropriate. The review processes are closely linked to reviews of programme performance and allow budget holders to take mitigating action to keep within budget limits. This governance mechanism ensures that the cost of every project in the equipment plan receives assessment and oversight at a senior level.

Some projects or savings initiatives in the equipment plan are managed and costed directly by TLBs. These costs are typically for initiatives in early development, and which have not yet been delegated to delivery organisations.

#### **Adjustments for Delivery Realism, -£12.0 billion**

The programme includes £12 billion of adjustments to reduce cost forecasts for judgements about delivery schedules and industrial capacity, increased from £10.4 billion last year, but stable as a proportion of the costed programme. Our approach to these adjustments is discussed in more detail in part three of the report.

#### **Savings Measures not yet Managed by Delivery Organisations, -£7.0 billion**

TLBs have planned £7.0 billion of cost reductions over ten years, which have not yet been implemented in project costings. This is an increase from £1.4 billion last year. The total includes some of the savings decisions taken in the Integrated Review to delete or descope large programmes for which there are clear plans but which were not yet finalised at April 2021.

Informed by the priorities of the Integrated Review we have also agreed proposals with TLBs to reduce costs in areas of spending consisting of many smaller projects, which make up a substantial portion of the equipment plan, and further savings. These assumptions are approximately £4 billion of the total £7 billion. Our experience of in year financial management provides evidence that TLBs can find savings from their programmes without substantial impacts to outputs. Unlike previous years, in the current financial year, we have not undertaken a centrally managed savings exercise and at the point of publication there have been no savings measures taken that significantly impact operational or capability outputs or which have required Ministerial approval. Based on previous experience, we judge the scale of savings is achievable, and we are now developing more detailed plans to build confidence in delivery.

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<sup>13</sup> Cost forecasts used for budget planning and approvals are typically at a confidence level where there is an equal chance of outturn costs being above or below the forecast, known as 50th percentile costing or 'P50'. P50 cost is split between the 'base cost' and a provision for risk which takes the total to the P50 confidence level. Other confidence levels are used when appropriate, for example some complex nuclear projects have used 70th percentile costing (P70) for forecasts to recognise the complexity of the programme.

### Efficiencies Initiatives in Delivery Within Projects (-£10.3 billion) and in Development (-£2.8 billion)

The cost forecast reflects the expected impact of efficiency programmes. For example, as part of the wider DE&S efficiency programme, DE&S acted on an efficiency opportunity to optimise inventory through better planning and forecasting, stockpile utilisation and disposals efficiency. Over £200 million of efficiencies have been realised in this way in MOD's spending on general munitions.

In recent years the Department has established processes for identifying, developing and delivering opportunities for efficiencies in the equipment plan, with a consistent approach for describing the maturity of measures adopted across the Department. Our priority in recent years has been to achieve the efficiency targets agreed at the 2015 Spending Review which total £12.3 billion over the ten years from 21/22. Against this target we forecast to achieve £13.1 billion, up from £11.9 billion last year, resulting in forecast over-delivery against our target of £0.8 billion.

Efficiency initiatives consist of higher confidence initiatives, which are embedded within individual programme forecasts, and lower confidence initiatives that are still in development and are not yet included in individual programme forecasts. The value of higher confidence initiatives has increased from £8.2 billion last year to £10.3 billion. The efficiencies planned this year are also much less reliant on lower confidence measures, with the total including only £2.8 billion of these measures compared to £3.7 billion last year. Forecast benefits against the targets are show in figure 5.

	EP21 10 Year Total	EP20 10 Year Total	Change from EP20
Target	12.3	12.3	0.0
Total forecast benefits	13.1	11.9	1.2
High confidence initiatives included in forecast costs	10.3	8.2	2.1
Lower confidence initiatives included in forecast costs	2.8	3.7	-0.9
Shortfall	0.8	-0.4	1.2

Figure 5: Efficiency savings targets and expected delivery, ten years 21/22 to 30/31. Positive values are savings/ increases in savings

The Department's progress against these targets was reviewed in the 2020 Spending Review. It now makes sense for us to review and reset the targets against which we track delivery of efficiency benefits, so that we focus our efforts on incentivising new efficiency delivery rather than continuing to track an ever-increasing volume of delivered reductions against legacy targets. This report is therefore expected to provide the final update on progress against these legacy targets.

### Defence Transformation Benefits, No Cost Assumptions in the Equipment Plan

Defence has set up a 'Transformation' portfolio to lead reform in key areas which cut across all organisations in Defence. We are currently forecasting financial benefits in acquisition, support and digital programmes. For example, we are looking at improving how we use 'category management' in acquisition, which improves the way similar or related products are procured to

support consolidation, efficiency and economies of scale. Forecast benefits are assumed within the Defence programme but outside the equipment plan and therefore do not appear in the figures in this report, although some benefits may result in savings against the current forecast cost of the equipment plan. These forecasts are risk adjusted to account for any optimism bias. The impact of these initiatives on the equipment plan will be explored in future reports.

The change between this report and last year’s update in each of the categories of cost above is shown in figure 6 below.

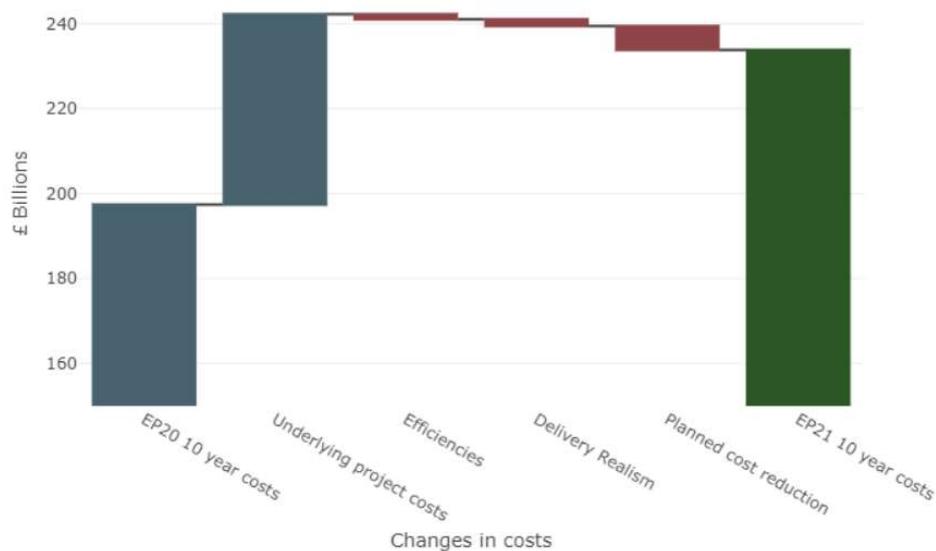


Figure 6: Changes in costing assumptions from previous year’s update to this year’s equipment plan, ten years from 21/22 to 30/31

## Risks to Affordability

This section describes the financial risks to the equipment plan and the mitigations and levers available to manage them.

Figure 7 below shows our assessment of the risks and opportunities in the equipment plan. Each of these judgements are then explained in the following section. These judgements imply a range between a £7.4 billion surplus and a £7.2 billion pressure for the equipment plan, compared to a pressure of between £1.8 to 17.4 billion reported last year.

In practice, it is extremely unlikely all risks or all opportunities would materialise simultaneously and the Department monitors spend through an annual planning process and adjusts plans to respond to forecast under or overspends. Forecasting across ten-years is inherently uncertain. In a complex plan with many large programmes, forecasts change as delivery schedules and cost estimates mature. Improving forecasting can help to reduce this risk, but the Department’s plans need to be flexible to adapt to change. This section also explains the levers available to the Department to manage its costs.

		EP21 10 yr total	EP20 10 yr total	Change
<b>Central estimate of surplus/pressure</b>		<b>4.3</b>	<b>(7.3)</b>	<b>11.7</b>
Potential increases in cost	Delivery organisation costing risk	7.6	3.9	3.6
	Delivery realism risk	1.1	0.9	0.2
	Further efficiencies risk	0.2	1.9	(1.6)
	Foreign exchange rate risk	2.6	3.3	(0.7)
	<b>Total plausible increase in costs</b>	<b>11.5</b>	<b>10.1</b>	<b>1.5</b>
<b>Upper bound of surplus/pressure</b>		<b>7.2</b>	<b>17.4</b>	<b>(10.2)</b>
Potential reductions in cost	Delivery realism opportunity	(0.7)	(0.9)	0.2
	Further efficiencies opportunity	(0.2)	(1.9)	1.6
	Favourable foreign exchange	(2.2)	(2.7)	0.6
	<b>Total plausible decrease in costs</b>	<b>(3.1)</b>	<b>(5.5)</b>	<b>2.4</b>
	<b>Lower bound of surplus/pressure</b>	<b>(7.4)</b>	<b>1.8</b>	<b>(9.3)</b>
Further risks and opportunities	TLB project costing risk	5.7	-	-
	TLB planned cost reduction risk	1.9	-	-
	Dreadnought contingency	(2.6)	-	-
	TLB planned cost reductions	(0.9)	-	-
	TLB project cost estimates	(3.8)	-	-

Figure 7: Potential sources of cost risk in equipment plan, £ billions.<sup>14</sup> Commentary on each item is provided below.

### Cost Growth in Project Costings

Costings for complex and novel programmes can be challenging to forecast accurately and historically have resulted in cost growth of elements of the equipment plan.

To inform our analysis of cost risk, the Department continues to run a rigorous annual process to review and challenge a sample of delivery teams' costings through an independent assessment by our Cost Assurance and Analysis Service (CAAS). During 20/21 CAAS conducted 89 independent cost estimate reviews. Of these, nine were superseded by later estimates or became redundant due to later events (e.g. where a programme has been cancelled). The remaining 80 represent approximately 58% of the delivery organisation costed equipment plan. While there may be further risk in the programmes not covered by the review, riskier projects are selected for the review, either where estimates are less mature or budget holders have particular concerns. This means, for example, programmes on a firm-price contract are less likely to be reviewed.

This year's analysis found £7.6 billion of costing risk in the projects examined, compared to £3.9 billion last year. While this is a significant increase, we do not expect all of this risk to materialise and we have mechanisms to manage any pressures which do emerge, explained below. In the current financial year, the £1 billion of risk identified by this analysis has not translated into our forecasts. Of the total, a third, £2.6 billion, is attributable to the Dreadnought

<sup>14</sup> The upper and lower cost estimate bounds use the same categories of risks and opportunities as previous years' assessments, but the assessment methodology has changed for the realism and efficiencies categories, which are now based on TLB self-assessment of potential variation. Top-down assumptions were used in last year's assessment of +/-25% for realism and +/-50% for efficiencies. The new methodology gives narrower bounds for risk and opportunity in these areas.

programme which has special funding arrangements described below. The remainder of the increase from last year's assessment is driven by the new programmes added to the review. 30 new projects have been assessed this year, while 19 reviewed last year have not been included; for example, the Warrior Capability Sustainment programme has not been reviewed because it has been cancelled. Excluding Dreadnought, the risk for projects which were assessed both last year and this has reduced by £0.3 billion.

Unlike other projects in the equipment plan, the financial risk to the Dreadnought programme is partly carried by HM Treasury through a contingency facility established at the 2015 Spending Review which allocated £10 billion for contingency on top of the £31 billion programme expected to be funded in the Defence budget. The contingency is available to ensure that the programme can be delivered to schedule, by allowing for changes in the spending profile or total funding without resorting to cutting spend in the wider Defence programme. The 2020 Spending Review confirmed that the contingency arrangement would continue. The independent cost estimate for Dreadnought suggests that £2.9 billion of spend may be required beyond the delivery team's estimated whole life costs. However, this would still not exceed the £31 + 10 billion limit to funding.

For the rest of the equipment plan, the financial risks are borne by the Department and contingency funds are held within the Defence budget. Excluding Dreadnought, the risk for all other programmes identified by the independent cost estimates is £4.9 billion compared to £2.9 billion last year. Of that £4.9 billion, £2.2 billion is attributable to the wider nuclear programme including the replacement warhead programme, which is a large, complex programme still in its early phases. As the programme develops and goes through the Departmental and Treasury approvals process, the current high levels of uncertainty will reduce.

Among the remaining areas of risk identified in the CAAS review, some programmes have recognised challenges that are being managed through established financial planning and approvals processes, while for others head office and the relevant budget holders have confidence that the project team estimates are likely to be robust based on past performance.

While the independent cost estimates cover costs managed by our delivery organisations, there is further risk in the investment and savings assumptions managed by TLBs where costs have not yet been delegated to delivery organisations. As of April 2021, this was the case, for example, for the Future Combat Air System. This year, for the first time, we have taken steps to assess the risk in these programmes for this report, through a self-reported assessment of risk by TLBs. This suggests there may be up to £5.7 billion of further risk for investments and £1.9 billion for savings. These are shown above but are separated from the main assessment to allow a direct comparison with last year's assessment. Further work is needed to refine our assessment of this risk. We plan to improve the methodology for collecting this evidence next year by revising the framework for assessment and ensuring head office challenges TLBs' judgements.

## Foreign Exchange Risk

The Department uses large volumes of foreign currency in any given year, particularly US Dollars and Euros. Changes in exchange rates can therefore significantly increase or decrease the cost of the plan. Figure 8 shows the impact of strengthening or weakening of exchange rates on the cost of the equipment plan. A 10% range fits most observed recent historical variance in exchange rates and is used in the range analysis above.

