

Public Accounts Committee

Oral evidence: Carrier Strike, HC 684

Monday 28 September 2020

Ordered by the House of Commons to be published on 28 September 2020.

[Watch the meeting](#)

Members present: Meg Hillier (Chair); Gareth Bacon; Sir Geoffrey Clifton-Brown; Barry Gardiner; Mr Richard Holden; Sir Bernard Jenkin; Nick Smith; James Wild.

Also attended: Mr Tobias Ellwood (Chair), on behalf of the Defence Committee.

Gareth Davies, Comptroller and Auditor General, National Audit Office, Jeremy Lonsdale, Director, NAO, and David Fairbrother, Officer of Accounts, HM Treasury, were in attendance.

Questions 1 - 91

Witnesses

I: Sir Stephen Lovegrove, Permanent Secretary, Ministry of Defence, Air Marshal Richard Knighton CB, SRO Carrier Enabled Power Projection, Charlie Pate, Director General Finance, MoD, and Sir Simon Bollom, Chief Executive Officer, Defence Equipment & Support, MoD.

Examination of witnesses

Witnesses: Sir Stephen Lovegrove, Air Marshal Richard Knighton, Charlie Pate and Sir Simon Bollom.

Chair: Welcome to the Public Accounts Committee on Monday 28 September 2020. We are delighted to be here today partly in physical form for the first time since March and with our witnesses from the Ministry of Defence physically here with us—those of us who are in the room. We are looking at the issue of Carrier Strike. It is now well known that the Ministry of Defence has procured and delivered two new aircraft carriers: the Queen Elizabeth and the Prince of Wales. They are doing sea trials. They have 18 Lightning II jets now operating off them and they were delivered, crucially, for £6.4 billion, which is just 3% above the revised figure announced to Parliament in 2013. However, there is slower progress in developing the crucial support for Carrier Strike, including Crowsnest and the support fleet, and there are questions to be answered about how Carrier Strike will be operated and supported more generally. We want to get to the nub of some of these issues and, obviously, talk about the money.

I am delighted to welcome, physically in the room, our witnesses. Sir Stephen Lovegrove is the permanent secretary at the Ministry of Defence. Welcome back, Sir Stephen. Air Marshal Richard Knighton is the carrier-enabled power projection—I'm not sure "project manager" is the right term.

Air Marshal Knighton: Senior responsible owner.

Chair: Senior responsible owner at the Ministry of Defence for this project. Welcome back, Air Marshal. Charlie Pate is the director general for finance at the Ministry of Defence. That is critical, as of course a moment's delay in any of these projects means millions if not billions of pounds of taxpayers' money. Finally, Sir Simon Bollom is the chief executive officer at Defence Equipment and Support. Welcome back to all of you.

Before we kick off on the main subject area, we have some questions, as you might expect, about other defence-related issues. I am going to ask Nick Smith to kick us off.

Q1 **Nick Smith:** I have a question for Sir Stephen. There has been a shocking story in Wales, in Pembrokeshire, in the last few days about the threatened eviction of many families—across the country, I understand—through the Annington Homes arrangements that you have. Sir Stephen, how many families are facing eviction because of this decision by the Ministry of Defence?

Sir Stephen Lovegrove: I'm afraid I cannot answer that question. I am not aware of the story to which you are referring. So I am very happy to take that away and respond to you more formally, but I'm afraid I am unsighted on that.



HOUSE OF COMMONS

Q2 **Nick Smith:** I understand this decision affecting Annington Homes will affect many places across the UK. You are not aware of it at all?

Sir Stephen Lovegrove: I'm afraid I am not; I really cannot give you an answer to that, because I do not have the details with me at all.

Q3 **Gareth Bacon:** This affects a number of Members of Parliament, including myself, as well as Nick. When you reply to Nick, could you look up every MP who is affected?

Sir Stephen Lovegrove: I will.

Q4 **Gareth Bacon:** Because I have a letter in front of me here from Annington Homes themselves, who say that this is not their doing; they didn't ask for this. This is an MOD thing that was done without consulting them at all and their position is that this does not have to happen; they do not need the homes back, so they are baffled as to why this is happening. A full response from you would be very useful.

Sir Stephen Lovegrove: I would be delighted to do that. I apologise that I do not have the information for you at my fingertips at the moment; I will get on to it as soon as I they get back to the Department and respond in full.

Q5 **Chair:** We did give you prior notice that we would ask about this, although we have discussed it quite a lot before—

Sir Stephen Lovegrove: Something has gone wrong with the process there, I am afraid.

Q6 **Sir Geoffrey Clifton-Brown:** Sir Stephen, good afternoon. I ask this question more in hope than expectation. Can you give us any update on the timing of either the strategic defence review or the equipment plan?

Sir Stephen Lovegrove: The strategic defence review—the integrated review—is still on time. We expect that it will be announced alongside the spending review at some point, probably towards the end of November. Mr Pate may have more precise details on the timing, but I am not sure that he will; it will probably still be towards the end of November.

We are working very hard in the Department to make sure that our plans and the proposition are fully understood in No.10, Cabinet Office and the Treasury. We are working very closely with other Departments on the security beat to make sure that it all fits together. As you know, we have meaningful challenges that we have inherited over a number of years, and we hope that we will be in a position to get a settlement that will resolve those in a decisive fashion.

Q7 **Sir Geoffrey Clifton-Brown:** Crucially, that will shape the equipment plan. When could we expect to see details of the equipment plan after that?

Sir Stephen Lovegrove: The equipment plan normally comes out in—



HOUSE OF COMMONS

Charlie Pate: In the autumn. We wrote to the Chair to say that we are working on the equipment plan for this year. In the next few weeks, we hope to have that out—in the next month or so. It will take us a while to work through our planning round from the outcome of the spending review and the integrated review, so I would expect next autumn to be able to publish the equipment plan '21, which will set out those details from those reviews.

Chair: We are pleased to have the Chair of the Defence Committee guesting on our Committee today. Tobias Ellwood, over to you.

Q8 **Mr Ellwood:** Chair, thank you for including me today. On the pandemic, the Prime Minister has made it clear, and we all understand, that another six months of difficulties lie ahead of us. In a statement in the House of Commons, the Prime Minister touched on utilising the armed forces in a greater capacity. Have you had any requests for this, and what might you offer?

Sir Stephen Lovegrove: We have not had specific requests as yet. The way in which we have gone about this is to place liaison officers with all of the Departments that will be affected—effectively, all the Departments through the rest of Whitehall. We have continued to make sure that there are military personnel who are capable of being deployed at short notice, either for some sort of heavy lifting or more usually for planning purposes.

As we know, in the first wave we put on standby nearly 30,000 people; in the end, 3,000 people were used and those were planners. It was perfectly possible for the civil authorities to be able to do the hard work, but the planning was where we added the value. Sir Simon's team at DE&S helped a great deal; there were many hundreds of them on the acquisition side on PPE.

We are gearing ourselves up. We have been thinking about the charging regime, so we will continue to charge marginal costs until 31 October and take a view on that afterwards. Until we know exactly the nature of the problems that the nation will be facing, we do not quite know what, but we are certainly at a state of high readiness.

Q9 **Mr Ellwood:** Thank you for that. The logistics and transport and the contributions that have been made are second to none, and the nation is very grateful, but you are the only Department that actually plans for emergencies, trains for crisis management and has the strategic thinkers beyond other Departments. Do you believe that there is a greater role you could participate in, not least because we have one of the biggest logistical ahead of us—potentially in six months—with the roll-out of a national vaccine?

Sir Stephen Lovegrove: Is there a greater role? I am sure there will be a different role. The vaccine roll-out is something that we have been giving quite a lot of thought to because that will clearly be a really significant logistical challenge. Our view so far has been that this is not the Ministry of Defence's war; this is a national endeavour that requires defence to



HOUSE OF COMMONS

play its fullest possible part, but it will be a fullest possible part in support of the civil authorities.

We will respond as fully as we possibly can to any requests, and we will make as many suggestions as we possibly can if we think that we can do things better or that things could be done differently. We are looking upon this, broadly, as a supporting role, but one without limit, as it were. I think that there will be, as you say, new challenges, which we hope to rise to, particularly around vaccines.

Q10 Mr Holden: I would like to declare an interest as a former special adviser in the Ministry of Defence. I have a very specific question about the defence equipment plan. In the latest plan, the assessment phase for the life extension programme for the main battle tank was extended. Has that assessment been completed and how many tanks will actually be upgraded in the next round?

Sir Stephen Lovegrove: I think either Air Marshal Knighton or Sir Simon will be in a better position to answer that question than I am.

Air Marshal Knighton: The assessment phase was extended to be able to work through the potential solution that involved integration of a different turret and a new gun on the tank. That has been pretty successful. You may have seen reporting of the joint venture between Rheinmettal and BAE Systems on a Challenger 2 tank with that upgraded turret and upgraded gun on it. The team in Army Command and Simon's team are doing the work right now to develop the business case that we expect to come forward to the investment approvals committee in the next couple of months. From there, we will decide on the level of investment and the detail around the plan and the risk associated with it.

We are not in a position today to say definitively what the plan will be, but the work that was done through the extended assessment phase to reduce the technical risk associated with the redesign of the turret and gun has been completed successfully. That gives us confidence that it will help to give the investment approvals committee confidence in the recommendations that it can make on whether we should decide to invest in it at that stage.

Q11 Mr Holden: There has been a huge amount of media speculation that maybe the entire thing will be scrapped completely or that there will be a reduction in the total number. Our forces are now looking at tank training in Estonia for new threats—a resurgent Russia, the flare-up in the Caucasus, Ukraine. There are different threats emerging all the time, including from rogue state actors. Has that had an impact on any of that decision making?

