



Ministry  
of Defence

# THE DEFENCE EQUIPMENT PLAN 2019

Financial Summary

27 February 2020





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# Foreword

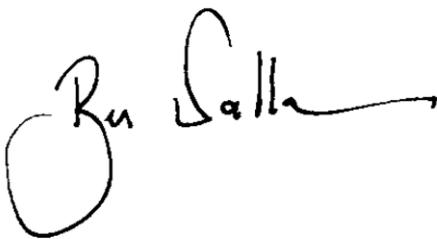
The threat to the UK and our interests is intensifying and diversifying. As we set out in the Modernising Defence Programme, we need to modernise to keep pace with these threats. The forthcoming Integrated Security, Defence & Foreign Policy Review will provide us with the opportunity to re-visit our equipment plans to make sure that we are spending the Defence budget on the right capabilities to keep our country safe in the decades ahead. This will inescapably bring some difficult choices.

We will need to create the financial headroom in our Equipment Plan to harness emerging technologies and develop the battle-winning capabilities of tomorrow. We know that to get this right, we must accelerate our work to mobilise, modernise and transform so that we deliver more effectively and efficiently over the long term. Reviewing our acquisition process will be an important part of this work.

Whilst there is clearly work still to do, the Department has made encouraging progress in improving financial management, including in the Equipment Plan. We have balanced the budget for equipment in the 2019/20 financial year and refined our assessment of the financial shortfall in our plans for the next decade, which has reduced from £7 billion to £2.9 billion, or 1.6% of our equipment budget.

We take seriously the recommendations of the 2018 Public Accounts Committee inquiry into the Equipment Plan and in April 2019 reported the actions we are taking in response. These include revisions to this report to include further analysis of changes to the affordability of the Plan and provide further background information to individual projects.

The Government remains committed to meeting the NATO target of spending at least 2% of GDP on defence and at least 20% of that spending will be on equipment. During 2018/19, the Government committed £1.6 billion additional spending for Defence and a further £2.2 billion was committed in Spending Round 2019. The detailed implications of this most recent settlement on the Equipment Plan are being reviewed and will be reported in due course.



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



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## Executive summary

### **We adjust our plans in response to a changing threat picture and operating environment**

The Modernising Defence Programme (MDP), building on the National Security Capability Review (NSCR), concluded that the challenges we face have become more complex, intertwined and dangerous. Threats are developing at a faster pace than anticipated. Our adversaries are increasing their engagement in hostile state activity and their technology is rapidly evolving. The MDP outlined the need to deliver across three priority areas: mobilise, modernise, and transform. These investment priorities underpin the budget settlements we received in the past two years and our investment plans.

### **We balanced the budget for the Equipment Plan in 2019/20 but there remains risk to affordability longer term**

In April 2019 the shortfall between available spending and expected costs reduced to £2.9 billion, or 1.6% of budget, over 10 years. This is down from £7.0 billion in April 2018. The Department started 2019/20 with forecast costs aligned to budget following the commitment of £1 billion additional spending in Budget 2018. We reduced forecast costs over the longer term through continued emphasis on identifying and delivering efficiency initiatives and investment in improving forecast accuracy.

However, there remain risks to affordability in the longer term. Forecast costs were £5.8 billion over the available budget for the four years from 2019/20. This is broadly comparable to the shortfall over the same period at April 2018 because there was no commitment to longer term funding at Budget 18 and the Department chose not to substantially revise plans ahead of a multi-year spending review originally anticipated in 2019.

Spending Round 2019 announced that the Government is investing an additional £2.2 billion in Defence over 2019/20 and 2020/21. How this additional investment will affect the Equipment Plan will be resolved through our annual planning process which will conclude this winter. We will manage risks to longer-term affordability carefully until the next review of the Department's financial settlement, currently anticipated to be a Spending Review in 2020.

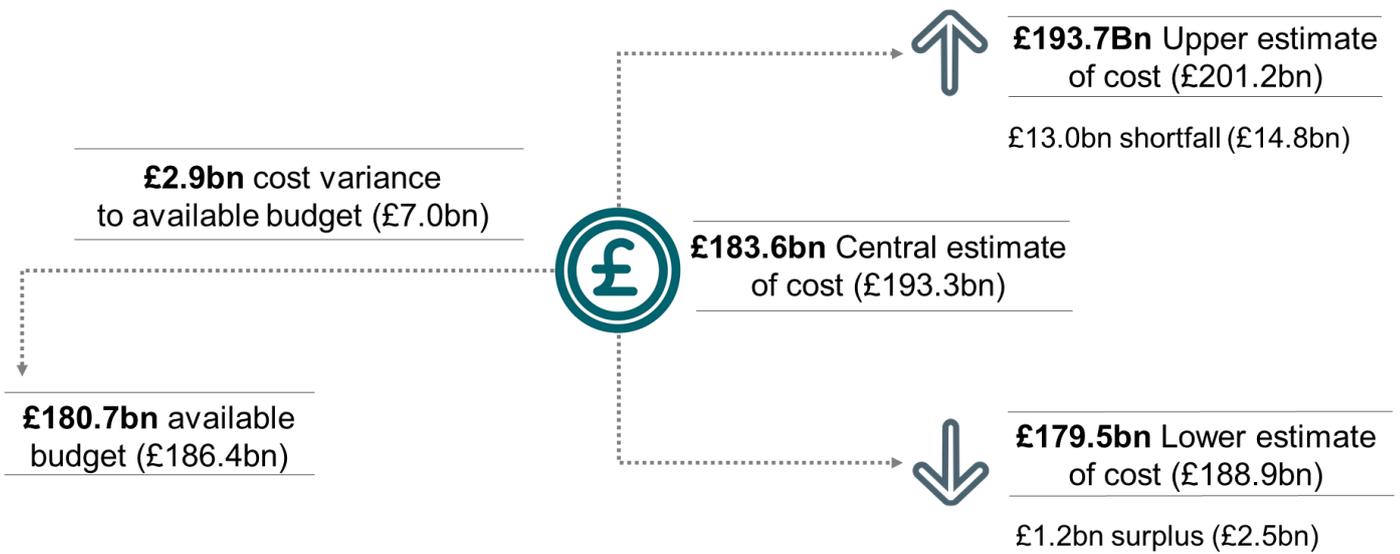
### **We continue to improve our management of the Equipment Plan and the transparency of our reporting**

The MDP outlined our commitment to transform Defence so we can improve productivity, reduce costs, and deliver next generation military capabilities. We are making good progress against our efficiency savings targets, including those for the Equipment Plan of which 60% are already being delivered. One of the goals of our ambitious transformation programme is to deliver the remainder, which will require upfront investment and a significant cultural shift.

We are strengthening Head Office's role in directing and enabling Defence to deliver its outputs, including through implementation of a Functional Leadership model for cross-cutting activities to drive business transformation.

We are committed to transparent reporting and have further improved the clarity and accessibility of this financial summary, in line with recommendations made by the NAO last year.

# Key facts



## £188.4bn spending plans



£46.7bn Submarines (£44.6bn)



£24.0bn Information Systems and Services (£24.8bn)



£19.5bn Land Equipment (£18.4bn)



£19.3bn Ships (£19.5bn)

£5.7bn ISTAR (£4.9bn)

£2.2bn Logistic Delivery (£2.2bn)

£4.5bn Other (£2.5bn)

n/a Naval Bases (£3.2bn)

£5.6bn departmental contingency allocated to the Equipment Plan (£6.2bn)



£18.4bn Air Support (£18.6bn)



£17.1bn Combat Air (£17.8bn)

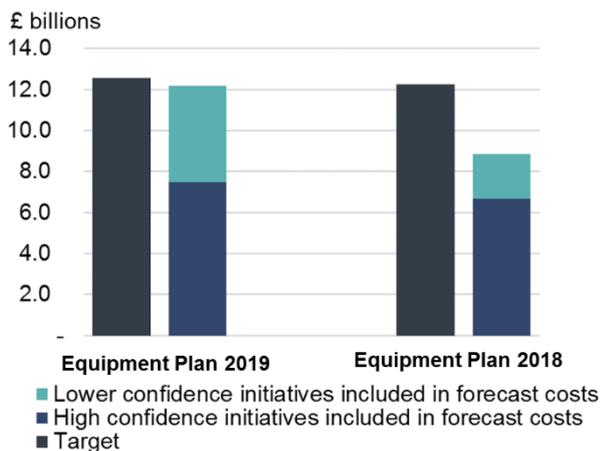


£14.7bn Weapons (£13.8bn)



£10.8bn Helicopters (£9.6bn)

## £12.2bn Expected efficiencies delivery\* (£8.8bn)



Figures may not sum due to rounding

Brackets denotes figures reported in Equipment Plan 2018

\*Efficiencies data excludes Complex Weapons Programme

## Introduction

This Equipment Plan financial summary report covers the period from 1 April 2019 to March 2029 and sets out spending plans for the procurement and support of equipment for the Armed Forces. It is published on the same day as the NAO assessment of the Plan for 2019<sup>1</sup>.

The purpose of this report is to provide Parliament and the public with an account of planned Defence equipment spending and progress delivering these plans. We continue to evolve the report in response to recommendations of the annual Public Accounts Committee inquiries and National Audit Office assessments. In 2018 the Department presented an assessment of the affordability of the Plan for the first time. We have updated our assessment in this edition and clarified our presentation of this information. We have made one substantive change to the structure of the report, adding a section to provide additional commentary on those projects we assess in the Project Performance Summary Table.

This report is presented in six parts:

**Part 1: Strategic Context.** This section sets the fiscal and policy context for the Equipment Plan and goes on to outline particular achievements of 2018/19.

**Part 2: Affordability and financial risk.** This section describes how the Department forecasts costs and plans budgets for the Equipment Plan, and concludes with an assessment of the affordability of the Plan, including an assessment of risks.

**Part 3: Changes to management of the Equipment Plan.** Part 3 explains changes the Department is making that will improve management of the Equipment Plan.

**Part 4: Sector Analysis.** This section presents planned spending on the Equipment Plan for each of the top-level budget organisations, the scope of Equipment spending for each and delivery progress in 2018/19.

**Part 5: Project Performance Summary Table.** This section focuses on the financial and delivery performance of individual projects in 2018/19.

**Part 6: Project Overviews.** A new addition to the report for 2019, this section provides background to the projects presented in Part 5 and commentary on delivery progress in 2018/19.

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<sup>1</sup> NAO, "The Equipment Plan 2019 to 2029", [www.NAO.org.uk](http://www.NAO.org.uk).

# Part 1: Strategic Context

## 1.1 Fiscal Context

In 2018 the Department presented its first detailed assessment of the affordability of the Equipment Plan. We concluded that the Department faced pressures of £7 billion over 10 years against the Planning assumptions agreed at Spending Review 2015.

At Budget 2018, MOD secured additional funding to relieve £1 billion pressure in 2019/20. This enabled continued investment in delivering the world-leading capabilities our Armed Forces require. It also allowed Defence to continue investing in modernising our critical assets, such as our offensive cyber capabilities, anti-submarine warfare and our nuclear deterrent.

This has allowed the Department to reach a balanced financial position for 2019/20. But with no commitment to further funding above the Department's Spending Review 2015 assumption for 2020/21 and beyond, there remained significant risk to affordability from 2020/21. Details of this pressure and the steps we have taken to manage this risk are set out in Part 2 of this report.

Spending Round 2019 announced that the Government will invest an additional £2.2 billion in Defence over 2019/20 and 2020/21. While the additional funding is much needed and reduces financial risk, the threats and challenges Defence faces continue to evolve, meaning challenging decisions will still need to be made to prioritise investment. We are working through the implications for the Equipment Plan as part of our planning process to be concluded through the winter. The 2019 Spending Round only provided a single year settlement and so the longer-term financial challenges within the plan will need to be resolved in a future multi-year Spending Review, with the next currently anticipated in 2020.

## 1.2 Delivering the Future Force

The 2015 Strategic Defence and Security Review (SDSR) reaffirmed the Government's

commitment to maintaining the UK's independent, minimum, credible nuclear deterrent. The nuclear deterrent exists to deter the most extreme threats to our national security and way of life; it remains essential to our security today and for as long as the global security situation demands. Since 1969, the Royal Navy's submarines have delivered Continuous At Sea Deterrence, with at least one submarine out on patrol at all times. The current Vanguard class submarines are nearing the ends of their service lives, and we are investing in a fleet of four new Dreadnought class nuclear powered and nuclear armed submarines to replace them. The first of these will enter service from the early 2030s and they will ensure that the UK has a credible, independent and capable nuclear deterrent out to the 2060s and beyond.

The 2015 SDSR also set out a headmark for the UK's Armed Forces in Joint Force 2025. This would be equipped with a range of new and enhanced capabilities, and better able to take on a broader range of missions to contribute to all three National Security Objectives. This includes the capacity to deploy a joint, all arms force comprising a Maritime Task Group, an Army Division, and Expeditionary Air Group and a wide range of joint force enablers in support. Both the world-leading capabilities we are currently operating and those we will be bringing into service in the years ahead will provide the backbone of the UK's Armed Forces.

Since 2015 the international security environment has become more uncertain, volatile and dangerous at a faster rate than we predicted in 2015. Technology now enables more complex and rapidly developing threats from a broader spectrum of actors than ever before. The post-Cold War era is over, and a new era of great power competition has arrived. Potential adversaries are modernising their conventional capabilities and we anticipate facing a peer threat. At the same time, a willingness to weaponise the space and cyber domains, and employ less conventional, hybrid tactics that blur the line between war and peace

forces us to adjust our approach to resilience, readiness and capabilities accordingly.

In response to this, in 2017 the National Security Council commissioned a focused National Security Capability Review (NSCR) to identify how we could develop, deliver and deploy our national security capabilities to maximum collective effect. This was followed by the Modernising Defence Programme (MDP) in 2018, which established a set of policy approaches and capability investment priorities that will help to keep us on track to deliver the right capabilities for UK Defence for the coming decade and put us onto an enduringly affordable footing for the future.

The MDP report, published in December 2018, explains three broad priorities for Defence in the immediate-term.

## Mobilise

Defence will mobilise, making more of what we already have to ensure our Armed Forces are best placed to protect our security. We will invest to improve the readiness and availability of a range of key Defence platforms and have re-prioritised the current Defence programme to increase weapon stockpiles and spares. We are hardening our systems and capabilities against the newer threats we face and become better at deterring our adversaries from hostile state activity by improving our ability to detect covert attacks and attribute responsibility when our adversaries attempt to deny it. We are working with allies and partners to harness routine training and deployments to demonstrate our strength and intent.

## Modernise

Defence will modernise, embracing new technologies and assuring our competitive edge over our adversaries. Technology-led modernisation will place this rapid, coherent, and strategic approach at the heart of defence

thinking and decision-making. This strategy of targeted modernisation will draw on the Defence Technology Framework's prioritisation of key technology areas, including the rapid incorporation of the newer domains of space and cyberspace. We are investing to improve our ability to protect our nuclear deterrent and critical national infrastructure from emerging threats, and have launched a new Transformation Fund, ring-fencing £160M of our budget in 2019/20 to create a fund available for innovative new military capability. Successful bids for access to the fund include among others: enhancements to the Shadow aircraft; a swarm of network enabled aerial drones and autonomous ground and air systems to resupply troops on operations.

## Transform

Defence will transform, radically changing the way we do business and staying ahead of emerging threats. We are already implementing important changes to how MOD is organised and operates. We have established a Strategic Net Assessment capability, to support smarter, better informed decision making and are strengthening MOD's Head Office so that it exercises stronger control over the wider Department. We are accelerating transformation of the Defence Equipment and Support organisation, have reviewed defence acquisition as the basis for Acquisition and Approvals transformation, and have reviewed Joint Forces Command (JFC) to improve how we operate in an era of constant competition.<sup>2</sup> Moving forward we will embrace modern business practices and invest in a programme of digitally enabled transformation as part of our drive to achieve over the next decade the very demanding efficiency targets we were set in 2015. We are working to establish a culture that can nurture innovation in Defence and strengthening our relationship with industry, and support it to become leaner, fitter, and willing to share risk more fully with MOD.

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<sup>2</sup> The outcomes of this review included renaming JFC as 'Strategic Command' in December 2019 to better reflect its contribution to Defence.

Within the context of the future force, we regularly assess the effectiveness of the Equipment Plan to deliver agreed Defence Task Outputs over the ten-year planning horizon. This ensures Defence maintains an understanding of the threats it faces, and the additional capabilities required beyond the core programme to mitigate the risks.

## 1.3 Delivery Progress and Challenges

### Progress

We have made substantial progress in delivery of our Equipment Plan through financial year 2018/19.

The Royal Navy and Royal Air Force completed the initial set of fixed wing trials of the F-35B during HMS Queen Elizabeth's inaugural deployment to the United States. We started assembly of the first of eight Type 26 Global Combat Ships (HMS Glasgow) and launched the competition for bidders for five Type 31 General Purpose Frigates, leading to announcement of Babcock as the preferred bidder in 2019/20.

The first six of the Army's new family of Ajax Armoured vehicles, have now been delivered and are conducting trials. These multi-role armoured fighting vehicles will transform the Army's medium armour and advanced intelligence, surveillance, target acquisition and reconnaissance capability as part of the war-fighting division, including the new strike brigades.

The Apache Capability Sustainment programme will provide the basis for the UK to maintain a battle winning attack helicopter and the initial batch of Apache donor airframes have been inducted into the programme. The UK's new Apache airframes are now in production under a foreign military sales case with first delivery planned for December 2020. The Programme remains on track to deliver the full fleet of 50 aircraft by the end of Financial Year 2023/24.

The RAF took delivery of its 17th F-35 Lightning aircraft and saw the return of 617 Squadron to

the UK. In tandem, the Typhoon enhancement project (CENTURION) was completed. Team Tempest was launched to prepare the UK for the development of a next generation combat aircraft to replace Typhoon. The P-8A new maritime patrol aircraft programme has seen the first RAF students training with the US Navy at Naval Air Station, Jacksonville. We signed a £1.51 billion contract to deliver five E7 Wedgetail, Airborne Early Warning and Control aircraft with Boeing Defence UK. Modification work to transform the Boeing-737 into E7 will begin in 2021, at Marshall Aerospace and Defence in Cambridge, with the target for Initial Operating Capability set for 2023. As part of the Plan for a managed transition to E7, we will reduce the existing E-3D fleet from six to four enabling us to focus resources on providing better availability from the remaining four aircraft.

The A400M tactical airlifter gained an Aeromedical Evacuation capability, enabling it to airlift seriously ill and injured personnel and accompanying medical teams. Trials to prove the aircraft can operate onto natural surface landing zones were successfully completed. This capability will enable the rapid deployment of troops into operational theatres. An agreement known as Global Rebaselining was reached between Airbus and all International customers – this secures the delivery of the full suite of capabilities as originally envisaged by the customers, including the UK.

JFC have continued to develop existing closed battlefield Communication and Information Systems (CIS) architecture into a more cost-effective, open architecture under the 'Morpheus' project.

Information Systems and Services (ISS) have continued to roll out modernised and cost-effective core Information and Communication Technology (ICT) capabilities across Defence under the 'MODNET' and 'Integrated User Services' programme. The New Style of IT (Deployed) programme continued to replace legacy ICT systems for deployed personnel.

The Dreadnought submarine programme remains on track to deliver the first of its class into service in the early 2030s and within its

SDSR 15 estimated cost. In April 2018 the programme entered its second delivery phase. This three-year phase will see continued manufacture of the first submarine (Dreadnought), commencement of the build of the second (Valiant), and manufacture of Dreadnought's nuclear propulsion power plant. The Astute programme continues with all the remaining boats in build now on incentivised contracts which maximise the opportunity to reduce costs and improve industry performance. Boats 5,6 and 7 are expected to be delivered within approved performance, cost and time.

The Core Production Capability project was re-baselined to ensure continued manufacture and delivery by Rolls-Royce of reactor cores for the submarine programme, including the procurement of materials and regeneration of facilities to manufacture reactor cores for the Dreadnought Class. Rolls-Royce was also contracted to provide continued in-service support and disposal for the submarine nuclear steam raising plants.

During 2018/9, there were successful firings of Sea Venom (Future Anti-Surface Guided Weapon (Heavy)) and Lightweight Multirole Missiles. This year the Complex Weapons Programme is developing a rationalised support programme which is going to deliver efficiencies by amalgamating in-service support for Sea Ceptor, Brimstone and ASRAAM weapons systems.

## Challenges

As would be expected in complex procurement and support programmes, variances to forecast cost or time can arise from a variety of sources including budget priorities, changes to requirements, technical challenges or opportunities encountered by the supplier, commercial and procurement processes, international collaboration, accounting adjustments and dependencies between associated projects. For projects with large requirements for foreign currency, exchange rate fluctuation remains a major budgetary challenge.

The following paragraphs explain some of the challenges that arose in 2018/19. Further information can also be found in Part 4 of this report. Costs presented here and in the Project Performance Summary Table (PPST) are those of the approved Demonstration and Manufacture stages of the project, rather than the full 10-year cost of the project.

Under-performance by the contractor during the development phase of the Crowsnest Airborne Surveillance and Control programme resulted in an In-Year underspend in FY 2018/19 of £46.01 million. A recovery action plan has been enacted and the project is being re-baselined to deliver an incremental capability to support the Carrier Strike Group 21 deployment.

There has also been a small increase in build costs as HMS Prince of Wales nears completion. A combination of industry incentivisation and exploiting the lessons learned through the HMS Queen Elizabeth build programme have been used to minimise this cost growth.

While the position of the Warrior Capability Sustainment Programme remains challenging, the demonstration phase is stabilising and providing a clear route to achieving key milestones. As previously reported, the final cost and time for manufacture will not be fully understood until the Department concludes negotiations with the Prime Contractor.

Delivery of the fourth submarine in the Astute Class, Audacious, was delayed during the commissioning phase. Welding quality issues on missile tubes for the Dreadnought Class submarines were identified in June 2018. Assessment and repair work is underway and we are working with our US counterparts to achieve the earliest supply of missile tubes for the programme. Our commitment to delivering the first of class into service in the early 2030s is unchanged, and we remain committed to delivering the programme within its SDSR15 estimated cost.

The delivery of Sea Venom has been delayed due to emerging technical issues in the Demonstration phase of delivery.