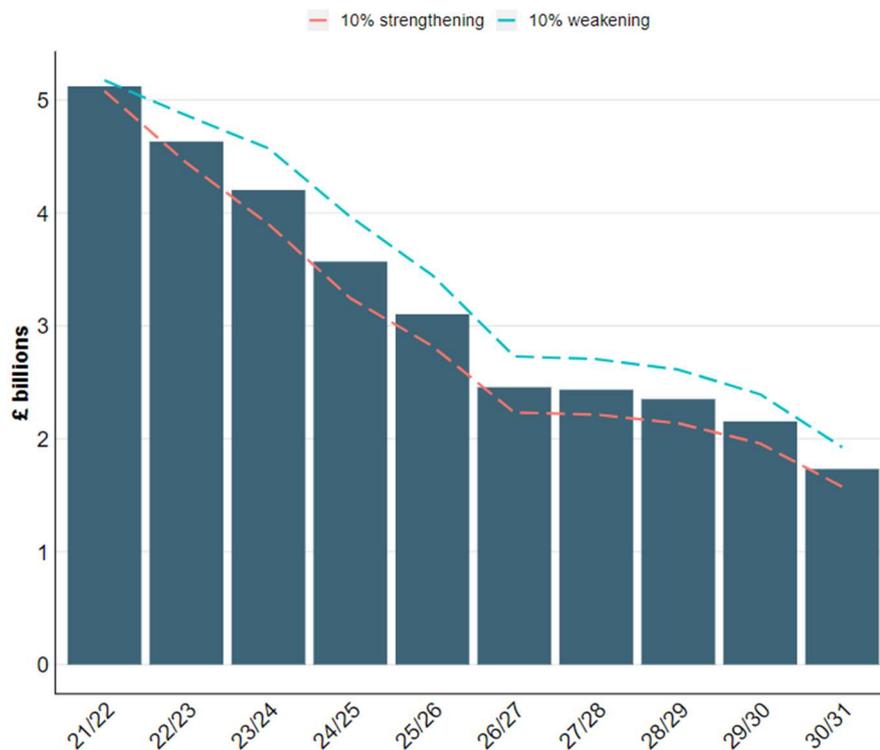


Figure 8: Expected cost of foreign currency in the Plan and sensitivity to changes in exchange rates

## Inflation

Movements in inflation affect costs. Programmes already factor tailored inflation assumptions into their costings, recognising that general inflation is not a suitable assumption for most parts of the Defence programme given our high spend on labour and technology. We have not included a separate assessment of inflation risk in the analysis here, but this will be partially covered by other costing risk assumptions.

## Under-delivery Against Realism Assumptions and Efficiencies

Failure to deliver the cost reduction assumptions described in the affordability analysis will result in additional cost pressure. We have included risks for cost changes resulting from under or over delivery against our realism and efficiency assumptions in the range analysis above.

In addition to the savings in the equipment plan, there are savings assumed in other parts of the Defence programme, such as in workforce costs, which could impact the affordability of the wider Defence programme if not delivered. These are not included in this analysis.

## Levers to Manage Affordability

While some changes will offset each other, experience shows that the cumulative impact of risks can result in significant increases in costs. An effective financial strategy needs to be able to accommodate change, without resorting to poorer value for money measures or cuts to capability. The financial reset afforded by the Spending Review has allowed us to put in place more effective levers to manage spend. Building on the existing levers available to the Department, these include:

**Layering risk provisions within budgets as described in part two of this report.** Projects hold their own risk provisions of £14.7 billion; head office holds a further contingency of £5.9 billion for the equipment plan, and additional contingency for the wider Defence programme. In previous years we released our equipment plan contingency holdings for the approaching financial year; this year we have entered financial year 21/22 with a funded contingency, the first time since 2018. These assumptions are shown in figure 9 below.

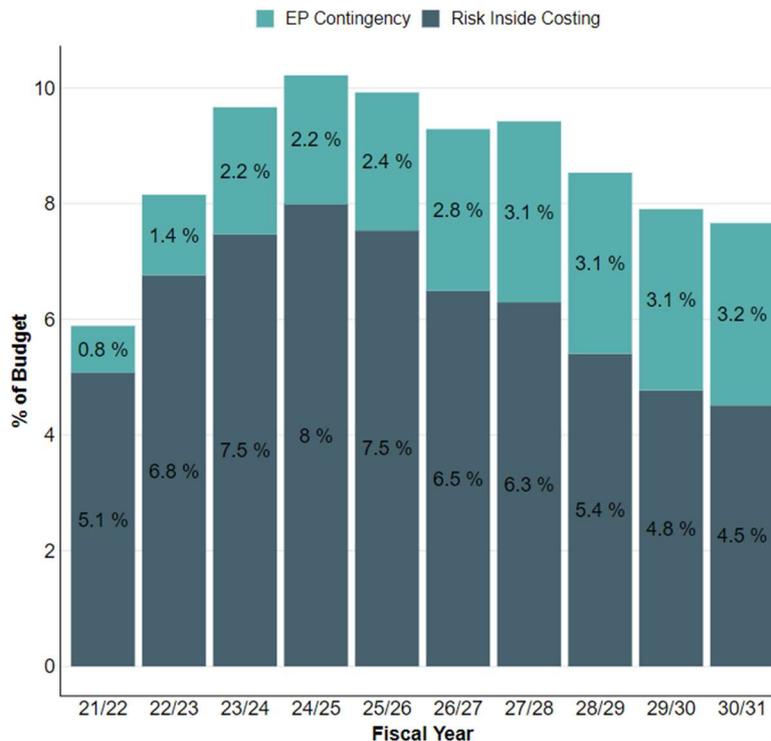


Figure 9: Risk provisions included in costing and corporate contingency as proportion of planned spend

**Protecting the equipment plan from significant movements in Dreadnought**, our largest and most complex programme, through the contingency facility provided by HM Treasury. This means the Department can accommodate fluctuations in the annual profile of spend by drawing down on the contingency instead of reallocating funding among other equipment programmes. The Spending Review confirmed £1.3 billion of funding available for this purpose across four years. The funding for subsequent years has not yet been set.

**Ensuring flexibility in delivery schedules.** For example, this year we have set up processes to identify choices to bring forward capital spend to support the Department to deliver its large

year on year increase in capital budget in the event of over-optimistic schedules in the current programme.

**Increased emphasis on portfolio management.** We are testing proposals to create new portfolios of programmes, using best practice in portfolio management to ensure that new investments are delivered and governed effectively and spend can be reprioritised effectively in response to evolving forecasts.

**Our approvals process** continues to provide a lever to monitor and control the financial performance of programmes. Setting an affordable programme means the relationship between approvals limits and budgeting can be strengthened.

**The Department continues to mitigate its exposure to foreign exchange risk** through forward purchases of Euros and US Dollars

**Setting aside funding for emerging priorities.** In addition to the headroom in the equipment plan, the Department has set aside £4.1 billion of funding outside the equipment plan from 25/26 onward to allow us to continue and exploit the investment we are making in research and development and to continue to develop new and innovative capability without having to make cuts to existing programmes.

**UK Strategic Command has set aside £178 million in its equipment plan to respond to operational equipment requirements** to mitigate unforeseen risks. This allows us to respond to issues quickly and without needing to reprioritise funding.

**If these levers are insufficient, the Department can choose to review the scope of new investment programmes, including the number of platforms procured.** As further development of plans is undertaken through the course of the current financial year, delivery organisations have been directed to prepare proposals for descoped investments where costs exceed funded assumptions. In later years of the plan, planned equipment investments worth £2.3 billion, including a second tranche of F35 and further A400M aircraft, have not yet been delegated to TLBs and doing so will be dependent on the affordability of the programme as a whole. Following the new investment in the programme, the proportion of planned spend which has not yet been committed (e.g. through a contract with a supplier) has increased to 70%, meaning there is greater flexibility to adapt spending plans if required.



*Type 26 frigate build*

Improving financial management will also require changes to the Department's approach. In previous years, the constrained financial position has required head office to be frequently and closely involved in directing spending decisions and rebalancing budgets across TLBs. Now that we have clear policy direction from the Integrated Review and a multi-year budget settlement, we are seeking to better delegate decision making across the Department. Significantly, decisions to manage cost pressures should be taken at lower levels of the organisation. Decisions should only be taken by head office where issues cannot be dealt with at the project, programme and TLB level, in that order of escalation, or where decisions have cross-cutting impacts across TLBs or impacts on agreed Defence outputs. This approach has the benefit of bringing decisions closer to the staff and programmes they affect, and ensures we fully utilise the skills and expertise of staff across the whole of the Department, rather than directing all decisions through head office. Head office will still play an important role in monitoring financial performance and the delivery of Defence outputs and ensuing ministers are consulted appropriately. We will be seeking to achieve this change by reviewing the use of portfolio management across key investments, as described above; providing more certain longer-term budget settlements for TLBs supported by the Spending Review; and reducing head office's direction of new investments and savings.

# Changes to the Management of the Equipment Plan

An increase in the Defence budget alone is not enough to ensure the Department can deliver the equipment plan on time and on budget. It is also important that the Department has the right data, tools, skills and processes in place. This year has seen important improvements in these areas. We have made progress in addressing the recommendations of the Public Accounts Committee following previous reports, but this work will continue. This section of the report describes the progress we have made, and the further work planned for coming years.

## **Better Data Quality and Assurance**

Making effective financial decisions is reliant on accurate and timely data. We are undertaking work to improve both the underlying quality of our financial data and the tools and capability to make sure it can be used effectively. Key initiatives in this area include:

### **Management Adjustments for Realism**

TLBs and delivery organisations make portfolio level cost reductions to reflect the deliverability of their projects and the broader portfolio based on historical performance. For example, several projects may require the same limited industrial capability, which is only apparent when considering a portfolio of programmes collectively, rather than in isolation. Part two of the report explained that these adjustments total £12 billion, 4.9% of the underlying programme cost. The value of these adjustments is stable as a proportion of planned spend, compared to last year. We have sought to avoid reducing costs further with these adjustments, despite the challenging step-up in delivery in the coming year.

Our experience of in year financial management shows that these adjustments are required to avoid underspends. However, we are aiming to reduce the size of these adjustments in coming years by improving forecasting accuracy at project level.

Head office currently reviews the aggregate value of these adjustments and conducts trend analysis to compare with historical performance, reporting to the Department's Finance Committee. In the coming financial year, head office will start to conduct more in-depth reviews of the evidence for adjustments to individual projects, as recommended by the NAO. This is being supported by the creation of a new standardised register to ensure underpinning evidence is recorded consistently and is available to head office. This new requirement has been set out in guidance which has also formalised clearer rules for the use of these adjustments.

### **Risk Costing**

In recognition of inconsistencies in the quality of costing risk across the Department, we have

developed new guidance which directs the use of standardised methodologies when calculating risk costings.<sup>15</sup> This should produce more accurate risk forecasts, which will better inform and support financial decision-making and control. The guidance will be tested as part of a pilot study. The candidate programmes for the pilot have been identified collaboratively with delivery organisations. The pilot will cover a sample of both high and low value programmes.

### **Financial Management Information**

The Department needs to have access to good management information to inform decisions. We are taking steps to ensure we are asking for the right data and that it is accurate and timely. A programme of automation and improvement of the Department's financial management information is in progress including the roll out of tools to support better forecasting, developing dashboards and producing better data visualisations. This will significantly reduce the effort needed to produce management information, improve accuracy and accessibility and give finance professionals more time to analyse the information, providing better insight for decision makers.

As an example, Defence Equipment & Support have created a data dashboard to allow project cost reviews to be conducted more efficiently by automating the production of cost data analysis. This was formerly a manual process, so the change has freed staff to focus on more valuable analysis. This has improved transparency between budget holders and DE&S who run programmes on their behalf and allows budget holders faster access to information about their programmes.

### **Project Delivery Management Information**

We are also improving the management information available to project delivery professionals. Learning from experience is a standard part of major programme management. We capture lessons at closure of our major programmes and it is a core component of approvals decisions. Recognising that learning lessons leads to innovation, better ability to mitigate risk, and better return on investment, the Department is investing in further improvements to ensure that lessons are captured and applied from strategy through to in-service. For example, in 2020 we launched a new project delivery toolkit which is an authoritative source of best practice and in 2021 we released the findings of a [review of lessons from project initiation](#).

### **Evaluation Team**

The Department formed a new evaluation team in November 2020 to improve the quantity and quality of project and policy evaluation and ensure that lessons are learned to inform future strategic outline cases. The primary benefit of this is better corporate and project level understanding of what works in project delivery, reducing risk and uncertainty and helping the Department stop avoidable costly mistakes. This will become a specialist multidisciplinary evaluation team drawn from the government analytical professions and has initially been staffed

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<sup>15</sup> The proposed changes include revising the value of Risk Inside Costing; namely from being defined as the delta between the 50% to the 10% probability of delivering to cost to the delta between the 50% probability of delivering to cost and the base cost excluding any risk or potential cost variations.

by government economists. Since formation, the team have produced guidance and templates aligned to updated Central Government Guidance, endorsed evaluation plans to support centrally approved business cases to the Investment Approval Committee (IAC) and designed and delivered evaluations for key stakeholders. The team will develop a forward plan of evaluations to be seen by the IAC on an annual basis and are working with evaluation practitioners across government to embed best practise and a culture of evaluation in the Department.

## **Training and Qualifications: Ensuring the Defence Workforce has the Right Skills and Expertise**

Delivering the equipment plan is also dependent on the Department's finance, commercial and project delivery expertise. We are improving the provision of training and ensuring personnel in key roles have appropriate qualifications to allow them to discharge their responsibilities effectively.

### **Finance**

We have a comprehensive training programme including mandatory finance training for all staff in the finance profession and we are committed to delivering a finance function where over 60% of the workforce are formally qualified.<sup>16</sup> At 31 March 2021, the number of qualified staff within the finance function was 1,211 (43%) and a further 396 (14%) were studying for professional qualifications of which 119 (4%) were on apprenticeship programmes. The number of qualified Senior Civil Servants in finance roles was 49 (83%) and the number of qualified senior managers (Grade 6/7) was 298 (75%). There were 81 staff in our Cost Assurance and Analysis Service (CAAS) in the finance function undertaking cost management activity of whom 65 had an accountancy qualification and a further one had a cost management qualification. There were an additional 149 staff in CAAS who provide cost management support by way of cost engineering and cost estimating services.

The recently published Government Finance Career Frameworks provide guidance for all Departments on which roles require qualifications. The MOD will be transitioning to this as part of our Finance Functional Leadership Programme. The published finance career frameworks will be used as a key part of the programme by introducing standard finance role descriptions along with expected skill levels for individual grades and standard templates for role adverts to provide clear requirements when undertaking recruitment. These will support the Finance Service Delivery Model being introduced across business units in the Department.