Air Marshal Knighton: In the specifics around the approval of a programme, the factors that you describe play a part only in terms of understanding the requirement, and that is actually quite mature. The wider question around what the forward equipment programme looks like and what the capability priorities are is clearly subject to much debate at



HOUSE OF COMMONS

the moment through the integrated review and the parallel spending review that the permanent secretary outlined.

To add to the media speculation now would be unhelpful from my perspective. However, suffice it to say that we expect the land operating environment—the land domain—to play an important part in future operations and in protecting and furthering the UK's interests in the future. As we work through the integrated review, we are looking at a whole range of questions around the future requirements for land vehicles. In fact, as the Chair of the Commons Defence Committee will know, that Committee has a specific hearing on the totality of the armoured fighting vehicle programme in a couple of weeks' time.

Chair: Thank you for that. Mr Holden, one last quick one?

Q12 **Mr Holden:** One last quick one: can we take from that answer that there will be some tanks, but perhaps not as many as previously?

Air Marshal Knighton: I will repeat my answer that all this is up for consideration as part of the integrated review. Once that is concluded, I will be able to answer the question with specificity.

Chair: The integrated review that we have been waiting for and waiting for and waiting for, for the lifetime of this Committee over two Parliaments? Anyway, I know that our sister Committee, the Defence Committee, is looking at this and, I am sure, will accept a guess from this Committee to interrogate the details and the numbers, along with this Committee's members.

Thank you very much for that. We are going to move on to the main session, on Carrier Strike. I will come to Mr Gareth Bacon, but first I ask James Wild to declare his interest.

James Wild: I was a special adviser in the Ministry of Defence until 2017.

Chair: Thank you very much for making that clear for the record. Over to Gareth Bacon.

Q13 **Gareth Bacon:** Sir Stephen, since the Committee last looked into this in late 2017, there has been a lot of progress. The Queen Elizabeth was delivered marginally late—a couple of months—while the Prince of Wales was on time, although the budget was again slightly exceeded, but by a statistically small amount. How did you turn it around?

Sir Stephen Lovegrove: We had a moment in 2013, effectively, when we realised that the way in which we were dealing with this was not adequate. At that point, we instituted the aircraft carrier alliance, which brought together the Department and the main contractors—Babcock, BAE and Rolls-Royce. As a result of that construct, we were capable of aligning the interests of the customer, us, and the supplier, them, much more closely. I have to say that that is a much more mature model when there is a monopsony buyer and a monopoly set of suppliers than the version that we had before, where we were effectively in an arm wrestle over



HOUSE OF COMMONS

various aspects of the contract all the time. It meant that there was a body that brought everybody together to discuss issues in a mature and detailed way, without an antagonistic feeling to it. There was a variety of different pain-share/gain-share mechanisms, which were very important. There was a sharing of information. We were tighter on our expectations. I should pay tribute also to Sir Peter Gershon, the chair of the aircraft carrier alliance, who played a very important role in making that difference.

I thank you, on behalf of the Department, for recognising that it did come in, at least by our standards, very close to on the button, which we are very pleased with. It has to be said that it was sufficiently successful as a construct that we have replicated it for Dreadnought, so we now have a Dreadnought alliance, again chaired by Sir Peter. Building a nuclear bomber submarine is considerably more complicated, however, than building an aircraft carrier, because there are different complexities, but even there we are seeing the benefits of that different and rather more mature set of relationships.

Q14 Gareth Bacon: You have shot my fox on my second question, because I was going to ask whether you have applied those lessons elsewhere. However, to a layman—me—what you just described is what I would have expected you to do anyway. Why did you not start off with that process in the first place?

Sir Stephen Lovegrove: There has been, for in a very long time in defence acquisition—certainly since the mid '80s—a belief that the closer that one can replicate the functioning of a competitive marketplace, the better that value will be driven for the taxpayer. I am a strong believer in market economies and I would not want to dilute that thinking too far, but the reality of the defence industry and the defence purchasing customer—the Ministry of Defence—means that a different type of approach needed to be taken. If I am absolutely honest, we had fallen too far into the assumption that seeking to replicate a normal functioning market was the way to get best value.

The aircraft carrier alliance was a departure from that orthodoxy and one that has paid dividends. The SSRO—Single Source Regulations Office—is another aspect of that debate where if we cannot see a functioning market, we try to mimic and replicate the activities of a functioning market. That also has some frictions in it in setting profit rates, which becomes very complicated when you have monopoly providers and monopsony buyers.

Q15 Gareth Bacon: Air Marshal Knighton, has there been an example, or has it been done to get things back on track, of short-term costs being deferred for things that will be needed in the future to get the carriers into service?

Air Marshal Knighton: Forgive me, do you mean inside the programme or more broadly across defence?

Gareth Bacon: No, inside the programme, so what the Committee refers

to as shifting things to the right—things that you are going to need, but in the short term you can put off until later on.

Air Marshal Knighton: You can imagine in a programme that is more than £6 billion that runs over—well, it was the defence review in 1998 that concluded that we were going to replace our carriers, and the decision was taken in 2007. Over that period, managing a really complex programme will inevitably see us having to actively and dynamically manage the programme of work, the schedule of that work and the costs that sit alongside it.

I cannot provide you with a specific example of where that will have occurred, but what I can provide is some assurance around the way in which we are managing the programme more generally, so not just the carrier element, but Crowsnest and the F-35. As Sir Stephen says, in 2013, there was a recognition of not only the way that the carrier delivery was being managed, but the risk to the delivery of the Carrier Strike capability. We needed to think about how we brought together the carrier and all the components associated with the delivery of that, the F-35 and all those components, and Crowsnest. All that needs to come together to actually deliver the capability.

Through that focus or recognition, we appointed a senior responsible owner, which is the appointment that I sit in. I am the third of the three who will have been the senior responsible owner for the overall programme. If you were to ask me to pick one thing that has led us to a largely successful position, it is a ruthless focus on the risks in the programme. Being very clear eyed about what the risks are and how those risks are going to affect the delivery of a particular milestone has enabled us to focus our resources and our energies on fixing the right things and getting us to the place that we need to be in.

The second thing I would add is about being clear about who is responsible for what and what the milestones are. That helps us to avoid the pitfalls that you describe of delaying something that you then eventually have to pick up later.

Gareth Bacon: That sounds like a long way of saying yes. There are things that we will want to pick up on about the jets, the support vessels and the radar. I probably ought to stop there though, Chair.

Chair: I will certainly bring you back in, Mr Bacon. I remind Committee members, because we are working from two locations, that the automated chat is a helpful way of communicating. I cannot keep in touch with all of you by looks or by paper, so could you keep an eye on your phones? I call Tobias Ellwood, Chair of the Defence Committee.

Q16 Mr Ellwood: Thank you very much indeed, Chair, and again I am pleased to be here. Looking back at the SDSR 2015, it makes very clear that we want 19 destroyers and frigates, and we want two aircraft carriers. As for the consequences, though, of, as you say, having now managed to basically manage the books, would you agree that the absence of any



HOUSE OF COMMONS

increase in the budget when you were tasked with providing two carrier capabilities has dented the surface fleet capability both in terms of resources and manning? This was before your time, Sir Stephen, so you can answer honestly.

Chair: Sir Stephen is always honest with us.

Sir Stephen Lovegrove: I certainly seek to be, Chair. We have two carriers. We have 19 destroyers and frigates, and that is what we aim to continue. I am not for a moment denying that the budgetary pressures under which the Department has laboured, certainly for all of my time there, have made decisions, particularly around the destroyers and frigates, more difficult. Maintenance periods have occasionally had to be delayed. We have not got after issues to do with power propulsion as quickly as we might have liked.

There is no question that we have had to take decisions that we would not ideally have made because of budgetary pressures. Do I think that that is the normal course of events in defence? I suspect it probably is. Defence organisations right across the world are always under a great deal of budgetary pressure. We are no exception, and the maritime environment is no exception within that.

Q17 **Mr Ellwood:** My concern is that we have 19 destroyers and frigates, which is just enough to do the six operational duties that we have through NATO and others around the world. In addition to that, you want to develop carrier groups, quite rightly. You need to protect this carrier. It needs at least a destroyer frigate, a submarine and indeed other assets as well. I put it to you that, hopefully through the integrated review, there is a case to be made to increase the size of our surface fleet.

Sir Stephen Lovegrove: There is certainly that case to be made. That debate is happening, as you would imagine, in the integrated review at the moment. I would also say that there is a case to be made for deploying our carrier group with allies, so that they can provide some of the components of a Carrier Strike group that we might otherwise want to deploy elsewhere. There are a variety of different ways of skinning this particular cat.

Q18 **Mr Ellwood:** Likewise, my last point on this is to do with the manpower. Manning is difficult across all three services, but ultimately if your maritime surface fleet budget has not increased and you are struggling with manning as well, we are going to struggle to make sure that we have the necessary engineers to actually put these things to sea.

Sir Stephen Lovegrove: Yes and no. At the moment, we do not have—to the best of my knowledge anyway—any problem with manning our surface fleet. One of the design principles behind the QE class was that it was going to be much more highly automated than, for instance, the American equivalents. They have a third of the number of sailors on them as the Ford class, but 70% of the capability. Where I think there is probably more of a pinch point in terms of manning is actually in the submarine fleet. I would absolutely agree with you there.



Q19 Mr Ellwood: My final point on this is to do with the costings. Because, I believe, of the pressures that you have had to face, you have ended up with an incredible, state-of-the-art asset, but it is facing, or is designed for, low-probability, high-risk events. For us to deal with littoral, expeditionary or humanitarian effort, we can provide other additional support mechanisms that can be placed on the ship itself, but it is much tougher to do because we have had to focus really on that single bespoke capability of high-end effort using F-35s.