## 1.4 Industrial Strategy

The UK defence sector makes an invaluable contribution to the UK's national security and prosperity and directly supports the Government's Industrial Strategy. The MOD spent over £18 billion with UK industry in 2017/18, directly supporting highly skilled jobs across the entire UK. We remain a significant exporter of defence capability, with UK industry being the world's second largest defence exporter measured over a 10-year rolling period.

We remain committed to delivering the National Shipbuilding Strategy, published in September 2017, which sets out our approach for transforming naval procurement. During 2018/19, the strategy's flagship Type 31 programme progressed with the launch of a competition for bidders to build five new Type 31 warships in the UK for the Royal Navy, which concluded in 2019/20 with the announcement of Babcock International as the preferred bidder. The Fleet Solid Support Programme also entered a competitive phase. Eight Type 26 ships will be built on the Clyde by BAE Systems, with the first ship, HMS Glasgow currently under construction, and cutting steel for the first time on HMS Cardiff in August 2019. This work alone will sustain some 1,700 jobs in Scotland and 4,000 jobs across the wider UK maritime supply chain for decades to come.

A review of our progress by Sir John Parker, author of the original Independent Report into a National Shipbuilding Strategy, was also conducted, the results of which were published on 29 November 2019. The Department has looked at his findings closely and will be pursuing a wider implementation plan. The Prime Minister also made the Defence Secretary the Shipbuilding Tsar to lead the cross-government endeavour to sustain the highly skilled shipbuilding workforce, deliver world class capability to the Royal Navy and increase exports for the UK. This work will build on the National Shipbuilding Strategy Implementation Plan.

In 2018 the Combat Air Strategy was published outlining how the UK will retain its ability to choose how we meet our future requirements. It

also initiated the programme to deliver the successor capability to Typhoon. An innovative Government-Industry partnership 'Team Tempest' was launched in parallel at the Farnborough Airshow. This is being used as a test bed to demonstrate more agile, efficient and collaborative ways of working. This arrangement has enabled a sizable industry investment in the Department's Combat Air research and development programme.

We continue to engage closely with Industry through the re-invigorated Defence Suppliers Forum and the Defence Growth Partnership.

## 1.5 Defence Prosperity Programme

In March 2019, we set out to Parliament the Defence Prosperity Programme, which is informed by the Defence Industrial Policy refresh published in December 2017. It was also informed by the review the Rt Hon Philip Dunne MP published on 'Growing the Contribution of Defence to UK Prosperity' in July 2018, setting out how Defence should grow its contribution. An inaugural Defence Prosperity Conference was held to outline the programme to leading defence industry partners.

The Defence Prosperity Programme is designed to ensure that while growing our contribution to the economy, we continue delivering defence capability at the best value for money. It is focused upon; embedding prosperity into Departmental policy, processes and culture; quantifying the Defence contribution to the UK economy; sustaining an internationally competitive Defence sector for the UK; and growing exports and inward investment.

Activity includes:

- An investment of £500k from the Defence Innovation Fund for a pilot to develop, test and validate how Defence can make better use of existing Government investment in supply chain development. By encouraging a more competitive, productive and innovative UK defence supply chain, Defence will

be able to better contribute to UK prosperity, enhance export success and deliver savings to Defence customers.

- Working with Other Government Departments, academia and industry to establish a Joint Economic Data Hub within the UK Defence Solution Centre, to provide consistent and impartial data on the UK defence sector.

- Providing guidance for people across Defence so they understand our prosperity objectives and have access to the support needed to deliver these in a consistent and coherent way.

We continue to work closely with industry, academia and across Government to embed the Defence Prosperity Programme.

## Part 2: Affordability and Financial Risk

### 2.1 Management of the Equipment Plan

Under the Defence Operating Model, Head Office leads Defence by setting direction through strategy and policy, allocating resources and providing oversight.

Top Level Budget (TLB) holders are responsible for delivering outcomes agreed by Head Office within delegated budgets. Responsibility for managing the Plan is within this delegated authority. TLBs therefore set equipment procurement and support requirements and manage budgets across their portfolios to achieve these requirements.

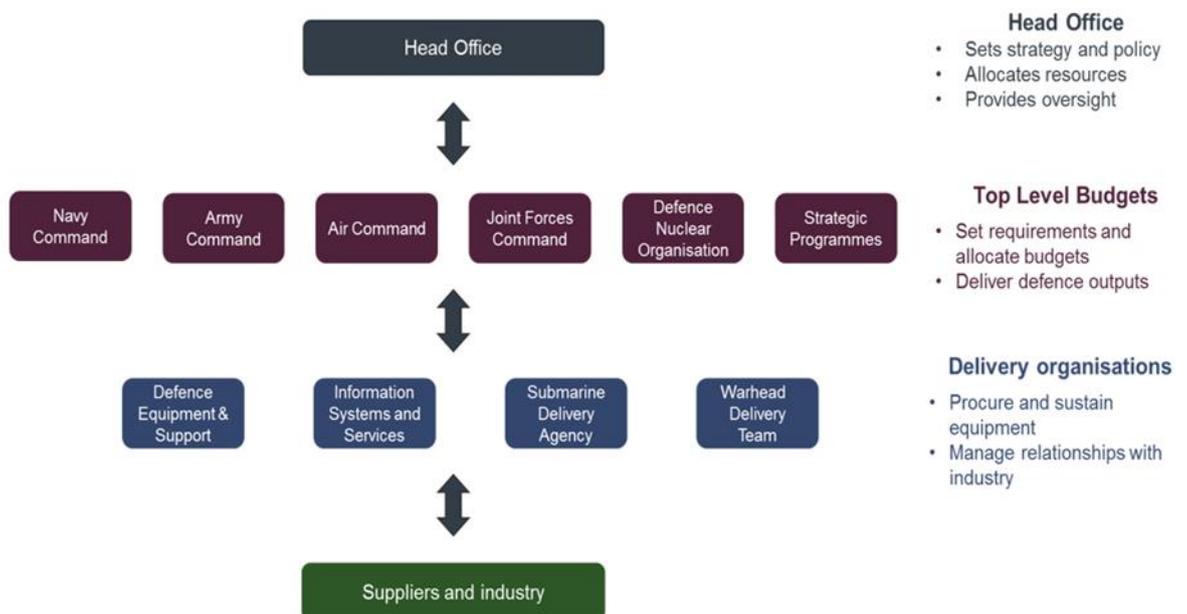
TLBs with responsibility for the Plan are the four Front Line Commands of Navy, Army, Air and JFC; the Defence Nuclear Organisation and Strategic Programmes.

The Plan is managed in two parts: the Equipment Procurement Plan, which covers capital investment in Equipment, and the Equipment Support Plan, which covers support costs.

The Plan is delivered on behalf of the TLBs by delivery organisations with the expertise to manage relationships with industry and provide commercial advice to support TLB's decisions.

These delivery organisations are Defence Equipment and Support (DE&S), ISS, the Submarine Delivery Agency (SDA) and the Warhead Delivery Team. The Warhead Delivery Team is part of the Defence Nuclear Organisation (DNO).

**Figure 1: Illustration of the relationship between TLBs and delivery organisations**



## 2.2 Cost forecasting for the Equipment Plan

TLBs are responsible for providing 10-year cost forecasts to Head Office for the Plan. These forecasts have two components:

- Forecasts generated and assured by delivery organisations, for projects delegated by TLBs; and
- Forecasts generated and assured by TLBs for elements of the Plan not delegated to delivery organisations.

**Delivery organisation costed plan.** Project teams in the delivery organisations forecast costs using quantitative models to understand the range of possible outcomes. 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 50<sup>th</sup> percentile costing. Other confidence levels are used when appropriate, for example some complex nuclear projects have used 70<sup>th</sup> percentile costing for forecasts to recognise the complexity of the programme.

Delivery organisations regularly review cost forecasts to provide assurance that current costings are realistic and that the level and profile of risk funding held within projects 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 senior level.

Project cost forecasts include the expected financial impact of risks that are assessed as more likely than not to materialise. These are known as “Risks Inside Costing”. At April 2019, the value of risks included in forecast costs was £13.4 billion over the decade. Risks judged to be less likely to occur are not included in cost forecasts and are referred to collectively as “Risks Outside Costing” which total £18.3 billion over the decade.

Delivery organisation forecasts also include management adjustments for delivery realism across portfolios based on past performance.

At April 2019, the total forecast cost of projects costed by delivery organisations was £181.8 billion, including £13.4 billion (7.3%) risk provisions and -£4.9 billion (-2.6%) management adjustment for realism.

This cost forecast is uncertain and so there is a risk of changes to costs. The Department’s Cost Assurance and Analysis Service (CAAS), carry out an independent assessment of the cost of the Plan each year. Their estimate of expected outturn for the 10 years from 2019/20 was £3.4 billion above project team cost forecasts. Consequently, there is a plausible range for the forecast cost of projects costed by delivery organisations of £181.8 billion to £185.3 billion.

The difference between the CAAS and project team estimates is up from last year by 0.2%. Such a fluctuation in variance is not unusual and can be attributed to factors including the progression of the 10-year planning window from one year to the next, changes in the CAAS analysis portfolio, and estimate updates to large scale projects. CAAS do not believe the current increase should be viewed as evidence of a material decline in project team estimating capabilities.

**Budget-holder costed plan.** Some projects or savings initiatives in the Plan are managed and costed directly by the principal budget holder organisations for the Equipment Plan, the TLBs. These costs are usually included to take account of initiatives that are less mature and for which requirements have not yet been agreed with delivery organisations. TLBs also include cost forecasts to reflect judgements about risks, delivery realism and savings initiatives across their portfolios.

The total forecast cost of the TLB-costed element of the Plan at April 2019 was £0.9 billion. This included: -£7.0 billion adjustments for delivery realism, -£5.7 billion planned cost reductions and £14.5 billion for less mature projects not yet delegated to delivery agents.

**Efficiency Savings.** The Department is aiming to achieve £12.6 billion reduction in cost in the Plan through efficiency initiatives over the 10 years from 2019/20. These targets are presented in detail in section 2.4.

The forecast cost of projects in the Plan includes adjustments for efficiency measures that delivery organisations are confident will be achieved. The total expected efficiency delivery forecast by delivery organisations was £7.5 billion over the 10 years from 2019/20.

In addition to these efficiencies already 'realised' in forecasts, delivery organisations and TLBs expect to achieve further savings through new initiatives that are under development, but not yet mature enough to include in project forecasts.

The Department estimates that approximately £4.7 billion savings should be expected from opportunities identified so far and from opportunities not yet identified, bringing the total expected benefits over the 10 years of the Plan to £12.2 billion against a target of £12.6 billion (97% delivery). This additional delivery is included in the forecast cost of the Equipment Plan. This figure is uncertain, with potential for over-delivery of up to £0.3 billion and under-delivery of up to £2.4 billion from these initiatives depending on the success of plans<sup>3</sup>. Processes are in place for identifying and developing new efficiency opportunities which will add to expected delivery against the Department's target over time.

**Delivery realism adjustments.** Both TLBs and delivery organisations adjust forecasts to reflect likely delivery across their portfolios of projects based on experience from previous years. These adjustments recognise potential biases in project forecasts, such as projects not delivering as quickly as planned, or contingency remaining unused if risks don't materialise. These adjustments reduce the expected cost of the Plan.

These realism adjustments total -£11.9 billion over the 10-year Plan, of which -£4.9 billion is found in project forecasts and -£7.0 billion is in TLB cost forecasts.

TLB judgements of delivery realism are not subject to the same level of assurance as realism adjustments included in project forecasts. Assuming a plausible maximum variation of 25%, the associated variation in cost to be managed is +/- £1.8 billion over 10 years.

**Fuel and foreign exchange costs.** The Plan includes forecast demand for US\$31.1 billion and €7.4 billion Euros. The effect of changes to fuel and foreign exchange rates in the Plan is tracked and managed by Head Office. TLBs forecast their 10-year costs using assumptions set by Head Office at the start of each financial year. The difference in cost at the Planning assumption rate and forecast rates is monitored in Head Office and funded from central provisions.

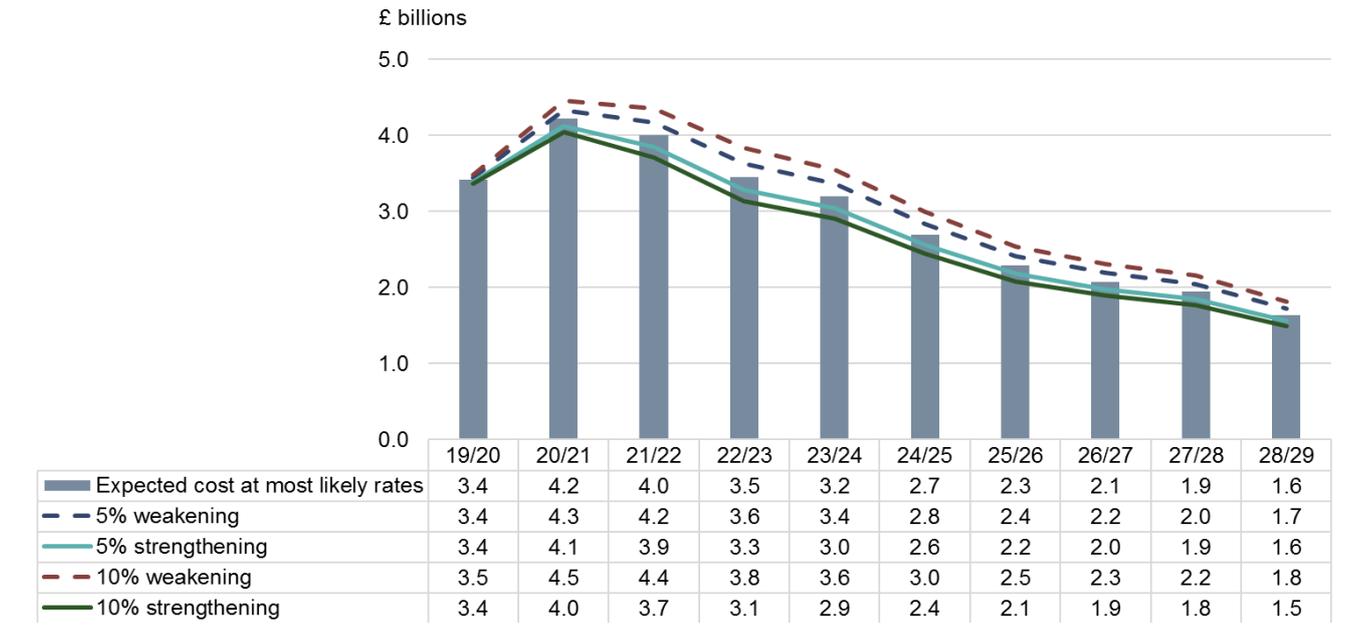
At April 2019, the expected cost of foreign exchange and fuel in the Plan was £904M greater over 10 years than the forecast cost using Planning assumption rates, due to changes in forecast exchange rates during 2018/19. Funding for this difference was being held by Head Office to ensure that the most likely expected cost was fully funded.

Exchange rate changes present a risk to the affordability of the Plan. The Department manages this risk by securing prices for a proportion of this demand in the first three years of the Plan using a forward purchase mechanism provided by the Bank of England and HM Treasury. Figure 2 illustrates the cost of foreign currency at forecast exchange rates at April 2019 and under different illustrative scenarios. The potential change in cost is reduced in the three years from 2019/20 due to the forward purchase cover. An illustrative 10% weakening in exchange rates for the duration of the 10 years of the Plan would change the expected cost of the Plan by around £2.6 billion.

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<sup>3</sup> The estimate of potential under-delivery assumes an unlikely case of 50% shortfall in delivery against plans for further delivery not yet realised in project forecasts.

**Figure 2: Expected cost of foreign currency in the Plan and sensitivity to changes in exchange rates**



**Inventory costs.** In 2017/18 the Department's budgeting treatment for Raw Materials and Consumables (RMC) was revised to align with the European System of National and Regional Accounts 2010. This has introduced additional costs to the Plan equivalent to the forecast difference between consumption and purchases of RMC. This additional cost was reported as a corporate adjustment to the forecast costs in the Equipment Plan financial summary 2018, to reflect that this cost was being managed by Head Office as new ways of working were developed. From April 2019 this cost is now reported and managed directly by TLBs and is included in the total forecast costs for the Plan.

The total cost of RMC for the 10 years from 2019/20 was £1.5 billion which has decreased from the £1.7 billion over 10 years reported in 2018. This reduction was expected as processes for inventory management improve.

As the Department's systems and inventory forecast matures it is anticipated that this will improve accountability and incentivise TLBs to more closely align purchases and consumption of RMC. This will contribute to a greater understanding of the drivers impacting the additional costs being incurred thus reducing costs over the longer term.

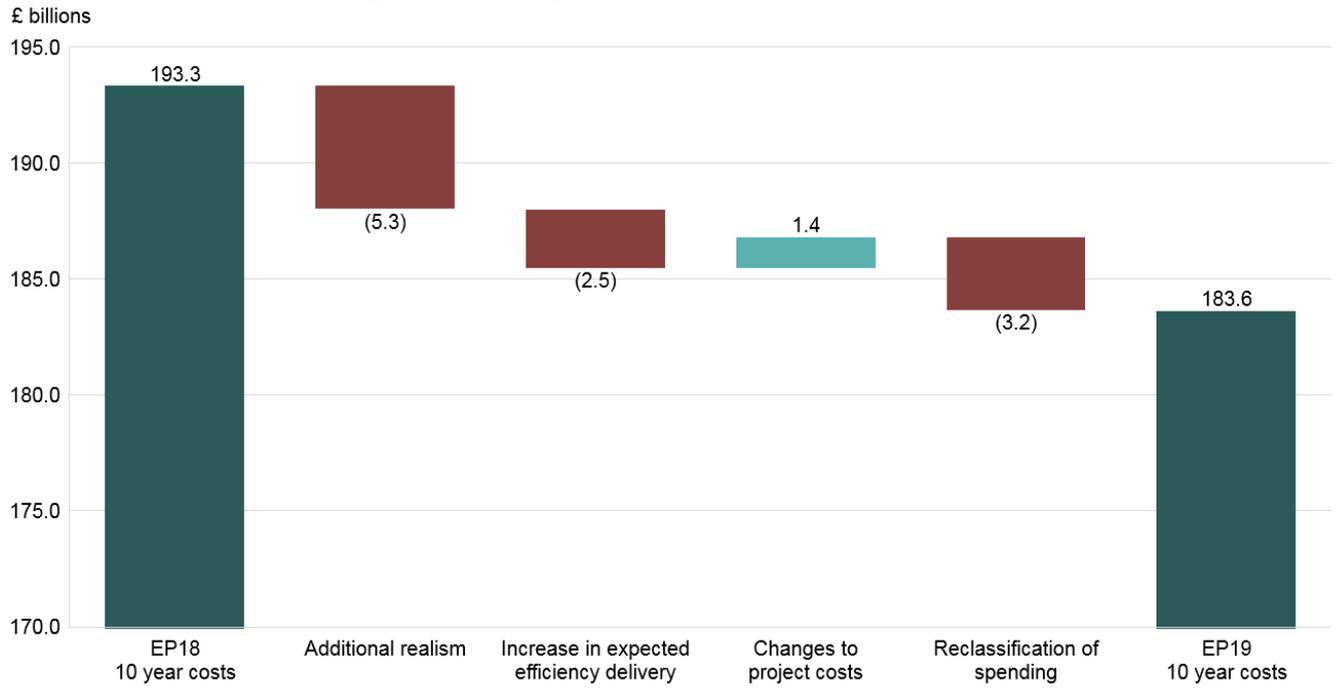
**Expected cost of the Plan.** At April 2019, a plausible range of 10-year costs for Plan was between £179.5 billion and £193.7 billion with a central estimate of £183.6 billion.

This was a decrease of £9.7 billion from 2018 due to the following most significant changes:

- -£5.3 billion for additional delivery realism adjustments based on past performance;
- -£2.5 billion additional estimated further efficiency delivery based on more realistic delivery assumptions; and
- Technical reclassification of £3.2 billion spending on naval bases as operating cost spending.

We believe that this forecast is more realistic than our previous assessment and is supported by our continued investment in processes to identify and deliver efficiencies and in our work to improve the evidence supporting our judgements on realism and financial risk. However, we recognise that there remains some risk in this forecast, which we will be reducing over the next year by driving greater coherence in the reporting and management of financial risk, adjustments for delivery realism and efficiency benefits.

**Figure 3: Changes in cost forecast, 10-year total**



## 2.3 Allocation of Equipment Plan budgets

Equipment Plan spending allocations are set by TLBs and Head Office through the Department's annual financial planning process, known as the Annual Budget Cycle.

The Annual Budget Cycle enables Head Office to review financial and capability risk to delivery of the Department's strategic objectives and agree changes to the programme needed to manage these risks. The process concludes with Head Office providing direction to TLBs, confirming TLB budgets for the forthcoming financial year and providing spending assumptions for the following nine years.

The Department secured a revised budget settlement for 2019/20 that would enable £1 billion additional spending, through £200 million brought forward to 2018/19 and £800 million additional funding provided for 2019/20. This settlement enabled Head Office to set indicative 2019/20 budgets for TLBs in December 2018, allowing TLBs more time to prepare for the year. The result was that the budget planning process concluded in April 2019 with a clear plan for delivering within budget for 2019/20.

The years beyond 2020/21 remain very challenging for the Department to maintain affordability while delivering policy ambition. In the absence of a review of longer-term settlements, the Department's longer-term planning in 2018/19 prioritised delivering as far as possible the outcomes of MDP while maintaining choice for a subsequent spending review. The Department also continued to drive improved forecast accuracy and understanding of financial risk in the Plan.

To manage the continued affordability challenge beyond 2019/20 the Department implemented new financial planning controls that ensure the Department can manage costs within the HMT agreed spending planning assumption. Head Office agreed a forecast spending profile for each budget holder consistent with the expected cost of their plans and applied a limit to budget holder financial commitments from 2020/21. The aggregate level of committed spend permitted was aligned to the Departmental spending planning assumption. This technical change in approach has affected the planned spending presented in

the sector analysis section and the available spending used in the assessment of affordability.

TLBs determine the proportion of their indicative budgets to allocate to the Equipment Plan, prioritising spending to deliver their outputs most effectively. Funding allocations are reviewed regularly based on evolving plans and priorities.

