



HOUSE OF LORDS

# International Relations and Defence Committee

## Corrected oral evidence: The UK's future relationship with the US

Wednesday 29 October 2025

10.30 am

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Members present: Lord De Mauley (The Chair); Lord Alderdice; Baroness Blackstone; Lord Bruce of Bennachie; Baroness Coussins; Baroness Crawley; Lord Darroch of Kew; Baroness Fraser of Cragmaddie; Lord Grocott; Lord Houghton of Richmond; Baroness Morris of Bolton; Lord Robertson of Port Ellen; Lord Soames of Fletching.

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Questions 182 - 195

### Witnesses

I: Dr Sophy Antrobus, Fellow of the Royal Aeronautical Society and Co-Director, Freeman Air and Space Institute, King's College London; Dr Justin Bronk, Senior Research Fellow for Airpower and Technology, Royal United Services Institute (RUSI).

## Examination of witnesses

Dr Sophy Antrobus and Dr Justin Bronk.

**The Chair:** Good morning. Thank you so much for joining us. We have with us Dr Sophy Antrobus, who is a co-director of the Freeman Air and Space Institute at King's College London and a fellow of the Royal Aeronautical Society, on whose behalf she is speaking; and Professor Justin Bronk, who is a senior research fellow in airpower and technology at the Royal United Services Institute.

This session is public and will last about an hour. We are live. I remind members that, if they have any relevant interests, they should declare them when first speaking. I also draw our witnesses' attention to the fact that there may be Divisions; if there are, we will suspend for 10 minutes then start again, if that is all right by you. Perhaps you would both like briefly to introduce yourselves, to the extent that I have not already done so; we will then plunge in with questions.

**Dr Sophy Antrobus:** As you said, I am here as a fellow of the Royal Aeronautical Society; I was formerly on its council and chaired its Learned Society Board. I am also a co-director of and a senior research fellow at the Freeman Air and Space Institute at King's College London. I have been there for five years. If it is relevant—it potentially could be—I served in the Royal Air Force for 20 years as an air operations officer before that.

**Dr Justin Bronk:** I am the airpower lead at the think tank RUSI; I have been there for about 12 years. I should state as a corrective that, because of a departmental change in Norway, I am currently back to associate professor, so it should be "doctor" rather than "professor" in my title.

**The Chair:** I am sure that your evidence will be just as valuable.

**Dr Justin Bronk:** Thank you.

Q182 **The Chair:** I will kick off. How do you assess the level of UK-US collaboration on the F-35 programme? In particular, how does the UK's level 1 partner status shape its influence on the programme? Let me tack something on to that. What mechanisms exist for the UK to hold the US accountable for delivery schedules, cost overruns or technical issues? How effective are those in practice?

**Dr Sophy Antrobus:** To start, I should probably make it clear that the level 1 partnership was for the systems development and demonstration part of the programme. That is no longer in existence. We are now equal partners in the production and in-service phases.

That said, generally speaking, the view is that we were the only level 1 partner early on in the programme—and that we were investing quite a lot of money in the programme early on—has had a lasting effect. Although we do not have that status any more, it still contributes to our

standing. As one person put it to me, "Don't underestimate the significance of that".

We leveraged early advantage through that, bringing the intelligent customer to the table. As a result, as you may know, 15% of F-35 aircraft are produced in this country. You will be aware of the industrial benefits as in the NAO report: from £11 billion of MoD spending, £22 billion has come back in industrial benefits and investment. So, although it does not exist now, foreign military sales customers are coming on board and there is a continual dilution of influence, the fact that we were in there at the beginning still has a lasting effect. In fact, I am aware that, on the steering groups over in DC, the voting goes: United States Air Force, because it has the most; US Navy; US Marine Corps; and then the UK. We are the next one to vote around the table of the partner nations. Again, that might seem trivial or minor, but it is relevant.