Sir Stephen Lovegrove: It is an immensely flexible capability, the carrier. It can do a huge number of HADR exercises. It can do neo exercises, evacuation exercises, and humanitarian assistance and disaster relief exercises. It carries huge amounts of helicopters and rotary wing if required. We have other assets that we deploy all the time, so while in certain situations you might be able to imagine that the carrier would be fixed in a high-end war-fighting situation and we would not be able to do those things, let us hope that we are not in that position and we will be able to use its full range of flexibility, because this is a very flexible asset. Indeed, if we choose to invest in it even more, we can probably make it even more flexible. That is one of the areas where—

Mr Ellwood: That is the interesting place where I wanted to end. Thank you.

Q20 Nick Smith: Sir Stephen, the aircraft carrier Queen Elizabeth is on the sea at the moment. I understand it has 15 aircraft. Five are from the UK and 10 are provided by the US Marine Corps, so to what extent does the Carrier Strike rely on US involvement to operate in the future as a credible force?

Sir Stephen Lovegrove: I will pass over some of that question to Air Marshal Knighton, but for a while—until we have brought up our F-35 fleet to critical mass, as it were—if we want to have a full complement of F-35s on the carriers, we will have to have some American F-35s on there from the Marine Corps. There will be a moment when we have enough F-35s to be able to equip both carriers entirely with British aeroplanes. Of course, the aeroplane in its own right relies on a support and logistical chain that, to a certain extent, is dependent on Lockheed Martin, which is the principal contractor, but we obviously have our own input into that and our own arrangements around it. There will always be a level of dependence in terms of support, but there will not always be a level of dependence in terms of the actual airframes themselves.

Air Marshal Knighton: I would just reinforce exactly the point the permanent secretary made, which is that we are designing and building the carrier to deliver a sovereign capability where we will be able to deploy up to 24 UK F-35s on to the carrier, and our objective date in the programme to deliver that is by the end of 2023—December 2023. The Americans, and the US Marine Corps in particular, are quite a long way ahead in terms of the delivery profile of their F-35s. They have had operational experience of deploying their aircraft on their carriers, and I should pay tribute here to the support we have had from the US Marine



HOUSE OF COMMONS

Corps and the US services more generally in supporting the UK to rebuild a carrier capability that we have not had for nearly a decade.

- Q21 **Nick Smith:** The phrase “sovereign capability” does not ring true when at the moment only a third of the aircraft on our aircraft carrier are UK planes. Isn’t the truth that we have over-promised and under-bought?

Air Marshal Knighton: The short answer to that is no. As I set out, our intention is to grow this capability over a period of time. By the time we get to full operating capability for Carrier Strike, which is the end of 2023, we will have sufficient aircraft and assets to be able to operate up to 24 aircraft on the carrier at a time, and that has always been the plan. We were always going to build and grow to that point. The carrier will be in service well into the 2040s and 2050s, and during that period we will have a sovereign capability in the way I describe it. It is only during this period where we are developing, regrowing and rebuilding that capability that we will be operating alongside the Americans.

The other point I would make aligns with what Sir Stephen said earlier. We see that in the future, our ability to work with our allies is going to be a vital part of the way in which we deter aggression around the world, so we actually see operating with US Marine Corps jets on board and proving we can do as a really positive thing.

- Q22 **Nick Smith:** When do you think we will have 48 UK jets? Do you think we will ever get the 138?

Air Marshal Knighton: The final one of those 48 aircraft is due to be delivered in financial year ‘25-26, and we have the funding set aside for those 48 aircraft. They are effectively on order, at various stages of build and delivery. Just to be clear, we have 18 at the moment; we have 30 more due to be delivered over the next five years. Beyond the 48, that is a question very much being considered at the moment as part of the integrated review and our long-term plan for that. What we know is that if we want to sustain the carriers out into the 2050s and we want to have a credible and sustainable F-35 capability, then we will need to buy more aircraft beyond the 48 to be able to sustain that capability over the long term. That will be part of the debate and negotiation through the integrated review and spending review.

- Q23 **Nick Smith:** Accepting that we are going to need to provide aircraft to 2050, 2060, and knowing that you have a strategic review in hand, would it not make sense to think more clearly about unmanned aircraft sooner rather than later, given the very high costs of the Lightning II craft?

Air Marshal Knighton: Part of the debate about the future requirement for F-35 numbers revolves around what our plans are for the future combat air system and the replacement of Typhoon from the 2030s. What we fully expect is that our future combat air system will be just that—a system. It will be a combination of crewed aircraft like F-35 and uncrewed autonomous systems that support it. The Air Force is working right now to develop autonomous aircraft to work alongside those aircraft we already have in service, to support us in terms of defending those aircraft and



HOUSE OF COMMONS

allowing us to prosecute targets. These run from quite small drones no bigger than this table right the way up to drones that are uncrewed but almost of the same sort of size as another combat aircraft. There is quite a range of potential costs associated with that, and understanding what the right mix is, how technology is going to evolve and develop, is a key part of the future combat air system programme that is already under way, and where we will need more investment if we want to continue along that route later into the 2020s, and provide the kind of capability you describe.

Sir Stephen Lovegrove: If I may, I have just one further point, Mr Smith. Of course you are right. There needs to be an uncrewed option. Our future combat air system needs to be very heavily focused around uncrewed options and those uncrewed options need ideally to work with the aircraft that we have at the moment—the Typhoons, the F-35s. There is a complicated debate about the legal basis on which you would be able to use lethal force in a situation like that, which is consistent with international humanitarian law, and I don't think anybody in the world knows exactly how the interaction of technology and legal norms is going to actually play out in the next 20, 30 years. It will be a matter of very considerable debate and I suspect controversy for many years to come, but these are things we are thinking about at the moment.

Q24 Nick Smith: I absolutely accept that. One of the things we have also tried to understand on this Committee previously—and, indeed, I sat in last week on the Defence Committee—is the costs of the Lightning II aircraft so far. The projects cost about £6 billion. We paid £2 billion to get into the game when it all began. We spent, I understand, about a half a billion on RAF Marham, and so far we have got 18 planes. Now if you were to do a crude average they are coming in at just under £200 million a pop. I am sure that that is wrong—there are other costs that need to be borne in mind that may be helpful for future plane purchases too, but, Mr Pate, what is going on here? How much are these things really costing?

Charlie Pate: We work with the Joint Programme Office in the United States, who bring together all the contributory nations into this, putting that in. We have seen the cost fall per aircraft, and the JPO stated at the end of last year that they expect further reductions of 13% for each of the aircraft types over the next three lots. So we are seeing lot by lot the price per aircraft fall while the capability is increasing. We do not set out lot by lot what we are paying because that is part of the commercial consideration.

Q25 Nick Smith: What is your best estimate at the moment on the cost per aircraft?

Charlie Pate: I will defer, if I may, to Sir Simon.

Sir Simon Bollom: In terms of lot 12, which has the three aircraft to be delivered this year, it is \$108 million. As has just been described, we are expecting further reductions in lots 13 through to 17. That is still to be negotiated.

Q26 Nick Smith: So what is the difference between the £3.5 billion left after



HOUSE OF COMMONS

the initial costs and RAF Marham and the \$100 million per aircraft? What is the balance being spent on?

Charlie Pate: We have to pay for all of the support arrangements around these. We have to pay for the ongoing upgrades and for the weapons integrations that are bespoke to the UK solution. All of that is included in the overall budget, which we have approved now up to £10.5 billion of the £13.4 billion we expect to spend on this through to programme closure in 2035. We will spend potentially around another £5 billion for the whole-life costs. That is of the 48, and some of that is in the Report.

Q27 **Nick Smith:** On those other on-costs, if you take out the cost of the \$100 million per plane, what does that come to?

Charlie Pate: I do not have the exact breakdown between aircraft.

Q28 **Nick Smith:** Can you get one?

Charlie Pate: We can write to you on the difference between the procurement and the ongoing support costs and other arrangements around that.

Chair: Thank you. We have in the past had a private briefing on the details and costs that cannot be talked about in the public domain. We are requesting another. I think the Committee speaks with one voice on that.

Q29 **Gareth Bacon:** This is to Sir Simon. We cannot have this discussion without talking about Crowsnest, because that is supposed to be crucial for the protection of the fleet, or for the Carrier Strike group. It is going to be delayed by at least 18 months—that was discovered relatively late—and it not be fully operational until 2023, I understand. What's gone wrong with it?

Sir Simon Bollom: I am disappointed by where we have got to with this programme. At the end of 2018 it became apparent that there was going to be a significant delay in the programme. Indeed, that was confirmed in January '19 by a Thales internal audit, which declared that they were going to be very late indeed. So what went wrong? A failure to understand the technical risk at the outset. There were delays in placing the initial contract, which compressed the timescales. The bottom line is that the industry consortium underestimated the technical risk and under-resourced the programme. That is where we got to up until the start of the year.

What I am pleased with is the reaction from that, with very strong engagement from the chief executives of the three companies involved—Lockheed, Thales and Leonardo—with a resolution to get this aircraft ready to be part of the CSG21 deployment. Where we are at the moment is that with the replanning and additional resourcing that has been put in, we expect to have an aircraft with an initial release to service by the end of January, which will allow pilots and crews to train, and by April next year, when we need to be there in support of CSG21, we will have the required functionality on Crowsnest to be able to support deployment.



Q30 Gareth Bacon: How much cover will you have? Is it full cover of the whole group?

Sir Simon Bollom: It will provide the wide area of surveillance that the aircraft is set out to do. It will have secure link 16 capability, mode 5 identification friend or foe and an air traffic management system. Will it be the capability that I expected it to be at IOC? No, it will not be. There will be progressive software drops that will improve radar fidelity and tracking and a number of other systems on the aircraft and, as would be the case with almost all the aircraft that we have in the fleet, there will be progressive capability upgrades right the way through to release 14, which will be in 2023.

Q31 Gareth Bacon: Are you confident that full operational capability will be achieved in 2023?