At April 2019, the total planned spending by TLBs for the Plan was £182.8 billion over 10 years.

**Corporate contingency.** Head Office allocates funding for the Equipment Plan to manage risks (referred to as contingency) and specific costs not budgeted for by TLBs (referred to as provisions).

Corporate contingency and provisions for the Plan at April 2019 were £5.5 billion in total, of which:

- **£4.8 billion** equipment plan contingency, which was informed by the CAAS realistic cost of outturn assessment 2018;
- **£692 million** provision to fund the difference in cost of fuel and foreign exchange at forecast prices (*£347 million for Euros; £337 million for US Dollars; £8 million for fuel*); and
- **£105 million** provision held centrally to for small projects not yet delegated to TLBs.

In addition to contingency funding specifically allocated to the Plan, Head Office retains corporate contingency to manage some specific financial risks across the Department.

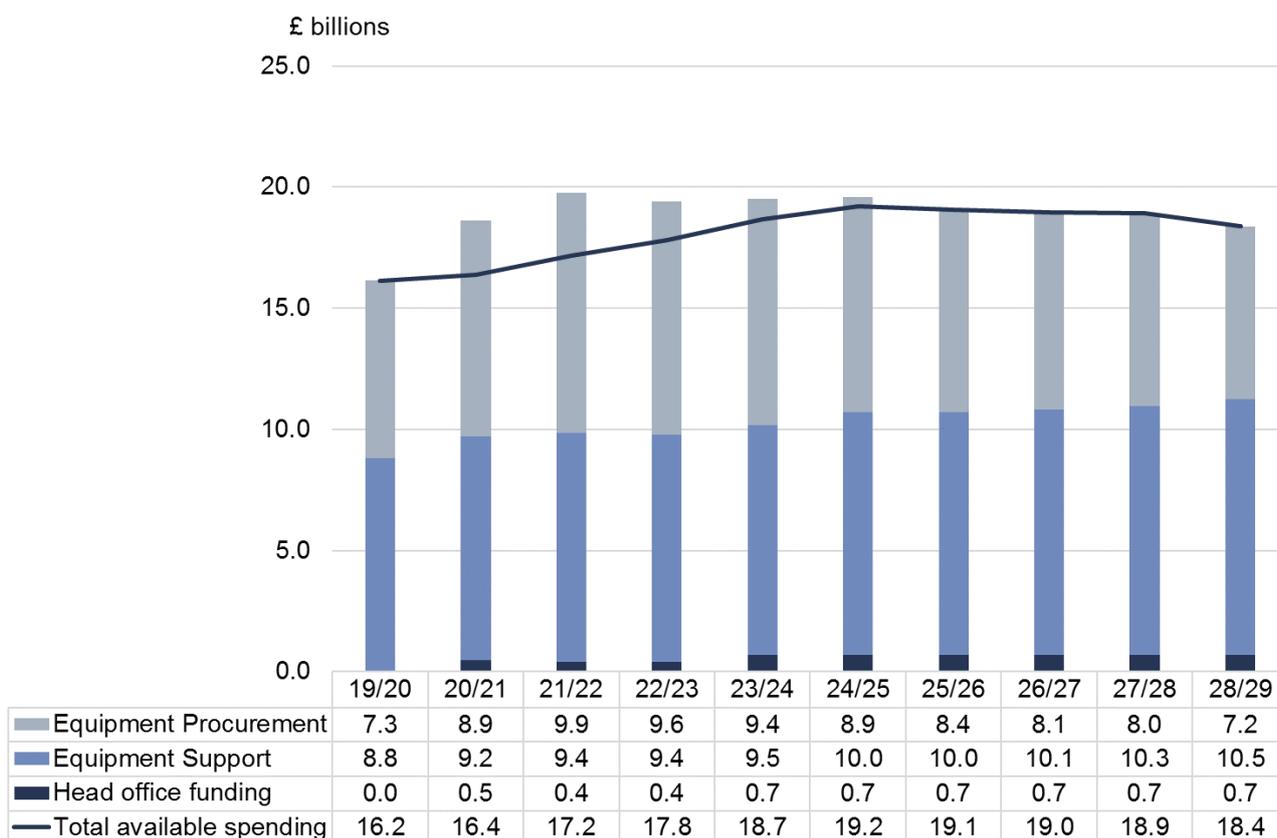
Overall, the contingency held by the department reduced compared to the position reported in the 2018 Equipment Plan report. These decisions were driven by the financial pressures on the Department and were agreed by HM Treasury as part of discussions around Budget 2018.

**Dreadnought Programme contingency held by HM Treasury.** MOD has made use of the £10 billion Dreadnought contingency announced in SDSR15. For 2018/19 HM Treasury gave access of up to £600 million. Access to contingency funding allows the Department to take opportunities to drive out cost and risk later in the programme to ensure that the Dreadnought programme remains on track to deliver on time and within its SDSR15 estimated cost

**Total planned spending.** Including TLB planned spending and corporate contingencies and provisions, the total planned equipment spending was £188.4 billion over 10-years at April 2019. The controls on financial commitments of £7.7 billion reduced available spending to £180.7 billion (see

Figure 5). This compares with £186.4 billion planned spending against the Plan in the 10 years from 2018/19 at April 2018.

**Figure 4: 180.7 billion available spending for the Equipment Plan**



**Notes:**

1. Figures may not sum due to rounding.

## 2.4 Savings targets in the Equipment Plan

The Department continues to track the financial benefits of change initiatives against targets agreed at Spending Review 2015 and in preceding fiscal events. The new Defence Transformation Programme, which has been established to enable next generation military capabilities and drive a sustainable Defence Plan, is changing the way in which benefits are tracked against targets. There has been a change in emphasis towards consolidating legacy financial targets to enable a more flexible, portfolio approach to delivering against the aggregate target.

This report has been revised accordingly to focus more on performance against an aggregate savings target for the Equipment Plan rather than performance of specific benefits programmes.

The Department is working to standardise approaches to identifying and tracking the maturity of new initiatives, building on best practice across TLBs. The results of this work are being adopted in financial planning during financial year 2019/20 and so are not reflected in this report. We expect to report a higher confidence assessment of expected efficiency performance for the Plan in 2020. At April 2019 the total target over the 10-years of the Plan was £12.6 billion, with total expected delivery of £12.2 billion, an increase of £3.3 billion from 2018. Of this total, £7.5 billion benefit is for initiatives already included in project forecasts and with high confidence of delivery.

The remaining £4.7 billion benefit included in forecast cost of the Plan is based on judgements on benefits expected from lower confidence initiatives not yet mature enough to include in project forecasts and delivery of benefits resulting from investment in processes to identify and develop new initiatives.

The total benefit of lower confidence initiatives already identified was £5.0 billion assuming they all deliver in full, up by £0.9 billion from 2018.

Assuming that the total expected delivery included in cost forecasts is achieved from the £5.0 billion opportunities already identified, the remaining value of potential benefits from these measures is £0.6 billion<sup>4</sup>.

There are a few specific initiatives of note delivering financial benefits in the Equipment Plan.

**DE&S & SDA Transformation.** DE&S and SDA continue to deliver significant efficiencies through their comprehensive programme of transformation, designed to raise the skills and productivity of staff and introduce world-class systems for managing and controlling projects. They have been focused on embedding new ways of working, maturing new systems and driving best practice, all of which is focused on supporting the UK's Armed Forces and improving value for money on a sustainable and enduring basis.

**The Submarine Enterprise Performance Programme.** The Department is working in conjunction with BAE Systems, Babcock Marine and Rolls-Royce Submarines to pursue improvements in efficiency, performance and long-term sustainability within the Submarine Portfolio. The Submarine Enterprise Performance Programme (Equipment Plan) supports the acquisition and maintenance of submarines as well as delivering £879 million of savings against the forecast cost of the submarine programme in 2010/11 over 10 years to 2020/21. By March 2019, £738 million of savings had been delivered. An additional 10-year period savings target of £1 billion was set for delivery from 2018/19. To date £600 million has been identified - work continues to identify and mature further efficiencies as part of the programme.

**Complex Weapons Programme.** The majority of missile systems within the Complex Weapons Programme is provided through an innovative approach based on a Partnered Portfolio Management Agreement with MBDA UK Ltd,

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<sup>4</sup> Based on comparison in each year of the total potential benefits from the lower confidence and expected delivery. Where opportunities identified are

insufficient to deliver the expected benefits we assume new measures are identified to do so.

focusing on the development of families of weapons utilising the principles of commonality, modularity and re-use. After 9 years of the 10-year efficiency programme, £2.066 billion (99.6% of the £2.075 billion target) is regarded as banked, secured or banked at risk, and a further £0.316 billion (£2.382 billion in total) classified as forecast. CAAS examined the benefit figures, and its report, delivered in July 2019, provided an opinion of substantial assurance of these figures, whilst

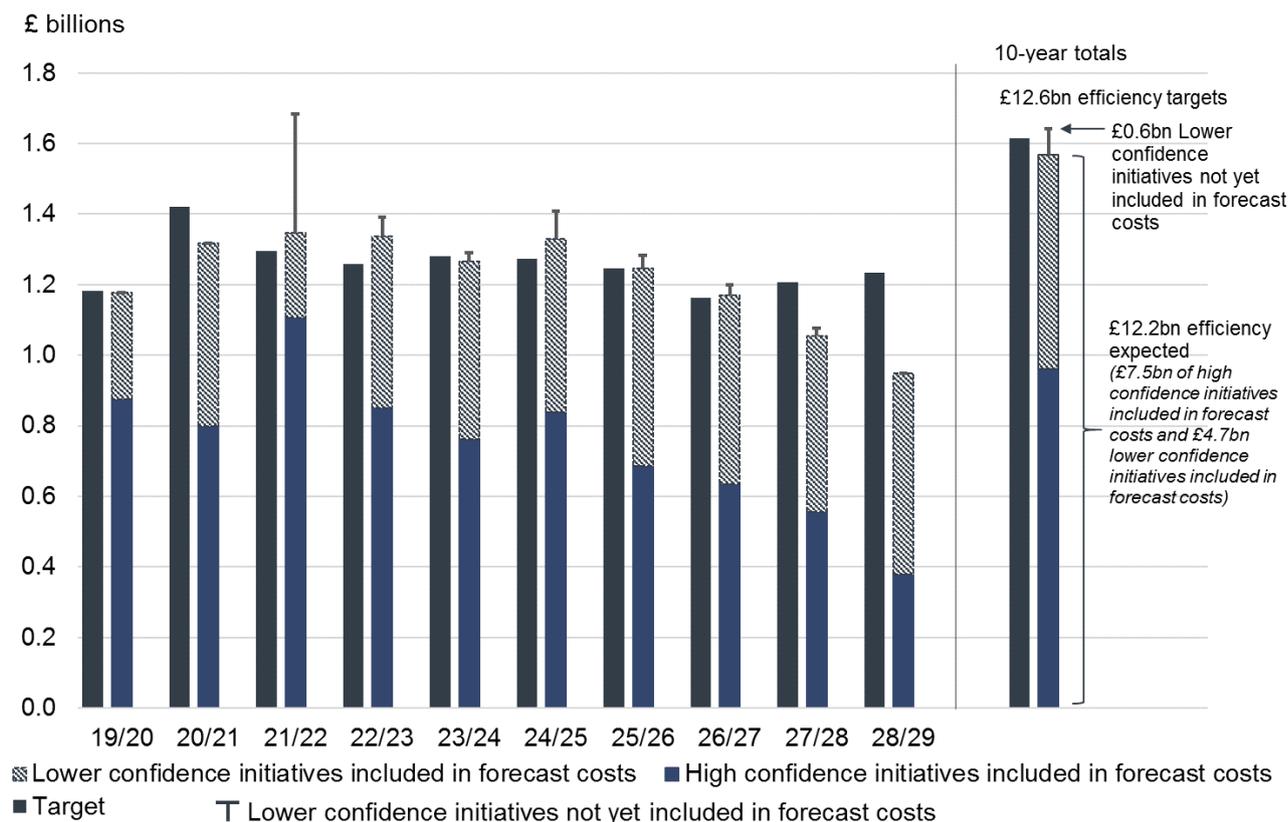
noting that the benefits remain subject to project performance delivery.

Team Complex Weapons expect that the £2.0 billion target will be delivered ahead of schedule and that the current forecast will exceed the target by £0.307 billion at the ten-year point. Because of this, it has substantial confidence that the £1.216 billion net savings, which have been assumed in the Complex Weapons Portfolio pipeline budget since Planning Round 2010, will be achieved.

**Figure 5: Summary of savings in the Equipment Plan**

Savings targets and forecast £ billions over 10 years	Equipment Plan 2019	Equipment Plan 2018	Change from 2018
Target	12.6	12.3	0.3
High confidence initiatives included in forecast costs	7.5	6.7	0.8
Lower confidence initiatives included in forecast costs	4.7	2.2	2.5
Total expected delivery	12.2	8.8	3.3
Remaining shortfall	0.4	3.4	(3.0)
Lower confidence initiatives not yet included in forecast costs	0.6	2.0	(1.4)

**Figure 6: Efficiency savings targets and expected delivery over the 10 years of the Plan**



Notes for figure 5 and 6:

1. Figures may not sum due to rounding.
2. Complex Weapons Programme excluded from both Equipment Plan 2019 and 2018 data

## 2.5 Assessment of affordability

At April 2019, spending available for equipment was £180.7 billion in the 10 years from 2019/20 against a forecast cost of between £179.5 billion and £193.7 billion, resulting in a variance between forecasts costs and available spending of between £1.2 billion surplus and £13.0 billion shortfall. This compares with an expected shortfall of between £2.5 billion and £14.8 billion in 2018.

Since April 2018, the central estimate of shortfall between available spending and expected cost reduced from £7.0 billion to £2.9 billion, or 1.6% of budget.

A contributing factor to this reduction in variance was that the Department balanced forecast costs and available spending for 2019/20, enabled by the Department's Budget 2018 settlement. In contrast, there was a shortfall of £1.3 billion at the start of 2018/19.

Reductions in the forecast shortfall beyond 2019/20 were principally the result of management adjustments to improve forecast realism and not changes to procurement and support plans to reduce costs. As a result we believe that the forecast is more robust than it had been previously, but that addressing the residual shortfall will be more difficult than comparable shortfalls in previous years. Improvements to forecast accuracy have been demonstrated through more stable spending forecasts in 2018/19 compared with previous years (see Figure 8), though we recognise that there remains risk in this forecast which we will reduce further through strengthening of the finance function and

continued emphasis on forecast accuracy in the Department.

The risk to affordability is greatest in the four years from 2020/21 with a forecast imbalance between cost and available spending of £6.0 billion, which is broadly comparable with the 2018 figure of £5.8 billion<sup>5</sup>.

This imbalance was not reduced because there was no commitment to longer term funding at Budget 18 and the Department chose to maintain freedom of choice for a spending review anticipated in 2019. Additional financial planning controls were used to ensure that the Department did not contractually commit spending from 2020/21 above the HMT-agreed budget planning assumption during 2019/20.

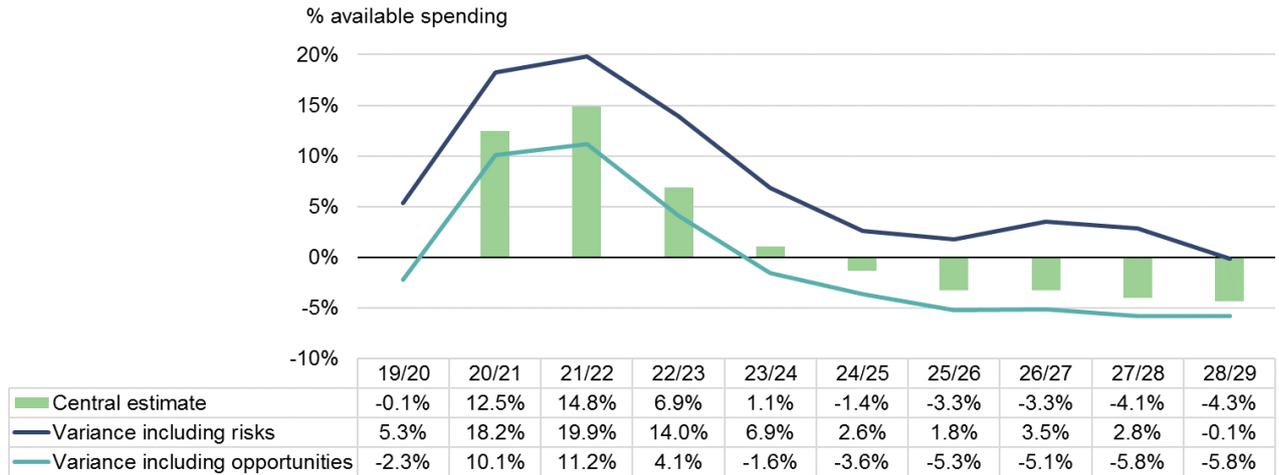
Spending Round 2019 announced that the Government is investing an additional £2.2 billion in Defence over 2019/20 and 2020/21. We are working through the implications for the Equipment Plan as part of our planning process to be concluded through the winter. The 2019 Spending Round only provided a single year settlement and so the longer-term financial challenges within the plan will need to be resolved in a future Spending Review currently anticipated in 2020.

The controls on financial commitments established in 2018/19 will be maintained to ensure that the Department remains able to deliver within its spending planning assumption, while retaining freedom of choice for the Spending Review.

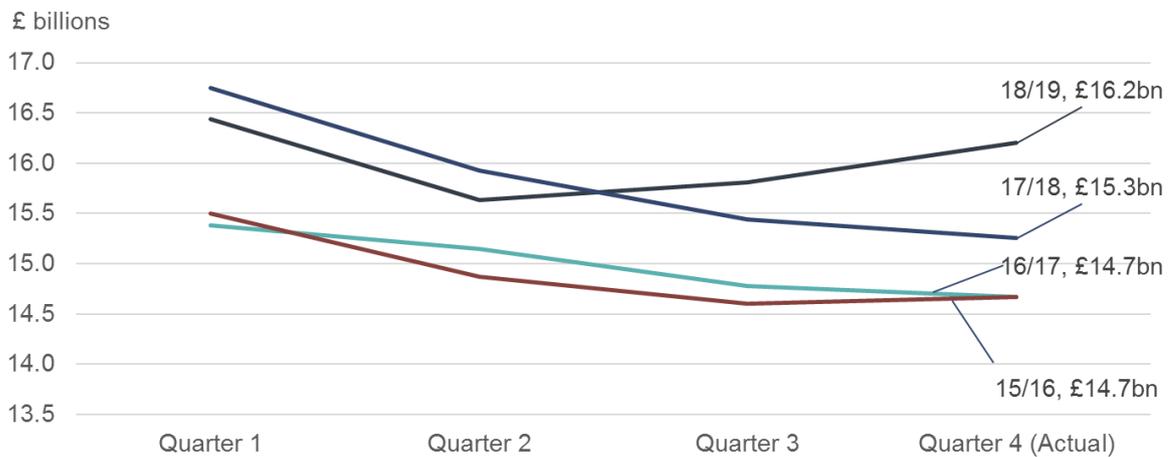
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<sup>5</sup> Risk to affordability for 2018 is calculated from the first four years

**Figure 7: Equipment Plan affordability: variance to available spending**



**Figure 8: Improvements in forecasting in 2018/19 compared with previous years.**



Notes: The profile of forecasts during 2018/19 illustrates that the Department established a more realistic forecast earlier in the year and spent closer to the initial forecast than in previous years.

## Part 3: Changes to management of the Equipment Plan

### 3.1 Defence Transformation

The MDP recognised that Defence needed to become a more agile organisation, capable of continuous and timely adaptation and the skilled workforce of the future, to maximise investment in the front-line and enable next generation digital and military capabilities. To achieve this a dedicated central transformation team was established in January 2018. The team support the Chief Operating Officer in driving forward a new strategic approach to transformation across Defence.

This new approach consists of a central and strategic Transformation Portfolio to enable next generation military capabilities, drive a sustainable Defence Plan, streamline systems and processes, and create a workforce and culture to enable change. The portfolio includes programmes relevant to the delivery of the Equipment Plan including acquisition and support, organisational design, functional leadership and the realisation of efficiencies.

#### Support Transformation

Support (Equipment Support, Logistic Support and Engineering Support) represents a significant proportion of departmental expenditure, with spending of c£12.8 billion per annum (and rising) and some £27 billion of inventory. In amongst all this there are significant strategic base capability and organisational shortcomings. A Support Transformation programme has been commissioned to re-establish the required degree of control, focus on effectiveness and to manage performance in Support on a pan-Defence basis.

The two key, early elements of the programme are the establishment of a 3\* Functional Owner for Support, the Chief of Defence Logistics and Support (CDLS), and the implementation of a new Defence Support Operating Model. In parallel, Support Transformation has initiated the Business Modernisation for Support programme as a mechanism to deliver a step-change delivery of efficient, effective and standardised, Defence-wide business processes, simplifying, automating and reflecting industry best-practice, and then securing

Information Systems capabilities to replace the existing assets.

The establishment of Support Transformation programme has allowed the creation of a number of discovery projects to assess potential benefits where changes could deliver significant improvements in operational effectiveness and realise efficiency savings that can be re-invested to meet Defence capability requirements. An early success has been the Forecasting and Resource Planning programme, where the application of industry leading techniques has the potential to deliver a forecast 21% increase in platform availability and at the same time deliver around 18% in cost savings.

#### Defence Operating Model

The Defence Operating Model is being reviewed and the revised model will reflect changes to strengthen Head Office's role in directing and enabling Defence to deliver its required outputs. These include improved planning and performance management processes, simplified senior governance structures, a new sponsorship approach to governance of the Enabling Organisations, and the adoption of wider government best practice in Functional Leadership.

#### **Acquisition and Approvals Transformation**

Improvements to the acquisition operating model aim to add pace and agility to the way that we acquire capability. We will ensure that projects and programmes are set to deliver from the outset through an earlier, more strategic focus on what is needed and why, coupled with an improved understanding of the programme and project drivers including market factors. Where time is critical, this will support decisions on the performance and cost trades that are needed to get battle winning equipment in to the hands our armed forces personnel when they need it.