On how to keep it accountable, if you read the Government Accountability Office's September report, the US Government have a lot of problems in trying to keep the programme on time and delivering. It is not. In 2024, none of the aircraft were delivered on time and the average delay was 238 days. The US Government have difficulty in holding the programme to account; obviously, the UK will be no more influential in that case. What is important is the embedding of MoD personnel in the Joint Program Office in Washington DC. At the last count, we have 38 out of 2,000. That continued role in the JPO has been important. That is our best route for influence at the various levels of steering groups.

**Dr Justin Bronk:** It is worth bearing in mind that, as Dr Antrobus said, the tier 1 partner status applied during the development process of the aircraft, which is now complete. That status was partly a result of the UK being able to bring—among the programme's other partners—unique technology expertise and IP to the programme. It was also predicated on the fact that, at the time, we were buying by far the largest number of aircraft. We were going to order 138; we currently have around 40, with 48 purchased and an intent to buy another 27 at least inked.

In the interim, you have seen Italy say that it wishes to get all 131. Japan is now by far the largest customer. Norway, the Netherlands, Australia, and several other countries operate more jets than we do. It is notable that where we have influence, as Dr Antrobus rightly says, it tends to be mostly structural within the programme. Unfortunately, our participation in a lot of practical areas has fallen significantly short of where our initial programme commitments were and where our rhetoric and assumed position would tend to place us. There is significant American awareness of that, even if they are quite polite about it in official communications. It is worth bearing that in mind.

On the positive side, there is significant differentiation in some of the most sensitive areas of the weapons system between the United States and the rest of the partners but also between the United States, Australia and the UK as the second tier of greatest access. That is run through the ACURL, whose acronym stands for the Australia Canada—because Canada

was assumed to be part of it—United Kingdom Reprogramming Laboratory. It is in the United States and is, in essence, where the UK and Australia can modify and create their own mission data loads, electronic warfare files and other things to a significantly greater extent than is allowed for other partner nations—including partner nations that have relatively high access to the ability to tinker with the software. Italy, the Netherlands and Norway, for example, have their own reprogramming lab, but it does not have the same level of access.

Within that ACURL construct, it is notable that Australia is increasingly significantly competing with the UK for the most preferred partner spot. Not only does it have 72 aircraft at the moment—significantly more than us—but it also flies them nearly twice as much. It is a key US partner in the Indo-Pacific all the time, whereas we periodically take an aircraft carrier across with a small number of much less capable B-model aircraft. Australia has that very close link. That is where we also compete—not necessarily always terribly well—for things such as the ability to integrate our weapons as a priority compared to weapons that, for example, Australia would like to have integrated as a priority, which tend to be Indo-Pacific weapons requirements that the US sees more commonality with.

**Q183 Lord Soames of Fletching:** Professor Bronk, in the first instance, how effectively are the UK and US aeroplanes integrated together? What lessons are there in that for other defence co-operation and operations?

**Dr Justin Bronk:** At the tactical level, UK and US aircraft are well interoperable when they do co-operate, but, again, it is notable that the vast bulk of the operations alongside which we fly with the United States are when its F-35s—that is, US Air Force F-35As—are around. We interoperate with the US Navy and the US Marine Corps when we can, and there has sometimes been cross-decking with the US Marine Corps on the Queen Elizabeth-class carriers; that has been very close co-operation.

They are interoperable in that sense, but there is a split between the different US services that we try to maintain close links with. The precise degree to which we can co-operate, either seamlessly or with some seams, day to day will vary a bit between the different services. Where it is not the B model, we are, of course, bound by different weapons and range restrictions than the US Air Force A models, for example—or, indeed, any other F-35s in Europe. That is with the exception of the small number of F-35Bs in Italy. Other European users, again, would be F-35As, so, from a COMAO—composite air operations—planning standpoint, they would be more interoperable or interchangeable with US models than the existing Bs.

**Dr Sophie Antrobus:** Professor Bronk has said pretty much everything I would have said. I would only add that there is an interesting additional factor in the UK space: because we are learning to operate this aircraft from both land and the maritime carrier environment, there is an additional layer of interoperability within the UK. It is worth bearing that

in mind, as well as working with the other militaries. I emphasise Justin's point about the range issues and the differences between the Bs and the As. There is some evidence to suggest that the F-35As—the US ones based in this country—operate more comfortably with As from, say, the Netherlands.