Between the end of the last financial year and the mid-point of the current financial year we estimated there to be approximately 10-13% vacancies across the finance profession. This data is being refreshed as part of the implementation of a new civilian HR system. There are a series of recruitment campaigns being undertaken by DE&S to fill a range of roles. The Head of

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<sup>16</sup> Consultative Committee of Accountancy Bodies (CCAB)/Chartered Global Management Accountant (CGMA) and Association of Accountancy Technicians (AAT)

Finance Profession is exploring with other business areas whether a similar central recruitment campaign would assist for staff across MOD sites.

### **Commercial**

There are currently approximately 190 senior commercial MOD roles in the Government Commercial Organisation (GCO), and recruitment through the GCO has enabled Defence Commercial to strengthen the senior commercial leadership team, ensuring that there is an increased focus on commercial activity across the acquisition life cycle, including Strategic Supplier Management. For example, we have updated our position on the limitation of contractor's liability, responding to industry concerns that too often the Department has sought to put uncapped liability onto bidding companies, which they may be unable to manage, may deter competition, and which do not reflect the degree of technical risk inherent in some Defence projects.

A commercial Market Skills Allowance was introduced at the end of 2018 and is already showing early signs of helping with both recruitment and retention of new and incumbent commercial professionals. This is reflected in the commercial function's attrition rate for 20/21 of 7.7%, which compares favourably with the overall Civil Service (10.3%) and MOD Civil Service workforce (11.1%) for the same period and is within Defence sector norms. This has a positive impact on reducing recruitment costs across the team and ensuring a clear focus on talent management and succession planning across the function.

In addition, a Commercial Licensing process has been implemented to test and accredit staff to evidence they have reached the required standard. A deadline of June 2022 has been set for all commercial staff with contractual authority to pass a MOD or Government Commercial Organisation assessment process and be Chartered Institute of Procurement and Supply professionally qualified. This timeline has been amended to reflect the impact of COVID-19 on our people's ability to attend face-to-face panels and assessment centres, and a comprehensive portfolio of virtual training and assessment delivery has now been developed.

MOD is also developing a Commercial Strategic Workforce Plan. It will project the number of commercial staff required to deliver the pipeline of commercial activity over a 5-year period and will support staff with a comprehensive programme of training, education, and career development tools. Significant investment continues to be made in improving contract management capability. MOD is still strongly supporting the pan-government Contract Management Capability Programme which offers training and development to all non-commercial staff responsible for the management of key contracts and supplier relationships. To date over 5,000 MOD staff have been accredited to Foundation level which exceeds our original target. MOD is considered an exemplar of Foundation level engagement and has shared its success with several other government departments. Accreditation performance at the higher level was severely affected by the training pause due to the pandemic response. However, since the restart in November 2020, via the new virtual training environment, we have made a substantial number of nominations to the programme to complete either the Expert or Practitioner level and achieve accreditation.

## **Project Delivery**

The Department continues to improve how it empowers its Senior Responsible Owners (SROs). Cabinet Office's Infrastructure and Projects Authority (IPA) has asked departments to ensure SROs for projects on the Government's Major Projects Portfolio (GMPP) to dedicate at least 50% of their time to their project. Almost 45% of Defence SROs in the GMPP are spending 45% or less of their time leading their projects. The Department is working to address this, while acknowledging that there may be exceptional cases where it makes sense for an SRO to lead two or more projects. We have improved tools to support the selection of appropriately skilled and experienced SROs and to identify the support individual SROs need. Clear succession plans will be developed for key roles on all major programmes, ensuring SROs and Programme Directors are pro-actively managed through transition points.

With almost 6,500 people, the Department's project delivery profession is the largest across government. The training available to these project delivery professionals is being improved through the newly launched Government Projects Academy which will provide a single, virtual, digital hub for professional standards, accreditation and training for project delivery across government. A Project Delivery Profession Accreditation will provide an industry aligned standard by which professionals working across government can be recognised for their knowledge, skills and experience resulting in a 'licence to practise'.

Strategic workforce planning is also critical, including attraction and development planning. This will inform who our top project professionals are, what skills they have, what support they need and what their next career moves are. To ensure those in senior project delivery roles have development plans, a skills audit will be conducted to assess their capability gaps and design a tailored offering, supporting both groups and individuals, with an appropriate pathway to SRO. The Government Online Skills Tool is one of our additional initiatives we are applying, to help us provide a department-wide development offer and baseline the Department against the rest of government.

## **Improving Defence Processes**

### **Defence Security and Industrial Strategy**

[The Defence and Security Industrial Strategy](#) (DSIS), published in March 2021, is the framework for a deeper, more sophisticated, and strategic relationship with industry. It replaces the Government's previous policy of global competition by default with a more flexible approach to determine the right approach to the acquisition of any given capability in line with our priorities and national security requirements.

The DSIS will ensure the UK continues to have competitive, world-class defence and security industries that underpin our national security, drive investment and prosperity across the Union, and contribute to the UK's strategic advantage through science and technology.

Government and industry are working together to deliver this commitment through innovation and improvements in productivity and efficiency, all of which strengthen the resilience of the defence and security sectors.

### **Acquisition and Approvals**

The threats being posed by our potential adversaries are evolving rapidly, exploiting the ubiquity of technology to challenge us in new and different ways. Our acquisition and approvals transformation portfolio aims to increase the pace of acquisition and improve programme delivery to ensure that we have the right capabilities at the right time to respond to these threats. We have set ourselves a challenging ambition to take two years out of the average end-to-end time to deliver capability. A key principle of this work is to focus on the outset of programmes, recognising that addressing issues early affects the whole of the programme's lifespan. We are bringing experts into decision-making early and increasing transparency across organisational boundaries. We have developed several new initiatives to improve acquisition processes and embed the necessary cultural change, including:

- A new tool to support SROs in identifying the drivers of risk and complexity for their programmes, allowing tailoring of approach, and setting programmes up for success from the outset. The tool will also enable 'appropriate risk' thinking allowing scrutiny and assurance activities to be targeted more effectively in support of investment decision-making.
- New approaches to support rapid acquisition of fast-moving emerging technology, embedding Agile principles to enable us to exploit the latest cutting-edge technologies and keep pace with their rapid development.

Testing of these new approaches continues and where successful they will be transitioned into business as usual in 2022. We also continue to embed Category Management across Defence, enabling a more strategic approach to the market in line with industry best practice and delivery of significant financial savings over the next ten years.

# Sector Analysis

Responsibility for managing most equipment spending is delegated to Top Level Budget (TLB) areas such as Army Command and the Defence Nuclear Organisation. This part of the report explains the changes made to the equipment plan through the Integrated Review, presents the Defence programme broken down by TLB and the split between procurement and support. Each section explores planned spending over ten-years, achievements and milestones from the past financial year, and explanations of significant changes.

Figures 10 and 11 show the breakdown of the equipment plan by TLB and operating centre respectively.<sup>17</sup> There are increases in planned spend across all TLBs. The nuclear enterprise continues to be the single largest area of planned spend. Strategic Programme sees a significant increase as a result of the planned spend as part of the stand-up of the Future Combat Air System Programme which currently sits within the Strategic Programmes budget. More detail on year-on-year changes is included in the following sections.

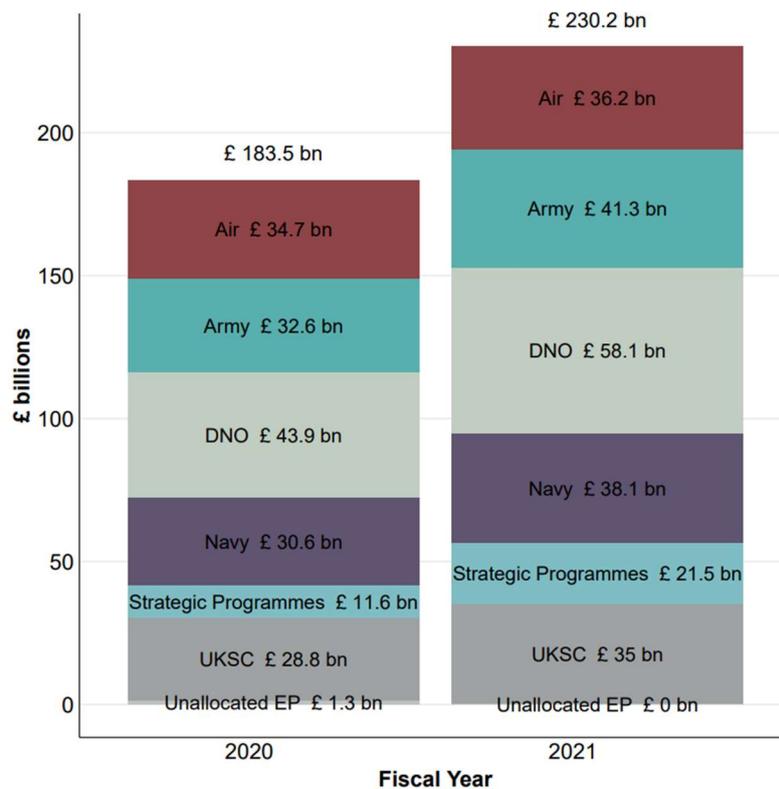


Figure 10: Chart showing change in ten-year total spending by TLB

<sup>17</sup> In Defence Equipment & Support project teams are grouped into 'Operating Centres' based on the type of equipment delivered. Figure 11 shows the breakdown of TLB planned spending for the equipment plan by the seven main DE&S operating centres, Defence Digital and the SDA.

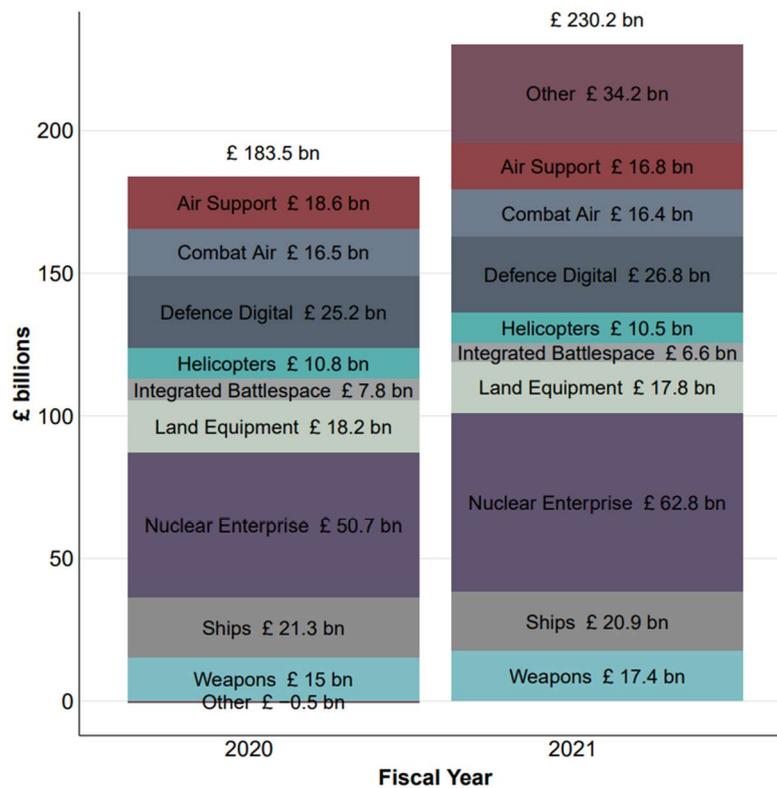


Figure 11: Chart showing change in ten-year total spending by operating centre

## Navy Command

Navy Command is responsible for surface ships, maritime helicopters and some elements of submarine delivery, although the major submarine build programmes are funded and delivered by the Defence Nuclear Organisation (see below).

Navy Command plan to spend £38.1 billion in the equipment plan over the next ten years compared to £30.6 billion at the end of the previous planning period. The breakdown of this spend is shown in figure 12.

Navy’s new investment is focused on improving the sustainability, lethality and availability of the fleet and delivering a more modern, high-tech and automated Navy. The lethality of the surface fleet will be increased by upgrading the air defence capability, Sea Viper, on our Type 45 destroyers to meet the increasing and evolving threat<sup>18</sup>. The Navy is also investing in a new lightweight torpedo for our ships and aircraft to replace our current Stingray weapon and will buy a highly capable ship to ship missile to replace our current Harpoon missile system which will go out of service in 2023. Additional investment has allowed the Merlin helicopters to be extended in service from 2029 until 2040 and ensured the Navy will have world-leading autonomous minehunting capability to replace legacy platforms.

<sup>18</sup> Funding captured within Strategic Programmes equipment plan

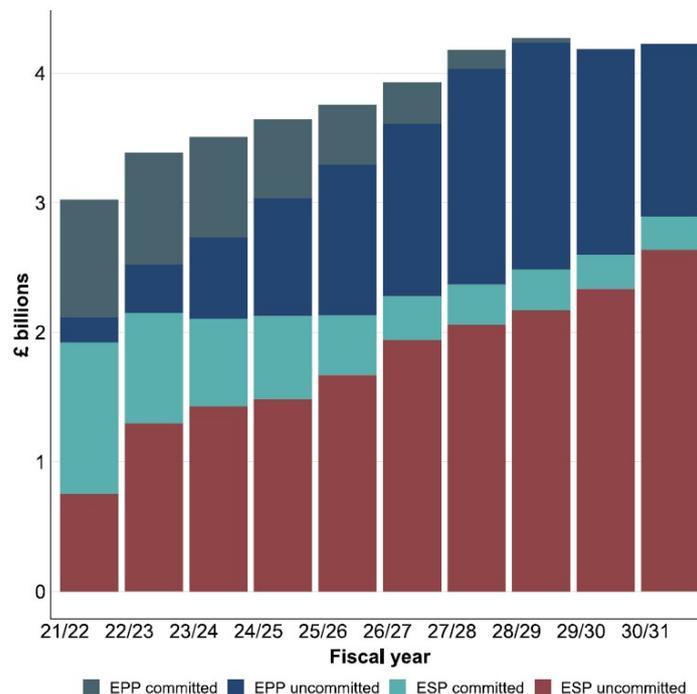


Figure 12: Navy Command equipment spend breakdown

The most significant investment in the Navy comes in the form of the shipbuilding pipeline. A strategic and long-term investment that will increase the capability and size of the Royal Navy's surface fleet and allow the development of three Fleet Solid Support Ships, a Multi-Role Ocean Surveillance Capability, Multi-Role Support Ships and Type 31 and Type 32 frigates. This will provide volume and certainty for our national shipbuilding enterprise and incentivise UK industry to invest to deliver world-leading levels of productivity.