We are encouraging greater use of off-the-shelf procurement and agile development as such

approaches will enable more rapid fielding of the latest technology. We are also simplifying and streamlining our processes, and tailoring how we apply them, to ensure that our effort is clearly focussed on value added tasks. We have piloted these new approaches and are now moving to wider implementation. These changes will transform our acquisition system when combined with other initiatives, such as strategic supplier management and category management, which will improve our understanding of the market and enable us to drive better value.

### Management of Efficiencies

In previous Spending Reviews, the Department agreed to an ambitious efficiency programme and remains committed to the delivery of the targets. To generate greater insight into the maturity and risks of the efficiencies, including those within the Equipment Plan, the Transformation team is embedding an improved approach to efficiency analysis throughout Defence.

### **Functional Leadership**

The Functional Leadership model for the management of cross-cutting activities is a key enabler of business transformation and the generation of efficiencies across Defence. Implementation is well advanced in several areas consistent with wider government and directly relevant to the effective delivery of the Equipment Plan, such as Finance, Commercial and Project Delivery, and this approach is also being applied to MOD-specific functions such as Support and Infrastructure.

### Finance Functional Leadership and Changes to Financial Management

The Finance Functional Leadership Programme is making good progress. The high-level design of the Finance Operating Model has been completed and we have improved the production of management information. For example, a finance reporting pack is now discussed at the Finance Committee each month, with the same information being used throughout the Department. A financial dashboard has been produced for Air Command, with the potential to rollout the same capability to other business areas. We are delivering the Financial Management Improvement Plan (a

continuous improvement plan), working with business areas to improve forecasting of costs.

A key strand of the Financial Management Improvement Plan is the improvement in forecasting accuracy. The finance reporting pack mentioned earlier has improved our ability to monitor forecasting performance and we introduced a target in 2018/19 which requires business areas to achieve +/-1% outturn against that forecast at the mid-year point. In addition, we track monthly cash forecasting accuracy to within +/-5%. During 2019/20, the Department will continue to place a focus on forecasting accuracy, in parallel with developing further metrics as outlined in the Financial Performance Report in the 2018/19 Annual Report and Accounts.

### As part of Acquisition and Approvals

Transformation MOD is changing the way it makes Investment Decisions, introducing a three-stage approval process and increased emphasis on programme level approval, led by the Senior Responsible Owner. A new Strategic Outline Case (SOC) is being introduced to provide early upfront engagement with the Approving Authority and focus the delivery approach for the programme from the outset, highlighting the most relevant courses of action and key pan-Defence Lines Of Development implications. It will also enable the Approving Authority to understand how the programme fits into the wider investment portfolio.

Following the publication of the 2018 Equipment Plan the NAO recommended that MOD should further investigate how money allocated to Risk Inside Costing (RIC) and Risk Outside Costing (ROC) is managed. In 2018, the Department carried out a detailed investigation, which showed the extent to which inconsistencies exist within current management practices. Over the next year the MOD plan to test different ways of managing the financial provisions needed in RIC allocations. The aim is to identify best practice that can then be shared across the MOD.

On 1 April 2019, the direction of the CAAS organisation and staff moved from DE&S to Head Office Finance to become a pan-MOD asset and functional leader in Cost Management. In line with the MDP and Finance Functional Leadership

initiatives, this has positioned CAAS and Cost Management at the heart of Defence to support better the timely decision-making, budgeting and pricing around cost risk, schedule risk and broader financial risk across the Department.

## 3.2 TLB Specific Change

### ***Air Command***

Air Transformation comprises sixteen programmes, which aim to transform mission and business effectiveness. The programmes will deliver the change, choice, efficiencies and headroom needed to harness the full potential of our people and invest in and deliver the Next Generation Air Force. The benefits of each programme are tracked against the RAF Strategy through a portfolio management approach, in line with Portfolio, Programme and Project Management (P3M) principles.

### ***JFC Review (UK Strategic Command)***

A review of the functions and outputs of JFC has been completed. It recommended that a future Joint Organisation<sup>6</sup> (fJO) building on JFC, should undertake additional responsibilities and activities to further support Head Office. The review examined functions and activities to be overseen by this fJO, the future relationship between Head Office and the fJO and how it relates to the rest of Defence.

The review's recommendations are now being implemented as part of the next phase of the Modernisation Programme. One recommendation being implemented which will affect delivery of the Equipment Plan relates to clarifying the responsibilities between JFC (which will be renamed Strategic Command in December 2019) and the single Services for the delivery of capability programmes. JFC will be seeking to transfer programme ownership to a Command at an early stage (once an Outline Business Case has been produced), while retaining capability sponsorship responsibilities.

### ***Navy Command***

Navy Command is undertaking its own transformation work. As set out in the 2019 Command Plan, this presents an ambitious vision of a future Royal Navy exploiting new equipment and capabilities across the globe with a transformed headquarters. The Royal Navy will embrace innovation and technological developments, utilising automation and digitisation, to deliver increased lethality. Increased and persistent forward presence, as part of the strategic 'Global Britain' approach, will require a global support infrastructure. Meanwhile, Navy Command modernisation is creating a simpler structure able to provide clear requirements in support of a sustainable building pipeline in the UK. The focus on transforming the way we do business will drive cutting-edge and cost-efficient processes that will provide further value for money within the Equipment Programme.

### ***Army Command***

The Army has a challenging modernisation agenda to ensure it remains competitive, useful and prepared for current and future challenges and has the best people, equipment and training to fight and win increasingly complex forms of warfare. The Army is embracing new and cutting-edge technologies, including robotics and autonomous systems, to assure competitive advantage. To allow this rapid transformation the Army is prioritising innovative capability enhancements that promotes lethality and mass. This will be delivered through embracing relationships with industry to leverage innovation whilst using 'prototype warfare' to bring industry to the front line, enabling a faster cycle of trial and experimentation to provide a winning edge. This close relationship will form productive and efficient holistic capability delivery and support solutions with partners enhancing prosperity.

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<sup>6</sup> UK Strategic Command (UK Strat Com) from Dec 19.

### 3.3 Change in delivery organisations

#### **Submarine Delivery Agency**

The Submarine Delivery Agency (SDA), an Executive Agency of the Ministry of Defence, leads on the procurement, in-service support and decommissioning of all UK nuclear submarines. The Agency is sponsored by the Defence Nuclear Organisation. As a delivery organisation, the SDA works closely with its two primary customers: the Defence Nuclear Organisation and Navy Command. The Agency also works with DE&S organisation, which provides common cross platform equipment. In delivering programmatic outputs, the SDA maintains a critical relationship with its Tier 1 suppliers: BAE Systems, Rolls-Royce and Babcock Marine as well as its wider supply chain. The Agency is governed by a Board, which operates under the provisions of its Framework Document, approved by Ministers. Accountability to enable the effective, efficient and proper conduct of SDA business rests with Chief Executive.

The SDA has an established governance framework and freedoms which enable it to manage its own workforce and organise itself in accordance with delivery of its objectives. The Dreadnought Alliance, a joint management team between the SDA, BAE Systems and Rolls-Royce, meets the Government's commitment, set out in SDSR15, to work closely with industry partners with the shared aim of improving delivery performance. The Alliance is chaired by Sir Peter Gershon who provides leadership to improve the transition of design information into production outputs and drive the Alliance programme schedule.

Over the coming year the SDA will focus on its four strategic priorities: In-service Support, Systems, Engineering and Disposal; Acquisition; Developing the SDA; and the Supply Chain, while ensuring the best value for the taxpayer and delivering

capabilities to the Royal Navy that are essential for the defence of the UK and its allies.

#### **Defence Equipment & Support**

While the formal DE&S transformation programme is complete and has been closed, DE&S transformation continues to embed within the organisation realising £4.5 billion of Equipment Plan benefits delivered since 2015 exceeding the target of £3.4 billion<sup>7</sup>. This reflects an increase of £1.1 billion within the financial year for the Equipment Plan. Both Equipment Plan and Operating Expenditure in-year savings targets were achieved.

Work to optimise Operating Expenditure baselines linked to the Equipment Plan has progressed through the completion of all planned Project Maturity Reviews, providing a comprehensive baseline of maturity of 170 largest projects and in-service support activities representing over 75% of our Cat A, B and C annual spend. The results of these reviews have generated continuous improvement plans for the projects themselves, for each of our operating Domains, and for the Corporate Centre enabling our Project Management, Project Controls, Integrated Logistics and Engineering functions to focus audit and assurance activity to add the greatest value.

DE&S continues to drive change and continuous improvement through the Plan to deliver 'DE&S@21'. Focused around the vision of 'Great people, Great delivery, Great place to work', which encapsulates the organisation DE&S wants and expects to be, the DE&S@21 implementation plan includes a range of workstreams designed to deliver key outcomes and success. Progress against the Plan will be monitored by the DE&S Change Committee, which is chaired by the DE&S CEO and replaces the Transformation Committee. A DE&S@21 Delivery Plan has been developed covering continuous improvement and change activity during the next two financial years in line with the DE&S@21 visions.

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<sup>7</sup> As at 31 March 2019; based on DE&S (including SDA) Equipment Plan transformation target, i.e. from 2014/15 to 2023/2024

### ***Information Systems and Services***

ISS sits within Joint Forces Command (JFC) and is part of the Chief Information Officer's organisation. The Chief Information Officer is responsible for delivering an ambitious transformation programme aimed at improving the use of digital and information technologies across Defence, delivering greater value for money and making significant improvements in military capability.

## Part 4: Sector Analysis

Since April 2013, responsibility for managing most of equipment spending has been delegated to TLBs, including the Front-Line Commands. TLBs are responsible for delivering outcomes agreed by Head Office within their delegated budgets.

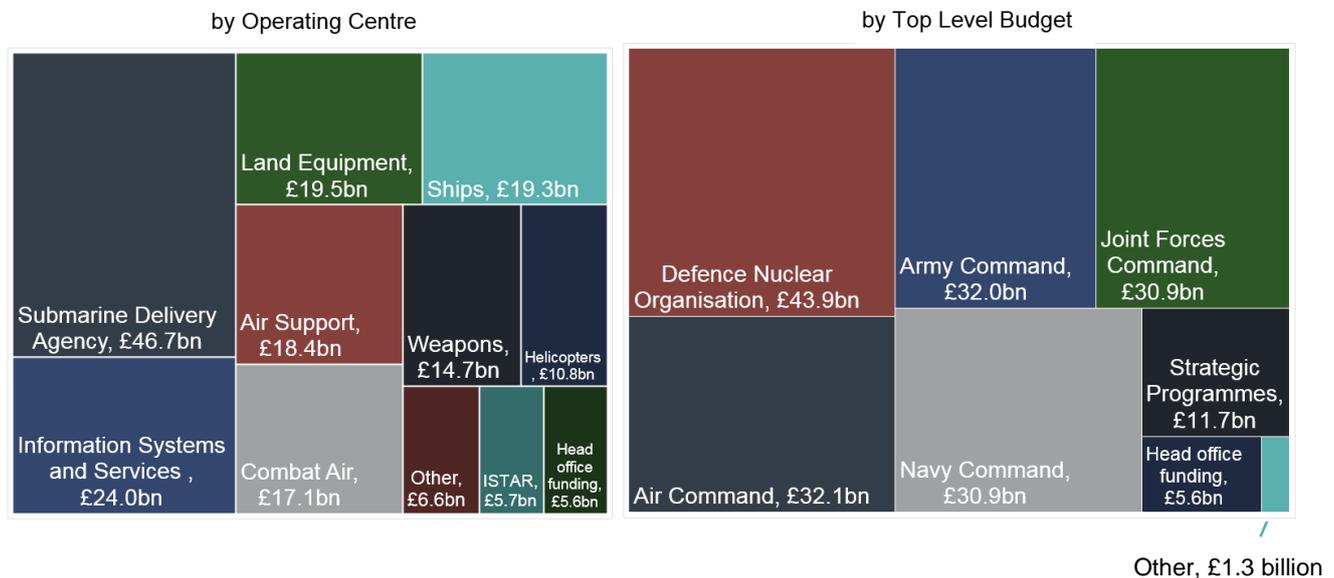
The TLBs allocate their equipment budget to the individual delivery organisation teams responsible for delivering equipment and support projects. In DE&S these project teams are grouped into 'Operating Centres' based on the type of equipment delivered. Figure 10 shows the breakdown of TLB planned spending for the Plan by the seven main DE&S operating centres, ISS and the SDA; and separately by TLB.

Consistent with previous editions, this part of the report presents TLB planned spending over 10-years. However, the basis for these figures has changed since the last edition of the report, due to

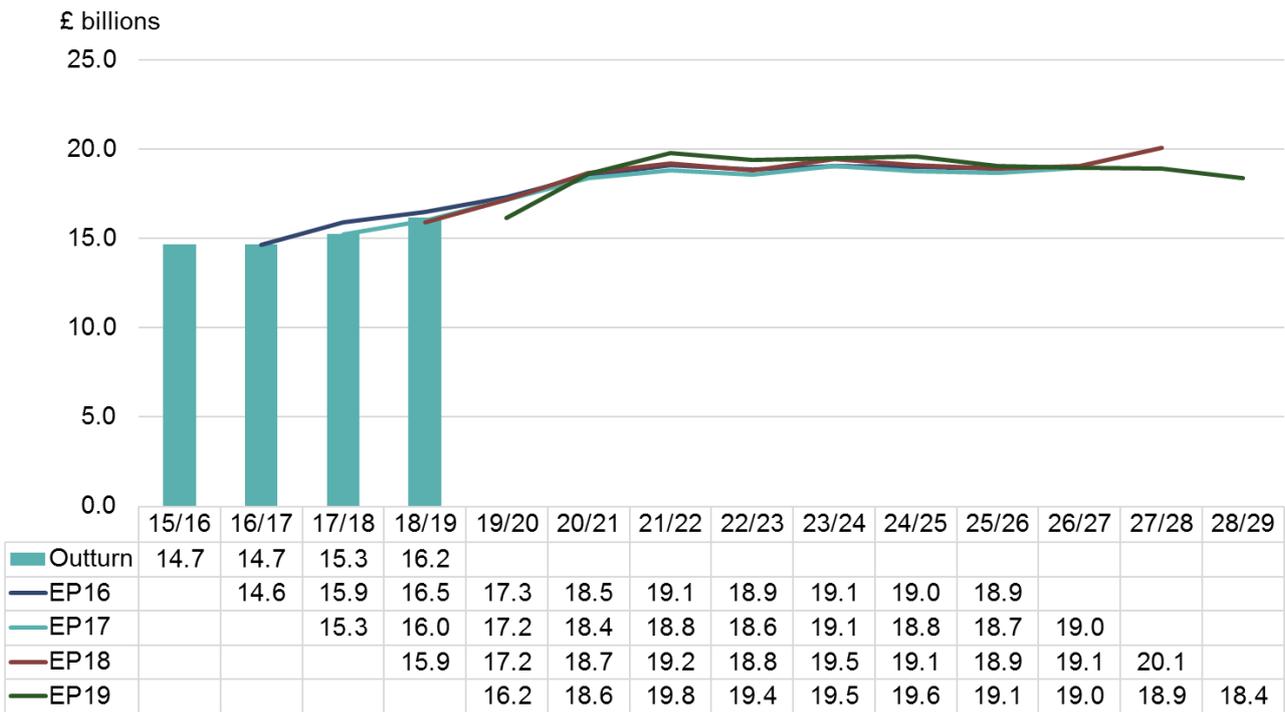
the different approach taken to agreeing spending plans in 2018/19 (see section 2.3). The revised planned spending figures are now more representative of spending required to deliver the Plan. This means that some of the differences in planned spending since 2018 are the result of the change in financial planning approach and not changes in underlying spending plans. The commentaries in this section have identified where changes are due to the different approach or adjustments to plans.

This section also highlights achievements and milestones from the past financial year, and explanations of significant changes to allocated budget by TLB. Examples of project level cost and time variations that have occurred during 2018/19 are presented to illustrate the affordability and deliverability challenges of the Equipment Plan as a whole.

**Figure 9: Equipment Plan 2019, £188.4 billion planned spending**



**Figure 10: Planned spending and outturn for the Equipment Plan since 2015/16**



## 4.1 Navy Command



Navy Command currently plan to spend around £30.9 billion in the Equipment Plan over the next ten years in comparison to £32.5 billion at the end of the previous planning period (see Figure 11). This reduction is principally due to the technical reattribution of support costs for Naval Bases from the Equipment Plan to the TLB Plan.

This spend encompasses surface ship and maritime helicopter upgrades and procurement, in service support of maritime platforms and programmes to improve availability and sustainability of equipment and capabilities.

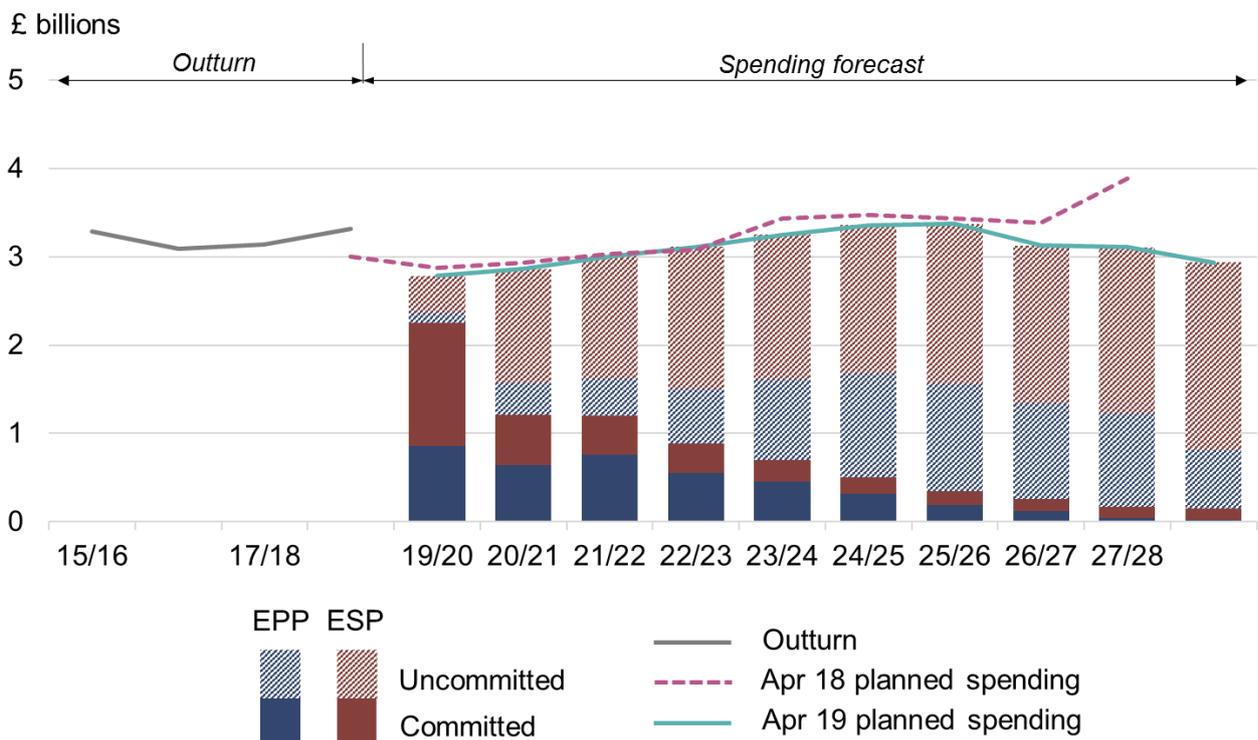
It should be noted that this includes some aspects of submarine support and equipment delivery, however, the major submarine build programmes are funded and delivered by the DNO.

### ***Changes in Planned Expenditure***

Throughout 2018/19 the Equipment Plan forecast remained stable. Internally, an accounting change has reallocated £3.2 billion over ten years transferring the liability for Naval Base support from the Equipment Plan into the TLB Plan. This change was required as part of the transition for Navy Command in assuming responsibility for the Naval Bases from DE&S and now more consistently aligns Navy Command to the rest of the MoD for this nature of support expenditure. Navy Command is responsible for:

- Completion of build and trials activity for HMS Prince of Wales ahead of her acceptance of contract and continued capability delivery into HMS Queen Elizabeth as we move towards the first operational deployment of the Carrier Strike Group in 2021;
- Continued development and initial build of the class of eight Type 26 Frigates as the replacement for the Anti-Submarine Warfare variant of the Type 23 Frigate;
- Development, procurement and delivery into service of a new class of initially five Type 31 Frigates to replace the General-Purpose variant of the Type 23 Frigate;
- Completion of trials and acceptance of the last of four Tide Class tankers for the Royal Fleet Auxiliary, to provide Replenishment at Sea support to the Royal Navy, and particularly the Carrier based Maritime Task Group;
- Design and procurement activity for a new class of up to three Fleet Solid Support Ships for the Royal Fleet Auxiliary, to deliver solid stores and ammunition Replenishment at Sea;
- Completion of the build and acceptance of a class of five new Offshore Patrol Vessels;
- Continued development and initial procurement of a mine hunting system capable of detection through to destruction or neutralising of sea mines, using autonomous and remote systems;
- Delivery of a new class of Airborne Early Warning and Control helicopters, based on the Merlin airframe;
- Completion of the upgrade and life extension of the Spearfish Heavyweight Torpedo, to ensure our submarine force retains an effective weapon against all threats.

**Figure 11: Navy Command Equipment Plan outturn and Spending Forecast**



- Development and implementation of a new industrial and contractual arrangement for warship maintenance and support activity in Naval Bases, aimed at delivering significant efficiencies, simplifying governance and allowing increased opportunity for Small and

Medium Enterprises, while providing the quality and flexibility of support required for the future maritime force.

**Equipment Support 2018/19**

During 2018/19 the Royal Navy:

- Deployed HMS Albion, HMS Argyll and HMS Montrose to the Asia Pacific region continuing UK maritime presence in support of UK Government objectives. During these deployments' equipment and logistic support was successfully provided over an extended period of time and at range.
- Deployed HMS Montrose to the Arabian Gulf region with novel support and manning arrangements, which will allow her to maintain operational presence for a period of three years whilst also providing further efficiencies.
- Maintained delivery of all permanent Defence Tasks including Continuous at Sea Deterrent, as well as home water roles covering border protection, maritime counter-terrorism and fishery protection duties, plus permanent presence in the Arabian Gulf, Falkland Islands, Diego Garcia and Gibraltar.
- Officially opened the new Naval Support Facility, Bahrain, providing improved engineering and logistics support to the forward deployed Royal Navy Frigate and Mine Countermeasures vessels under Op KIPION.