Q184 **Lord Robertson of Port Ellen:** I declare an interest inasmuch as I am the senior counsel with the Cohen Group in Washington. I want to explore the successor to the F-35. Inevitably, the Americans are clearly working on a successor. Why do you think that we have decided to go for GCAP at huge expense and not wait for an American successor to the F-35?

**Dr Justin Bronk:** The next generation of combat aircraft that the American system is currently pursuing in terms of development—it is now called the F47; it was previously called Next Generation Air Dominance—is or was intended to be a successor to the F22. It is very specifically in the air dominance role, as they would say—we would probably say the air superiority role—whereas the F-35 was always intended to be a multi-role, relatively universal fifth-generation aircraft. Similarly, if the US Navy's F/A-XX programme goes ahead, that will be nominally to replace the F18 Super Hornet rather than the F-35 specifically.

The main reason why I think the UK has chosen to push heavily towards GCAP as a route for next generation combat air, rather than relying on the US, is that, first and foremost, there is a desire among successive Governments to keep the UK in the sovereign industrial combat aircraft manufacturing and development game. You have to keep giving your designers, integration engineers and industrial pipeline work, otherwise it will not continue to operate. Within the F-35 programme, although it is absolutely true that we have gained huge national profit from it in terms of the work share that we achieved, that was partly off the back of having a lot of intellectual property from previous combat aircraft development that we have done nationally, which we could use to buy into the programme. There is a desire to keep BAE Systems, Rolls-Royce, our military engine manufacturing and all of the other parts of the ecosystem going.

Secondly, at the time when the GCAP decision was made, the NGAD programme, as it then was, was very much up for debate. It was on again, off again, depending on which bit of the US budget cycle you looked at, because it is very expensive. The US's fighter programme is completely unaffordable on its own sums.

It has also become fairly clear, when you look at some of the requirements—you can see them in outline in the open source—that the F47 will be a phenomenally expensive aeroplane. It has been designed for a combat radius of roughly 1,000 nautical miles, as compared to around 550 to 600 miles for an F-35. This means that it will have to carry all of its fuel and weapons—and a huge amount of them—internally as a stealth aircraft, which means that the aircraft will be huge as compared to something like the F-35.

One of the best predictors of operating cost and acquisition cost is maximum take-off weight. If you want it to be stealthy and supersonic, you can shift the curve up, but something heavy will inherently be more expensive to operate and build. You are probably looking at around \$310 million to \$350 million a tail, and around \$200,000 an hour to fly, at a baseline. For a country in Europe that does not necessarily have the same range requirements because there is a lot of tarmac, there are a lot of places to refuel and there are a lot of places to fly out of—also, Russia does not, at least currently, pose anything like the same long-range counter air threats that China does—it probably would not make sense to buy into something like the F-47, even if we were allowed to by the Americans. Our current problem is as much a lack of combat mass as it is a lack of capability in those individual platforms, so doubling down further on what would be for us a minute fleet of incredibly complicated aeroplanes, albeit very capable ones, probably was not the way to go.

Thirdly, GCAP has acquired a lot of additional political emphasis since January because of the extremely divergent policies of the second Trump Administration, particularly over Russia and European security but, let us be honest, on a whole range of things. This has complicated the immediate term of defence planning. Of course, close interoperability and co-operation with the Americans remains essential for our security, but, in the medium to long term, for programmes like GCAP, it has become politically much harder to argue against the need to invest in European capability at a high end, with less reliance on the Americans.

**Lord Robertson of Port Ellen:** Even setting aside the cost issues, the reality is that the Americans are not willing to share the technology for the successor, the F47?

**Dr Justin Bronk:** As Donald Trump himself said, “We might share a 10% degraded one at a bit of a mark-up”. He is remarkable for saying the quiet part out loud. Fundamentally, based on what I would assume the rough configuration of the F47, the only export customer in the F-35 programme for whom it would currently make a great deal of operational sense is Australia, because it has the security relationship, which we also do, potentially to be allowed to buy into the programme; also, geographically, the range is a lot more attractive for them than it would be for us.