Frigate availability will also be improved over the next few years by extending the life of three of our most recently refitted ships, with two of our oldest Type 23 Frigates being taken out of service. We will also launch the UK-designed cutting-edge Type 26 Anti-Submarine Warfare frigates alongside Canada and Australia.

The construction of the new National Flagship, which was announced by the Prime Minister on 30 May 2021, will be delivered by Defence, but was not included in our costings in April 2021 and so does not appear in the figures in this report.

Other changes to planned expenditure this year include increases in the cost of the existing programme, including reprofiling of Type 26 and Type 23 refits. The latter reflects adjustments in the build programme as a consequence of COVID-19 related delays. Other significant changes included an increase to Queen Elizabeth Carrier support costs as a result of improved knowledge of the work required to support and maintain these platforms.

## Key Achievements and Challenges

### Procurement

#### Achievements

Progressed the detailed design of the five Type 31 ships and made significant progress in modernising the shipyard at which they will be built, continued the build of the first Type 26 (HMS Glasgow) and commenced procurement of long lead items in support of the next batch of Type 26 Ships.

The Fleet Solid Support (FSS) requirement and procurement approach was successfully reviewed enabling a new competition to be started in spring 2021.

The final Off-Shore Patrol Vessels (OPV) Batch 2 (B2) have now been accepted into Service from BAE Systems, completing the five ship build programme.

Delivery of Maritime helicopter programmes to meet the HMS Queen Elizabeth Carrier deployment in 2021, including delivery of Merlin Crowsnest, force generation of Merlin Commando carriers and delivery Wildcat fitted with Future Air to Surface Guided Weapons.

Delivery of a Carrier Strike Group to Initial Operating Capability, based around the HMS Queen Elizabeth Strike Group and her Lightning II and Merlin air wing, ready for operational certification and deployment.

HMS Prince of Wales was accepted into service and began conduct of F35B trials to further expand the Carrier Strike Operating Envelope.

#### Challenges

Enterprise capacity to deliver the three maritime aviation programmes simultaneously, particularly under COVID-19 constraints.

### Support

#### Achievements

Maintained delivery of all permanent Defence Tasks including Continuous at Sea Deterrent, as well as home water roles covering border protection, maritime counterterrorism and fishery protection duties, plus permanent presence in the Arabian Gulf, Falkland Islands, Diego Garcia and Gibraltar.

Accepted into Service and then deployed HMS Medway to the Caribbean to provide hurricane season assistance with RFA Wave Knight. HMS Medway has since remained in the Caribbean providing persistent forward presence.

Accepted into service sister ships HMS Trent, HMS Tamar and HMS Spey, with HMS Trent deploying to the Mediterranean to provide persistent forward presence.

A review of the Type 45 Complex Warship Support Plan has been conducted and a revised plan, which provides greater T45 availability, has been endorsed by Navy Command.

Deployed a tailored littoral strike task group to the Mediterranean to conduct testing and evaluation of potential future support equipment and technology which may provide enhanced but discreet capability to future operations.

Spearfish Upgrade Programme. The upgraded Spearfish heavyweight torpedo completed sea trials at the Atlantic Undersea Test and Evaluation Centre in the Bahamas and achieved Equipment Delivery Date in spring 21 to support Programme delivery and first platform outload in summer 22.

#### Challenges

HMS Dauntless was delivered to Cammell Laird Shipyard as first T45 for embodiment phase of Propulsion Improvement Project (PIP). Although extended by ten-months because of COVID-19 related delays, PIP conversion and installation Inspections were achieved in FY 20/21.

Continuous at Sea Deterrent. Against the challenge of an ageing fleet of Vanguard Class SSBNS, CASD continued into its 52nd year. Investment seeks to improve submarine availability across the decade through a series of targeted investments in infrastructure, Base Maintenance Period (BMP) optimisation and equipment.

## Army Command

Army Command is responsible for: armoured fighting vehicles; ground-based air defence; artillery systems; protected and support vehicles; battlefield helicopters; certain unmanned air systems; soldier fighting systems; and communications and information systems in the land environment.

Army Command plan to spend £41.3 billion in the equipment plan over the next ten years compared to £32.6 billion at the end of the previous planning period. The breakdown of this spend is shown in figure 13 below.

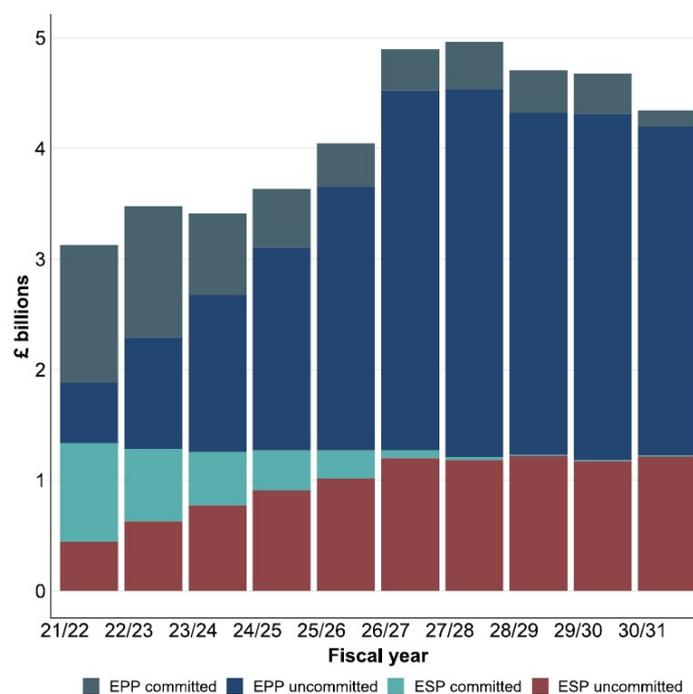


Figure 13: Army Command equipment spend breakdown

The Army’s new investment is focussed on making the Army more agile, integrated and lethal. The Army is restructuring around Brigade Combat Teams (BCTs) and establishing Land Special Operations capabilities through new Ranger battalions making the Army more responsive to operational demands.

To enable this, the Army has expanded the Boxer programme to equip the two armoured BCTs and is upgrading 148 Challenger II tanks to make them amongst the most lethal and survivable in the world, with the remaining Challenger fleet being retired. This upgrade to the Army’s existing Challenger II Main Battle Tanks will include a digitalised turret, a more capable 120mm smoothbore gun with enhanced munitions, upgraded sights and enhanced survivability based on upgraded armour and other survivability enhancements. In addition, new investment in the Army equipment will increase the capability and capacity of our layered ground-based air defence and our long range precision fires, modernise Land based electronic warfare and signals intelligence capabilities, increase Cyber and Electromagnetic capabilities and improve

Intelligence, Surveillance and Reconnaissance (ISR) capabilities by extending and upgrading the tactical UAS, Watchkeeper, and increase the number of batteries of Mini-Unmanned Aerial Systems under Project Aquila. These investments will enhance land forces' ability to provide ground-based air defence, improve their understanding of the operating environment, but also enable targeting of their future deep fires capabilities.

The AH-64 Apache Attack Helicopters will be upgraded to a state-of-the-art capability by 2025. Investment in a new and modern medium lift helicopter in the mid-2020s will enable a consolidation of the Army's disparate fleet of medium lift helicopters from four platform types to one: including the replacement of Puma.

Some legacy platforms that have already been extended beyond their planned life will be retired. In doing so, the Army has been able to plan to invest in accelerating the in-service date of the Boxer armoured vehicle, enhancing its capability and increasing the overall number of the fleet. We will no longer upgrade Warrior but it will remain in service as the Army transitions to Boxer based BCT, which we now expect to happen by the middle of this decade. The Army is also retiring its oldest CH-47 Chinook helicopters and purchasing newer variants of this operationally proven aircraft from the US.

## Key Achievements and Challenges

Procurement	Support
<p><b>Achievements</b></p> <p>The Preliminary Design Review for Boxer was successfully completed in October 2020 and the Critical Design Review is due to be signed off. This will enable manufacture of demonstration vehicles to commence and the delivery of the first production vehicles into trials and acceptance by early 2023.</p> <p>An £800 million contract to deliver a fleet of Challenger 3 Main Battle Tanks was awarded to Rheinmetall BAE Systems Land in March 2021.</p> <p>Approval was granted to commit to Tranche 1 of the Chinook Capability Sustainment Programme and a Letter of Offer and Acceptance has been signed with the US Government through the Foreign Military Sales process.</p> <p>The first ten E model aircraft, purchased under a foreign military sale with the United States to deliver the UK's Apache Capability Sustainment Programme, have now arrived in the UK.</p> <p>Dismounted-Joint Fires Integrator went on contract with ESUK Ltd in Jan 21 and now enters the demonstration phase of the programme. This contract award was achieved ahead of time, under</p>	<p><b>Achievements</b></p> <p>Deployed and sustained UK operations overseas including support to the UK's increased role in support of UN operations in Mali. This support included a significant mobility upgrade to the Mastiff and Ridgeback platforms to enhance performance over challenging cross-country terrain.</p> <p>All three Op TORAL Puma aircraft in Afghanistan completed a significant contribution to supporting the front line of UK defence and security operations.</p> <p>Supported the response to COVID-19, including supporting a mixed fleet of over 2300 platforms delivering a variety of tasks that included patient transport, PPE and Vaccine distribution and moving equipment to support the build of Nightingale hospitals.</p> <p>£2.4 billion, 15-year contract placed with BAE Systems Land UK at the end of 2020 for continued supply and support of 39 different munitions including small arms ammunition, mortars, medium-calibre gun rounds and large-calibre artillery and tank shells. An estimated 1,260 people will work on this across five BAES sites within the UK. Negotiations resulted in significant savings compared with the original bid and the contract</p>

budget and with a proposal at a high level of technical compliance.

The Enhanced Palletised Loading System was delivered ahead of schedule fielding 381 vehicles by 31 Mar 2021.

The wheeled Tanker fleet, the mainstay of logistic support, has had the out of service date extended from 2025 to 2030 and the support, provided by Oshkosh Defense, will ensure the capability is maintained throughout.

### Challenges

The Ajax programme remains challenging, significant technical issues relating to noise and vibration have been identified in the demonstration phase, which have impeded further progress being made on demonstration. Production has continued as the programme resolves the technical challenges. More detail is provided in the project overviews in Annex B.

contains incentives to pursue further cost efficiencies throughout the life of the contract. Additionally, there are further incentives relating to product quality & safety, timely delivery and efficient provision of the munitions engineering programme.

An innovative multi-supplier framework for capital spares contract was let. This approach allows mini competitions between the framework's contractors for procurement of capital spares, significantly driving down material risk across the in-service fleet.

### Challenges

The Morpheus Evolve to Open project, which will develop the next generation of tactical communications for land forces, has fallen behind schedule and is subject to a contract re-negotiation. The current in-service system, BCIP 5.6 will be sustained for up to a further 5 years, extending its out of service date to 2030/31. The Evolve to Open project is a key enabler of the wider Morpheus sub-programme and other Land programmes and the impact on these is under review. Work is ongoing to develop a revised plan for this programme.

## Air Command

Air Command is responsible for combat air, including fast jets and weapons; Intelligence Surveillance and Reconnaissance (ISR), including large ISR aircraft, remotely piloted aircraft and their enablers; strategic and tactical air transport; air-to-air refuelling aircraft; air platform protection; training aircraft; space; and training systems, including synthetics such as augmented and virtual reality.

Air Command holds funding for the core R&D and funding for the Future Combat Air System Technology Initiative, but the new investment for the acquisition phase of the programme is held separately by the Combat Air Directorate in Head Office as part of our Strategic Programmes (see below). Both budgets are overseen and managed by the Senior Responsible Owner in Head Office. Funding for new A400M Atlas and additional purchase of F35B Lightning II (beyond the 48 the Department is already committed to) is not included in Air Command's planned spend here and is held centrally.

Air Command plan to spend £36.2 billion in the equipment plan over the next ten years compared to £34.7 billion at the end of the previous planning period. The breakdown of this spend is shown in figure 14.

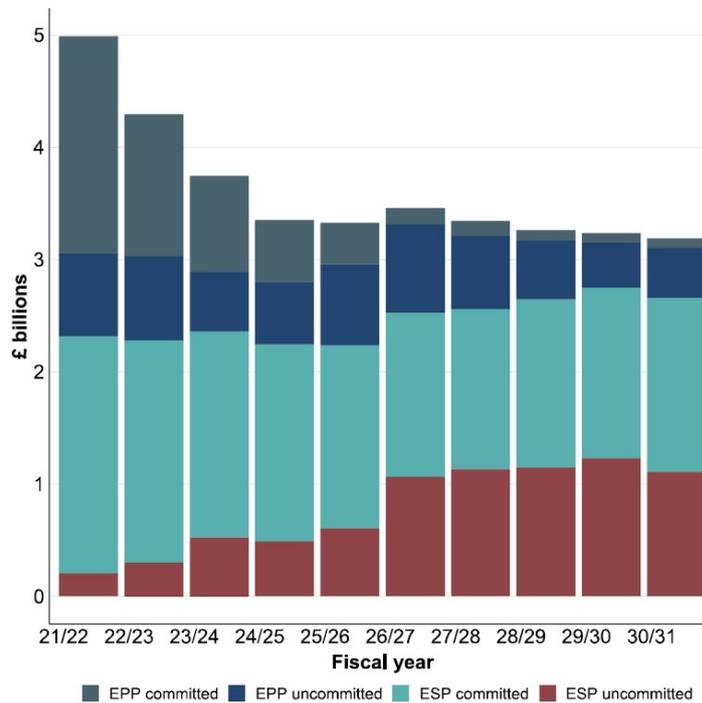


Figure 14: Air Command equipment spend breakdown

New investment is focussed on making the Royal Air Force one of the most technologically innovative, productive and lethal air forces in the world. New funding is supporting the Radar 2 programme to give Typhoon a powerful active electronically scanned array (AESA) radar, ensuring this capability can continue to operate successfully in the most demanding future operating environments. We will enhance the military flying training system with further investment in synthetic training that will deliver more capable pilots quickly and efficiently. The next generation airborne command and control aircraft, E7 Wedgetail, will replace the E-3D Sentry.