### **Equipment Procurement 2018/19**

During 2018/19 we:

- Achieved first of class F-35B fixed wing flying trials during HMS Queen Elizabeth's inaugural WESTLANT 18 deployment to the United States.
- Cut steel and commenced assembly of the first Type 26 (HMS Glasgow).
- Commenced the Competitive Design Phase for the Type 31 programme.
- Accepted the second of the Tide Class tankers, RFA Tiderace into service. The third and fourth ships of the class, RFA Tidesurge and RFA Tideforce, are anticipated to enter service during 2019.
- Continued to evolve and refine the Royal Navy aspects of the National Shipbuilding Strategy, by improving internal governance and structures in order to support the efficient delivery of future surface ships in line with the new 30-year plan between Defence, wider government and industry.

- Undertook the first Merlin flight with airborne surveillance and control system equipment (Crowsnest) fitted.
- Issued Invitation to Negotiate documents for the Fleet Solid Support competition (November 2018).
- Accepted into service HMS Forth, the first of a new class of 5 Batch 2 River Class Offshore Patrol Vessels

### **Risk to Affordability or Delivery**

The QEC programme is now in its final stages. The small increase in build costs have been partially mitigated through learning from experience and industry incentivisation as HMS Prince of Wales nears completion.

The Type 26 Frigate programme remains on track to deliver within contract. The selection of Type 26 by Australia and Canada as a baseline to meet their future Frigate requirements potentially adds a further 24 ships based on this design. This is projected to provide long term benefits from economies of scale in the global supply chain for both the acquisition and in-service support enterprises. As part of this a cross Government working group will be stood up to facilitate the necessary inter-government export control and information sharing arrangements.

The preferred bidder for the Type 31 Frigate was announced in September 2019. The innovative and streamlined procurement of fixed vessel build costs will provide capability balanced against affordability. Timely delivery of Type 26 and Type 31 is particularly important to avoid further extensions to the Type 23 platform, which are already operating beyond their originally intended design life. Support and maintenance costs will continue to increase the longer that they are extended in service.

Under-performance by the contractor during the development phase of the Crowsnest Airborne Surveillance and Control programme resulted in an In-Year underspend in FY 2018/9 of £46.01 million. A recovery action plan has been enacted and the project is being re-baselined to deliver an incremental capability to support the Carrier Strike Group 21 deployment.

UK industrial capacity in complex warship and submarine building remains limited and key elements will continue to operate at capacity in the future based on procurement in the forward maritime equipment plan. This introduces tight inter-programme dependencies and risks, though the National Shipbuilding Strategy goes some way to mitigate these. Similarly, the return to

Task Group operations, rather than regular single ship deployments, and the extended forward deployment of HMS Montrose has the potential to challenge current maintenance and support arrangements, including industrial capacity. Navy Command is working closely with both suppliers and service providers to better understand, manage and mitigate these potential risks.

## 4.2 Army Command



© General Dynamics

Army Command plan to spend around £32.0 billion on the Army's Equipment over the next decade in comparison to £30.2 billion at the end of the previous planning cycle (see Figure 12).

### ***Changes in planned expenditure***

There has been cost increase over the comparable years of the programme since April 2018 (£871M) mainly due to the change in accounting treatment of Raw Materials and Consumables items which has now brought the cost of these items inside the Army's Equipment Programme.

Army Command is responsible for:

- The delivery and support of armoured fighting vehicles;
- Artillery systems;
- Protected and support vehicles;
- Helicopters;
- Unmanned air systems;
- Operational infrastructure;
- Soldier fighting systems;

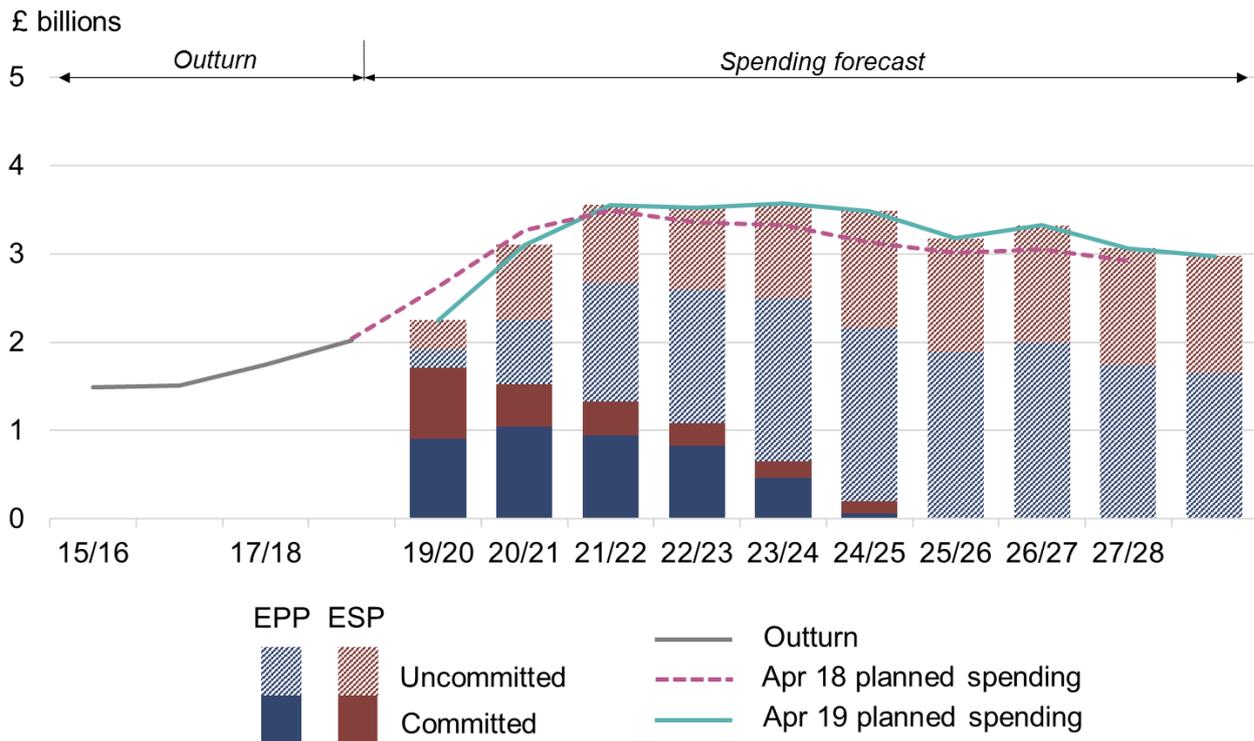
- Training solutions in the Land and Special Forces domains.
- Readiness and sustainment Land Force elements; and

Intelligence, surveillance, target acquisition and reconnaissance (ISTAR) and communications capabilities whilst pivotal to the Land Environment are largely funded and delivered by JFC.

Current programmes include:

- The multi-role Ajax armoured fighting vehicle programme, which will transform the Army's medium armour and advanced ISTAR capability as part of the war-fighting division, including the new Strike brigades; the first vehicles have been delivered and are conducting trials;
- The Mechanised Infantry Programme, which will deliver a fleet of 8x8 Mechanised Infantry Vehicles to equip the Army's new Strike brigades (announced in SDSR 2015), as part of Joint Force 2025;
- The Warrior Capability Sustainment Programme, which will deliver a fleet of upgraded Infantry Fighting Vehicles which will be the corner stone of the modernised Armoured Infantry brigades. The programme will deliver capability enhancements to its lethality as well as its survivability and improved situational awareness;
- The Challenger 2 Life Extension Programme+, which will enhance the lethality and protection of the UK's Main Battle Tank as well as treating critical obsolescence and extending the life of the platform from 2025 to at least 2035;

**Figure 12: Army Command Equipment Plan outturn and Spending Forecast**



- The Multi Role Vehicle Protected programme delivering a family of adaptable, protected general purpose vehicles for command and logistics;
- The Close Support Fires Programme which will deliver a step change in artillery capability providing greater agility, range and lethality in support of the warfighting Division from 2026;
- The Apache Capability Sustainment Programme, which will provide the basis for the UK to maintain a battle winning Attack Helicopter that is aligned to and interoperable with our major allies;
- The Chinook Capability Sustainment Programme, which will provide a UK heavy lift capability replacing the current fleet over the next two decades, as the current fleet becomes obsolescent, sustaining the capability beyond 2050;
- Utilising the Defence Transformation Fund to deliver innovative capabilities in accelerated timelines including; Unmanned Air Systems, robotic platoon vehicles, development and trailing of autonomous systems to revolutionise logistic support and to deliver information manoeuvre.

### **Equipment Support in 2018/19**

During 2018/19 we:

- Deployed and sustained equipment in support of overseas operations. This included the enhanced forward presence in Poland and Estonia, significant support to Iraq and Afghanistan, the UN Mission in South Sudan as well as numerous smaller operations in Africa, and deployment of the Supreme Allied Command Europe's Strategic Reserve Force Battlegroup to the Baltics.
- Deployed and sustained equipment in support of major exercises including;
- Ex TRIDENT JUNCTURE, supporting over 600 vehicles that deployed by air, sea, rail and road to Norway as part of an Article 5 scenario rehearsal and certification of the 2019 NATO Readiness Force Land Command Headquarters,
- Ex SAIF SAREEA 3 in OMAN, which represented the largest overseas deployment of British soldiers since Op TELIC 1
- Ex KHANJAR OMAN, a Battle Group deployment which demonstrated the potential for combined joint collective training.

- Agreed a price with Leonardo Helicopters for the support of Apache Mk1 aircraft to their out of service date of 2024 which secured £137 million in efficiency savings.
- Transitioned Terrier vehicle from a contract for logistic support to a traditional support arrangement realised a £25 million efficiency.
- Let the Protected Mobility Engineering and Technical support contract for Foxhound, Jackal and Mastiff with NP Aerospace realising a £14 million efficiency.
- Negotiated and let the 5 year in service support contract for Watchkeeper in March 2019.

### **Equipment Procurement 2018/19**

During 2018/19 we:

- Delivered the first six of the Army's new family of Ajax Armoured vehicles, which is in the manufacture phase. Ajax trials are ongoing using seven prototypes and numerous production standard vehicles. The cold trials in Sweden were completed successfully in early 2019, and the early reliability trials were conducted at Bovington in preparation for entry qualification trials.
- Delivered the qualification and reliability trials for the Warrior Capability Sustainment Programme including the unmanned firing which began on schedule as part of the build up to manned fire on the move that will take place later in 2019.
- Continued with the delivery of the Ajax and Warrior 40mm case telescopic cannons project which is running to performance and cost with a predicted schedule reduction of over nine months. The programme also qualified the first ever medium calibre airburst round.
- Commenced the manufacture phase of the Apache Capability Sustainment Programme through a foreign military sales agreement with the US with the first 14 Mk1 donor airframes having entered the remanufacture stage in the US.
- Gained approval for the Challenger 2 Life Extension Programme+ to extend the

assessment phase to enhance the lethality and protection of the UK's main battle tank as well as treating critical obsolescence and extending the life of the platform from 2025 to at least 2035.

- Gained approval for the demonstration phase of the Multi Role Vehicle Protected Package 1 - Joint Light Tactical Vehicle delivering an adaptable, protected general purpose vehicles for command and logistics.
- Gained approval for time-critical long-lead items, capability enhancement engineering and military airworthiness certification activities in support of the acquisition for Chinook Capability Sustainment Programme which is being delivered through a foreign military sales agreement with the US.
- Delivered the £72 million contract to produce 382 Enhanced Palletised Load System vehicles and proved logistic readiness to meet the NATO readiness exercise deadline.
- Procured and deployed rapid erect shelters and temporary landing surfaces for F-35 deployment to RAF AKROTIRI.

### **Risk to Affordability or Delivery**

Army manages numerous programmes with a FOREX requirement of c£7 billion over the 10 years for programmes including Apache, Ajax and MIV. Foreign exchange rate fluctuation is therefore a major budgetary risk.

An Accounting Officer Assessment (AOA) was considered for the Armoured Infantry Programme's Warrior Capability Sustainment Project (WCSP) which is forecasting delays and cost growth against its original approval. The Permanent Secretary as Accounting Officer considered that the project should proceed as it remains affordable and a high priority for the Army to meet Defence Strategic Objectives.

An AOA was considered for the Watchkeeper programme following delays to Full Operating Capability 1. The Accounting Officer considered the revised schedule to be acceptable, the milestone was subsequently achieved in Nov 2018 and the programme is now due to close in 2021.

## 4.3 Air Command



Air Command plan to spend around £32.1 billion on the Equipment Plan over the next decade in comparison to £34.0 billion at the end of the previous planning period (see Figure 13). The reduction is due to Tornado going out of service and the Equipment Plan programme activity peaking in the early years with the introduction of new equipment and stabilising in the later years – for example the F35 Lightning aircraft.

### ***Changes in planned expenditure***

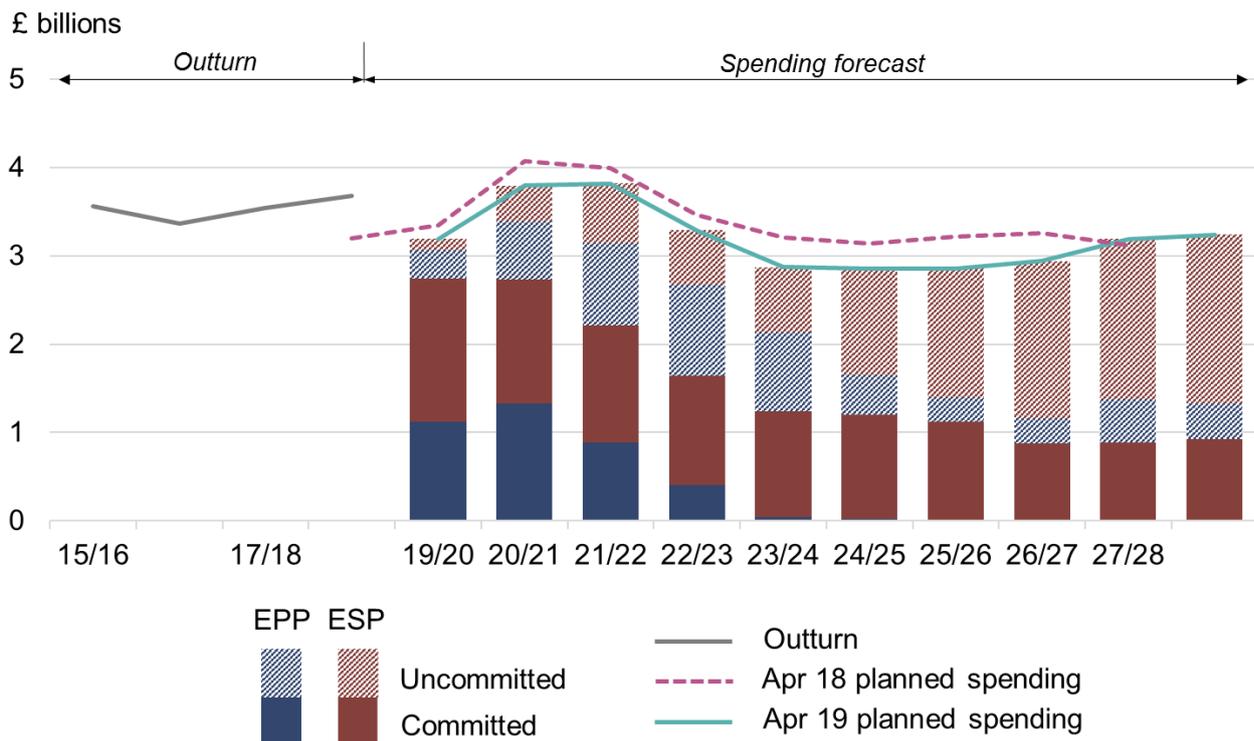
Air Command is responsible for three major sectors:

- Combat Air, which covers fast jets including the Future Combat Air System, weapons and synthetic training systems.
  - Air Mobility and Air Enablers, which covers all large transport and air-to-air refuelling aircraft, air platform protection, and training aircraft (as part of the UK military flying training system).
- Command, Control, Intelligence Surveillance and Reconnaissance (ISR), which covers large ISR aircraft, remotely-piloted aircraft, and a broad range of equipment associated with communications, radar, air traffic management and tactical data links.

This investment includes:

- Achievement of Main Gate Approval for the Defence Operational Training Capability (Air) (DOTC(A)) which allows for a rebalancing of live/synthetic training resulting in several contracts being awarded. Air Battle Training Centre simulator domes have been retired to enable DOTC(A) Infrastructure delivery
- Approval for the procurement of additional synthetic training devices being approved to augment and double Typhoon training capacity at Royal Air Force Coningsby.
- Investment in Typhoon continues post-delivery of Project CENTURION, with an extensive spiral upgrade programme commencing. This next phase of Typhoon evolution, known as Programme JANUS, will ‘maintain UK Typhoon at the forefront of RAF Combat Air, enhancing capability in an increasingly complex threat environment’ - delivering compliance and regulatory enhancements and survivability upgrades.
- A contract awarded in March 2019 to deliver a new Mission Planning System for Typhoon.
- The award of a contract to procure five E7 Wedgetail aircraft.

**Figure 13: Air Command Equipment Plan outturn and Spending Forecast**



**Delivery Progress**

The RAF took delivery of its 17<sup>th</sup> F-35 Lightning aircraft and saw the return of 617 Squadron to the UK. In tandem, the Typhoon enhancement project (CENTURION) was achieved. Team Tempest, a joint MOD and industry team, was launched at the Farnborough International Air show in July 2018 and will prepare the UK for the acquisition of a next generation combat aircraft to replace Typhoon. The P-8A new maritime patrol aircraft programme has seen their first students training with the US Navy at Naval Air Station, Jacksonville. A contract for a new Airborne Warning and Control System aircraft capability (E7 Wedgetail) has been awarded. We delivered and accepted into service a world-class High-G Centrifuge facility at RAF Cranwell; it is in use training fast jet aircrew, and testing safety-critical equipment.

The A400M tactical airlifter achieved a full aeromedical evacuation capability. Trials to prove the aircraft can operate onto natural surface landing zones were successfully completed, a capability that will enable the rapid deployment of troops into operational theatres. Trial crews also despatched 24 tonnes of stores under parachute

in a single pass. The largest load to be despatched on record, this demonstrated the step-change in capability ATLAS brings.

After more than two years of work, an international Global Re-baselining contract amendment for A400M was finalised in February 2019. This is a cost-neutral arrangement that secures the route to the full suite of A400M contracted capabilities, aircraft deliveries and retrofit schedule while also keeping the programme on a sound financial footing.

UK Military Flying Ab-Initio Elementary Flying Training on the new Prefect aircraft commenced, as did Multi-Engine Pilot Training on the new Phenom aircraft. All ten Texan aircraft were delivered to RAF Valley, ready for the commencement of Basic Flying Training, preparing students for the Hawk fast-jet trainer already in service.

**Equipment Support in 2018/19**

During 2018/19 we:

- Deployed and sustained equipment in support of overseas operations globally including OP SHADER in Iraq and Syria, OP

KIPION in the Gulf and supporting the French forces in Mali on Op NEWCOMBE.

- Delivered support to NATO, providing Quick Reaction Alert with Typhoon and Voyager, also ensuring UK security.
- Provided Military Aid to the Civilian Authorities within the UK after severe weather and flooding with Puma and Chinook support, as well as through the deployment of the Defence Warning and Reporting Flight when drones were active around Heathrow and Gatwick airports.
- In partnership with Foreign and Commonwealth Office Services, achieved Programme TARTARUS Full Operating Capability by installing an advanced security solution at Remote Radar Head Saxa Vord that enabled the site to be unmanned.
- Approval for the European Common Radar Solution Mk2 to enhance Typhoon's radar capability and survivability to significantly improve operational effectiveness.
- Programme work commenced to establish a Joint UK/Qatari Typhoon squadron in 2020.
- The UK was awarded further F-35 Lightning Component Maintenance Repair, Overhaul and Upgrade work, to provide services for the European region.
- F-35 Lightning completed first of class Flying Trials from HMS Queen Elizabeth.
- Conducted a successful Critical Design Review for Programme GUARDIAN, which will replace the ground-based air command and control systems in the UK and the Falkland Islands.
- Let a contract for a replacement deployable long-range Air Defence radar, which will be available for worldwide deployment by Number 1 Air Control Centre from end February 2020.
- Signed the Shadow aircraft Long-term Sustainment Contract for the Programme, through to the current Out of Service Date of 2030.

### ***Equipment Procurement in 2018/19***

During 2018/19:

- The delivery of a ground-based Ballistic Missile Defence radar that will enhance the

effectiveness of NATO Ballistic Missile Defence.

- Project CENTURION was declared in service. This represented a significant step change in Typhoon's operational capability, with the addition of the deep strike cruise missile Storm Shadow, Beyond Visual Range air-to-air missile Meteor, and the precision attack missile Brimstone.
- Team Tempest, a joint MOD and industry team, was launched at the Farnborough International Air show in July 2018 and will, as part of the Future Combat Air System Technology System Technology Initiative, prepare the UK for the acquisition of a next generation combat aircraft to replace Typhoon.
- F-35 Lightning achieved Initial Operating Capability (Land).
- Awarded a contract for Block Buy 1 for 17 additional F-35B Lightning aircraft.
- Three F-35 Lightning infrastructure facilities (the Lightning Operations Centre, the Integrated Test Centre and a Maintech & Finishing facility) at RAF Marham were completed.
- Took delivery of improved High Definition Intelligence, Surveillance and Reconnaissance sensors for the UK Reaper Force.
- The fitment of enhanced sensors and equipment to Shadow R Mk1+ to deliver the first High Definition capability on a UK ISR platform.
- Spiral upgrades to Shadow R Mk1+ to primarily enhance air safety but also operational capability. Ongoing work and investment on the Shadow R Mk2 Programme that delivers a world-leading Tactical ISR capability.
- Completion of the first set of UK built P-8A Poseidon auxiliary fuel tanks, which were fitted as the first UK P-8A aircraft ZP801 build commenced in the USA.