**Dr Sophy Antrobus:** Because the F-35 programme has been established for such a long time, we are all interwoven into it as partner nations. You cannot really unpick it without the entire system failing. As Professor Bronk pointed out, starting at the beginning of the programme, with the uncertainty that we have with the US Administration going forward—and whichever Administration are now looking towards the Indo-Pacific and not so much towards the European area—we are in a different geopolitical context. You are all well aware of that more than me, I guess. It does not make sense. It makes much more sense to do something ourselves.

Q185 **Baroness Blackstone:** I want to turn to NATO and ask Professor Bronk

this: does the interoperability of the F-35 between the US and UK enhance NATO's capabilities? If it did not exist, what would be the pros and cons, and what would other members of NATO make of that?

**Dr Justin Bronk:** The F-35 absolutely enhances NATO interoperability, not just between the US and other NATO members but also within European NATO because the F-35 interoperates extremely well with other F-35s.

The tactics that you would use to enhance the capability of more traditional aircraft vary depending on what relay capabilities you have and how much access you have to the F-35 programme. However, broadly speaking, not only do different F-35s from different air forces in Europe interoperate very easily; their presence also greatly enhances the capability, even if they are not closely linked to other aircraft in a strike package. A few F-35s can hugely increase the survivability and lethality of other multinational, more traditional non-stealth aircraft, particularly in high-threat environments.

If you wanted to look at an alternative where the F-35 did not exist and what that might look like, I would suggest that France and Sweden are the obvious places to look; they are both countries that would not buy an American weapons system for domestic industrial reasons and political reasons. Both of them have arguably managed to maintain a greater, proportionally speaking—or, in the French case, just a greater—number of combat aircraft for a given comparable spend per person or per size. In that sense, they have greater combat mass without the F-35. On the other hand, what they do not have is any serious ability to penetrate highly defended airspace, such as you would see on NATO's eastern flank, in a conflict directly with Russian forces.

From a European industrial point of view, unfortunately, there is no current equivalent to the F-35 and no replacement for it either. Without F-35s in the mix, the already tactically constrained things that you can do with fourth-generation or advanced fourth-generation fighter aircraft—the Typhoon, Rafale or Gripen—would be significantly more constrained. It is programmatically problematic for a whole host of reasons: delays, cost overruns and governance mechanisms. There are lots of things that we would potentially wish were different, but, in terms of a combat-capable asset—before you get to the delayed Block 4, or what used to be called Block 4, capabilities—it is still in a completely different league of capability to any other combat aircraft operated in Europe.

**Baroness Blackstone:** Do you want to add anything, Dr Antrobus?

**Dr Sophy Antrobus:** I support everything that Professor Bronk said, but I would reiterate that it is about NATO interoperability and other partner nations, rather than being US-UK specific. By the 2030s, we will have about 700 F-35s around Europe, but only two squadrons will be US ones. The bigger picture is cross-NATO, cross-partner interoperability, not just with the US. It comes with the deal, as it were, but it is the capability that F-35 has across all of the nations that own it that is important.

**Q186 Baroness Crawley:** Dr Antrobus, you spoke about the UK being interwoven with the F-35 programme. My question is about the risks and constraints of that interoperability. How might factors such as—to put it politely—the evolving US defence priorities, industrial dependencies and technological changes affect the UK’s operational independence and strategic flexibility? To add to that, what do you think about the soft kill switch theory, which could be a denial of UK function over time?

**Dr Sophy Antrobus:** On your first point—as you said, I mentioned this earlier—if any partner nation pulls out of the system, it will not work properly. Its interwoven nature means that it is not in any nation’s interest, including the US, to limit or ring-fence bits of the programme. It works better with us all working together, coming back to the earlier point.