Sir Simon Bollom: As confident as I can be. Where we are at the moment is that at least we have a firm foundation. The initial flight trials have been carried out; all the handling trials are sorted out. The software that we need for the IOC is 100% coded; the issue now is the flight test and the fix that happens with any complex software integration. So we are in a much better place. I think the programme management that, frankly, was not there when we started the programme and went through to the delays is much better now. We have much higher fidelity on the programme, and the way the primes and the subs are working is very much improved.

Q32 Gareth Bacon: I would like to probe that last point a little bit more, because I am interested in what went wrong. I understand, of course, that you have to have contractors and subcontractors, but the National Audit Office looked into the MoD's reporting on this, and the timeline suggests that in December 2018 the project was reporting that delivery of IOC was achievable by the deadlines. The following month is when the Thales corporate internal audit report suggested that there was going to be extensive delay and cost overruns, so what happened in between? Is there an element of—I don't know—positive confirmation bias in terms of the reporting that is coming back?

Sir Simon Bollom: It became apparent to me—I remember this, actually—in October '18 that the milestones were not moving as they should be and that actually what we were getting was milestones that were being missed, and the ramp up towards the finish line became increasingly steep. Part of it, I think, was a bit of a can-do attitude amongst industry. You always think that you can catch up, and sometimes engineers are their worst enemy here. So I think there was an optimism, which we unpicked, and that, unfortunately, generated the 18-month delay.

Q33 Gareth Bacon: So what have you changed now to make sure that the prime contractors and subcontractors are working better both with each other and with the Department?



HOUSE OF COMMONS

Sir Simon Bollom: Two things—one of them is the estimation at the beginning and making sure that that estimate actually started with the prime and was carried through into the subcontractors. I think that is absolutely critical. Also, understanding technical risk and continging for it appropriately—with the benefit of hindsight, I don't think that was done on this programme.

Q34 **Gareth Bacon:** I will ask, then, the same question that I asked the permanent secretary at the outset. As a layman, I would have assumed that you would have already thought about this and it would have been in train right from the beginning. Why wasn't it?

Sir Simon Bollom: I have asked myself that question. Actually, on the face of it, this should have been relatively low risk. It was the Searchwater radar and Cerberus mission system that was taken from the Sea King Mark 7. I just do not think, though, that they had really probed into the issue of the systems integration requirements that were there and the upgrade to the mission systems that were planned to be part of the capability going forward.

Q35 **Gareth Bacon:** I will turn to Air Marshal Knighton, because this is the critical question, I suppose. If this is not having the full airborne radar capability in May 2023, what is it going to have, in terms of the operational capability of the Carrier Strike group?

Air Marshal Knighton: I will just go back to the initial operating capability and what we will have for the Carrier Strike group 21 deployment next year. I just want to provide reassurance to the Committee that we will have a credible baseline radar capability that will enable us to search the area and protect the carrier from airborne threats. As Sir Simon has described, some modes of that radar will not be available. For example, the weather mode on the radar will not be immediately available when the aircraft deploys; the capability will be incrementally improved as the software is developed. Our ability to understand, survey and search all the area, and to identify potential threats and pass that information to the carrier and to the other parts of the carrier group, will be in place. The naval commander—the three star—has been personally engaged in reviewing that and is confident that we will have a credible baseline capability by the time it deploys.

Between 2021 and 2023, when the full operating capability is expected to be delivered, we will, as I described, incrementally improve that capability. It is feasible, as Sir Simon said, that we will find that that capability is perhaps not delivered as quickly as we would wish or is not as good as we would want it to be, but at the moment we are planning for it to be successful. If we have to compromise on the delivery of that capability in terms of time, we know that we have a sufficiently credible capability; it is just not as good as we would wish it to be for the life of the carrier in the 2030s and beyond. We will be working tirelessly with the contractors to ensure that they are able to deliver that and, in the background, developing contingency plans for how we will operate if certain elements



of the automation system or other modes of the radar are not as we would wish them to be.

- Q36 **Gareth Bacon:** You said that there would be an operational radar capability at the outset. Crowsnest offers significantly enhanced capability, from how you have just described it. Are those nice-to-haves from Crowsnest, or are they absolutely integral to maximise the potential efficiency of the carrier group?

Air Marshal Knighton: The way we think about requirements is that we set both threshold and objective requirements. Threshold is the point that references the bare minimum capability that we need to be able to deliver the outputs that are asked of that particular asset—in this case, the Carrier Strike group. The objective level is where, if we are able to get to that level and the balance of investment suggests that it makes sense from a value-for-money perspective, we should drive at that.

I would not want to describe them as nice-to-haves; they will enable the operator to exploit to the maximum the capability and the technology, and will ensure that the Carrier Strike group is as protected as it can be. As you will understand, in military operations, there is never a situation where we have no risk. It is about trying to manage that risk appropriately. As I say, we and the commanders involved are confident that, even by next year, we will have a credible baseline capability that will only improve through to 2023 and probably beyond as well.

- Q37 **Gareth Bacon:** We are in the formative stages of the operational capability, then, and it will get better, but not having Crowsnest operational until 2023 will not put the carrier group at more risk than it would otherwise be?

Air Marshal Knighton: That is correct, yes—exactly that.

- Q38 **Sir Geoffrey Clifton-Brown:** May I ask you, Air Marshal, whether you have considered the non-conventional threats? As we know from recent examples in Syria, low-cost Turkish drones have taken out some very sophisticated tanks, including Russian tanks. Have you considered that threat and an Iranian-type threat of large numbers of small boats packed full of high explosives?

Air Marshal Knighton: The answer to both those examples is yes. When we think about the carrier and the Carrier Strike group, it is best for us to think about it as a package that has a layered defence. As Mr Ellwood described, the Carrier Strike group will include frigates that will help us protect from undersea threats; we have destroyers that help us to protect from surface and air threats; and we also have a submarine that would be part of that full package as well. Each of those ships will have a range of weapons on board, some of which are optimised to be able to deal with fast in-shore attack craft, or to deal with the non-traditional threats that you describe in some kind of airborne form.

For the captain of the carrier and for the operational commander, this kind of assessment of the operational risk, the threats that they face depending



HOUSE OF COMMONS

on the location, and how to mitigate those threats—through both deterrence and defeat, should that be necessary—are a really key part of thinking through that entire layered defence. But the types of threats that you describe, Sir Geoffrey, are exactly the things that I know the operational commanders are worried about and will seek to blunt.

Chair: And another reason why we need the SDSR to happen sooner rather than later. But I guess—I see you nodding very vigorously there, Sir Stephen. That is a frustration for this Committee. And talking about frustrations for this Committee, we go to Nick Smith for the issue that he would like to raise.

Q39 Nick Smith: I just want to come back to this cost of planes malarkey. Sir Stephen, the Air Marshal has talked about sovereign capability—48 planes. We learned that the base cost of each of these aircraft is \$100 million; I presume there are significant on-costs again. If we are going to be talking about another 30 aircraft to meet the Air Marshal's sovereign capability, it will be at least \$3 billion and probably nearer \$5 billion to get there. How likely is it that the UK will be able to afford to buy and sustain this required number of aircraft? That is a lot of money to come out of your defence budget, isn't it?

Sir Stephen Lovegrove: It is a lot of money and it would be disingenuous to say that it isn't. The future combat air system, no matter how it is designed—whether or not it is F-35-heavy or something else very heavy—is going to be a very, very, very expensive part of what defence spends its money on.

What I would say about that is perhaps two things to give you a bit of reassurance. One is that the costs—the fly-away costs, as it were—of the F-35 are coming down very fast; I mean, they really are coming down fast. The F-35B is the most expensive variant of them, but that is coming down fast as well.

Q40 Nick Smith: But you acknowledge that it is going to be £4 billion to £5 billion for the 30 craft.

Sir Stephen Lovegrove: It rather depends on how fast the costs come down, but the support costs are, in many ways—

Q41 Nick Smith: It is that order of magnitude, isn't it?

Sir Stephen Lovegrove: Yes—one can do the maths.

The second thing I would say is that this is a very, very long-term programme. We spend about £40 billion-plus a year and these aircraft, or the aircraft that we may choose to develop in order to supplement them, will be being built and bought into the 2040s and 2050s. So, it is a long time that this capability is going to be deployed—

Q42 Nick Smith: But I am talking about these 48 aircraft for us to be sovereign capable. This is pretty short-order expenditure really, isn't it?



HOUSE OF COMMONS

Air Marshal Knighton: Forty-eight aircraft are provisioned for; we have the budget for that. We have the budget for the ongoing upgrade, we have the budget for the support of those aircraft and we have the budget to operate them.

Nick Smith: Okay. Moving on to support ships—

Chair: In which case, I will bring in Mr Ellwood next.

Q43 **Mr Ellwood:** I put it to you that 48 aircraft is not enough to run on a single aircraft carrier through its durability. I am reminded of my O-level maths multiple choice; I took in four pencils, not one, just in case I required back-up. Not just a second, nor a third, but a fourth, so I was guaranteed to have a working pencil at any time. You will be familiar with this—it is the force elements at readiness, which is the military's term for saying, "How many do we need to have operational at any one time?", bearing in mind that we have got to repair things, we have got to train people, and so forth. So, please can I ask: what is the upper number that you require to run two aircraft carriers?

Air Marshal Knighton: The 48 number was calculated on the basis of having sufficient aircraft to continue to maintain and sustain the training regime—the operational conversion unit—and the three aircraft that are permanently attributed to do testing and evaluation, and to leave sufficient aircraft to have two operational squadrons, so that we could routinely have—

Q44 **Mr Ellwood:** Two times 12?

Air Marshal Knighton: Yes, that kind of order of magnitude. That would provide the opportunity to surge to up to 24 aircraft at a time on the carrier. However, we would more routinely operate with a lower number—somewhere between six and 12, as necessary—as the aircraft carrier went on a deployment. Forty-eight is adequate to deliver that level of output.