Air Command will retire equipment that has increasingly limited utility in the digital and future operating environment. This will include rationalising older fleets to improve efficiency, retiring Typhoon Tranche 1 by 2025, and Hawk T1. Air Command will also retire the BAe146 as planned by 2022, take the C130 Hercules out of service by 2023 and retire the E-3D Sentry in 2021.

### Key Achievements and Challenges

Procurement	Support
<p><b>Achievements</b></p> <p>The F-35B Lightning II achieved Queen Elizabeth Class Carrier Initial Operating Capability allowing it to operate from sovereign aircraft carriers. This is a key part of the delivery programme towards full operating capability.</p>	<p><b>Achievements</b></p> <p>The Lightning Force deployed eight aircraft and their supporting personnel and equipment to HMS Queen Elizabeth to take part in the Carrier Strike Group deployment.</p>

UK Space Command was formed 1 April 2021 and is building strong links with the US Space Command. UK Space Command is now on the path to lead UK space operations to protect UK and allied interests in space.

Our Maritime Patrol Aircraft, P-8A Poseidon, has achieved Initial Operating Capability. The aircraft will provide Intelligence, Surveillance, Target Acquisition, Reconnaissance and Attack (ISTAR) effect against sub-surface and surface targets for its anticipated 25-year life span.

The first flight of a UK Protector RG Mk1 took place in the USA in September 2020. The Protector programme involves industry across the UK with vital parts of the aircraft manufactured on the Isle of Wight. It will be fitted with UK mission systems and weapons. Collaboration is allowing us to share spiral development costs.

The Qatar Typhoon Programme has reached a further milestone, opening their 12 Squadron hangar with equipment to train 32 Qatar Emiri Air Force (QEAF) pilots alongside the RAF. Such a programme establishes a mutually beneficial international partnership between the QEAF and the RAF and supports Defence's contribution to UK prosperity through air exports.

### Challenges

P-8A Poseidon. Regaining long-range maritime skills will take time and could be challenging.

RAF Typhoons were deployed to Romania in early 2021 to support the NATO Air Policing mission. During this period, the RAF have participated in exercises, including with the United States Air Force and the Italian Army Joint Terminal Attack Controllers.

Supported the COVID-19 response through the provision of military airfields, aircraft and personnel for a variety of tasks, including setting up testing and vaccination facilities, providing support to Local Resilience Forums and transportation services.

Royal Air Force personnel and A400M Atlas, C17 Globemaster, C-130-J, and Voyager aircraft from the Air Mobility Force deployed on Operation PITCHING as part of the Afghan Relocation and Assistance Programme.

Deployed and sustained personnel, aircraft and equipment in support of major exercises in the USA, Qatar, Malaysia, Oman and the UAE.

Voyager aircraft, from the Air Mobility Force, helped strengthen ties with the Armed Forces of the Republic of Korea. Following the signing of a memorandum of understanding, annual committees will now oversee aerial exercises, training, tactics and logistical support in recognition of shared goals.

### Challenges

COVID-19 pandemic presented significant challenges to the delivery of operations including the deployment of personnel and equipment, sustainment, quarantine requirements and recovery.

Our industry partners and contractors have worked to mitigate the delays caused by COVID-19, particularly within the supply chain for required parts to meet operational output.

## UK Strategic Command

UK Strategic Command is responsible for command, control, communications, computers, intelligence, surveillance, targeting, acquisition and reconnaissance systems and capabilities (C4ISTAR) in both operational and business environments; special projects including procurement for UK Special Forces and Joint Force Protection capabilities; pan-Defence logistics systems; capabilities to support Defence operations and activities; and medical capabilities.

UK Strategic Command plan to spend £35.0 billion in the equipment plan over the next ten years compared to £28.8 billion at the end of the previous planning period. The breakdown of this spend is shown in figure 15.

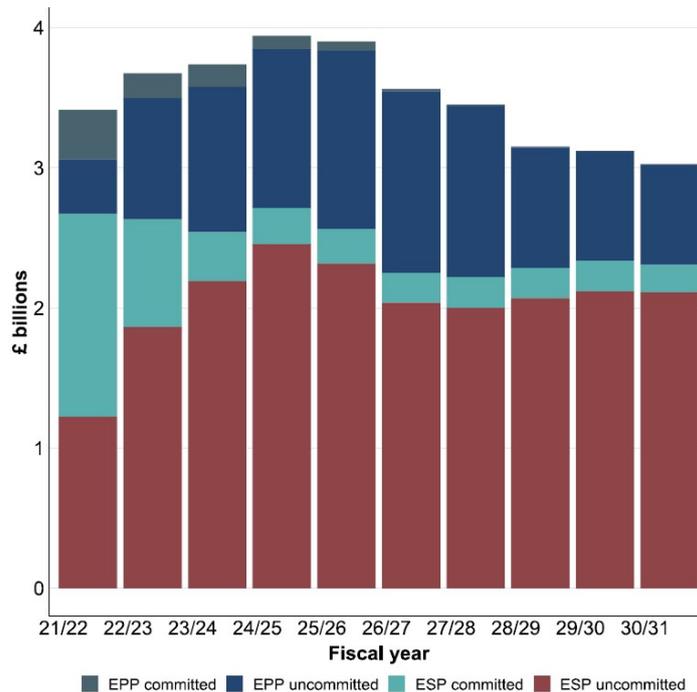


Figure 15: UK Strategic Command equipment spend breakdown

UK Strategic Command’s new investment is focussed on improving integration across domains and developing our digital and cyber capabilities. The Department has chosen to increase investment in our intelligence capabilities, including through increased use of automation in the analysis of the vast amount of data we collect. Defence has increased investment in our cyber capabilities and in the transformation of our logistics and support of our forces to make both better and more efficient. Further investment in a Defence synthetic enterprise and better networked modelling and simulation capabilities will enable more efficient and better-quality training, experimentation and mission rehearsal. An increased pipeline of funding for our Special Forces will ensure that they continue to have the equipment and capabilities that they need to continue to undertake the most challenging operations.

### Key Achievements and Challenges

Procurement	Support
<p><b>Achievements</b></p> <p>A COVID-19 Urgent Capability Requirement, Lumira Dx, Deployable lightweight rapid COVID-19 Diagnostic System was purchased and brought into service in under six months. This was used on Operations, Ships, Overseas and Firm Base locations, where access to national COVID-19 testing is difficult or impossible.</p> <p>Defence Digital has responded rapidly to the demand to allow personnel to work remotely at multiple classifications. 100,000 ‘MoDNET’ Windows 10 devices have been issued across Defence, with network upgrades</p>	<p><b>Achievements</b></p> <p>Stand up of Defence’s Cyber Security Operating Capability in April 2020 to enhance our defensive cyber capability.</p> <p>Assurance of Carrier Enabled Power projection C4ISR</p>

supporting increased remote access. Additional capability has been deployed to provide Secret connectivity, removing the need for people to travel to the office.

In July 2020, Defence awarded Airbus Defence and Space a contract to build and launch SKYNET 6A, a new satellite.

The New Style of IT (Deployed) programme, to provide deployable Information Systems, has completed testing of the first Secret and Official Operational Network (OpNET) nodes for the land environment as well as a large node for the Maritime environment.

Joint Crypt Key Programme has continued to make progress in the replacement of legacy crypt key.

### Challenges

Delays caused by COVID-19 have affected Dstl's ability to conduct trials and testing parts in support of processes to address urgent capability requirements on operations.

The Cyber threat facing Defence has continued to escalate, resulting in an increasing focus on the development and implementation of cyber protections.

Recruitment and retention of staff with digital skills continues to be challenging.

Delays and cost increases on the New Style of IT (Deployed) programme due to challenges associated with the integration of some legacy applications and functions, which were further compounded by the impact of COVID-19.

capabilities supported the delivery of the Carrier Strike capability.

Project Welcomer delivered in-year generation of an interim SIGINT reach back capability in the Land Domain.

The Department continued in 20/21 to sustain Defence's core IT and core network 'live' services through existing contracts, in advance of the planned transition to modernised successor arrangements.

## Defence Nuclear Organisation

The Defence Nuclear Organisation (DNO) is responsible for: procurement and disposal of all the UK's submarines, through the Submarine Delivery Agency; and nuclear warheads and Trident missiles for the UK's nuclear deterrent.

DNO plan to spend £58.1 billion in the equipment plan over the next ten years compared to £43.9 billion at the end of the previous planning period. The breakdown of this spend is shown in figure 16.

DNO's new investment is focussed on the modernisation of the UK's nuclear warheads to ensure we maintain an effective deterrent throughout the commission of the Dreadnought Class, working closely with the US so that our new sovereign warhead remains compatible with the Mk7 aeroshell and Trident Strategic Weapon System. The scope of work of the DNO has increased since the previous report including work to determine future solutions for replacing the Astute Class submarines when they leave service; known as the SSN(R) programme.

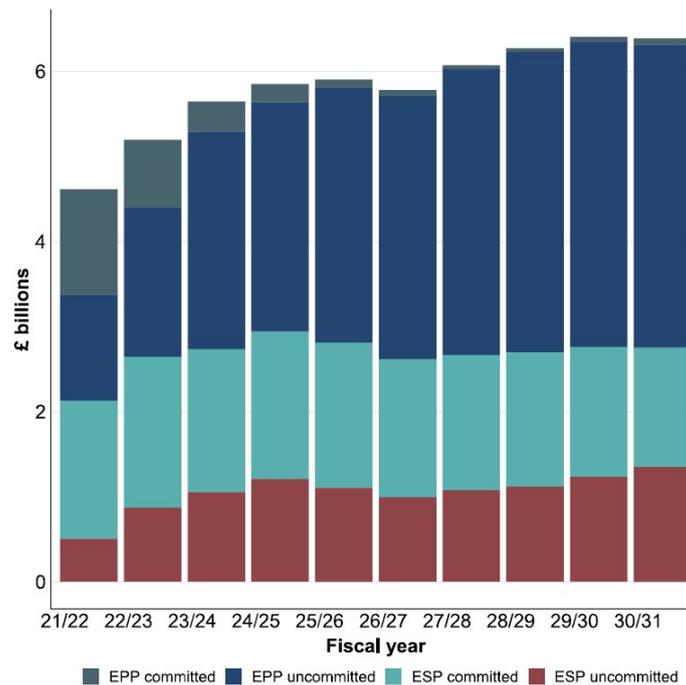


Figure 16: DNO equipment spend breakdown

The reported increase in planned spending also reflects increases in the assessed cost of delivering DNO's key strategic responsibilities. These cost increases are driven by the need to assure through-life support and platform availability for the programmes, including through additional investment in critical infrastructure projects and in submarine availability. Key drivers of cost changes also include delivery of key outputs of the recent Integrated and Spending Reviews including work to maintain and improve submarine availability.

### Key Achievements and Challenges

Procurement	Support
<p><b>Achievements</b></p> <p>Progress in delivery of the Dreadnought programme, including the delivery of the Missile Tubes for the first boat, integration into the Pressure Hull, platform design maturation, significant material procurement and redevelopment of facilities within the Barrow Shipyard.</p> <p>Handed over Astute Class boat 4, HMS Audacious to the Royal Navy for Sea Trials in April 2020.</p> <p>Progress on the builds of Astute Class boats 5, 6, and 7, with boat 5 (Anson) successfully launched in April 2021.</p> <p>Two key infrastructure milestones supporting delivery of Dreadnought Class reactor cores to the shipbuilder have been completed on time at the Raynesway site.</p> <p>Progress on the concept design of the new SSN(R) platforms.</p>	<p><b>Achievements</b></p> <p>DNO supported the UK's submarine operations, including the Continuous at Sea Deterrent.</p>

## Challenges

Recognising the high-levels of uncertainty caused by COVID-19, and the short-term uncertainty in industrial partners and their supply chains, the three-year Delivery Phase 2 of the Dreadnought Programme, entered into in 2018 will continue for a further 12 months and we will move to Delivery Phase 3 in April 2022.

During the early stages of the COVID-19 pandemic, self-isolation of key personnel and adaption to new ways of working drove some delays into the Astute Class build programmes (for all four remaining boats), but the shipyard has adapted extremely well and more recently it has been operating at near full capacity.

Recruitment and retention of staff with skills and experience for nuclear programmes continues to be challenging.

The Atomic Weapons Establishment (AWE) prepared for a return to public ownership in July 2021. AWE continues to work with the Office for Nuclear Regulation to make sustainable safety improvements at its Aldermaston and Burghfield sites.

## Strategic Programmes

Strategic Programmes is a set of equipment programmes, led by a team within head office. They are responsible for the procurement of Defence's complex weapons portfolio, test and evaluation and training services. In addition to this, the Combat Air Director holds the new funding for the next phase of the Future Combat Air System programme.

The combined Strategic and Combat Air Programmes currently plan to spend around £21.5 billion in the equipment plan over the next ten years compared to £11.6 billion at the end of the previous planning period. The increase is largely attributable to the new investment in the concept and assessment phase of the Future Combat Air System. The breakdown of this spend is shown in figure 17.

New investment will be made in missile and sensor upgrades for the Type 45 Sea Viper system, in directed energy weapons and in our test and evaluation capabilities. The Novel Weapons Programme has been funded in its first year (FY21/22) in Strategic Programmes' equipment plan. A decision will be required to transfer it into the equipment plan on a rolling basis beyond this.

An investment has also been made to develop future Test and Evaluate (T&E) capability for Novel Weapons, Artificial Intelligence, and synthetic, digital and space-based systems. These are areas we are starting to consider under the T&E Futures programme, in which we intend to invest over £60 million over the next four years. Overall, our investment will accelerate these next generation technologies into the hands of our personnel and develop a pipeline of future capabilities for the armed forces of tomorrow.