As Professor Bronk said in answer to an earlier question, there is the area around weapons, where we have decided to decouple from the F-35 programme in terms of developing UK-specific weapons: SPEAR 3 and Meteor. The priority in Washington DC, to your point about numbers and the lack of commitment to the 138 and so on, pushes us a bit further down the pile. There are problems or potential risks with that, partly because of the way in which we as a nation have behaved over the numbers issue.

On the kill switch, I was at a fascinating NATO-Ukraine conference in Stockholm only a few weeks ago. There was a presentation by an excellent Greek academic. He was talking about a particular thing: I will get my numbers wrong, but F22 is about 2 million lines of code whereas F-35 is about 9 million lines of code. It is a software system and hardware. He made the point that there are so many different organisations, contractors and institutions involved that it does not have to be a nefarious US Government; it could just be an incompetent individual who could—

**Baroness Crawley:** Accidental.

**Dr Sophy Antrobus:** Yes. He said that, when you buy an F-35 or anything that is that software-dependent, essentially, you are taking the risk that something can go wrong. Worrying about it being the US Administration versus anything else is potentially not as big a deal as some have made out. I found that a very interesting and quite compelling argument.

**Dr Justin Bronk:** I will add a couple of things. First, I agree completely that the software complexity adds potential risk. It is worth remembering, though, that the US operational test and evaluation ecosystem is the best in the world. That is part of the reason why everything takes so long: there is exhaustive testing and evaluation. Even what would be considered pretty minor faults in any other context—because it is a combat aircraft, it has to work every time—generate additional follow-up work. That is partly why you have seen consistent programme delays over its history: these things are exhaustively tested



and the bugs demand to be worked through, rather than deferred. Then the UK conducts its own OT&E when we get the aircraft, which adds additional potential time delay but also adds significant layers of safeguarding for some areas of risk—where one can, at least.

Secondly, if one were making policy based on concern about a soft kill switch—a hard kill switch does not exist as far as I have been able to gather—it would be an enormous vulnerability of the aircraft itself for US use if you were to embed one because, if an adversary were to discover it, that would be a huge cyber vulnerability for their own forces. A soft kill switch, if they were to remove access to the maintenance backbone—the software backbone—could theoretically make it very difficult to continue to operate the fleet in the medium term. Of course, in a scenario where the US was trying to stop us using our aircraft for our own defence purposes, it would also presumably not allow us to use its orbital command and control or its electronic warfare assistance. It would not be resupplying our munitions. It would not be doing a whole host of things, without which, quite frankly, we cannot fight any serious conflict.

We are so militarily dependent on the United States that concerns over a scenario in which it actively tries to stop us fighting completely miss the point of where our priorities should be. I suggest that our priority should be to look at the key areas of our collective European security requirements where we rely not just on American tacit support or enablement but on America doing our fighting for us—of which there are quite a few—such as the suppression and destruction of Russian air defences.

For example, in a scenario along the lines of the Falklands, where the US was willing to enable and quietly do munitions resupply and assist with training and basing but was not willing to do our fighting for us, at the moment, we would have a great deal of trouble in establishing any air superiority at all. Those gaps are significantly easier and quicker to fill than attempting to create some ability to fight while America is trying to stop us, which I would suggest is impossible—within a decade, at least.

**Q187 Baroness Coussins:** Thinking about risk more broadly, I appreciate that you cannot go into legal detail but can you comment on the recently reported challenge to the UK by CND that our purchase of F-35As with their nuclear capability puts the UK in breach of the non-proliferation treaty?

**Dr Justin Bronk:** I will jump in briefly. First, we have signed an intent to purchase the F-35A. Unless the argument is that every F-35A customer in the world is in breach of the non-proliferation treaty because the aircraft is hypothetically capable of delivering the B61-12—the American nuclear weapon—if the Americans enable it with permissive action links and everything else, I do not think that that argument holds.

If we proceed and with joining the NATO nuclear sharing agreement alongside Germany, the Netherlands, Italy, Turkey and Belgium, at that point, we would be committing to maintaining the capability to be handed

the right to deliver American nuclear weapons in extremis and in war, subject to US presidential authorisation. However, until that authorisation occurred, those weapons would remain American weapons under American custody on American property, presumably either at Lakenheath, where they currently are for the US, or, potentially, at Marham if we built nuclear weapons storage there for the Americans to use.