My point about needing more aircraft over the life is because the life—over the long-term, out into the 2040s and '50s—is limited by design, and it will need to be replaced. Also if we wanted to increase the capacity of that force and stand a third squadron, you would need more aircraft.

Q45 **Mr Ellwood:** Cutting to the chase, if we want to have, through its life, two Carrier Strike capabilities, we will need that 138. Were we to reduce that number in any way, heading towards 48, we would affect our capability.

Air Marshal Knighton: When the original number of 138 was developed, that was against the backdrop of the original design of the carrier, which would have had four operational squadrons and two carriers operating at all times. The Governments in 2010 and 2015 took a different view. As I say, the number of aircraft that we have and will have by the end of the financial year 2025-26 will be adequate to deliver those two squadrons. If you want to pack a bigger punch and you want to thicken that force, you will need more F-35s, but that is a judgment around the overall size and shape of the armed forces, which brings us back, I am afraid, to the integrated review.



Q46 Mr Ellwood: My next question is: what are you flying from this carrier? It is a state-of-the-art carrier, the newest in the world, yet we only seem to be flying fast jets from it—the F-35Bs. When we look at others around the world, including the United States, they are already flying drone aircraft. You talked about UAVs. I do not understand at all why there is not, today, a concurrent timetable to put on board Scout Eagle, Fire Scout, X-47Bs—all things that could be utilised and would far more cheaply allow us to do the work that otherwise would have to be done by F-35s. Why was there not a parallel programme to look at how the X-47 came up in 2011 or how the Fire Scout came around in 2000? These are now standard things. How come we are not seeing them on board today, rather than in five or 10 years' time?

Air Marshal Knighton: Of those particular capabilities that you describe, the X-47 was an experimental plane developed by the US Navy and requires a catapult to launch it. These aircraft carriers do not have catapults on board. We went for a short take-off and vertical landing variant of the ski ramp off the front of the carrier. That drives us to requiring different solutions. I am confident that—

Q47 Mr Ellwood: Sorry, ScanEagle is found on frigates, let alone carriers, yet we do not have one on board ours today.

Air Marshal Knighton: ScanEagle provides a short-range electro-optic search and surveillance capability. What I will say is that—

Q48 Mr Ellwood: Or ISTAR capability, which your Crowsnest does not have. I am just saying that it is not there and we have nothing—we have no drone on board at the moment.

Air Marshal Knighton: You are absolutely right: we do not have a drone on board today. One of the really important pieces of work that we need to do over the next decade is to develop the integral ISR—intelligence, surveillance, reconnaissance—capability for all our ships, not just the Carrier Strike group. That will almost certainly be an autonomous, uncrewed system. We do not have a plan today to put that on board, but we absolutely recognise that that is an important capability that we will need to invest in over the next few years.

Q49 Chair: Air Marshal Knighton, your answers to Mr Ellwood were quite illuminating on the reason for the decision to have 48, which is a number that this Committee has been worried about for a while. Basically, you are clear that it was a decision by Government—a political decision—to trim costs that reduced the numbers.

Sir Stephen Lovegrove: I wouldn't quite go that—

Chair: No? That's all right. I'm pushing because I was interested. That was what I inferred, and I wasn't sure whether I assumed right.

Sir Stephen Lovegrove: I wouldn't quite go that far. I mean, 138 is clearly the upper limit. Realistically, given two carriers, 138 is a very full-fat—



HOUSE OF COMMONS

Mr Ellwood: But how are you going to guarantee that you have that capability—

Chair: Can we have one at a time, through the Chair, please?

Sir Stephen Lovegrove: Four squadrons, both carriers deployed at the same time. If you decide that you are not going to have four squadrons and you are not going to deploy both carriers at the same time—at the moment, I think the 2015 SCSR said that we were going to have one carrier out at a time, with the other one in dock—then you do not need, clearly, 138 aircraft.

If you choose to change the nature of the deployment patterns of the two carriers, and you decide that you want to use them for different things, then you end up with a different number. It is not going to be 48. It is going to be more than 48. I am very confident that it is going to be more than 48, which is enough for us right now. It would be great if there were more, but it is enough for us right now. It will in due course be quite a lot more than that. As I say, 138 will be the upper limit of it, though.

Chair: So the SCSR again comes into play, because the capability—whether one or two could be deployed at same time—comes into play. I will turn next to Sir Bernard Jenkin.

Q50 **Sir Bernard Jenkin:** Thank you very much, and good afternoon, gentlemen. I remember the 1998 strategic defence review, when the concept was very much grander than what we are discussing now in terms of the number of surface ships in support and even the number of aircraft that we would be ordering, which I think was more than 138, if I remember correctly. The capability has been pared back and pared back. Then we find ourselves finishing up by talking about how valuable this is going to be for peace support operations and aid operations.

I want to ask about the value for money, because we are buying some very expensive capability. Unless we can scale up, how can we really justify this enormous expense? I think that is what Tobias Ellwood was really asking about. The incidence of state-on-state warfare is expected to increase, so the expectation is that we must be ready for high-intensity warfare and high-intensity operations. To what extent will we be able to sustain losses from this very limited inventory that we are now planning for, in order to be able to sustain the capability in a war?

Sir Stephen Lovegrove: It is clearly the case that if we are to equip the carrier/carriers with the minimum number of aircraft in a high-intensity war fight, there is going to be attrition quite quickly at this level that we would not be able to sustain, and at that point the utility of the carrier becomes very much reduced, which is one of the reasons why we will be buying more F-35Bs, in order to be able to make sure that that situation does not happen. It is clearly not the case that we can conjure them up just like that. They are expensive things to build. They take a bit of time to appear. We are going to get our first 48 over the next five years, and there will be a decision coming up as to how many more we get over the period after that.



HOUSE OF COMMONS

The point I was seeking to make about the aircraft carrier was not only that it is an immensely potent capability for a high-end war fight, admittedly surrounded by all the other capabilities that Mr Ellwood was talking about earlier on. It is certainly true that it needs anti-submarine warfare frigates, anti-aircraft destroyers, and hunter-killer submarines in that kind of situation. However, it is also a capability that is capable of projecting Britain's power in the world without some of those things, and capable of doing a variety of other tasks as well. It is a very full and capable piece of equipment, so I have no doubt that it will be value for money, but when you look at the range of things this particular capability can do in all the different situations it might be deployed in, I do not think it is going to be very susceptible to a straightforward value-for-money calculation. I guess that would be my answer; that might not satisfy you, Sir Bernard, but it is as good as I can get.

Q51 Sir Bernard Jenkin: Could I just make the suggestion that what is required is for the Department to write a maritime strategic aviation concept that builds in this idea of scaling up, in order that what we are projecting now and what we might be projecting in, say, 10 years' time carries with it the credibility of the sustainable punch, should it need to do so? That needs the backing, if you like, of some defence industrial policy to support the scaling up.

Sir Stephen Lovegrove: I take that suggestion absolutely on board. It would be fair to say that within the Department, exactly that kind of thinking has been done and continues to be done. What I do not think we have done is reveal it to the world, and there is a deterrence and persuasive force to the argument for making it more public. I will take that away and speak to Ministers about it.

Sir Bernard Jenkin: Thank you.

Q52 Barry Gardiner: Mr Pate, you said that the cost of the jets was coming down, and I believe the Permanent Secretary then reinforced that. However, paragraph 1.16 of the NAO Report says: "The Department has increased the approval limit four times since we reported in 2017, an increase of £1.4 billion (15%)." Does that mean that when you said the cost was coming down, you were talking about the basic procurement of each jet?

Charlie Pate: That is right, Mr Gardiner. The basic price of each jet is coming down, and that was what I was referring to, with the next three lots falling over 13%. May I explain the increase in that cost that is referred to in the Report?

Q53 Barry Gardiner: I think it is explained in that paragraph, where it says: "It has a strategy of incremental acquisitions, and the approvals were for capability upgrades, integration of UK weapons and sustainment costs". I presume the capability upgrades were to those jets, but the compatibility upgrades—the integration of UK weapons—were for those jets, so were you not playing with semantics when you said the cost has come down? There is not much point in having a jet that does not have that capability



HOUSE OF COMMONS

or is incompatible with UK weapons systems, is there?

Charlie Pate: This is an agreed and understood part of the programme: the overall F-35 would go through a process of continuous upgrades, and it will continue that through its life. Included with that is the integration of the UK weapons systems on to that, so again, that was known at the start and was an agreed part of the programme.

Q54 **Barry Gardiner:** It was known at the start, but this is actually an approval uplift since 2017, isn't it? So in the past three years, the cost has actually risen by £1.4 billion.

Charlie Pate: As the NAO Report states, this is how we do incremental approvals within an agreed overall whole-life cost of around £13.5 billion, which I referred to earlier, through to programme closure at the end of 2035. We do not approve all of that right at the start, mostly because we need to work through the precise costings of each element with the SRO and the various programme teams working on this. As those become clearer, we take them through the investment approvals committee, which I chair, and then through to Ministers and the Treasury as required, so that we are putting sensible bounds around different elements of the programme.

The alternative, frankly, would have been to have given approval for the whole-life costs, or the overall programme costs, right at the start. I would suggest that that reduces the control that we need on the programme.

Chair: One last quick one, Mr Gardiner.

Q55 **Barry Gardiner:** There was a whole-life cost of £18.425 billion. The final question that I wish to put to the perm sec is, in 2015, the Department announced that it intended to pursue 138 jets and committed to operating the two squadrons. The way you were talking in response to Mr Ellwood and Sir Bernard Jenkin, it seemed as if that might not be the case. Has there been any change from that announcement in 2015?

Sir Stephen Lovegrove: The position stands as at the SDSR of 2015, where there was announced an intention to have 138 F-35s. We have a funded programme to buy, contractually, 48 of them, which leaves 90 left over.