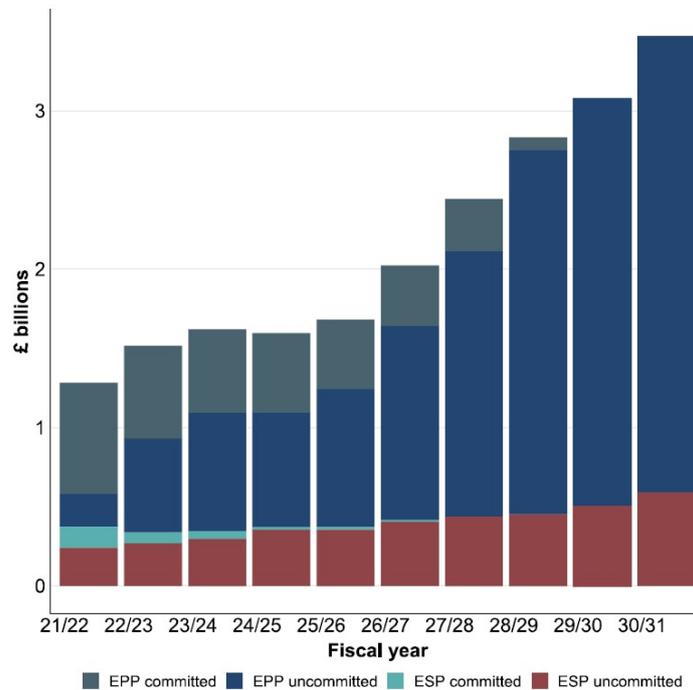


Figure 17: Strategic Programmes equipment spend breakdown

Most significantly, we are also investing in the concept and assessment phase of the Future Combat Air System. The funding for the next phase of the Future Combat Air System Acquisition Programme is to define the concept for the UK’s next generation innovative systems of core platforms, optionally-crewed and autonomous systems to preserve our operational advantage long into the future. This programme will exploit our unique industrial base to create a 6th generation combat air enterprise centred in the UK.

### Key Achievements and Challenges

Procurement	Support
<p><b>Achievements</b></p> <p>Operational restrictions due to COVID-19 impacts at DM Gosport on Aster processing were recouped by development and implementation of a revised processing approach by DE&amp;S, MBDA, Defence Munitions, and Navy Command. The impact was mitigated, the Carrier Strike Group deployment delivered, and the stockpile upheld.</p> <p>The operational impact from COVID-19 was minimised on the UK test ranges. No trials were cancelled due to unavailability of staff or ranges.</p> <p>Progressed work to mature Directed Energy Weapons</p>	<p><b>Achievements</b></p> <p>In Test and Evaluation, full operating capability was achieved for the Long Term Partnering Arrangement (LTPA) contract which transferred the capability maintenance risk to QinetiQ.</p> <p>Test and Evaluation hosted the successful multinational Formidable Shield (FS21) exercise on the Hebrides range.</p> <p>Full Business Case Approval and contracting progressed for Sea Viper Common Anti-Air Modular Missile (CAMP) and ASTER missile Mid-Life</p>

(DEW) capability for all services. This year this included concluding the Novel Weapons Programme pre-concept phase and completing a competition for substantial investment in DEW capability demonstrators through the Weapons Sector Research Framework (WSRF) announced at DESi.

## Challenges

The COVID-19 pandemic has seen significant impact across key suppliers and programmes and has required mitigations to be developed and employed to minimise schedule slippages, cost increases, and preserve ability to test.

Shortage of suitably qualified and experienced personnel across the complex weapons enterprise (MOD and Industry) caused sub-optimal need for prioritisation decisions, delays to programme delivery and reduced ability to respond to changing circumstances/threat/need.

Future Anti-ship Weapon Heavy (FASGW(H)) development and integration required prioritisation to achieve early deployment with CSG21 under a First Beneficial Use. This has impacted on costs with a bespoke pipeline to achieve the timeframe. Issues with transfer alignment and radar data transfer continue to challenge project delivery.

Refresh. Enhancing anti-surface and sustaining anti-air capabilities on the T45 Destroyer.

Sea Ceptor fitted and proven on Royal Navy Type 23 Frigates.

Spear Cap 4 (SC4) accepted into service on Typhoon in early 2021. A mid-life refresh of the Storm Shadow cruise missile providing increased countermeasure resistance.

Initial load of Future Anti-ship Weapon Light (FASGW(L)) and Future Anti-ship Weapon Heavy (FASGW(H)) missiles delivered to Carrier Strike Group 21 (CSG21), significantly enhancing the task group's defences against surface threats.

METEOR Mid-Life Upgrade Concept Study. This two-year study will deliver its findings in mid-2023, to determine the optimum solution of future Meteor capabilities and affordability.

International Partnering. Successful completion of Anglo-French concept phase and move to assessment phase of FCASW.

Established work on the Future Complex Weapons Strategy, renegotiating the Portfolio deal with our main supplier, seeking to exploit transformation in ways of working, manufacturing and cost of ownership.

# Annex A: Project Performance Summary Table

The Project Performance Summary Table (PPST) provides an overview of the delivery performance of the Department's largest equipment procurement projects. Each project has passed the Full Business Case (or previously the Main Gate) investment decision point to proceed to the Demonstration and/or Manufacture phases. For each project we report on the forecast cost, forecast timescales for achieving the 'In-Service Date' (ISD) and the forecast achievement of meeting Key User Requirements (KURs). As this is an assessment of project performance at 31 March 2021, outcomes from the Defence Integrated Review (IR) are not reflected in the table. Footnotes have been provided for those projects impacted by IR decisions.

Independent validation of the data continues to be conducted by the Department's Cost Assurance & Analysis Service (CAAS), who review evidence provided by projects to support in-year cost, time and KUR variations.

The overall PPST findings are summarised in figure 1. Complete details for each of the projects can be found in the PPST which are published in the data tables on gov.uk alongside this report.

## Changes to the Projects Included in the Table

In total there are 21 projects within the PPST population for 2021, with four changes to the project population from 2020. Queen Elizabeth Carrier has been removed having reached its In Service Date and the Warrior Capability Sustainment Programme (CSP) has been removed following the decision in the Integrated Review to cancel the programme. The Challenger Life Extension Programme (LEP) and Skynet 6A have entered the population.

## Forecast Cost

During the 2020/21 financial year, the aggregate forecast costs of the 21 projects decreased by -£219 million.<sup>19</sup> The most significant reductions were against the P-8A Poseidon programme (-

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<sup>19</sup> Projects are allocated a Foreign Exchange Rate (FOREX) risk provision so that minor or transitory changes in rates will not necessitate a re-approval. Depending on the level of foreign exchange risk exposure projects will either be allocated a foreign

£517 million, primarily due to the transfer of scope of initial aircraft and training support to a separate support approval) and E7 Wedgetail (-£89 million, driven by infrastructure savings associated with the change of E7 basing location from Waddington to RAF Lossiemouth).

The most significant increases were associated with Marshall (+£98 million), Astute (+£85 million), Sky Sabre (+£66 million), Core Production Capability (+£58 million), Type 26 (+£48 million) and New Style of IT (+£47 million). Marshall's increase was due to changes to capability requirements since the Main Gate investment decision, which includes changes to Marshall's core Air Traffic Management capabilities. Astute cost increases were due to COVID-19 impacts on the build schedule. Sky Sabre cost increases were primarily due to integration issues, late contractor delivery and COVID-19 impacts upon trials. Development and refurbishment challenges impacted on Core Production Capability resulting in increased forecast costs. Type 26 Frigate forecast increases were driven by technical difficulties in a number of key areas that caused programme slippage; these were also exacerbated by COVID-19 restrictions, driving up escalation and pain share costs (split 50:50 with industry). A combination of technology baseline changes, Private Sector support and delayed Defence Information Infrastructure (DII) Exit are attributed to New Style of IT (NSOIT) cost increases.

### Forecast Time

16 of the 21 projects with an approved In Service Date reported no in-year change to their forecast date. The other six projects reported a combined project increase of +58 months. Time increases were reported by New Style of IT (+19 months), due to challenges associated with the integration of some legacy applications and functions, which were further compounded by the impact of the COVID-19 pandemic. Brimstone CSP delays (+12 months) were attributed to both hardware integration issues and COVID-19. A time increase of (+11 months) was also experienced by Ajax due to noise and vibration issues with the vehicles which resulted in non-acceptance by the customer. Resolution of these issues is ongoing and a priority, following which the time impact can be defined. Sky Sabre reported a time delay of (+9 months), due to integration issues between its sub-systems, late contractor delivery and the impact of COVID-19 which delayed essential trials. The ASRAAM Sustainment (MG1) project experienced a time delay (+7 months) due to delays in a third-party reviewer assessing evidence which forms a mandatory part of the Safe and Suitable for Service assessment as well as a key part of the Safety Case.

### Key Performance Measures

For PPST 21 there has been no in-year change to the projected forecast of meeting Key Performance Requirements (KURs) for our major acquisition programmes. The forecasted delivery remains at 98% with 159 out of 162 KURs being met. As in previous years some projects within the population are outside the scope for reporting on KURs in the PPST due to

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exchange risk within the Approved Budgetary Level (ABL), a separate additional FOREX risk allocation outside the ABL, or both. There are nine projects in this year's table that hold a FOREX risk allocation outside of the ABL which can be found highlighted within the table footnotes.

either security reasons or awaiting approval of a revised schedule.

### Comparison of Performance between PPST 20 and PPST 21

A direct comparison should not be drawn between PPST 21 and prior years due to differing projects entering and leaving the population and projects which have received uplifts in their approval. A concise record of overall Cost, Time and KUR performance reported in previous Defence Equipment Plan publications is provided below.

Year	Number of projects	In-year Cost forecast variation	Time forecast variation	Forecast achievement of performance measures (KURs)
2021	21	-£219m	+ 58 months	98%
2020	21	-£1,135m	+12 months	98%
2019	27	-£20m	+69 months	100%
2018	27	+£783m	+62 months	99%
2017	28	+£224m	+57 months	99%
2016	22	+£237m	+34 months	99%

Figure 1: Key summary statistics for project performance summary tables

# Annex B: Project Overviews

## Dreadnought

### Equipment Background

The Dreadnought Class is the future submarine platform of the UK's strategic nuclear deterrent. Replacing the Vanguard Class, they will be the largest submarines ever operated by the Royal Navy.

Dreadnought is a new design with a number of new systems and equipment improvements which will provide the necessary increase in capability and performance to address the advances being made in the underwater battlespace by the UK's potential peer level adversaries. The Defence Nuclear Organisation is delivering this complex programme through the Dreadnought Alliance, a joint management team formed in 2018 comprising the Submarine Delivery Agency, BAE Systems and Rolls-Royce. The Alliance has rapidly developed the capabilities required to develop and deliver the Dreadnought submarines. When they enter service from the early 2030s, the Dreadnought submarines will ensure that the UK can maintain a credible, independent and capable nuclear deterrent out to the 2060s and beyond. The four Dreadnought Class submarines have all now been named: Dreadnought, Valiant, Warspite and King George VI.

### In Year Progress

The Dreadnought programme remains within the £31 + 10 billion limit to funding

established at SDSR15 and on track for the first of class to enter service in the early 2030s. Given the impact of COVID-19, the Delivery Phase 2 framework was extended to deliver the required scope until March 2022. Work is underway to move to new delivery framework, Delivery Phase 3, in April 2022. Over the past year there have been significant successes in the programme: the delivery of the Missile Tubes for the first boat, including integration into the Pressure Hull, platform design maturation, significant material procurement and redevelopment of facilities within the Barrow Shipyard.

## Core Production Capability

### Equipment Background

In April 2012, the Department started a 16-year programme to regenerate and replace the nuclear core production facilities at the Rolls-Royce site in Raynesway, the centre for design and manufacture of the UK's submarine reactor. The UK's current fleet of nuclear submarines are powered by a Pressurised Water Reactor (PWR). The PWR1 powers the Trafalgar Class submarines. The PWR2 was developed for the Vanguard Class submarines and also powers the Astute Class. The future Dreadnought Class submarine will be powered by new reactor technology with the PWR3. The CPC consists of two main areas of activity, the manufacture of reactor cores and the regeneration of the required

infrastructure, both of which remain essential to delivering the strategic aims re-asserted in the Integrated Review.

### **In Year Progress**

No reactor cores were required to be delivered this financial year. The first new reactor core component design in 25 years was introduced into the factory as part of the process for producing Dreadnought Class reactor cores. Technical challenges have slightly delayed the initial manufacture of the new design and pushed the forecast for completing the associated milestone from FY2020/21 into FY2021/22. Two key infrastructure milestones supporting delivery of Dreadnought Class reactor cores to the shipbuilder have been completed on time at the Raynesway site.

### **Astute 4-7**

#### **Equipment Background**

SDSR15 confirmed the Royal Navy's commitment to the purchase of seven Astute Class hunter-killer submarines. These submarines are the largest, most advanced and powerful attack submarines ever operated by the Royal Navy, combining world-leading sensors, design and weaponry in a versatile vessel. The state-of-the-art submarines are nuclear powered and armed with Spearfish torpedoes and Tomahawk land cruise missiles. Three Astute Class submarines, HMS Astute, HMS Ambush and HMS Artful, are already in service, HMS Audacious is preparing to be accepted into service following a successful Sea Trials period over the last 12 months. Remaining in build are Anson, Agamemnon and Agincourt, the latter two of which are progressing with their dry phases of construction. Anson is now afloat and undergoing pre-sailing preparations. Fuelled for 25 years, these platforms will contribute

to protecting the nuclear deterrent and Maritime Task Groups; collecting intelligence and delivering Tomahawk land attack strike capability. Astute submarines are designed to be adaptable throughout their life with modular systems to reduce the cost of upgrades.