### ***Risk to Affordability or Delivery***

Air manage numerous programmes with large requirements for foreign currency including the Lightning programme. Foreign exchange rate fluctuation is therefore a major budgetary risk

The forecast cost of the approved elements of the Lightning programme remains within its cost approval value. However, moving forward the challenge is to ensure that the global support solution meets the readiness needs of the users

and remains affordable. In addition, the future development programme for the aircraft is now underway and will be an area to monitor closely to ensure it remains affordable.

## 4.4 Joint Forces Command



JFC plans to spend around £30.9 billion on the Equipment Plan over the next decade in comparison to £30.2 billion at the end of the previous planning period (see Figure 14).

The change in forecast expenditure since April 2018 is driven by increases in funding in line with commitments made in the 2015 Strategic Defence and Security Review associated with SKYNET 6, and the delegation of the ESA 10 Provision associated with Raw Materials and Consumables to JFC.

JFC is responsible for four major sectors:

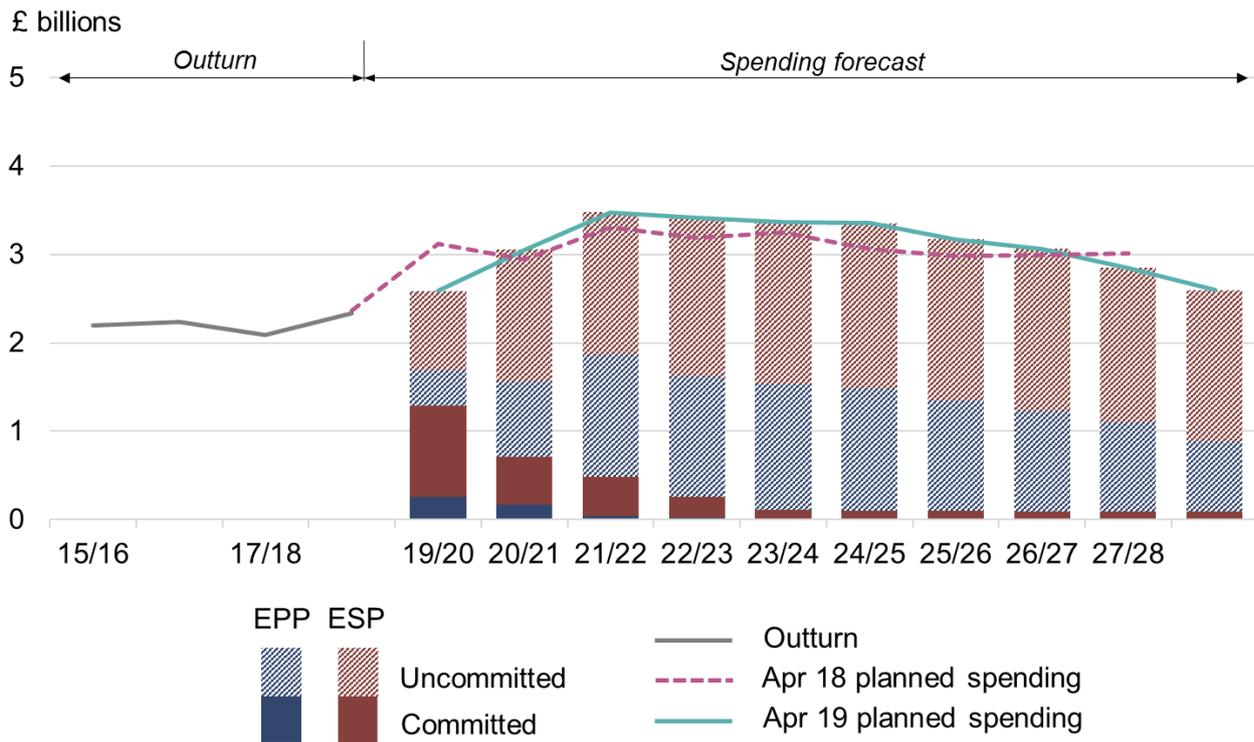
- C4ISR, which covers Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance systems and capabilities in both operational and business environments.

- Special projects, which includes procurement for UK Special Forces and Joint Force Protection capabilities.
- Joint Logistics, which covers the procurement of pan-Defence logistics systems and capabilities to support Defence operations and activities.
- Medical, which covers the procurement of medical operational capabilities, to minimise disease, injury and death in all operational environments.

This includes the development and delivery of:

- Resilient Command, Control, Communications, Computing and Information capabilities. These capabilities encompass: Defence's core ICT system, user services (e.g. telephony) and networks; logistics information systems; operational information systems, which are interoperable with our closest allies; and tactical information systems to support operations and activity in the land environment.
- The current UK military satellite network and the UK's future military satellite capabilities.
- A range of Intelligence Surveillance and Reconnaissance capabilities, to collect information and process intelligence.
- A sovereign cryptography programme with GCHQ, to sustain Defence cryptographic capabilities and the UK's ability to encrypt and decrypt information.

**Figure 14: JFC Equipment Plan outturn and Spending Forecast**



- Special Forces counter-terrorism and other equipment capabilities, to enhance their ability to operate and strike globally on their own or with our closest allies.
- Joint force protection capabilities, particularly in Chemical, Biological, Radiological and Nuclear Weapons (CBRN) defence and electronic countermeasures, for UK forces on operations.
- A range of joint logistics enabling capabilities, such as contracts for food to support military activity in the UK and overseas and the provision of food across all military environments.
- A range of medical equipment capabilities to support military activity and operations.
- Cyber and Joint Training and Simulation capabilities.

**Equipment Support 2018/19**

During 2018/19 we:

- Continued to support the in-service ‘Skynet 5’ military satellite network.
- Continued the roll-out of modernised and cost-effective core ICT capabilities across

Defence under the ‘MODNET’ and ‘Integrated User Services’ programmes.

- Continued to develop the New Style of IT (Deployed) programme to replace legacy ICT systems for deployed personnel.
- Delivered enhancements to the UK Armed Forces’ ICT interoperability with allies, including collaborative working environments through the ICT ‘Gateways’ programme.
- Undertook a number of investigations into potential cyber vulnerabilities across Defence, as part of the Defensive Cyber Operations programme.
- Sustained the Enterprise Social Media project, which supports the Whole Force approach through the provision of communications services to the Reserve Forces of the Army, Navy and Air Force.
- Extended support for the Intelligence Processing Service, which provides enhanced tools for intelligence analysis, out to 2030.
- Maintained our commitment to NATO by sustaining the provision of NATO Communications and Information Services to the UK through to 2027.

## Equipment Procurement 2018/19

During 2018/19 we:

- Continued the development of the existing, closed battlefield CIS architecture into a more cost-effective, open architecture owned by the Department under the 'Morpheus' project.
- Continued to deliver a range of Defence CBRN capabilities and committed to the development of next generation Electronic Countermeasures to ensure the continued force protection of deployed personnel.
- Continued Concept Phase work on a broad range of activities to enhance Defence's use of Artificial Intelligence, particularly around intelligence processing.
- Delivered an uplift in medical material and equipment to all Front-Line Commands and

the Defence Primary Healthcare organisation, enhancing both the Firm Base and Operational readiness.

- Continued to deliver a range of critical equipment capabilities for UK Special Forces, including urgent capability requirements identified for current operations.

### **Risk to Affordability or Delivery**

As at 31 March 19, the Global Connectivity programme has already delivered a Wide Area Network/Local Area Network area network to over 880 sites in the UK (90% of the total requirement) and work continues delivering services to the remaining sites. But the delivery of the full programme remains challenging.

## 4.5 Defence Nuclear Organisation



The DNO plans to spend around £43.9 billion on equipment procurement and support programmes over the next decade in comparison with £40.9 billion at the end of the previous planning period (see Figure 15).

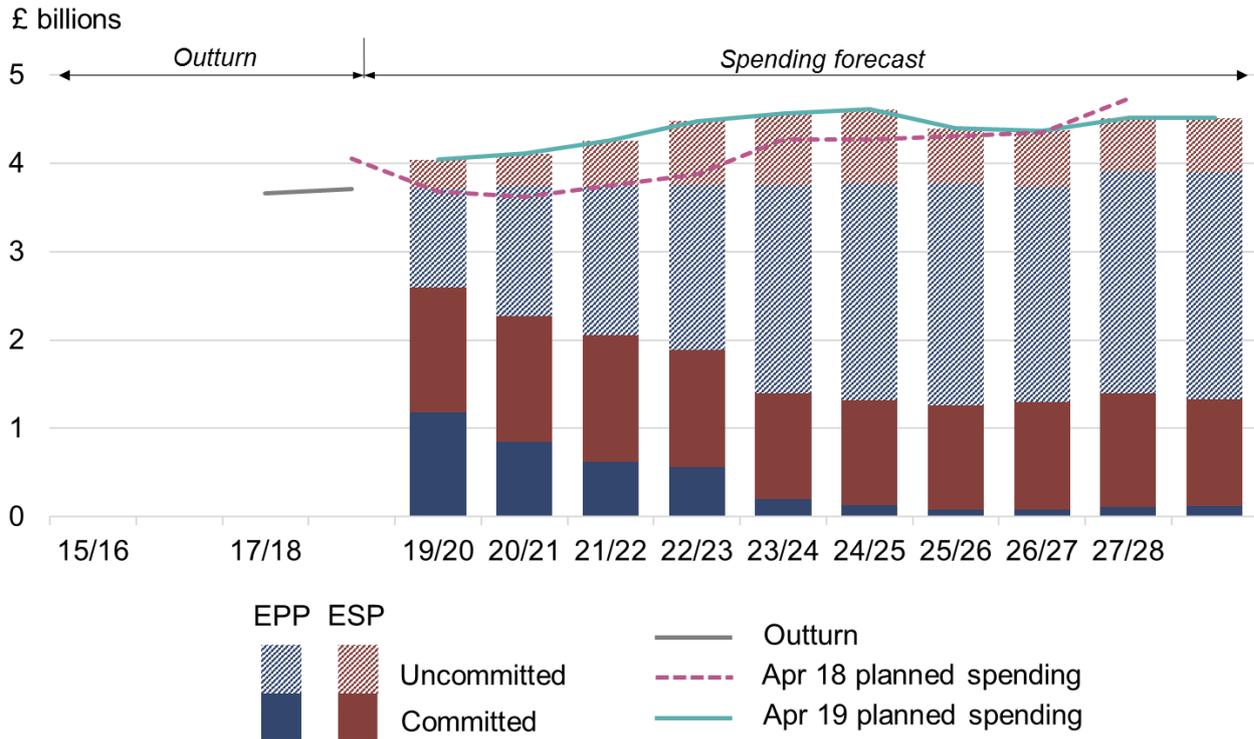
### **Changes in planned expenditure**

The reported increase in planned spending is largely the result of technical changes to budget planning between 2018/19 and 2019/20 and do not reflect changes in expected costs, which broadly remain unchanged since last year.

The DNO is responsible for: the procurement and disposal of all the UK's submarines, through the Submarine Delivery Agency; the nuclear warheads and Trident missiles which form the UK's nuclear deterrent; nuclear skills; nuclear-related infrastructure; and day-to-day nuclear policy. This includes investment in:

- The delivery of four Dreadnought Class submarines to replace the Vanguard Class, including the common missile compartment arrangements with the US and upgrades required to naval base infrastructure;
- Trident II D5 missiles with the US;
- The delivery of seven Astute Class submarines to replace the Trafalgar Class;

**Figure 15: Defence Nuclear Organisation Equipment Plan outturn and Spending Forecast**



Notes: No outturn is shown for DNO before 2017/18, as nuclear spending was part of Strategic Programmes until April 2017/18.

- The demonstration programme to recycle the UK's decommissioned nuclear-powered submarines;
- The support, procurement and design of naval nuclear propulsion systems;
- The Nuclear Warhead Programme, including the Nuclear Warhead Capability Sustainment Programme which entails the maintenance and updating of the Atomic Weapons Establishment, the UK/France collaborative Teutates project and the development and sustainment of the capabilities required for Nuclear Threat Reduction and National Nuclear Security.
- Studies to support a decision on whether to renew or replace the nuclear warhead.

**Equipment Support 2018/2019**

During 2018/19 we:

- Supported the UK's submarine operations, including the Continuous At Sea Deterrent.

- Placed a contract amendment for delivery of specific Astute Class Submarine Training to all seven Astute Class submarines out to 2037. This commitment includes contracts for delivery of new classrooms and a new ship control simulator.

**Equipment Procurement 2018/19**

During 2018/19 we:

- Spent over £1.5 billion in the Dreadnought programme. During the year Dreadnought boats 2 and 3 were named Valiant and Warspite respectively. (Boat 4 has also subsequently been named King George VI.)
- Made good progress on the builds of Astute Class boats 5, 6, and 7.
- Re-baselined the Core Production Capability project to ensure continued manufacture and delivery by Rolls-Royce of reactor cores for the UK's submarines, including the procurement of materials and regeneration of

facilities to manufacture reactor cores for the Dreadnought Class.

- Contracted with Rolls-Royce for continued in service and disposal support for the submarine nuclear steam raising plant  
Signed a three-year pricing and programme period with the Atomic Weapons Establishment, a significant step forward in aligning financial incentives with driving programme priorities.

### **Risk to Affordability or Delivery**

Welding quality issues on missile tubes for the Dreadnought Class submarines were identified in June 2018. Assessment and repair work is underway and we are working with our US counterparts to achieve the earliest supply of missile tubes into the Dreadnought programme. Our commitment to delivering the first of class into service in the early 2030s is unchanged, and we remain committed to delivering the programme within the SDSR15 estimated cost.

Astute boat 4, Audacious, experienced some delay during the submarine’s commissioning phase. Final commissioning is underway and Audacious is scheduled to leave Barrow for sea trials later in 2019.

A range of factors have led to extensions of original project timescales and cost increases for

submarine defueling and dismantling, as detailed by the National Audit Office in its April 2019 report. We recognise that the disposal of nuclear-powered submarines is complex and challenging, but believe that the Department is making good progress by putting in place the necessary facilities, processes and technical solutions to demonstrate steady state disposal of laid-up submarines as soon as possible, and we are committed to funding these projects to deliver best value for money to the taxpayer.

Project MENSA, which will deliver facilities to replace the Gravel Gerties at AWE, is making significant improvements and this has been reflected in the overall Infrastructure and Projects Authority rating. However, it remains a challenging programme requiring active management, and its commissioning will be complex.

An Accounting Officer Assessment was submitted in 2019 following the cost growth in the Teutates programme, although it should be noted that it remains affordable within the context of the Nuclear Weapons Capability Sustainment Programme. The Permanent Secretary as AO considered that the programme remains a satisfactory use of public resources and that it should continue to proceed.

## 4.6 Strategic Programmes



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The Strategic Programmes Directorate plan to spend £11.7 billion on the Equipment Plan over the next decade in comparison to £10.9 billion at the end of the previous planning period (see Figure 16).

Of this, about 75% is used to procure and support our more sophisticated guided weapon systems through the Complex Weapons Programme. Within this Programme, most of this is delivered through a partnering agreement with MBDA which is termed the Complex Weapons Portfolio Management Agreement. The remainder will fund the provision of various Test & Evaluation and Training Services capabilities that support the majority of the Department’s major procurement and in-service programmes and the procurement of several Novel Weapon demonstrators and potentially future Novel Weapon capability.

### Changes in planned expenditure

There have been limited changes in forecast expenditure since April 2018. The main changes being:

- The Long-Term Partnering Agreement was renegotiated with QinetiQ to achieve improved value for money and a range of commercial improvements including conversion to a QDC.
- Land Precision Strike costings were revised following a review of scope.

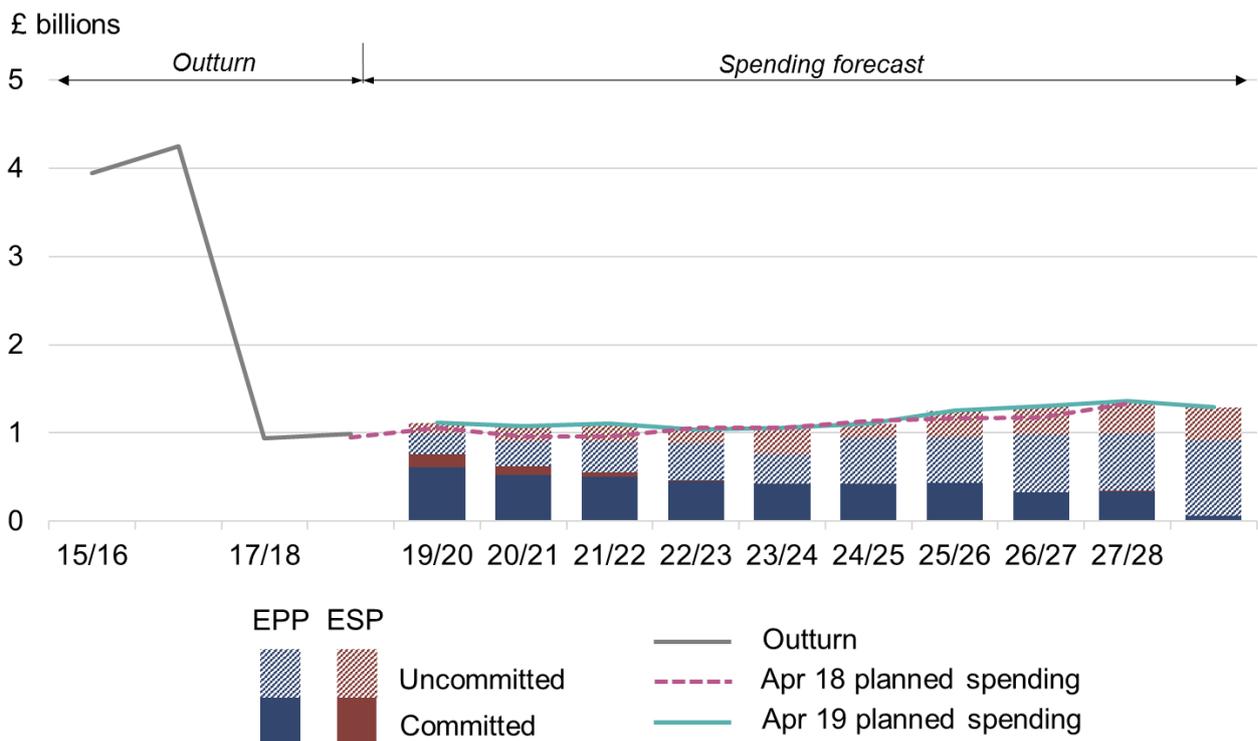
Strategic Programmes also undertook a detailed review of costs in preparation for Spending Review 2019.

In 2019/20, Strategic Programmes will continue to provide Test, Evaluation and Training Support

Services through the long-term partnering agreement with QinetiQ. Under the contract, QinetiQ manages and operates various strategic Test & Evaluation capabilities owned by the Department. The services provided vary depending on specific requirements, but in general, QinetiQ:

- Provides the technical expertise for the Planning, management and conduct of trials and provide evaluation and analysis of the results;
- Supports the Department in transforming capabilities so that they continue to match our needs; and,
- Supports the Department in investment in new technology, people and facilities by financing and implementing development and maintenance programmes.

**Figure 16: Strategic Programmes Equipment Plan outturn and Spending Forecast**



Notes: Nuclear spending was included in the Strategic Programmes budget until April 2017/18.

- We will also provide a range of aerial target capabilities through the Combined Aerial Target Service Contract, also with QinetiQ, in support of in-service weapon firings and

weapon development testing including associated telemetry analysis.

## **Test and Evaluation**

During 2018/19, three key Test & Evaluation achievements were:

- Improvements to and use of the Thales' new signature measurement facility in Wells.
- Hosting the very successful multinational Formidable Shield (FS19) exercise on the Hebrides range.
- Signature of the Contract Amendment of the Reinvigorated Long-Term Partnering Agreement with QinetiQ, achieving considerable efficiencies across the 10-year Annual Budget Cycle period bringing the Long-Term Partnering Agreement to an affordable position.

In coming year Test & Evaluation plans to:

- Make good progress with DE&S/TEST in holding QinetiQ to account for delivery of the milestones necessary to deliver the first year of Reinvigorated Long-Term Partnering Agreement Transition.
- Initiate early strategic level thinking on how T&E needs to change to enable Defence to mobilise, modernise and transform by adopting an enterprise approach.
- Provide a leadership and cohering role for the FS21 exercise noting its increase in scale and complexity over FS19.
- Establish a Counter small Unmanned Aerial System (C-sUAS) Rapid Innovation Cell on behalf of Defence. This will include:
  - The development of a site threat vulnerability assessment methodology to be applied by Defence Security and Resilience to assess a prioritised list of Defence sites.
  - A mobile testing capability for C-sUAS to be up and running by Autumn 2019
  - Leading to a catalogue of tested industry products for C-sUAS to help match those with specific requirements with potential providers.

## **Complex Weapons Programme**

During 2018/19, the Complex Weapons Programme:

- Achieved successful firings of Sea Venom, a new air-launched anti-ship weapon guided weapon operated with the Wildcat helicopter.
- Continued qualification firings of the Lightweight Multirole Missile.
- Began the mid-life upgrade of Storm Shadow missiles in order to expand their capabilities and extend their life.
- Brought Meteor (a medium-range air-to-air air defence capability), Brimstone (short-range precision strike capability) and Storm Shadow (long-range precision strike capability) into service on Typhoon aircraft.
- Sea Ceptor achieved initial Operating Capability on Type 23 Frigate utilising the Common Anti-air Modular Missile to provide Future Local Area Air Defence capability in the Maritime environment.

In coming years, the Complex Weapons Programme plans to deliver:

- Lightweight Multirole Missile, very short-range air defence capability in the land environment.
- Future Ground Based Air Defence, to ensure that the ability to conduct land manoeuvre remains relevant against evolving threats.
- Future Battle Group Organic Anti-Armour, enabling land combat units to engage armoured targets with organic surface to surface fires.
- Land Precision Strike and Deep Fires Rocket System, ensuring the Land Component's ability to engage targets at long range with sufficient precision.
- Sea Venom and Martlet (utilising the Lightweight Multirole Missile), Future Heavy and Light Anti-Ship capabilities for Wildcat;
- Brimstone 3A Capability Sustainment Programme and 3B Capability Uplift Programme, delivering short-range precision strike capability for Typhoon with future application for Protector and Attack Helicopter.
- ASRAAM Block 6, short-range air-to-air air defence capability and Meteor, medium-range air-to-air air defence capability, for Lightning.