It is my understanding—I am not a specialist in NPT law—that, certainly based on all previous nuclear sharing agreements and the existing NATO nuclear sharing agreements for other nations, those weapons remain American until they are handed over in case of war. So I do not think that it would violate, as far as I understand things, the NPT commitments.

**Baroness Coussins:** Dr Antrobus, is there anything to add?

**Dr Sophy Antrobus:** Not really—apart from that, if they were handed over at times of war, essentially, a US or European commander would hand them over to the Supreme Allied Commander Europe, which is the same person at the moment; it is a US general. I do not even think that they would technically be handed over to the UK specifically in that scenario.

**Dr Justin Bronk:** It would probably be in UK custody for delivery by a UK person, but you are right that it would be under SAC Europe.

**Dr Sophy Antrobus:** We are getting into the legalities but, yes, it would be a NATO declared mission rather than a UK mission specifically.

Q188 **Lord Bruce of Bennachie:** You have indicated how costly and complicated these things are. You have implied, or even stated, that no country is capable of doing it by themselves—not even the Americans. What is the alternative to continuing in this programme? For example, is there scope for us to divert some of our resources into another programme? Is the programme with Japan appropriate? We obviously cannot build our own fighter plane by ourselves. Once we have decided that we have a potential problem with the Americans' trustworthiness, or the possibility of them restricting what we can do, I am not clear on the practical alternatives for what we can do. Is it another programme that we do not have? Is it reprioritising the programmes that we do have? What can we do?

**Dr Sophy Antrobus:** In my view, there is not an equivalent alternative; Professor Bronk made that point quite well. If we did not have the F-35 programme, we would not have a fifth-generation aircraft, end of. If we did not have a fifth-generation aircraft, we would not be learning quite a lot that is helping us in the development of a sixth-generation aircraft in the Global Combat Air Programme. You referred to France and Sweden. Essentially, we would step back into being a different level of contributor to NATO and to deterrence in general. We would have to make the decision that we wanted to be a much lower-tier nation; that is clearly a political decision. There is not an alternative equivalent. We either go

forward and continue to support the F-35 programme—and, at the moment, look forward to GCAP—or we decide to take a completely different posture in our national defence. That is my view.

**Dr Justin Bronk:** I would caveat it, or I would suggest thinking about it in terms of periods of risk. Say you are looking at the acute period of risk of a significant war between European nations and Russia over the coming five years or so; I suggest that that is something about which we need to be very concerned. Look at the current, extreme mismatch between European rearmament and Russian military production and force expansion: the force engaged against Ukraine is currently more than three times the size it was at the start of the invasion in February 2022, for example, despite slightly over 1.2 million casualties in the interim. Given that we are contemplating further cuts to our own Armed Forces and they were not sufficient to begin with, it is a rather extraordinary state of affairs.

However, in that period of risk, the focus needs to be on filling in as many gaps as possible as fast as possible, particularly in key munitions and enablers, in order to reduce our dependence on America coming to save us in an acute crisis and to increase our ability to fight as part of a predominantly European-led NATO force, if required, against Russia.

In the late 2030s and onwards, which is when GCAP will, if it comes in on target, be aiming to deliver initial operational capability from around 2035 onwards—that is quite ambitious but it is the target, particularly from Japan—at that point, it should give us scope to build out a considerably more balanced force, particularly if defence spending does rise according to government commitments to 3%-ish by the end of the decade and, potentially, 3.5% in the years following that.

There should also be sufficient money to be put towards, assuming we wish to do so, large capital programmes such as Main Gate, the production of the core fighter at the heart of GCAP and other parts of that programme, plus things such as AUKUS and next gen submarines. However, that assumes that those rises in defence spending will continue and that we will avoid a major war in the interim; if we do not, all bets are off.