Since then, things have certainly moved on. The thinking about what a future combat air system will require us to operate to replace the Typhoons that, as Air Marshal Knighton mentioned, are coming out of service in the late 2030s is beginning to change the way in which we are thinking about what the totality of the combat air fleet is going to be. As a result of that, that will be one of the subjects that will be discussed in the IR.

Barry Gardiner: But the—

Chair: We need to move on now, Mr Gardiner.

Q56 **Nick Smith:** Air Marshal, we all understand that Carrier Strike is a



HOUSE OF COMMONS

massive logistical challenge. Initially it was planned to have three supply ships. Should a carrier be in a dangerous place, how would the UK maintain a sustained, high-tempo carrier deployment if the RFA Fort Victoria, which I understand is fantastic, is the only solid support ship available? How are we going to make sure that supplies, fuel and back-up munitions are in place to support our Navy?

Air Marshal Knighton: As you describe, the Fleet Solid Support ship programme was the fourth leg of the four parts of the carrier-enabled power projection. To sustain the delivery of that capability through life, we currently estimate that we are going to need three of those Fleet Solid Support ships. We need three because you would expect one or two of them, potentially, to be in some kind of maintenance over time.

Until we have all those ships in service, we will have to rely on Royal Fleet Auxiliary Ship Fort Victoria. As a consequence of that, we will have to think through how much of our spares and stores we need to preload on to the ship. We will have to think about what the potential rates of consumption will be, depending on the environment in which the ship is operating. Where necessary, as I say, we will either have to preposition spares and stores on board the ship or potentially seek support from our allies.

Fundamentally, however, we will seek to manage the consumption of our stock and spares based on the operational demand of the time. We will match the load-out of the carrier and the load-out of RFA Fort Victoria to enable us to do that. Inevitably, we will be constrained in the way we have to operate if we have only RFA Fort Victoria. We have known about that since the inception of the programme, because since 2011, the Fleet Solid Support ships have been pushed back in terms of the timing of when they will be delivered.

Q57 Nick Smith: Air Marshal, what you have said is that if we think it is going to be difficult, we will put loads of materiel on the aircraft carrier and rely on our allies to help us out should it happen short term, but that could really be difficult could it not?

Sir Simon Bollom, the Air Marshal has just given what we used to call a "hospital pass" when I played rugby, because he is saying, "We need three ships." Why has the Ministry of Defence consistently failed to order those ships?

Sir Simon Bollom: As you are no doubt referring to, we had the Fleet Solid Support programme, where the intention was to go out to the market to purchase three ships. As of last year, we got to the end of the bid process and to the point where we did not have a compliant bidder, so on 5 November, that competition was stopped. Again, that has taken us into the integrated review area, and we are now considering the requirement and stand ready to launch a further competition when instructed.

Q58 Nick Smith: Okay. It does feel a little like jam tomorrow waiting for the review to come along. Thank you, Sir Simon. Sir Stephen, why is there still no funded permanent solution for the maritime intra-theatre lift?

Sir Stephen Lovegrove: I will refer that question to the Air Marshal, if I may.

Air Marshal Knighton: We do have a maritime intra-theatre lift; it is an interim solution provided by Merlin. Two are currently embarked on the carrier. That will provide the capability that we need to be able to operate the carrier for the foreseeable future. The maritime intra-theatre lift requirement is about moving spares, people and, potentially, high-value assets, around the fleet and, potentially, to shore. We will need to find a long-term solution, well into the 2030s and 2040s. In fact, coming back to Mr Ellwood's earlier question, I anticipate that in the future that will be an uncrewed autonomous system of some form.

For the foreseeable future, the Merlin Mk4 will give us the capability that we need to be able to operate the carrier. The experience that we have gained from looking at the USS Essex deployment and our own experience through a number of deployments of the carrier suggest that, for the moment, that Merlin capability is perfectly adequate to deliver what is required.

Q59 **Nick Smith:** A last one from me on this bundle of support questions: Sir Stephen, how likely is it that you will be able to meet your target and declare Carrier Strike interim operating capability in the coming December, with all the criteria having been met, including Crowsnest?

Sir Stephen Lovegrove: Very likely. We have talked at some length about the inevitably slightly more limited nature of the Crowsnest capability, but in terms of the initial operating capability, that is very likely.

Q60 **Mr Ellwood:** On that, there seems to be a number of weak links: inadequate logistical support, no Crowsnest, limited ISTAR, and the absence of indigenous carrier refuelling. Is that something that the integrated review will be able to reconcile?

Sir Stephen Lovegrove: We will certainly be setting our plans to be able to bring those various components together, but I do think it important that we recognise that we are talking about the very complicated interweaving of a number of different—in their own right—very complicated capabilities, which we have not had for over a decade. In that decade, technology has moved on a lot. It grieves and pains me to say that there will be teething troubles in making sure that this capability works absolutely seamlessly, but that is just the reality of it. It will take a few years, probably, for us to really understand how best to make this work. An absolutely crucial part of learning about what we have got—and we are still in that phase, learning about what we have—will be the deployment in 2021 through the Gulf and the Indian Ocean and into the Pacific. After that we will be coming back and we will be very happy to tell you what we have learned about it. Sitting here right now with this very new capability, it is tough.

Q61 **Mr Ellwood:** I genuinely don't know how much the Treasury get any of this, and the importance of it, the absence of which has an impact on the



HOUSE OF COMMONS

capability. It is important that we do share, and we want to work with you—or, certainly, my Committee does—to make this case for the integrated review.

Moving on to the potency of the munitions, the weapons systems that are actually on board, ultimately this is why the aircraft carrier is there. There is posture, and so forth, and status, but ultimately it is the lethality, the accuracy of the bombs or missiles that are actually dropped, or the air supremacy that you are able to gauge. So can I ask whether you believe that the utility that you have in what is in the magazine at the moment is equally shared among all the assets that are on board the aircraft carrier?

Air Marshal Knighton: I'm sorry, Mr Ellwood: do you mean as in the air-launched munitions for the F-35?

Q62 **Mr Ellwood:** Yes. What I am getting at is that we actually have some amazing kit. MBDA make some of the most incredible weapons systems exported around the world. They are not used, all of them, on the F-35. Neither are they used, actually, on Merlin either. So going back to the versatility and flexibility, and the power projection and so forth, what we have purchased, the F-35, is actually quite bespoke in what you can strap to it for stealth mode or otherwise. The Merlin itself is actually more passive. I am asking, why have we not advanced Brimstone or even Storm Shadow on to the Merlin? Why isn't Merlin used as a refuelling? As I understand it there is no indigenous mid-air refuelling capability for the F-35B.

Air Marshal Knighton: There is quite a lot in there. If I start with the weapons systems, we foresee over time an incremental development and release of weapons clearances on F-35. That takes time. Taking a complex weapon, integrating it into a complex aircraft with a complex mission system is a serious feat of engineering, and that just takes some time. I am confident that over the next few years we will increase the number of UK-built weapons that we integrate on to F-35. One of the most significant and potent will be SPEAR capability 3, which we think will be a really important component of that arsenal and, as you say, is an MBDA-developed weapon. When the aircraft deploy at CSG21 they will be armed with capability that gives us confidence that they can be used in an operational sense, should we need to.

The point you made about air-to-air refuelling: there is no intention for us to put an air-to-air refuelling capability on to the carrier in its current form. The concept of carrier operations is such that you are able to put the carrier closer to the target and therefore there is less requirement for air-to-air refuelling. If you were in circumstances, perhaps in the Gulf, where you might want to operate the carrier—this is exactly what the USS Essex did—the aircraft that come off the carrier are able to refuel from the likes of our Voyager or a US or other country's asset, as part of the integrated capability. Sorry, the international operation that is being run over the middle east; that would be the way in which we would apply it.

Q63 **Mr Ellwood:** Can I encourage, please, that greater effort is made to use the spectrum of weapons systems that we have in a cleverer way? The



HOUSE OF COMMONS

Brimstone should be able to be used on the Merlin—also on the Apache, on the Wildcat and so forth, and even on a main battle tank. We tend to be very siloed in what we are doing with these weapons systems when they are going to be in the magazine of the carrier itself. You may have Apache on it, in certain circumstances—we saw that in Op Ellamy. I am simply asking why there seems to continue to be a very siloed approach to the weapons systems that we use, even though we have an incredible spectrum of capability.

Air Marshal Knighton: If I might provide a small amount of reassurance, Brimstone is one of the options we are considering for integration on to Apache. We will not be fitting weapons to Merlin, the airborne early warning platform, because of the way in which it is used operationally; you need to have that asset focused on delivering its airborne early warning capability. We deliver the strike capability through some of the missiles that are UK-built weapons fitted to the likes of the Wildcat.

Q64 **Mr Ellwood:** But the cost of flying Lightning II is 10 times more than the cost of flying a Merlin. Nobody is going to complain at the other end about the fact that a Storm Shadow has come off one or another, so how come you are not allowing Merlin to be more versatile to be able to do both roles?

Air Marshal Knighton: Storm Shadow is a large weapon—

Chair: I think we are in danger, Mr Ellwood, of replaying the Defence Select Committee in discussing individual capabilities. Would you like to ask a question and then we can move on?

Q65 **Mr Ellwood:** I just want to see greater versatility. If Merlin is on board, it is a flying asset that can be used. There is an array of weapons systems in your magazine. Can we have the foresight to allow greater versatility in the airborne assets that you have?

Air Marshal Knighton: Mr Ellwood makes a very good point about making sure that we maximise the investment we have made in our weapons and using them on as many platforms as we can.

Q66 **Chair:** And the effectiveness of what Carrier Strike can achieve. I want to move on to costs. I will come back to colleagues afterwards. Mr Pate, we are going through a pandemic. Lots of money is being spent—lots doesn't even begin to describe it—by the Treasury. Have you had any conversations with the Treasury about the potential impacts on your budget?