- A mid-life refresh programme for ASTER missiles, a medium-range air defence capability for Type 45 Destroyers.
- SPEAR Capability 3, a medium-range precision strike capability for Lightning (with the option also to fit it to Typhoon).
- Future Cruise / Anti-Ship Weapon (which could be delivered in co-operation with France). Sea Viper Evolution Pre-Concept study to de-risk and understand a Ballistic Missile Defence capability for ASTER.
- Deliver Sea Ceptor to T26 and T31 Frigates.
- SPEAR Capability 4, a mid-life refresh of the Storm Shadow cruise missile providing increased countermeasure resistance.

### ***Risk to Affordability or Delivery***

The Programme is continuing to deliver capability to approved timescales, although there are considerable cost challenges especially in the next three years. Strat Progs is working with MBDA to mitigate these risks to deliver capability within budget.

In addition, we have had to declare a slip to the Sea Venom (Future Anti-Surface Guided Weapon (Heavy) capability) programme for the Royal Navy caused by technical issues in the Demonstration phase of delivery.

### ***Novel Weapons***

During 2018/19, the Novel Weapons Programme:

- Was formally established and is seeking to accelerate the introduction of Directed Energy Weapons (DEW), into all services, by 10 years
- Initiated the Novel Weapons Pre-Concept Phase which aims to generate the cross-

DLOD evidence and understanding required in advance of balance-of-investment decisions and to prepare defence for the introduction of DEW

- Initiated the Novel Weapons Capability Demonstrator Programme which aims to undertake a series of DEW Capability Demonstrators which will integrate mature technology into platforms to provide equipment which can be put into the hands of the user to rapidly understand requirements and accelerate future procurement.
- Developed strong relationships with the US DEW community and supported the inclusion of DEW as a Next Generation Capability Cooperation topic

In coming years, the Novel Weapons Programme plans to:

- Continue to identify, address and solve the challenges to DEW introduction
- Continue to work with the Front Line Commands, DE&S and other stakeholders to understand the impact and the cost of DEW introduction into core
- Generate the DEW Strategic Outline Case for April 2021 presenting the various options available for DEW advancement for selection by the IAC
- Deliver the DEW capability demonstrators by 2023 for trials with the user community ranging from 6 months to 1 year Continue to build relationships with allies in this area to ensure future interoperability of DEW systems
- Continue to work with UK industry and wider government to support UK prosperity

## Part 5: Project Performance Summary Table

The Project Performance Summary Table (PPST) provides an overview of the delivery performance on the Department's largest Equipment Procurement projects that have been approved for Demonstration and Manufacture phases. For each project, we report on the forecast cost, forecast timescales for achieving In-Service Date (ISD) and the forecast achievement of meeting Key User Requirements (KURs). All are approved as part of the Main Gate Business Case (MG) or when the Department commits to the manufacture of the equipment.

This year, more information about the individual projects and equipment capabilities being procured are presented within the project profiles.

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 and time variations. Learning from experience from PPST18 the Department has updated its internal processes for production of the PPST and these have been reviewed by the National Audit Office (NAO).

The overall PPST findings are summarised in Figure 17. Complete details for each of the projects can be found in the PPST which is provided at Figure 21.

Figure 17: PPST19 Key Findings



**-£20 million**

decrease in forecast costs driven by accounting adjustments, changes in scope and underlying cost reductions



**+69 months**

increase in forecast time due to issues with contractor schedule adherence



**100 per cent**

of Key User Requirements (191 of 191) forecast to be met

### **Changes to the PPST Population**

In total, there are 27 projects in the PPST population for 2019, with two changes to the project population from 2018; the Tide Class Tanker has been removed having reached its ISD during financial year 2017/18 and E7-Wedgetail entered the population following approval to enter the Demonstration and Manufacture phase during financial year 2018/19.

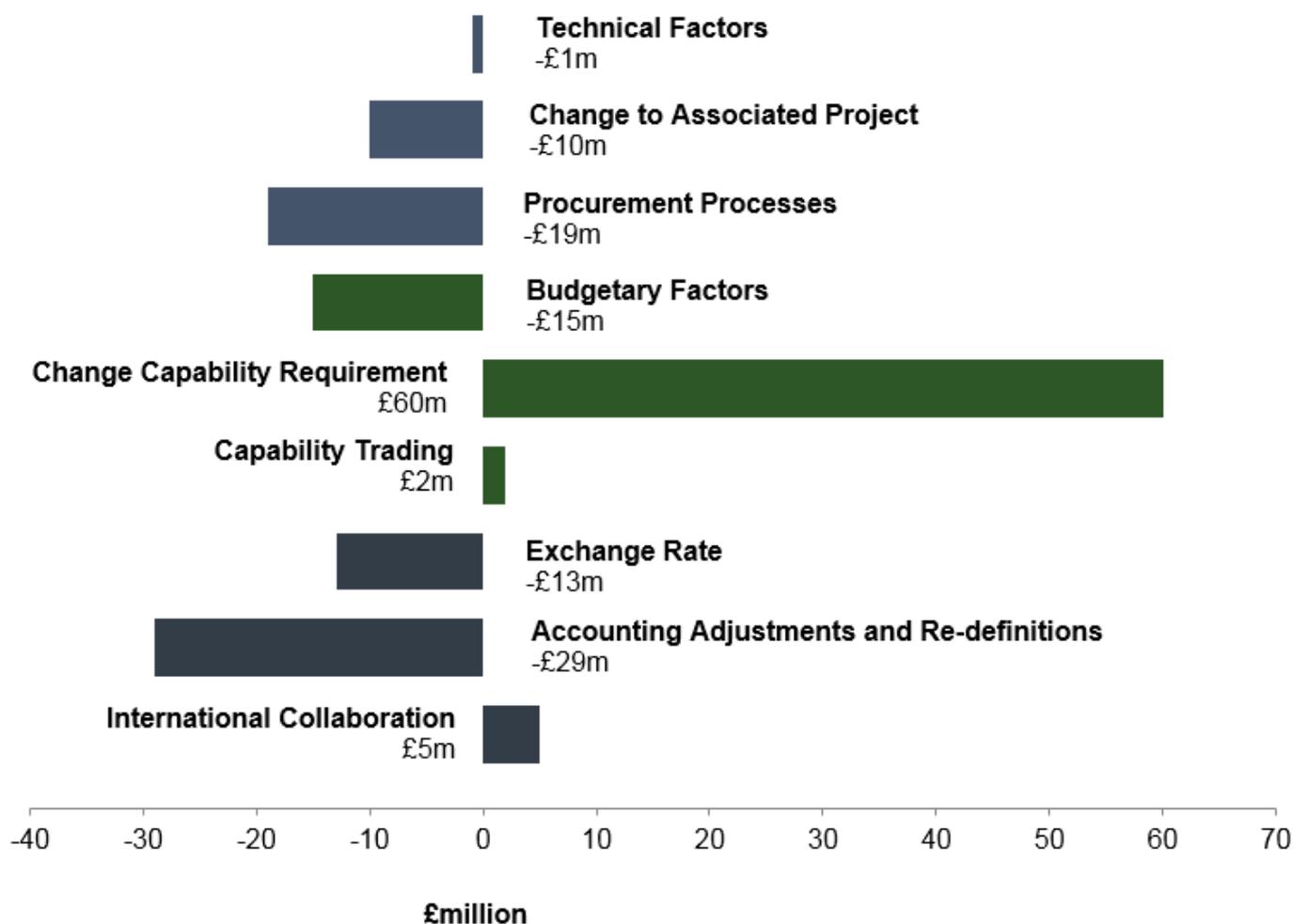
### **Forecast Cost**

During the 2018/19 financial year, the aggregate forecast costs of the 27 projects decreased by -£20m. The most significant decreases were in Ajax (-£72m), Astute Boats 4-7 (-£34m) and Typhoon Meteor Integration (-£22m). Ajax reported a cost reduction due to Command led capability change requests, Astute achieved savings primarily from retiring risks that did not occur and change in scope, while contributions from one of Typhoon's multi-national partners

resulted in a saving to the Meteor Integration project. There were significant increases for; Core Production Capability (CPC) (+£51m), Queen Elizabeth Class (QEC) Carriers (+£35m), Protector (+£20m) and Future Anti-Surface Guided Weapon - Light (FASGW (L)) (+£14m). CPC was impacted by customer driven scope changes and QEC increases are largely driven by schedule delays and rectification costs to resolve issues identified during test and

commissioning activity on HMS Prince of Wales. Final cost estimates for Protector are now reflected following rebaselining as a result of customer directed saving measures to address near-term affordability issues as reported in the Plan18. FASGW (L) saw cost increase following schedule updates to prioritise the delivery of FASGW (H). Figure 18 provides a breakdown of the in-year cost variations by category.

**Figure 18: In-year cost variations by factor**

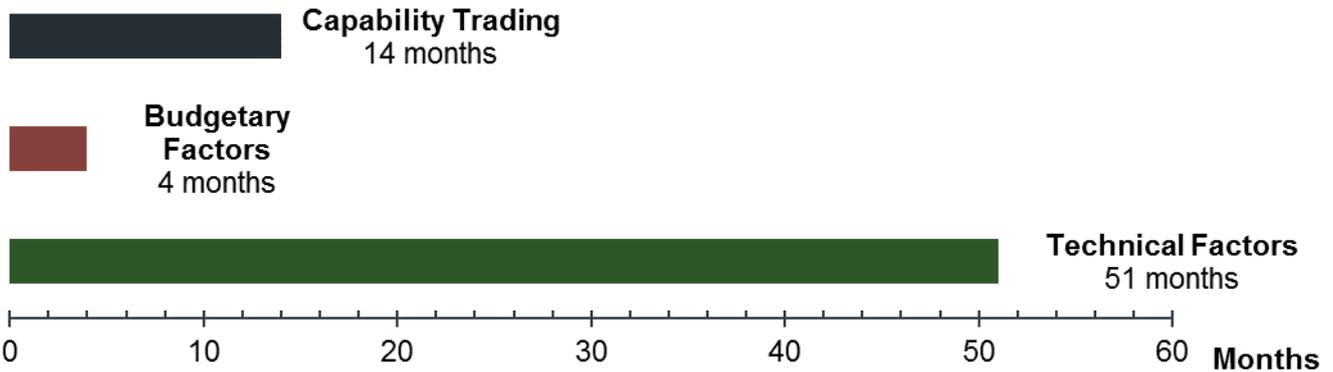


### Forecast Time

A total of 17 of the 23 projects with an approved In-Service Date (ISD) reported no in year change to their forecast ISD<sup>8</sup>. However, there was a total project duration increase of 69 months reported by six projects.

The largest time increases were experienced by ASRAAM MG1 (+33 months) and FASGW(H) (+15 months). ASRAAM MG1 incurred a time delay following a joint risk assessment between DE&S and the industry partner and contractor delays resulted in the time increase for FASGW(H).

**Figure 19: In-year time variations by factor**



### Key Performance Measures

Forecast delivery of Key Performance measures has improved to 100% this financial year<sup>9</sup>. All projects are forecast to meet their Key User Requirements (KURs), however, several projects have highlighted risks they are actively mitigating. Similarly, to last year, some projects within the population do not have approved KURs, therefore are considered outside the scope for the PPST.

### Comparison of Performance in PPST18 and PPST19

A direct comparison cannot be drawn between PPST19 and prior years due to projects entering and leaving the population and projects which have received uplifts in their approval. Furthermore, a comparison cannot be made between the PPST and other sections within the

Plan. Whilst the PPST focuses specifically upon Demonstration and Manufacture phase projects, other sections of the Plan focus on the 10-year programme which encompasses other phases of a project's life cycle. However, a record of Cost, Time and KUR performance reported in previous Defence Equipment Plan publications is provided below.

**Figure 20: PPST Comparison**

Year	Cost forecast variation	Time forecast variation	Forecast achievement of performance measures (KURs)	Number of projects
2019	-£20m	+69 months	100%	27
2018	+£783m	+62 months	99%	27
2017	+£224m	+57 months	99%	28
2016	+£237m	+34 months	99%	22

<sup>8</sup> BVRAAM on Lightning, Spear Capability 3 and Dreadnought do not yet have an approved ISD.

<sup>9</sup> In EP18 there were a total of 191 out of 193 KURs forecast to be met.

Figure 21: Project Performance Summary Table 2019

Portfolio	Project	Description	Cost						Time						Key User Requirements (KURs)											
			Expected cost to completion at approval	Current forecast cost to completion	Total cost variation to completion	In-year variations attributed to FOREIGN EXCHANGE (FOREX)	In-year variations not attributed to 'Delivery Organisations' (exc FOREX)	In-year variations attributed to 'Delivery Organisations' (exc FOREX)	In-year change on costs to completion	Expected In-Service Date at approval	Current forecast In-Service Date	Total time variation against approval	In-year variations not attributed to 'Delivery Organisations'	In-year variations attributed to 'Delivery Organisations'	Total In-year change to In-Service Date	Number of Key User Reqs	To be met	To be met, with risks	Total number of Key User Reqs to be met	Not to be met	In-year change, to be met, with risks	In-year change - not to be met				
			(£m)	(£m)	(£m)	(£m)	(£m)	(£m)	(£m)			(months)	(months)	(months)	(months)											
<b>DEFENCE EQUIPMENT &amp; SUPPORT (DE&amp;S)</b>																										
-	AJAX (Specialist Vehicles)	Armoured Fighting Vehicle	5,479	5,382	-97	2	-61	-13	-72	Jul-20	Jan-20	-6	0	0	0	11	11	0	11	0	0	0				
-	Apache Capability Sustainment Programme	Sustainment of Attack Helicopter	1,778	1,635	-143	-6	2	-8	-11	Apr-22	Apr-22	0	0	0	0	0	0	0	0	0	0	0				
-	Brimstone Capability Sustainment Programme	Sustainment Programme of Air to Ground Missile	521	520	0	2	0	0	2	Oct-22	Oct-22	0	0	0	0	8	8	0	8	0	0	0				
-	BVRAM on Lightning II	Fighter Integration of Air to Air Missile	80	75	-5	0	0	0	0	ISD not set at Main Gate						KURs not set at Main Gate										
-	Future Anti-Surface Guided Weapon (Heavy)	Maritime Air to Ground Missile (Heavy)	392	363	-30	3	0	0	3	Oct-20	Jan-22	15	0	15	15	5	3	2	5	0	0	0				
-	Future Anti-Surface Guided Weapon (Light)	Maritime Air to Ground Missile (Light)	311	308	-3	0	0	14	14	Oct-20	Jan-21	3	0	3	3	5	5	0	5	0	0	0				
-	Sea Ceptor FLAADS (M) T23	Maritime Ground to Air Missile (Type 23)	850	851	1	0	0	0	0	Nov-16	May-18	18	0	0	0	10	10	0	10	0	0	0				
-	Sea Ceptor FLAADS (M) T26	Maritime Ground to Air Missile (Type 26)	130	128	-2	0	0	0	0	Dec-19	Dec-19	0	0	0	0	0	0	0	0	0	0	0				
-	Spear Capability 3	Fighter Air to Ground Missile	473	467	-6	0	0	-5	-5	ISD not set at Main Gate						8	8	0	8	0	0	0				
-	ASRAM Sustainment (MG1)	Sustainment Programme of Air to Air Missile	415	413	-1	0	2	1	4	Nov-18	Aug-21	33	0	33	33	8	8	0	8	0	0	0				
-	ASRAM Sustainment (MG2)	Sustainment Programme of Air to Air Missile	246	240	-6	0	0	0	0	Aug-22	Aug-22	0	0	0	0	0	0	0	0	0	0	0				
-	E7 Wedgetail	Airborne Early Warning and Control Aircraft	2,156	2,160	5	5	0	0	5	Dec-23	Dec-23	0	0	0	0	8	8	0	8	0	0	0				
-	Lightning II	Fighter / Attack Aircraft	9,134	8,538	-596	-7	0	0	-7	Dec-18	Dec-18	0	0	0	0	7	7	0	7	0	0	0				
-	Marshall	Air Traffic Control System	1,890	1,890	0	0	0	0	0	Feb-17	Jun-19	28	0	0	0	7	6	1	7	0	0	0				
-	P-8A Poseidon	Maritime Patrol Aircraft	2,392	2,203	-189	-12	0	8	-4	Apr-20	Apr-20	0	0	0	0	9	9	0	9	0	0	0				
-	Protector	Unmanned Aircraft	704	1,001	297	-2	22	0	20	Jul-21	Nov-23	28	4	0	4	14	14	0	14	0	0	0				
-	Queen Elizabeth Class Carriers	Aircraft Carrier	3,541	6,286	2,745	0	35	0	35	Jul-15	Feb-18	31	0	0	0	9	7	2	9	0	0	0				
-	Sky Sabre	Ground Based Air Defence System	618	599	-19	0	0	5	5	Mar-20	Nov-20	8	0	0	0	10	10	0	10	0	0	0				
-	Type 26 Frigates	Global Combat Ship	3,700	3,596	-104	0	0	0	0	Oct-27	Oct-27	0	0	0	0	12	3	9	12	0	0	0				
-	Meteor Integration	Integration of Beyond Range Visual Air to Air Missile	130	85	-45	1	-1	-22	-22	Jun-18	Aug-18	2	0	2	2	10	10	0	10	0	0	0				
-	Storm Shadow Integration	Integration of Deep Strike Missile	172	114	-58	0	0	0	0	Aug-18	Aug-18	0	0	0	0	10	9	1	10	0	0	0				
-	Brimstone 2 Integration	Integration of Precision Attack Missile	186	199	13	0	1	-6	-5	Dec-18	Dec-18	0	0	0	0	10	6	4	10	0	0	0				
-	Warrior Capability Sustainment Programme	Infantry Fighting Vehicle	1,319	1,546	227	2	0	-6	-4	Nov-18	Mar-23	52	0	0	0	9	9	0	9	0	0	0				
<b>DEFENCE EQUIPMENT AND SUPPORT (DE&amp;S) TOTAL</b>			<b>36,615</b>	<b>38,599</b>	<b>1,984</b>	<b>-13</b>	<b>0</b>	<b>-31</b>	<b>-44</b>	<b>-</b>	<b>-</b>	<b>212</b>	<b>4</b>	<b>53</b>	<b>57</b>	<b>170</b>	<b>151</b>	<b>19</b>	<b>170</b>	<b>0</b>	<b>0</b>	<b>0</b>				
<b>SUBMARINE DELIVERY AGENCY (SDA)</b>																										
-	Astute Boats 4-7	Attack Submarine	5,859	6,862	1,003	0	-14	-20	-34							10	4	6	10	0	0	0	0			
-	Core Production Capability	Core Manufacturing Facility	1,385	1,716	333	0	51	0	51	Jun-26	Oct-25	-8	0	0	0	2	2	0	2	0	0	0				
-	Dreadnought	Ballistic Submarine	8,051	8,051	0	0	0	0	0																	
<b>SUBMARINE DELIVERY AGENCY (SDA) TOTAL</b>			<b>15,295</b>	<b>16,632</b>	<b>1,336</b>	<b>0</b>	<b>37</b>	<b>-20</b>	<b>17</b>							<b>-8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>12</b>	<b>6</b>	<b>6</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>INFORMATION SYSTEMS &amp; SERVICES (ISS)</b>																										
-	New Style of IT (Deployed)	Information Capability to the Frontline	722	707	-15	0	0	7	7	Jun-19	Jun-20	12	12	0	12	9	9	0	9	0	0	0				
<b>INFORMATION SYSTEMS &amp; SERVICES (ISS) TOTAL</b>			<b>722</b>	<b>707</b>	<b>-15</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>7</b>							<b>12</b>	<b>0</b>	<b>12</b>	<b>9</b>	<b>9</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>TOTALS</b>			<b>52,632</b>	<b>55,937</b>	<b>3,305</b>	<b>-13</b>	<b>37</b>	<b>-44</b>	<b>-</b>							<b>216</b>	<b>16</b>	<b>53</b>	<b>69</b>	<b>191</b>	<b>166</b>	<b>25</b>	<b>191</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>OVERALL TOTAL</b>									<b>-20</b>	<b>OVERALL TOTAL</b>									<b>100%</b>							

**Publication notes:**

**In-Service Date (ISD)** is defined by each project within its business case.

**Defence Equipment & Support**

**Complex Weapons – BVRAM on Lightning.** The In-Service Date will be approved when the decision to manufacture the munitions is taken at the next Main Gate.

**Complex Weapons – Spear Capability 3.** The In-Service Date will be approved when the decision to manufacture the munitions is taken at the next Main Gate.

**Lightning II.** There was an increase in the overall approval limit of £186m from PPST18. This increase in the approved cost relates to Main Gate 4 Review Note 5 which covers the next stage of the Follow-On Modernisation programme.

**Type 26 Frigates.** PPST19 does not include Demonstration Phase approval costs as this element of the incremental approval concluded in 2018.

**Type 26 Frigates.** Reports against Initial Operating Capability (IOC) instead of In-Service Date (ISD) as this was the official recommended and approved metric referred to in the Main Gate Business Case.

**Submarine Delivery Agency**

**Dreadnought.** Information reflects current approvals for manufacturing activity of the £318n Dreadnought programme up to and including 2020/21.

**Information Systems & Services**

**New Style of IT.** The approved cost of the project has increased £556m following approval of phases 2 and 3. This has also impacted the reported Initial Operating Capability (IOC) delaying delivery of the programme by 15 months.

## Part 6: Project Overviews

This new section of the report introduces the projects included in the PPST and summarises their progress in the last year. It is intended to address concerns raised by the public accounts committee on the transparency and accessibility of the Equipment Plan report in 2018.

### Ajax

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
5,479	5,382	Jul-20	Jan-20	11



© General Dynamics

### Equipment Background

Ajax forms part of the Armoured Cavalry 2025 Programme. The aim of the programme is to deliver by 2025, a versatile and agile multi-role capability, operating at the heart of the Strike and Armoured Infantry brigades, and able to succeed on current and future operations.

The multi-role Ajax armoured fighting vehicle programme will transform the Army's medium armour and advanced intelligence, surveillance, target acquisition and reconnaissance capability as part of the war-fighting division, including the new Strike brigades. The first vehicles have been delivered and are conducting trials. Ajax will transform the way the Armoured Infantry and Strike brigades operate and underpin the Army's ability to war fight at the divisional level.