For GCAP, the fundamental position needs to be either do it properly or do not do it at all. Thus it would be a mistake trying to do it on a shoestring budget, which initially could be read in some of the initial pitches for it—much less now. Now that there are commitments to go to 3% then 3.5% of GDP—if they materialise, the funding should be there. You need to do this programme properly; that is probably to the tune of £80 billion to £100 billion between the three main partner nations by 2030 or slightly beyond. It is a lot of money. A lot of that will be reinvested back into our own industry, particularly in parts of the country that tend to have relatively little other industry. A lot of that money is going back into our own economy, of course.

The Japanese will be the primary capability driver because they face a much more urgent, higher-end threat from the Chinese than we do from a requirement-driving point of view. The counter air capabilities of the People's Liberation Army today are almost incomparably greater as compared to Russia's. However, that probably does not drive significant convergence from the UK because I would assume that we will have to assume, in our own capability plans for the 2030s and 2040s timeframes, that Chinese technology will proliferate to the Russians.

Therefore, by that 2030 to 2040-ish timeframe, when we would be expecting to be getting Tempest into service, we must expect that we will be facing Russians carrying Chinese weapons, Chinese sensors and, probably, Chinese tactics and training. After all, the decision has already been made by the Russian leadership to be dependent on China from here on out; they made that in February 2022, whether they understood it or not. The integration has only gotten closer since then, so we probably need to continue to see those threats as linked.

The final thing I would add is that, in terms of linking threats, the likelihood of a major war in the coming five years or so—either over Taiwan, in the Indo-Pacific or in eastern Europe against the Russians—is significantly greater if the other one occurs. If, for example, China and the United States end up in a major clash or even a major standoff over Taiwan, the US will pull a significant amount of its capability out of European Central Command and the continental United States.

The Chinese are likely to put pressure on the Russians at that point, to create trouble in eastern Europe in order to split European and, ideally, American attention; the Russians would absolutely love the chance because they will never get a better one than that. Equally, if war breaks out between Russia and NATO forces over Russian aggression against a NATO member, that will inevitably distract at least some American attention and, certainly, European attention. At that point, the Chinese might well decide that they will never get a better chance to go for the unification of Taiwan by force. The problems are significantly interlinked.

**The Chair:** On that cheery note, I turn to Baroness Morris.

Q189 **Baroness Morris of Bolton:** I thank Dr Antrobus and Professor Bronk for that clear and, for me, understandable—if frightening—evidence so far.

Dr Antrobus, at the beginning of our session, you said that the US Government themselves are having difficulty in holding the programme to account. Professor Bronk, you mentioned that UK delivery has not always matched our rhetoric. Given that background, how have disagreements, if there have been any—I do not know whether we would know if there were disagreements—or delays in the F-35 programme affected broader UK-US defence planning and joint operational commitments?

**Dr Sophy Antrobus:** Professor Bronk mentioned the numbers issue: the commitment to 138 but, contractually, only to 48. That wishy-washy, for

want of a better term, or unstable commitment on numbers has not helped our reputation as a partner nation; that is an issue.

It is long in history now and probably no longer having an impact, but the 2010-12 debacle over changing from F-35B to F-35C—an aircraft for a carrier with catapults and arrestor gear—and then back to B had an impact at the time. There are a couple of examples of how the UK has not, despite having that level 1 partner status we started this hearing off talking about, covered itself in glory. Going forward—I speak as a fellow of the society, which would agree on the same—political stability around what our commitment will be would be helpful, if only possibly cross-party although that is clearly very difficult in the current climate, because then we will know what we are dealing with and we can go forward on those grounds.

There are difficulties on both sides—not disagreements exactly but, clearly, the problems they are having over there with Block 3 and the technical refresh overrun will have an impact on us. In a sense, problems with the programme based in the US are impacting on UK capability. Those are some frictions on both sides. I do not think that any of them are critical, but it is worth acknowledging them.