Charlie Pate: Yes; we keep in touch weekly with the Treasury. Of the two main areas that we have been talking to them about, the first is on operational support. Sir Stephen described earlier a military—

Chair: Yes, we know.

Charlie Pate: We have done that on a marginal cost basis. We are clearly identifying the costs. More broadly, it is the impact on the Department's business. The clearest of those is the position of the pound. We have



HOUSE OF COMMONS

discussed on several occasions foreign exchange. We are keeping that dialogue with the Treasury going. We are also making sure we identify where we think we have specifically spent or in fact lost income as a result of the pandemic.

Q67 **Chair:** Obviously the forex issue is a critical one, but is there any hint from the Treasury that, in a future spending review, you might have to offer up extra savings? A small saving in the Ministry of Defence, percentage-wise, is a large saving for other Departments.

Charlie Pate: The track record from the last three years is that we have received £3 billion additional from the Treasury. We are in discussion about what we think we require, and we will find the result in the coming months.

Q68 **Chair:** Have you had any indication of when the spending review is going to happen?

Charlie Pate: As Sir Stephen said, it has to be before the end of November to release the local government settlement. That is the only timing that we have heard.

Q69 **Chair:** I will not repeat our questions on that. As we are looking at Carrier Strike, what work have you done to establish what enhancements are needed and what they will cost? There are options, as we have discussed, but have you costed them all?

Charlie Pate: Again, in three areas there are, as the NAO Report makes clear, the existing budgets around support, which includes maintenance but also upgrades as they are required, including on the F-35, as we have described, but also on the other capabilities. There are then the operating costs, where we have taken what we can from the trials and the understanding of these capabilities, but again as Sir Stephen said, we need to go through the Carrier Strike group in 2021 and that will give us a much better understanding of what these things actually cost when we are operating them properly, and we will feed that back in. Then the third area, as we understand it, is the lifetime of the current capabilities that we have got and how those will develop. Those feed into our equipment planning and programming in the normal fashion. Some of those are part of the back end of the 10 years that we discussed in a previous hearing. Others go well beyond even this 10-year timeframe.

Q70 **Chair:** Clearly, 2021 is a critical year for determining capability, but also costs. How quickly can you pivot if something proves too expensive? I will come to Air Marshal Knighton about what he might have to de-scope as a result. How quickly will you be able to make that change if there is a big overrun?

Charlie Pate: From operating costs, we do just have to understand that, relative to our overall £40 billion budget, those are not the main costs within that. Where we are operating a Carrier Strike group, we will not be doing other thing with those assets, so I think there is some displacement there.



HOUSE OF COMMONS

Furthermore—and this is not the case for CSG21—if the National Security Council decides on the use of the Carrier Strike group, we can then go into discussion with the Treasury about access to the special reserve, just as we do for Operation Shader and other things for which where we require funding above what we are normally funded for normal running costs. So we have a couple of avenues before I have to go to Air Marshal Knighton to see what we have to reprogramme.

Q71 Chair: I will be interested to know what the status of the special reserve will be—on one level, capability-wise—once we have the covid bill in front of us. Have you had any discussions with the Treasury about that impact?

Charlie Pate: The special reserve for us is for military operations and that has been falling over recent years given activity. I have not discussed that with the Treasury on the overall covid bill, no.

Q72 Chair: Air Marshal Knighton, if 2021 does not go well with the covid impact, what might you have to de-scope? Have you been thinking about that? We have been talking about other things with Mr Ellwood, but what might you have to drop off Carrier Strike if you had to trim it? I think when we met a couple of times ago, discussions were about whether the Royal Marines would have anything to do with Carrier Strike, for example, and we have heard some examples from Mr Ellwood. What are the ones that are seriously in play?

Air Marshal Knighton: I thought that the question you were going to ask was around what we would do across the rest of the defence budget, which is a topic of considerable discussion as we think through the potential financial scenarios and the outcome of the integrated review, and the very thorough examination of the UK's position in the world and the capability required for it. In terms of Carrier Strike itself, we judge that it remains a really vital component of the UK's military capability and military power. It is an important symbol of our position in the world; of our allies, only the US operates more than two carriers.

We would seek to prioritise the investment that we have planned to deliver the Carrier Strike capability and would therefore potentially have to look elsewhere in the rest of the defence programme. If the judgment were made by the Ministers that, actually, they no longer wanted to privilege and prioritise investment in Carrier Strike, clearly we would look at what the future investment plans were and where we could go to make savings.

If I may, Chair, to speculate about how we might prioritise within the Carrier Strike programme would perhaps not be helpful.

Q73 Chair: It would not be helpful to you, but there is a lot of speculation out there, and we see things floated in the press, such as the tanks that Mr Holden mentioned at the beginning. As I said, it was the Royal Marines a few years ago. There are different things being floated out there, and I suspect that for some of them, a seed is sown somewhere in the Ministry of Defence or in our Armed Forces.



HOUSE OF COMMONS

Air Marshal Knighton: On Carrier Strike itself, one of the keys points—to go back to the very first questions from Mr Bacon—is that to deliver a credible capability from Carrier Strike, you need to have all the components in place. If you do not have some of them, you will be compromised. That is why we are managing it as a whole programme and why we need to move forward as a whole programme. Taking bits or components out will undermine the programme and the value for money.

Q74 **Chair:** Indeed—you have said it. That is one of the concerns that we have had all the way through, as you know from the Committee. I know that the Defence Committee has concerns as well.

Sir Simon, if Carrier Strike is fully delivered, can you afford the wider capability with everything else that is currently on the table?

Sir Simon Bollom: That is a difficult question for me to answer because I turn to my colleague, Rich Knighton—

Chair: From your perspective and then I will go to the others.

Sir Simon Bollom: I will give you some assurance now that the budget is allocated for me to place contracts to provide support. I am never comfortable with a budget, but in terms of sustaining the elements of the carrier task group I do not have any major concerns at this time. One of the things that we will get from the first deployment—CSG21— is the learning that we need. The carriers are, of course, very new. The material state of them is improving—similarly, with the Type 45 as well—but in terms of deploying them as a task group it will stretch our lines of communication and our ability to support those task groups. We will build that experience as we go through, and do the best that we can within the budget.

Q75 **Chair:** I appreciate you saying that it will stretch it. Sir Stephen, we know that it does not take much to stretch this, does it? It is pretty stretched already.

Sir Stephen Lovegrove: I guess we have had versions of this conversation—

Chair: It feels a bit like groundhog day.

Sir Stephen Lovegrove: It does feel a tiny bit like groundhog day. It is no secret, nor have we ever tried to disguise the fact, that the defence budget is under very considerable pressure. That has been the case for quite a long period of time. There is a variety of reasons for that. Some of the previous integrated reviews or SDSRs were very fully specified without necessarily having the funding associated with them. There has been optimism bias and, in particular—this is something that we have discussed at great length in the past—much of it has historically been predicated on efficiency targets that have been very, very ambitious and ultimately impossible to execute. In fact, currently we have £26 billion worth of efficiencies that we know we are going to get in the next 10 years, but we need to find another £9 billion.



HOUSE OF COMMONS

Even that leaves us a bit short, so the task for this integrated review, and the task that all of us and many other colleagues in the Department are engaged in, is to have a balanced review that gets the equipment programme and the outputs back into a degree of equilibrium with the finances that we have to deliver them. That is what it is all about. I hope that that is what we get.

Chair: They haven't been for some time. Sir Stephen, you have just laid out your tasks ahead. It is a good moment, I think, to bring in Mr Nick Smith.

Q76 Nick Smith: None of us wants to lose the battle for the want of a nail, so I have to press you, Sir Simon. I understand that in November 2019 Air Command postponed buying a second Lightning II deployment spares pack for one year on affordability grounds. Have you established the level of spares that you need to operate all elements of the Carrier Strike group, and do you have the funding necessary to provide it in the future? Do we have enough nails?

Sir Simon Bollom: My judgment is that, as I said earlier, it is going to be tight. One of the issues that we will face that we have not thus far is deploying the aircraft in the maritime environment. That puts additional stresses on the aircraft. It means that in terms of stockpiles, you have to have a very carefully worked strategy as to where you are actually going to resupply the task group.

My judgment at the moment is that it will be tight, but we will manage the risk. One of the benefits of working alongside a sister service with the US Marine Corps is that we will be able to share that risk to some extent. The question is always, "Would you like more?" Yes, we can always make do with more, but it is a case of optimising the spares buy to what is affordable.

Air Marshal Knighton: To add to that, it is fair to say that over a number of years we have not prioritised investment in support in the way that we should have done. I am on record in front of the Defence Committee and here in front of the Public Accounts Committee as saying that one of my first priorities, should we have more funding available, would be to invest in support. They are not very sexy things—spares and stockpiles—but they enable us to extract the most value out of the assets that we have.

A key factor in our thinking as we go into the integrated review is to make sure that we have appropriate support to enable us to operate our aircraft and other assets on a global scale and to meet the Government's appetite and intent for the UK to be properly engaged right around the world. It is a really important issue that you identify and it is high in our priorities when we think about investment in the future.

Q77 Mr Ellwood: I will turn to the integrated review. On the wider scheme of things, you touched on the importance of Carrier Strike capability. It is interesting that you are willing to focus on that, perhaps at the cost of other things. Can you elaborate on how you see the aircraft carrier being



HOUSE OF COMMONS

utilised? Have you been given any instruction or direction to say, "We anticipate greater focus in the South China Sea, in the middle-east, near HMS Jufair"? Have you been given any instruction as to where it will fit in the next 10 to 15 years?

Sir Stephen Lovegrove: Precise details about that, obviously, are not really, I guess, for airing in this Committee, but we have been given a clear instruction by the Prime Minister that he expects defence to be more actively deployed and working in a greater number of situations in more places around the world to make sure that we are playing our full part in promoting British values of all types. The carriers will be an important part of that. The CSG21 going, as it does, right through the Gulf and Indian Ocean and into the Pacific is a good example of that. Exactly how that plays out in future years, I do not know, but I think you can expect to see more people with more assets doing more things more of the time in defence in the coming years, and the carrier will be a big part of that.