### **In Year Progress**

The fourth Astute Class submarine, HMS Audacious, departed Barrow in April 2020 to embark on a full set of sea trials, including a deployment to the US. Although COVID-19 initially halted some work within the Barrow shipyard, efficient progress to address health and safety requirements and alter the ways of working for staff meant that all remaining build platforms could resume full scale working by Q3 2020. Good progress was made on the remaining boats, Anson, which was launched in April 2021, Agamemnon and Agincourt, which are in the dry phases of their construction.

### **Type 26**

#### **Equipment Background**

The Type 26 Global Combat Ship Programme will procure eight Anti-Submarine Warfare ships to protect strategic assets and sustain national shipbuilding capability.

The programme will deliver a world class platform which will have increased survivability against global threats and maintain a high level of fleet availability. It will operate globally, enhancing the UK's ability to contribute to sea control, including through maritime force projection and strategic command and control. It will deliver the flexibility to be able to operate across the scale of contingent and non-contingent operations and provide resilience across the Royal Navy.

**In Year Progress**

The build of the first Type 26 (HMS Glasgow) continued and the Department commenced procurement of long lead items in support of the next batch of Type 26 Ships. Type 26 Frigate forecast increases were driven by technical difficulties in a number of key areas that caused programme slippage; these were also exacerbated by COVID-19 restrictions, driving up escalation and pain share costs (split 50:50 with industry).

**Type 31****Equipment Background**

The Type 31 General Purpose Frigate Programme is procuring five ships for maritime security, humanitarian aid, and defence engagement-based roles to replace the ageing T23 general purpose frigates. It is the pathfinder programme for the National Shipbuilding Strategy and succeeded in reintroducing competitive tension into the UK warship building market.

The Frigate programme will deliver the capability to undertake maritime security and defence engagement operations, releasing complex warships to their primary roles. It will be available and deployable at high readiness and capable of providing a sustained and credible deterrent presence worldwide. The T31 will be interoperable with joint UK allied, coalition and civil forces, whilst maintaining the UK's freedom of action to operate independently. The T31 will be adaptable, providing evolution paths for future capability to enable growth of the destroyer and frigate numbers into the 2030s.

**In Year Progress**

The detailed design of the five Type 31 ships continued and the Department made significant progress in modernising the shipyard at which they will be built.

**Ajax****Equipment Background**

Ajax is the Armoured Cavalry Programme. The aim of the programme is to deliver a versatile and agile multi-role capability, operating at the heart of the Deep Reconnaissance Strike and Armoured Combat Brigades, that are able to succeed on current and future operations.

The multi-role Ajax armoured fighting vehicle will transform the Army's medium armour and advanced intelligence, surveillance, target acquisition and reconnaissance capability as part of the war-fighting division. Ajax will transform the way the Army conducts Deep Ground Reconnaissance and underpins the Army's ability to war fight at the divisional level through its inclusion in the Armoured Brigade Combat Teams.

The Ajax fleet will have extensive capabilities, including increased lethality through a new 40mm stabilised cannon able to fire on the move, acoustic detectors, a laser warning system, a local situational awareness system, a high-performance power pack, and best in class protection.

**In Year Progress**

The Armoured Cavalry Programme remains challenging. Emerging technical issues with noise and vibration have been identified in the demonstration phase which have resulted in delays to the programme. The vehicles are subject to staged safety case

assessments and approvals for design and operation, which alongside the requirements, are evidenced from written assessments, acceptance trials, reliability growth trials, battlefield trials and other validation and verification methods. Following a pause in dynamic testing and training in June, trials at the independent Millbrook Proving Ground resumed in September with agreement from a Safety Assurance Panel for Ajax. Extensive work is being undertaken on the Health and Safety aspects of noise and vibration. The health of our personnel remains our top priority and additional work is ongoing to assess and support the health of all personnel potentially affected.

The independent trials are essential to provide the evidence to support fundamental root cause analysis and to enable the safe resumption of wider trials and training activity. The focus for the MOD and General Dynamics remains on identifying the root causes of the noise and vibration issues to develop long-term solutions to ensure Ajax meets the Army's need. New work is being conducted between MOD and Industry to examine and test potential design modifications as part of the overall solution.

A recovery plan for the Programme is being prepared and declaration of Initial Operating Capability will not be made until solutions have been determined for the effective resolution of the noise and vibration concerns. Work continues with MOD and General Dynamics both fully committed to delivering a safe resolution and deliver this important capability.

## **Boxer**

### **Equipment Background**

Boxer forms part of the Mechanised Infantry Programme and will deliver Mechanised Infantry Vehicles that can perform a range of roles to the Infantry, Combat Support, and Combat Service Support elements across the formation (brigade) level to enable a coherent and credible deployable fighting, peacekeeping or humanitarian aid capability.

Boxer transforms the Army's medium capability with significantly improved protection and mobility and provides a reduced logistic burden. Equipped with 21st century electronic architecture and growth potential, this modular platform is future proofed to operate in the digital age.

Boxer is a lower delivery risk, UK modified off-the-shelf, highly mobile wheeled armoured combat vehicle. Boxer will be built in Telford and Stockport with a supply chain across the UK. Boxer combines long distance road deployment with all-terrain defensive and fighting capability. Similar configurations of the vehicle are already in-service with Germany and the Netherlands and are entering service with Lithuania and Australia. A common base platform, offering the development of interchangeable mission modules, Boxer can rapidly be adapted to suit the military mission.

### **In Year Progress**

Following UK design trials in summer 2020, the Preliminary Design Review for Boxer was successfully completed in October 2020 and the Critical Design Review commenced. This will enable manufacture of demonstration vehicles to commence ahead of trial activity and the delivery of the first production vehicles into trials and acceptance by early 2023. The Integrated Review announced the intent to accelerate,

enhance and uplift Boxer delivery, which is currently being explored.

## Challenger LEP

### Equipment Background

To meet the enduring need for the UK to deploy Main Battle Tanks (MBTs) there is a requirement for the Army's in-service Challenger 2 MBT to be upgraded to meet future threats. Modern armies need to maintain a blend of capabilities. While new technology offers the potential for significant advantage on the modern battlefield, it has not replaced the requirement to physically take and hold ground. The most effective means of doing this is the combination of the Main Battle Tank, supported by the Infantry. The Army assess that modernised tanks are essential to maintain a credible and desirable British contribution to NATO.

The new MBT will be designated Challenger 3 (CR3) and will be built by Rheinmetall BAES Systems Land (RBSL). CR3 will be a highly capable MBT as it will have a completely new digitised turret with new sights and fire control systems, the turret will mount a smoothbore gun capable of firing advanced ammunition. CR3's protection will be increased through an armour upgrade and an active protection system, subject to an ongoing feasibility study.

The contract with RBSL will create and sustain 650 jobs within the UK and will attract inward investment in RBSL's Telford facility and will utilise a UK supply chain that includes companies in the West Midlands, Glasgow, Newcastle upon Tyne and the Isle of Wight.

### In Year Progress

An £800 million contract to deliver a fleet of Challenger 3 (CR3) Main Battle Tanks

(MBT) was awarded to Rheinmetall BAE Systems Land (RBSL) on 18 March 2021. This will upgrade 148 of the Army's existing CR2 MBTs with a digitalised turret, a more capable 120mm smoothbore gun with enhanced munitions, upgraded sights and enhanced survivability based upgraded armour and other survivability enhancements. The CR3 design will continue to be refined until Nov 22, at which point a number of prototypes will be built for trials purposes before manufacturing commences to deliver an operating capability in 2027.

The Interim and Critical Design Reviews (CDR) concluding by end 2022 represent the next key milestones. CDR is the point at which the design is frozen and prototype manufacture commences.

## Apache CSP

### Equipment Background

The Apache Capability Sustainment Programme (CSP) will ensure the UK maintains a battle winning Attack Helicopter out to at least 2040 that is aligned to and interoperable with our major allies. The programme will address obsolescence issues that are gradually degrading the current Apache Mk1 Fleet. Fifty Apache AH-64E helicopters are being procured through the US government via a foreign military sale to meet a December 2024 target for Full Operating Capability. While the UK's AH-64Es will maintain commonality with the latest US aircraft, the version 6 aircraft will have two UK modifications: a sovereign Defensive Aids Suite and Windscreen Wash Wipe for maritime operations. Whilst the new platform looks very similar to the Apache AH Mk1, new engines, drivetrain and main rotor blades will deliver a boost in

aircraft performance and on-board engineering diagnostics and greater reliability will ensure increased availability.

Inside the cockpit, revamped software will create a more stable operating system, and with the introduction of a revolutionary Cognitive Decision Aiding System, pilots will be able to prosecute targets quicker and operate in a safer manner. For improved target engagement, sights and sensors on the nose turret and rotor mast have been upgraded to enable identification at greater ranges and with improved accuracy thus enhancing lethality and aircraft protection.

### **In Year Progress**

The first ten AH-64E aircraft have now arrived in the UK and the programme remains on track to deliver the full fleet of fifty aircraft by 2024. The first of 3 Longbow Crew Trainer simulators has arrived, been certified, and is currently delivering conversion training to the first tranche of UK AH-64E pilots. The programme remains on track to achieve Full Operating Capability by December 2024.

## **E7 Wedgetail**

### **Equipment Background**

This programme was established to procure five Boeing Wedgetail Airborne Early Warning & Control (AEW&C) aircraft. In accordance with the outcome of the Integrated Review, the size of the fleet has been reduced from five to three and will be co-located with the P-8A Poseidon fleet at RAF Lossiemouth. The Wedgetail is based on a standard Boeing 737 NG airliner, modified to carry a sophisticated Northrop Grumman active multi-role electronically scanned array (MESA) radar. Modification of the aircraft being carried out in the UK, by

STS Aviation in Birmingham. The MESA radar lies at the heart of the aircraft and is a highly capable and flexible radar and will provide the UK with a technological edge in an increasingly complex battlespace allowing the tracking and targeting of modern adversaries and threats more effectively than ever before. It is capable of multiple operating modes in support of Joint Domain Command and Control. Wedgetail will be a central asset in the RAF's Next Generation ISTAR Force and will enhance the capability of other advanced platforms by providing situational awareness to platforms such as the Queen Elizabeth Class Aircraft Carriers, P-8A Poseidon, Typhoon and Lightning II.

### **In Year Progress**

Following the 2021 Integrated Review, negotiations with Boeing continue to formalise the Programme schedule. The first aircraft to be modified arrived in the UK in January 2021 and STS Aviation was accredited by the Military Airworthiness Authority. The latest increment of the Ground Support Segment contract was let in December 2020 which includes provision of mission support equipment, the Air System Document Set and other technical activities. The arrival of the second aircraft arrived for conversion in autumn 2021. The delivery team continue to work with Boeing to resolve several issues with the Wedgetail configuration relating to obsolescence certification and interoperability, and it is the current intent to include resolution of these issues along with the schedule discussions in an omnibus contract amendment.

## **F-35B Lightning II**

### Equipment Background

The F-35B Lightning II aircraft is an advanced, fifth generation aircraft procured to operate alongside the RAF's Typhoon. It is jointly crewed by the Royal Air Force and the Royal Navy, has the ability to operate with equal capability from land and sea and forms an integral part of Carrier Strike operating from the UK Queen Elizabeth Class aircraft carriers. It is a multi-role combat aircraft, meaning a single aircraft can conduct the roles and missions of different aircraft types simultaneously. These include air-to-air operations, air-to-surface operations and intelligence gathering. The aircraft has been designed for growth and expansion of its capabilities, which will continue to be developed through life to ensure we stay ahead of emerging threats. SDSR 15 accelerated the purchase of Lightning aircraft to generate 2 front-line squadrons, from 2023, delivering a carrier strike capability second only to the USA. The Initial flight trials of the F-35 Lightning aircraft from HMS Queen Elizabeth were completed successfully in 2020, the first major step in allowing a coherent build-up towards delivering a carrier Strike capability for the UK. The inaugural deployment of the Carrier Strike Group in 2021 to the Indo-Pacific region showcased the UK's ability to project global influence.

### In Year Progress

In December 2020, Initial Operating Capability (Maritime) was declared to enable Lightning to deploy to a Queen Elizabeth Class Carrier and conduct operations from a land or sea base, contributing to the UK's Carrier Strike capability. The focus for the Lightning Programme is now building to generate two front-line squadrons from 2023. In May 2021, Lightning began a contribution to Operation FORTIS, the

inaugural operational embarkation of the Lightning Force on HMS Queen Elizabeth.

## Marshall

### Equipment Background

The Marshall programme will deliver a sustainable military Air Traffic Management (ATM) capability at MOD-operated airfields and flying ranges within the UK and overseas. It will also provide a deployed ATM capability in support of expeditionary operations. The prime contractor is Aquila ATM Services, comprising specialists from National Air Traffic Services and Thales UK. The programme was initiated in October 2014 and will deliver services for a period of 22 years, until 2037. It is structured around the delivery of Technical Services rather than simply upgrading equipment but also replaces ageing military ATM equipment and will ensure compliance with mandatory international regulations such as 8.33KHz Frequency Radio Spacing and Mode S Radar Capability. Key programme deliverables include improved safety, regulatory compliance and a reduction in the requirement for military maintenance personnel. Marshall will transform the current military capability into a modern, efficient and world-class ATM service.

### In Year Progress

The programme is currently in its sixth year of delivery, providing ATM services via legacy systems, and rolling out new equipment in parallel across the MOD estate. Aquila support for legacy capabilities, delivering 'Temporary Technical Services', has continued to be strong. There has also been significant progress with the installation of the new equipment, including

the delivery of the 'all-up' surveillance capability package at RAF Shawbury; this entered Full Operational Service in January 2021. The programme saw cost increases due to changes to capability requirements since the Main Gate investment decision, which includes changes to Marshall's core Air Traffic Management capabilities.