Each Ajax has extensive capabilities, including 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 project is concurrently in the Demonstration and Manufacture Phases. Ajax validation and verification trials started in 2015 and will continue until 2021 using 7 prototypes and numerous production standard vehicles. The cold trials in Sweden were completed successfully in early 2019, and the early reliability trials were conducted at Bovington in preparation for entry qualification trials. Reliability growth trials will begin in late 2019.

The British Army took receipt of the first ARES variants on 14 February 2019. These will enable the British Army to start training and re-rolling the Household Cavalry Regiment, the first unit to receive Ajax. Ajax has a total of 11 KURs; all requirements are forecast to be met.

## Apache Capability Sustainment Programme

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
1,778	1,635	Apr-22	Apr-22	0



### Equipment Background

The Apache Capability Sustainment Programme will provide the basis for the UK to maintain a battle winning Attack Helicopter that is aligned to and interoperable with our major allies. The programme will address obsolescence issues that will gradually degrade the current Apache Mk1 Fleet. 50 Apache AH-64E helicopters will be procured through the US government via a foreign military sale to an April 22 Initial Operating Capability. The standard US version 6 aircraft will have two UK modifications; Defensive Aids Suite and Windscreen Wash Wipe. 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 will have been upgraded to enable identification at greater ranges and also enhance aircraft protection. Finally, new data-links will expand battlefield situational awareness, expand our operations with ground troops and implement a Manned-Unmanned Teaming concept with Unmanned Aerial System and other rotary assets whilst advancing interoperability with our allies. **In-**

### Year Progress

The programme is currently in the Manufacture Phase. This is the preparation of the 50 Mk1 aircraft which has been split into two stages. Stage one covering 14 aircraft which were in long term storage, is now complete ahead of schedule with successful delivery to the US. Stage 2 covers the preparation of the 36 aircraft of the forward fleet as well as the 50 Fire Control Radars. The Long-Term Training Support Solution tender was received in September 2018 and, following evaluation, is currently in the negotiation phase. Progress continues to be made in the critical path activity to deliver a Release to Service for this US-designed helicopter to operate within UK airworthiness regulations. The effects of recent delays to the US Army AH-64E development on the expected Release to Service have been analysed and recovery actions are in hand to maintain Initial Operating Capability within the programme approval. Work is also in hand to prepare for the initial support phase of the AH-64E which will be supplied through the US Government.

## Complex Weapons Portfolio

### Background

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.

Programme	Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
Brimstone Capability Sustainment Programme	521	520	Oct-22	Oct-22	8
BVRAAM on Lightning II	80	75	ISD not set at Main Gate	ISD not set at Main Gate	KURs not set at Main Gate
Future Anti-Surface Guided Weapon (Heavy)	392	363	Oct-20	Jan-22	5
Future Anti-Surface Guided Weapon (Light)	311	308	Oct-20	Jan-21	5
Sea Ceptor FLAADS (M) T23	850	851	Nov-16	May-18	10
Sea Ceptor FLAADS (M) T26	130	128	Dec-19	Dec-19	0
Spear Capability 3	473	467	ISD not set at Main Gate	ISD not set at Main Gate	8
ASRAAM Sustainment (MG1)	415	413	Nov-18	Aug-21	8
ASRAAM Sustainment (MG2)	246	240	Aug-22	Aug-22	0

## **Weapon Context**

### **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.



### **Meteor on Lightning II**

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 minor modification to allow internal carriage by Lightning.



### **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 FLAADS T26**

The Sea Ceptor missile system will also be fitted to the T26 Frigate to provide local area air defence.



### 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 the French and is due to enter with the Royal Navy in 2022.



© MBDA

### Future Anti-Surface Guided Weapon (Light)

The Martlet Missile manufacture by Thales, is a helicopter launched missile designed to counter the threat posed by Fast Inshore Attack Craft. The system is due to enter Service with the Royal Navy in January 2021.



© Thales

### Spear Capability 3

SPEAR Capability 3 is a medium-range missile due to enter service in 2024 as the primary air-to-surface weapon for Lightning. Guided by GPS, laser or advanced radar scene matching, its miniaturised turbine engine gives it a substantial range advantage over the US equivalent.



### ASRAAM

ASRAAM is a short-range air-to-air missile currently in service at Block 4 standard on Typhoon and Lightning. Block 6 missiles incorporate a UK-manufactured seeker and will progressively replace Block 4 as part of routine stockpile management.



## **In-Year Progress**

### **Brimstone 3A**

Service entry is on track for 2022.

### **Meteor on Lightning II**

Meteor was assigned a place in the Follow-on Development Programme by the F-35 Joint Programme Office, with completion expected in 2024. (ISD not set at Main Gate, this will be addressed in future platform approval submission). Design work began on the necessary modifications to the missile.

### **Sea Ceptor FLAADS (M) T23**

Sea Ceptor achieved ISD on Type 23 Frigates in May 2018. Five Frigates are now currently fitted with this capability.

### **Sea Ceptor FLAADS T26**

The provision of the Sea Ceptor system to the T26 platform remains on track to meet the platform's planning ISD

### **Future Anti-Surface Guided Weapon (Heavy)**

A number of design issues with key sub systems of the Sea Venom missile has resulted in the Planned IOC being slipped to 2022.

### **Future Anti-Surface Guided Weapon (Light)**

Integration of the Martlet capability into the Wildcat helicopter remains challenging, but the date of the declaration of the ISD remains January 2021.

### **Spear Capability 3**

The first 'design definition' missile was built ready for robustness testing. Estimated service entry is 2024. (ISD not set at Main Gate 1, this will be addressed in future platform approval submission).

### **ASRAAM**

The Block 6 seeker underperformed in testing and remedial work is expected to delay the missile's in-service date until 2021. Life extension of Block 4 missiles beyond their current out-of-service date of 2022 will mitigate the risk of further delay.

## **E7 Wedgetail- Airborne Early Warning and Control Aircraft (AWACS) Capability Sustainment Programme**

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
2,156	2,160	Dec-23	Dec-23	8



### **Equipment Background**

Under the AWACS Capability Sustainment Programme, the MOD, with the approval of Her Majesty's Treasury, made the decision to proceed with the acquisition of five Boeing E7 Airborne Early Warning & Control aircraft, to replace the RAF's existing E-3D Sentry fleet.

The E7 is based on a standard Boeing 737 NG airliner, modified to carry a sophisticated Northrop Grumman active electronically-scanned radar, which has a surveillance coverage of four million square kilometres over a single 10-hour flight period.

Modification of the aircraft will be carried out in the UK, sustaining over 200 highly skilled jobs at Marshall Aerospace and Defence Group in Cambridge, and there will also be opportunities for British suppliers to be involved in future training and support arrangements.

To be officially named the Wedgetail AEW Mk1, the E7 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 the likes of the Queen Elizabeth Class Aircraft Carriers, the P-8A Poseidon, and the F-35B Lightning.

### **In-Year Progress**

On 22 March 2019, the Secretary of State for Defence, announced a £1.51 billion contract with Boeing, for the acquisition of five E7 Wedgetail Airborne Early Warning & Control aircraft.

Boeing has sourced two 737NG from the commercial market and secured a further three production slots on the Seattle production line in 2021 and 2022 to meet our needs.

## **F-35 Lightning Combat Air System**

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
9,134	8,538	Dec-18	Dec-18	7



### **Equipment Background**

The F-35B Lightning aircraft is an advanced, fifth generation aircraft procured to operate alongside the RAF's Typhoon. It will be jointly manned by the Royal Air Force and the Royal Navy, will be able to operate with equal capability from land and sea, and will form an integral part of Carrier Strike operating from the UK QEC 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 first phase of Initial flight trials of the F-35 Lightning aircraft from HMS QUEEN ELIZABETH have been completed successfully, this is the first major step in allowing a coherent build-up towards delivering a carrier Strike capability for the UK from 2020. As stated in SDSR 15, we will maintain our plan to buy 138 F-35 Lightning aircraft over the life of the programme.

### **In-Year Progress**

The UK took delivery of its 17<sup>th</sup> Lightning in November 2018 and declared ISD in Dec 2018. first of class Flight Trials were completed successfully and numerous facilities including the Lightning Operations Centre, Maintenance and Finishing Facilities and Integrated Test Centre were opened at RAF Marham.

Lightning has a total of 7 KURs all of which all were met in the Equipment Plan 2018.

**Marshall Programme**

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
1,890	1,890	Feb-17	Jun-19	7



© Aquila

**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 an out-of-area ATM capability in support of expeditionary operations. The prime contractor is Aquila ATM Services, consisting of 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. It is structured around the delivery of Technical Services rather than simply upgrading equipment but 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 project is currently in the fourth year of delivery, providing ATM services via legacy equipment and systems, while replacing equipment across the MOD estate. Aquila support for legacy systems, delivering ‘Temporary Technical Services’, has continued to be strong. There has also been significant progress with the roll-out of new systems and the programme is on track to have delivered the necessary equipment for 8.33 KHz compliance by 30 June 2019.

**Poseidon MRA Mk1 (P-8A Poseidon) Maritime Patrol Aircraft (MPA)**

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
2,392	2,203	Apr-20	Apr-20	9



**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 Light-Weight ASW Torpedo and the AGM-84 Harpoon air-to-surface missile to enable it to attack targets above and below the water.

The ability of the MoD to rapidly reintroduce a 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 will be carried out by the US Navy at Naval Air Station Jacksonville, USA, before training relocates to RAF Lossiemouth in 2021.

**In-Year Progress**

The UK’s first Poseidon aircraft is in production in the US and is expected to make first flight in July 2019. The mission systems will then be installed, and aircraft will be delivered to the RAF, at NAS Jacksonville, Florida, in October 2019. The first aircraft will arrive in the UK in February 2020 and all 9 aircraft will be delivered by November 2021. The Poseidon infrastructure at RAF Lossiemouth is progressing well and should be ready for use by September 2020.

Poseidon has a total of 9 KURs which are all on track to be met.

**Protector RG MK1**

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
704	1,001	Jul-21	Nov-23	14



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**Equipment Background**

Protector RG Mk1 is designed to deliver a UK Sovereign capability for Deep and Persistent Armed ISTAR out to the late 2030s, which will encompass long range, persistent wide area surveillance and precision strike capabilities and will replace the current Reaper fleet.

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 unique 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. These act as a commitment to sovereign capability and allows the UK to act independently in support of UK defence policy at home and abroad. 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 aircraft 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 and can provide persistent ISR over fixed points on the ground.

**In-Year Progress**

Following HM Treasury approval of a re-baselined programme profile in April 2019, the programme is in the Manufacture Phase.

**Queen Elizabeth Class Programme**

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
3,541	6,286	Jul-15	Feb-18	9



**Equipment Background**

The Queen Elizabeth Class aircraft carrier is an investment in Britain’s security, prosperity and place in the world. HMS Queen Elizabeth and HMS Prince of Wales are the largest and most powerful warships built for the Royal Navy and will provide a conspicuous presence on the global stage, sending a clear message of reassurance to our allies, and of defiance to those who wish to counter UK interests worldwide.

The Royal Navy will operate QEC carriers in a Maritime Task Group with one carrier always at Very High Readiness and the other at High Readiness supported by air, surface and subsurface platforms to deliver maritime effect.

**In-Year Progress**

The programme is currently in the Delivery Phase. Contractor Sea Trials began on HMS Queen Elizabeth in 2017. Since In Service Date (ISD), trials have continued with first of class Rotary Wing Flying Trials swiftly followed in Autumn 2018 by the first deck operation and flying trials for F-35B. In-Year progress has continued with further weapon, sensor and aircraft trials ahead of WESTLANT 2019 where the platform will test F35B in the second series of Fixed Wing Flying Trials which will build on the success of 2018 and exploit the operating envelope further. HMS Prince of Wales completion has continued at pace with Ship’s Company now working and training on board ahead of formal “move on board” in Summer 2019 and Ready for Sea Trials in September 2019. Aircraft Carrier Alliance remain focussed is on achieving Vessel Acceptance Date of December 2019 with ISD in March 20.

## **Sky Sabre**

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
618	599	Mar-20	Nov-20	10



© MBDA @Rafael

### **Equipment Background**

The Sky Sabre programme will deliver a Ground Based Air Defence (GBAD) replacement for the ageing Rapier Short Range Air Defence (SHORAD) capability deployed in the Falkland Islands. It transforms the delivery of GBAD, enabling Beyond Visual Range (BVR) engagement of aircraft and air-delivered munitions.

The system consists of a GIRAFFE radar sensor from SAAB, mobile launcher and missile from MBDA, and a Battlespace Management, Command and Control system from Rafael to link the elements together. It shares missile technology with the maritime Sea Ceptor system.

Sky Sabre is on schedule for its initial deployment in 2020 and will be operated by the Royal Artillery and maintained by the Royal Electrical and Mechanical Engineers.

On achieving Initial Operating Capability, Sky Sabre will be transferred from the Royal Air Force to the Army, who have assumed lead command responsibility for the provision of GBAD from 1 April 2019 and who are developing the wider Contingent Divisional GBAD programme.

### **In-Year Progress**

The project is currently in the Manufacture Phase. All three main contractors have been aligned onto a single integration plan; one-to-one and one-to-many component integration trials have been successfully concluded. Integration and equipment delivery will continue through the remainder of 2019.

Sky Sabre has a total of 10 KURs, all of which will be delivered on achieving the Initial Operating Capability, forecast for November 2020.

## **Type 26 Anti-Submarine Warfare Frigate**

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
3,700	3,596	Oct-27	Oct-27	12



### **Equipment Background**

The Royal Navy is required to replace the Type 23 Anti-Submarine Warfare Frigates (T23 ASW) on a one-for-one basis to provide continued capability in support of Continuous At Sea Deterrence and the Carrier Strike Group. The T26 Frigate programme will deliver 8 Ships from mid 2020s within the policy and proposals set out in SDSR15, the National Shipbuilding Strategy report. Although primarily an ASW Frigate, T26 will be a multi-mission platform designed for joint and multinational operations across the full spectrum of warfare as well as independent operations. The T26 Flexible Mission Bay will deliver a wider range of capabilities matched to operational requirement including boats, unmanned vehicles and humanitarian and disaster relief stores while the aviation facilities will be able to accommodate helicopters up to Chinook.

Those KURs which are reported at risk in the PPST table are based on key dependant programmes which are not aligned to the T26 build programme or that have limited maturity.

T26 is an integral part of the future Royal Navy and the Maritime Strategy 2035.

### **In-Year Progress**

There are three T26 currently on contract with BAE Systems (Batch 1). The first of Class (Glasgow) is under construction in BAE Systems' Glasgow facilities, with the first steel cut for the second of Class (Cardiff) in August 19. T26 Batch 2 will follow through Main Gate process by 2022.

Block construction has continued In-Year with GLASGOW's main hull blocks now being assembled in the Ship Building Outfit Hall. BAE Systems continue to use learning from experience from River Class Off-Shore Patrol Vessel Batch 2 to identify areas for improvement such that delivery of T26 is optimised and within cost.

## **Typhoon Capability Programme**

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
487	398	Dec-18	Dec-18	30



### **Equipment Background**

Typhoon is an agile, high performance multi-role combat aircraft providing air superiority and ground attack capability. It entered service in 2003 and will remain as the backbone of RAF combat air mass until at least 2040. Priority for the Typhoon capability enhancement team this year has been the delivery of Project CENTURION by 31 December 2018 to allow the seamless transition of Tornado GR4 capabilities onto the Typhoon aircraft ahead of Tornado's retirement by March 2109.

Project CENTURION delivers the integration of Meteor (Beyond Visual Range air-to-air missile), Stormshadow (strategic deep-strike cruise missile) and Brimstone2 (precision attack) weapons onto Typhoon, its delivery is a strategic milestone for the RAF and Typhoon and from a capability perspective, it represents a significant step change in Typhoon's operational capability.

### **In-Year Progress**

CENTURION was delivered via a staged acceptance approach throughout 2018, with formal declaration of IOC achieved on the 18th December 2018. The delivery of this significant milestone for the platform was successfully realised on time and budget, with a notable achievement within this being the delivery of Stormshadow to the platform 2 years ahead of original forecasts. Within a month of IOC, Brimstone2 was used on operations and positive feedback had been received from RED FLAG 1/19 on the enhancements package (P3Ea) delivered.

Beyond CENTURION, investment in Typhoon has continued, with work on an extensive spiral upgrade programme commenced in January 2019. This next phase of Typhoon evolution, known as Programme JANUS, will 'maintain UK Typhoon at the forefront of RAF Combat Air, enhancing capability in an increasingly complex threat environment' - and deliver compliance/regulatory enhancements and survivability upgrades

## **Warrior Capability Sustainment Project (WCSP)**

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
1,319	1,546	Nov-18	Mar-23	9



© Lockheed Martin UK Ltd

### **Equipment Backgrounds**

Warrior was designed in the late 1970's and early part of the 1980's to keep up with Challenger 1 (Main Battle Tank) and to deliver and support the infantry in the assault. It entered service in 1988 and was highly successful in the Gulf War, Bosnia, Kosovo, Iraq and Afghanistan. Warrior has an out of service date of 2025 and has not had a mid-life upgrade, although it has received some survivability upgrades, including thermal imaging sights and additional armour solutions.

The Warrior Capability Sustainment Programme will deliver a fleet of upgraded infantry fighting vehicles which will be the corner stone of the modernised Armoured Infantry Brigade. It seeks to address capability gaps in fightability, lethality, survivability, growth potential and safe operation of Warrior, whilst also extending the out of service date to at least 2040. The intent is to deliver a Warrior 2 Battle Group at readiness by Q1 2024 and Brigade of Warrior 2 by Q1 2026.

### **In-Year Progress**

The project is currently in the demonstration Phase. Qualification trials started September 2018, involving 11 demonstration vehicles. The first stage of unmanned firing trials has been completed ahead of schedule and reliability trials started in March 2019. Warrior Capability Sustainment Programme has also successfully fired on the move, a key milestone. Formal manufacture negotiations are due to commence this year upon completion of 20 battlefield missions or the output of spending review 2019, whichever is later. A mandate has been given to DE&S to enable this. Submission of a business case to enter manufacture is expected in Q2 20. Currently, Warrior Capability Sustainment Programme is graded red for delivery confidence; this will be reviewed on completion of the battlefield missions and the completion of MoD manned live firing, both expected in Q3 2019. September 2019 will also see an assurance review conducted by the Infrastructure and Projects Authority.

Warrior Capability Sustainment Programme has a total of 9 KURs of which all of which are being assessed during reliability and qualification trials.

## Astute

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
5,859	6,862	Withheld	Withheld	10 <sup>10</sup>



## Equipment Background

SDSR15 confirmed we are buying seven Astute Class nuclear 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 cruise missiles.

Three Astute Class submarines, HMS Astute, HMS Ambush and HMS Artful, are already in service, with the remaining four boats, Audacious, Anson, Agamemnon and Agincourt in various states of construction.

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

On 29 March 2018, the MOD placed an incentivised contract worth £1.5 billion for the seventh Astute Class submarine, Agincourt.

Audacious, the fourth Astute Class submarine, has experienced some delay during the commissioning phase and is now scheduled to leave Barrow for sea trials later in 2019.

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<sup>10</sup> We are unable to provide further explanation as to why some KURS in the PPST table are identified as 'to be met, with risks'. To do so would likely prejudice the capability, effectiveness and security of the Armed Forces

## **Core Production Capability (CPC)**

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
1,385	1,718	Jun-26	Oct-25	2



## **Capability 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 submarine classes 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 PWR 3. The CPC consists of two main areas of activity, the manufacture of reactor cores and the regeneration of the required infrastructure.

## **In-Year Progress**

Within the manufacture phase, the programme achieved two key milestones this year, with the delivery of an Astute submarine core and launch of Dreadnought core production. Regeneration saw completion of the Product Assembly Building construction, an enabler for assembling Dreadnought Class submarine reactor cores.

**Dreadnought**

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
8,051	8,051	Withheld	Withheld	Withheld



**Equipment Background**

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

Dreadnought will provide capability and performance similar to the Vanguard Class, although the Dreadnought is a new design with a wide range of evolutionary improvements combined with equipment already in service.

The Defence Nuclear Organisation will deliver the programme through the Dreadnought Alliance which is a joint management team between the Submarine Delivery Agency, BAE Systems and Rolls-Royce. Working with industry partners, the Department will ensure that the UK has a credible, independent and capable nuclear deterrent out to the 2060s and beyond. The submarines have all been named: Dreadnought, Valiant, Warspite and King George VI.

**In-Year Progress**

The programme remains within its SDSR15 estimated cost and on track for the first of class, to enter service in the early 2030s. Work continues at pace with good progress on the whole boat design and with the transition into construction. The programme entered Delivery Phase 2 in April 2018. This three-year phase of work will see the continuation of the manufacture of the first submarine, and commencement of the build of the second (Valiant), and the manufacture of Dreadnought's nuclear propulsion power plant.

## **New Style of IT (Deployed) (NSoIT(D))**

Expected cost to completion at approval (£m)	Current Forecast cost to completion (£m)	Expected In-Service Date at approval	Current Forecast In-Service Date	Total Key User Requirements (KURs) to be met
722	707	Jun-19	Jun-20	9



### **Equipment Background**

NSoIT(D) (formally OpIS) will deliver cutting edge information and communications technology (ICT) to enhance deployed operational command and control. It will be used by the Royal Navy, Army and the Royal Air Force to support Sovereign and coalition operations at home and overseas. Harnessing existing suppliers and innovating through the use of small to medium enterprises the programme will deliver highly configurable, cyber resilient ICT fit for the warfighters of the future.

NSoIT(D) will replace circa 10 legacy deployable Communication and Information systems and will provide universal access and similar user experience across all security domains (OFFICIAL to Secret UK Eyes Only) and in all physical locations.

The key benefits provided by NSoIT(D) will be:

- Reduced time to deploy and rapid reconfiguration to meet changing operational requirements.
- Reduced logistical footprint. NSoIT(D) will be of significantly smaller form factor compared to legacy systems.
- Reduced training burden (a single system to learn rather than 10 legacy systems)

### **In-year Progress**

The programme is currently in the Design & Delivery phase. The hardware for the OFFICIAL and SECRET domains has been installed to HMS Queen Elizabeth. Design and development of First of Type nodes for the Land Environment is progressing well.

NSoIT(D) has a total of 9 KURs and it is anticipated that all will be delivered by 2023.