Q78 **Mr Ellwood:** Would you also agree that the surface fleet—our maritime presence—is going to be ever more important, given that we will want to develop new market opportunities post Brexit in other parts of the world and that there is a growing threat, if you like, of interest from Russia and China as they expand their interests as well? Have you made that case to the Treasury to say that if they want to secure those prosperity lines and new opportunities, they will have to increase the size of our Navy?

Sir Stephen Lovegrove: We have made those arguments, yes.

Q79 **Mr Ellwood:** What was their response?

Sir Stephen Lovegrove: They are considering those arguments at the moment, I think.

Chair: We are endlessly waiting for the strategic defence review. I will bring in Sir Geoffrey Clifton-Brown.

Q80 **Sir Geoffrey Clifton-Brown:** Sir Simon, the report makes it clear that the aircraft carriers will need to be refurbished every six years. Have you purchased the capability to do that and will that be at Glen Mallan or at Portsmouth, possibly via a dry dock?

Sir Simon Bollom: We have thought about that. At the moment, I think there are five capabilities in the UK of sufficient size to accept the carrier. It is about a six-week maintenance period, as you rightly say, every six years. Our plan at the moment is probably to put it out to competition.

Q81 **Sir Geoffrey Clifton-Brown:** When is that going to happen?

Sir Simon Bollom: It is six years into the—

Sir Geoffrey Clifton-Brown: I did not mean when the maintenance will happen, but when you will put it out to competitive tender.

Sir Simon Bollom: Not for several years yet. To be clear, we will do that on a case-by-case basis.



HOUSE OF COMMONS

Q82 Sir Geoffrey Clifton-Brown: But we know it is going to happen in six years' time. Presumably those things do not happen in five minutes.

Sir Simon Bollom: No, but we do have facilities in the UK—I think it is five, as I said—where we can do that.

Q83 Sir Geoffrey Clifton-Brown: On the basis that the aircraft carriers might, in some circumstances, be operated independently of our allies—I am thinking of a Falklands-type situation—why are we not thinking about purchasing any air refuelling for our Lightning jets?

Sir Simon Bollom: I would probably defer to Air Marshal Knighton's earlier answer.

Sir Geoffrey Clifton-Brown: Sir Stephen, or Air Marshal Knighton?

Air Marshal Knighton: Forgive me—I think you may have been out of the room when I answered the question about air-to-air refuelling.

Q84 Sir Geoffrey Clifton-Brown: I am sorry—I probably was. If you have answered it, fine. We'll move on.

It has been mentioned during this hearing—you said this to Tobias—that we will be seeking increasingly to manufacture our own weapons systems. How will that work regarding interoperability with American Lightning jets on our own ships if they have different weapons systems?

Air Marshal Knighton: That is exactly the situation we will face when we deploy on Carrier Strike group 21. There are some specific weapons that will be for the US deployment that will sit in the magazine alongside the UK weapons. The advantage of it being a multinational programme is that once a weapon is cleared on to the aircraft, it is cleared effectively on all aircraft, whichever nation owns them. That provides us with a degree of flexibility when we think forward into an operational scenario. It also provides an opportunity for British weapons that are cleared on F-35s to be sold to other F-35 users, and potentially opens up a market for them as well.

Q85 Sir Geoffrey Clifton-Brown: I get the flexibility argument, but coming back to Nick Smith's question about spares, does it not make logistics and spares very much more difficult if you have different weapons systems for two different types of aircraft?

Air Marshal Knighton: Forgive me—I am not sure I quite understand the question.

Q86 Sir Geoffrey Clifton-Brown: Well, if you have an American weapons system on some of the Lightnings and a British weapons system on British Lightnings on the same aircraft carriers, does that not make the logistics of that operation far more difficult?

Air Marshal Knighton: Not particularly. As I say, that is exactly the model we are going to employ for Carrier Strike group 21. The magazine is large enough to hold the weapons that we require. We have done a lot of work over the last two or three years to get US weapons cleared into the



HOUSE OF COMMONS

UK magazine. That has not been without its challenges, but when it comes to the deployment, we do not anticipate any difficulties at all.

Q87 Sir Geoffrey Clifton-Brown: Right. Finally, you said that the aim of these aircraft carriers is to put them as close as possible to threat. You can keep them safer by keeping them away from the threat, and given all that we have heard today regarding numbers of jets, radar, support ships and ISTAR capability, when will we be in a position to be able to deploy these aircraft carriers in the maximum sensible area of threat?

Air Marshal Knighton: Once we reach initial operating capability at the end of the year—

Q88 Sir Geoffrey Clifton-Brown: That's in 2023. But you still will not have a full suite of support ships and capability by 2023, will you?

Air Marshal Knighton: That is correct. We will not have the Fleet Solid Support ships in service by that stage, but we will be able to deliver a carrier strike capability. As I described earlier, exactly as the question was asked, only having RFA Fort Victoria will affect our flexibility and the scheme of manoeuvre. We will have to think about how we support those deployments with spares and where we put them. But I am confident that when we reach the initial operating capability at the end of the year, should the Government decide it wanted to deploy the carrier in an operational role to deliver lethal force on behalf of the United Kingdom, it would be able to do that.

Q89 Sir Geoffrey Clifton-Brown: So you would be able to get to the optimum areas of threat in 2023. Would that be dependent on allies, or would we be able to do it in an independent situation like the Falklands?

Air Marshal Knighton: We could definitely do it in circumstances like the Falklands. More generally, we would expect most of our operations in the future to be done in some form of coalition. The operational design and laydown of the forces will be dependent on who the allies are and what the particular task is. But if your question is specifically, "Could we deploy the carrier and operate it in the south Atlantic?", without question we could.

Q90 Sir Geoffrey Clifton-Brown: Refining the question—if it were a peer-to-peer adversary, would we still be able to deploy those aircraft carriers in the maximum area of threat that we would like to be able to under any circumstances?

Air Marshal Knighton: My judgment would be that if we were about to find ourselves in a peer-on-peer conflict, we would definitely be doing that with allies, and our war gaming and our planning work on the assumption that we will work together with our allies to protect our high-value assets and deliver the kind of operational punch that is going to be required in those kinds of circumstances.

Q91 Sir Bernard Jenkin: It is ironic that these last questions are so germane. We are interested in bang for buck. What kind of cost-benefit analysis does the Department do to work out how much more optimal this capability could be if we had onboard refuelling capability so that we could



extend the range of the aircraft to make up for the fact that the carrier itself cannot be put in such harm's way? We could extend the range of the aircraft with carrier onboard refuelling, and the same goes for carrier onboard long-range radar, which we had on the FA2 in the Falklands, by the way, almost by accident and which became such an essential component of the whole fleet's defence. How do you do the cost-benefit analysis to work out whether those add-ons are actually worth much more than some of the fixed costs that we are adding to the programme anyway?

Air Marshal Knighton: I will answer part of that and I will invite Charlie Pate to comment as the chair of the investment approvals committee. We describe them as balance-of-investment judgments, so we are trying to decide where we should invest in order to deliver an output, an outcome, that defence wants, and we run a whole range of mechanisms by which we might do that. We might run a combined operation evaluation and investment appraisal. We might run a mechanism called multi-criteria decision analysis, which is quite a useful technique for us to be able to identify the relative importance and value in terms of an output or an increase in capability against a specific cost. We will apply those techniques at different points in the lifecycle. Multi-criteria decision analysis is particularly useful when you are making broad balance-of-investment judgments. We have been through two cycles of that in 2018 and 2019 to inform our thinking around the Modernising Defence Programme priorities and in what we thought was going to be spending review 2019, which then did not happen. And those enable us to compare, as a colleague of mine used to describe it, apples and Tuesdays by trying to provide a common assessment of the relative value that you get. The advantage of that methodology is that it is about relative value and then cost.

When it comes to investment approvals, cost-benefit analysis will be undertaken as part of that investment appraisal, but Charlie Pate might want to comment on that.

Charlie Pate: All I would add is that yes, we do that analysis, but, unlike most other Departments, where it is primarily financial and economic, ours is based more on the risk and the threat and the effect that that investment will have against us helping to treat that risk. That is how we look at those and we prioritise in the way the air marshal has described.

Sir Stephen Lovegrove: I just want to amplify Mr Pate's point. If it was absolutely clear and straightforward and stable that the range of risks that faced the country and our citizens was going to be the same all the time, multi-criteria decision analysis would be all you needed to do, but the reality is that the risk changes all the time, the nature of the threat changes all the time.

Even in my time in the Department, the kinds of capabilities that we need to fight in the grey zone on a constant basis, sometimes unacknowledged, have risen a long way up the MCDA, and that will just continue to happen.



HOUSE OF COMMONS

Every judgment is ultimately exactly that: a judgment. We can try and make it as empirically well founded as we can—

Chair: And we will help you do that.

Sir Stephen Lovegrove: You indeed do help us do that, and debate of this type is extremely important for us, but it is a question of which threats you are seeking to protect against, and that is ultimately a question of policy as much as anything else.

Chair: Absolutely. I think, Sir Stephen, you have helpfully—for yourself—laid out the challenge to your political masters on that, and we know that part of your appearance today is no doubt putting in your word for the SDSR and the spending review. We know as a Committee how frustrated we are that the spending review has not taken place, and in this particular area of spending it is absolutely vital that both take place as soon as possible. I know I speak for the Committee on that. It is not a party political point; it is just practically what we have got to get on with.

I thank you very much indeed for your time, and for appearing in front of us in person. We look forward to a private briefing on the jets; we have had it before, but it will be particularly useful for new members of the Committee, and for those of us who have served before, it will be a good update.