## **P-8A Poseidon**

### **Equipment Background**

Nine P-8A Poseidon Maritime Patrol Aircraft, based on the Boeing 737-800 Next Generation aircraft, are being procured to fulfil the Persistent Wide-Area Surveillance (Maritime) capability requirement. The Poseidon provides detection, location, identification, tracking and attack of above- and below-water targets, contributing to Anti-Submarine Warfare (ASW) and Anti-Surface Unit Warfare (ASuW). It will also contribute to Maritime Counter-Terrorism activity, Joint Personnel Recovery and long-range Search and Rescue operations. Poseidon will be equipped with the Mk 54 Lightweight ASW Torpedo to enable it to attack sub-surface targets. The ability of the MOD to rapidly reintroduce a sovereign UK MPA capability has been greatly enhanced by the RAF's 'Seedcorn' personnel who are already operating the Poseidon with the US Navy. Training of our initial cadre of Poseidon personnel has been carried out by the US Navy at Naval Air Station Jacksonville, USA, since 2019, and relocated to RAF Lossiemouth in autumn 2021, located in a brand-new purpose-built facility which houses all training, maintenance and mission support activities.

### **In Year Progress**

On 1 April 2020, Air Command was able to declare an Initial Operating Capability for the

P-8A Poseidon, following a successful transition from the US Navy base at Jacksonville to the UK, operating from a temporary base at Kinloss Barracks until the RAF Lossiemouth runway work was completed. RAF Lossiemouth's runways and operating surfaces were declared ready by the end of September 2020, despite some challenges presented by COVID-19, and Poseidon moved across from Kinloss to its new home in early October 2020 and the new purpose-built Strategic Facility. Since then, the Poseidon force has continued to grow, and the fleet received its fifth aircraft in early February 2021.

## **Protector**

### **Equipment Background**

Protector RG Mk1 is designed to deliver a UK Sovereign capability for Deep and Persistent Armed ISTAR out to the late 2030s, that will encompass long range, persistent wide area surveillance and precision strike capabilities and will replace the current Reaper fleet. It will be the first RPAS to be operable in non-segregated controlled airspace around the world. It will be piloted utilising Beyond Line of Sight satellite communications by two front line squadrons, supported by a dedicated UK based Operational Conversion Unit, all commanded by the ISTAR Force Commander. The platform will deliver a range of operational effect and will additionally contribute to a broad array of Homeland defence tasks, such as Military Aid to Civil Authorities. The UK modifications include enhanced datalinks and a variety of precision weapons. The open system architecture presents opportunities to integrate current and future UK weapons and sensors and enables a

50% payload increase over Reaper. Fitted with a class-leading multi-spectrum high-definition camera combined with world beating intelligence gathering capability, the RPAS will carry next-generation, low collateral, precision strike weapons. The RPAS includes a variety of innovative capabilities, including Automatic Take-off and Landing. This will vastly increase operational flexibility and response time and will enhance safety through providing a greater range of emergency or weather diversion options. It is ready to be integrated with Detect and Avoid technology, which will widen the class of airspace in which the aircraft can operate. The aircraft has a 40-hour endurance in an ISR role.

### **In Year Progress**

On 25 September 2020, the Protector RG Mk1 aircraft successfully completed its first flight. That milestone in the Protector programme followed the announcement in July 2020 that the first three aircraft were being manufactured following the award by the MOD of a £65 million contract to General Atomics – Aeronautical Systems Inc in May 2020. A Bilateral Statement of Intent has also been agreed between the UK and Belgium to explore collaboration over the platform, which both nations are in the process of acquiring. A major alteration to the Protector infrastructure solution was required in November 2020 due to the relocation of the Wedgetail to RAF Lossiemouth. Work continues with the Defence Infrastructure Organisation to provide suitable facilities to meet the planned Initial Operating Capability in late 2023. Additionally, development of the complex information requirements of Protector have progressed significantly during the year and will be further refined in the coming period.

## **GBAD-FI Sky Sabre**

### **Equipment Background**

The GBAD-FI Programme will deliver the Sky Sabre Air Defence capability to replace the currently fielded Rapier system in the Falkland Islands. The Programme passed Main Gate in Dec 2016, at which the Investment Appraisal Committee mandated that two in service capabilities (sensor and effector) were to be integrated with a new Battlespace Management, Command, Control, Communications, Computers and Information (BMC4I) system. The Sky Sabre capability therefore comprises Saab's Giraffe-Agile Multi Beam air surveillance radar, MBDA's Networked Land Ceptor / Common Anti-air Modular Missile effector and Rafael's BMC4i system (which is based on the 'Iron Dome' capability). Sky Sabre will provide enduring air defence against the current and Future Aerial Target Set and has an Out of Service Date of 2045. Although optimised for Falkland Islands use, it will provide a pathway for the future contingent Land GBAD capability.

### **In Year Progress**

Integration development and testing have continued, and the recent successful completion of a comprehensive Live Fire Trial in the US proved the system's ability to operate in both networked and stand-alone configurations. Sky Sabre saw cost increases due to integration issues and COVID-19 impacts on trials. The programme was delayed due to integration issues between its sub-systems, late contractor delivery and the impact of COVID-19 which delayed essential trials.

## **FBLOS Skynet**

### Equipment Background

The purpose of the SKYNET 6 programme is to provide and sustain a space-based communications capability, thereby delivering information to enable MOD's information advantage anywhere, anytime. This includes enabling strategic, operational and tactical communications to static and deployed forces, overseas territories, areas of Strategic Interest and the UK. SKYNET 6 consists of three main workstreams: the first new satellite, SKYNET 6A; ground services within the Service Delivery Wrap; and the future space and ground solutions, known as Enduring Capability.

### In Year Progress

A contract was awarded to Airbus Defence and Space for SKYNET 6A in July 2020. This will cover all aspects of a military communications satellite development and a planned launch in 2025.

## New Style of IT (Deployed)

### Equipment Background

The New Style of IT (Deployed) programme is delivering operationally deployable UK Secret, Mission Secret and Official information and communications technology to the Land and Maritime environments. The next generation system will be known as OpNET and will replace numerous, divergent and obsolete legacy systems delivered by multiple suppliers. The Integrated Review has provided the opportunity to increase the scaling of this critical new military capability.

### In Year Progress

The New Style of IT (Deployed) programme has completed testing of the first Secret and Official OpNET Lightweight, Medium, and Large nodes for Land environment and the

Secret and Official OpNET Large+ solution for Maritime environment. Time increases were reported due to challenges associated with the integration of some legacy applications and functions, which were further compounded by the impact of the COVID-19 pandemic.

## Complex Weapons Portfolio

### Equipment Background and In Year Progress

The Complex Weapons Portfolio initiative is based on meeting the UK's enduring requirement to have battle-winning military capability through the use of Complex Weapons and to retain the ability to develop leading-edge Complex Weapons technologies.

Within this context, the initiative aims to deliver: Improved, adaptable and flexible Complex Weapons that can be shaped to meet current and future military capability needs; and freedom of action and operational advantage in our Complex Weapons through a sustained indigenous industrial construct.

**Brimstone 3A:** Brimstone 3A is the latest standard of the combat-proven short-range, air-to-surface missile, capable of engaging static and mobile targets with high precision and very low risk of collateral damage. It will progressively replace Brimstone 2 on Typhoon as part of routine stockpile management.

Manufacturer delays have resulted in entry into service being delayed until spring 2024.

**Brimstone 3B:** The Brimstone Capability Upgrade Programme continues in spite of integration onto Apache being cancelled. Work continues on Brimstone 3B development for employment from Typhoon

and Protector, with Typhoon being recently selected to be the lead platform.

**Meteor on F-35B:** Meteor is a beyond visual range air-to-air missile featuring active radar guidance and exceptional long-range performance. Developed by a 6-nation partnership, it is currently in service on Typhoon and will undergo modification to allow internal carriage on Lightning II.

Meteor was assigned a place in the Follow-on Development Programme by the F-35 Joint Programme Office and contracts were awarded to Lockheed Martin in the early summer. However, entry into service is not anticipated to be until 2027 and there is a possibility that integration pressures in the programme may incur further delays because of challenges in the wider F-35 programme.

**Spear Capability 3:** SPEAR Capability 3 is a medium-range missile due to enter service in 2025/26 as the primary air-to-surface weapon for Lightning II. Guided by GPS, laser or advanced radar scene matching, its miniaturised turbine engine gives it a substantial range advantage over equivalent sized unpowered weapons.

The first 'design definition' missile was built ready for robustness testing and the first guided firings are scheduled to begin later this year on Typhoon. These firings will de-risk integration onto Lightning II. However, the anticipated entry into service on Lightning II of 2025 is likely to slip to 2026, on account of the overburdened integration schedule.

**ASRAAM:** ASRAAM is a short-range air-to-air missile currently in service at Block 4 standard on Typhoon and Lightning. The upgraded Block 6 missile incorporates a UK-manufactured seeker and will progressively

replace Block 4 as part of routine stockpile management.

The Block 6 seeker underperformed in testing and remedial work has delayed the operational evaluation, thus delaying entry into service on Typhoon until spring 2022. The Block 4 missile will continue to be used by Lightning II until integration is complete in 2025.

**SPEAR Cap 4:** SPEAR Cap 4 is the mid-life upgrade of the very successful Storm Shadow, long range, deep penetrating, precision strike weapon. This upgrade sees refreshment of the weapons explosive components and upgrade of other components to support service until the end of the decade.

SPEAR 4 was accepted into service in January this year and will gradually replace the existing stockpile of legacy Storm Shadow weapons.

**Sea Ceptor FLAADS (M) T23:** Sea Ceptor is the local area air defence missile which entered service in May 2018 on the T23 Frigates and replaces the Sea Wolf missile system. The active radar seeker and increased range offers a significant operational advantage over previous systems.

Sea Ceptor achieved its in service date on Type 23 Frigates in May 2018. Eight frigates are now currently fitted with this capability.

**Sea Ceptor FLAADS T26:** The Sea Ceptor missile system will also be fitted to the T26 Frigate to provide local area air defence. The provision of the Sea Ceptor system to the T26 platform remains on track to meet the platform's planned in service date

**Future Anti-Surface Guided Weapon (Heavy):** The Sea Venom helicopter

launched anti-ship missile is intended to defeat Fast Attack Craft and Corvettes. The system is being jointly developed with France. A 'First Beneficial Use' capability should formally enter service in 2023.

An interim version of the missile was delivered in Mar 21. It was deployed on CSG21 units. Initial Operating Capability for the interim variant remains on track for mid-2022. Ongoing integration challenges for main programme continue to present time and cost challenges.

Future Anti-Surface Guided Weapon (Light) Martlet missiles and equipment were

delivered in Apr 21 to support the first operational deployment on Carrier Strike Group 21, in line with the Royal Navy's priorities. Currently an operational clearance is in place, with formal Initial Operating Capability declared in October 2021. Ongoing integration and missile qualification challenges continue to drive time and cost growth risk into the programme.

**Future Anti-Surface Guided Weapon**

**(Light):** The Martlet Missile manufactured by Thales, is a helicopter launched missile designed to counter the threat posed by Fast Inshore Attack Craft.

## Annex C: Changes to the Defence programme

This table shows the changes across the whole Defence programme, not just the equipment plan. This shows the breakdown of the £10.7 billion of investment in the period covered by Defence's current budget settlement with HM Treasury (21/22 to 24/25). Investments are measures which were not included in the costed Defence plan at the time of the previous equipment plan although Defence may have announced its intent to pursue these measures before the Spending Review. Measures are grouped by the size of the financial impact.

Value in Spending Review Period	Investments <i>See key below table</i>	Savings and Reprofiting
<b>Over £1 billion</b>	Replacement Warhead <b>A</b> Future Combat Air System <b>A</b>	Research and Development <b>Ex</b> Workforce savings Reprofile spend on new Chinook
<b>£200m to £999m</b>	Infrastructure investment <b>Ex</b> Typhoon Radar 2 Procurement <b>A</b> Digital transformation programme <b>N</b> Improve submarine availability <b>Ex</b> Persistent engagement <b>N</b> Nuclear investment <b>N</b> National Cyber Force uplift <b>N</b>	Space Command and Defence Space Portfolio <b>N</b> Cyprus Infrastructure Improvements <b>N</b> Sea Viper Enhancements <b>N</b> Minewarfare and Hydrographic Capability Block 1 <b>N</b> Surface to Surface Guided Weapon <b>N</b> Cancel the Warrior Capability Sustainment Programme Defer MRVP Package 1 Tranche 1 Reduce E7 Wedgetail fleet from 5 to 3 Retire C130
<b>£100m to £199m</b>	Invest further in Defensive Cyber <b>N</b> Future Accommodation Model <b>A</b> Invest in Support Functions across Defence <b>N</b> Head Office investment <b>N</b> Land Special Operations Units <b>N</b> Astute Class <b>Ex</b>	Boxer <b>N</b> Shipbuilding Pipeline <b>N</b> Invest further in Synthetics <b>N</b> Intelligence and Electromagnetic activities <b>N</b> Invest in Land Ground Based Air Defence <b>N</b> Defer Lewis BMD Radar Retire E3 Sentry AMRAAM savings LTTSS-Apache Support Contract Renew the ISR Strategy
<b>Up to £99m</b>	Purchase Future Lightweight Torpedo <b>N</b> Landing Ship Dock Auxiliary capability upgrade <b>N</b> Test and Evaluation <b>N</b> Medium Lift Helicopters to replace Puma <b>N</b> Electromagnetic Warfare, Surveillance, and Intelligence <b>N</b> Extend Merlin Mk2 and Mk4 OSD <b>N</b> Future Commando Force Investment <b>N</b> Extend Type 23 Frigates <b>Ex</b> <i>Other investments: £652 million</i>	Adjust Land Precision Strike programme Air Command Range Infrastructure savings Puma helicopter taken out of service Retire Hawk T1 (excluding RAF acrobatics team) Retire two Type 23 frigates Defer the F35B Air Signature Assessment Facility JAGM used for Apache instead of Brimstone Retire Sandown class mine countermeasures vessels Typhoon Tranche 1 taken out of service <i>Other savings: £784 million</i>
<b>Cost change outside the Spending Review period</b>	Funding for F-35B second tranche <b>N</b> Equipment for Special Forces <b>N</b> Minehunter and Hydrographic Capability Block 2 <b>N</b>	Invest in additional A400M Atlas <b>N</b> Air Platform Protection (APP) <b>N</b>

Key for investments: **N** = new investment, **A** = previously announced but not included in EP20 costed plan, **Ex** = expand existing work or platform or improving availability