**Dr Justin Bronk:** I agree. The left and right of the arc of possible is probably worth examining when we look at what we blame on the US programme versus what we blame on the way in which the UK has managed its relationship within the F-35 programme. There are some issues, such as delays to what were Block 4 capabilities with the Tech Refresh 3 hardware, which have affected all partner nations. There are, however, plenty of F-35 user nations—ones that come to mind are Norway, the Netherlands and Australia—that have managed to get much more out of their fleets, and a lot more combat capability as well, than the UK has, even though they are dealing with the same programme-wide issues as we are. A lot of the limitations on the UK's fleet capabilities are UK-based and UK-derived rather than necessarily programme-derived.

On the delays and the shortfalls versus where the programme was expected to be by this point, particularly in terms of Block 4 capabilities, based on the latest NAO/GAO reports, things are overrunning by five to six years. It is worth putting that in context, of course: all fighter programmes overrun all the time. We are more than 10 years beyond where we expected to have an e-scan radar on Typhoon, and we still do not. As far as I am aware, we have one flying on a front-line aircraft, with delivery of the 40 radar sets expected sometime in the early 2030s. That is a bit of an indictment of our system, I would say.

The same goes for bandwidth upgrades and such things, which have for a long time been lumped under something called the LTE—the lifetime extension or midlife—upgrade for Typhoon. We have been arguing between the four core Typhoon partner nations for nearly a decade and still have not, as far as I am aware, agreed on timeframes and scope.

The same goes for the Swedes, who are fantastic at delivering things on a budget and as close as possible to sovereign, alongside the French with the Rafale. Gripen E is about seven years late in intended deliveries to the Swedish Air Force. The Rafale is massively late for deliveries to the Armée de l'Air; again, that is back-and-forth responsibility between deferments of in-year spending, as we have done, by the French versus Dassault, with the French Government's agreement, giving export customers delivery licences and slots for Croatia, Serbia or wherever. This is a problem in all fighter aircraft programmes; it is worth bearing that in mind.

The shortfalls in where the UK wanted to be with the programme at this point stem primarily from having bought too few airplanes too slowly and with not enough engineering support, so we have consistently struggled to fly them as much as we intended to. We have also had continually to trade off operational deployments with the Operational Conversion Unit's capacity. In previous years—not with this carrier strike group deployment, which is good—when, for example, we have sent a carrier strike group away for months, it has in essence shut down the production of new pilots at the OCU. We have simply had national ambition for the F-35 maintained far above what we have resourced.

The same is true for Typhoon, by the way. Other nations have been better at maintaining a stable set of ambition versus resourcing and a plan; they have reaped significantly more combat capability as a result.

**Baroness Morris of Bolton:** When you say, “not enough engineering support”, is it that we physically do not have engineers with the capability?

**Dr Justin Bronk:** Mostly, yes. The UK has always had a history of trying to do things in a lean fashion—to be as efficient as possible and find efficiency savings year on year. The problem is that, at a certain point, what you are doing is building in huge fragility, so, whenever you add additional commitments—“We'll just do this exercise or this deployment”—there is no slack in the system and you end up completely overstressing it.

We have a military culture that is admirable in the sense that it produces officers who will bend every spar, as it were, to make things happen when asked. The problem is that, when you do that as a consistent thing and it becomes the assumption of the day-to-day operating tempo, you build in a wasting force as a way of working and it hollows everything out. It is, I suggest, the core problem at the heart of most of the UK Armed Forces' issues: output and ambition have consistently outstripped resourcing.

Q190 **Lord Grocott:** There is a lot of food for thought there; an awful lot of problems were identified in that answer. This question is about lessons learned from the F-35 programme and how it has developed so far, including what it tells us about defence procurement. Bearing in mind that the focus of all of our work is UK-US relations, particularly in the

security field, is this programme seen as a model for relationships between the two countries that could be, not replicated exactly, but could have lessons learned from it in any future procurement programme? Or is it so fraught with problems and difficulties that you would not want to do it again?

**Dr Sophy Antrobus:** We have talked about the divergence in future sixth-generation aircraft capability between the Global Combat Air Programme, with us, Italy and Japan, and the Americans, with the F47. I do not think that there is a similar programme on the cards at the moment.

We can learn quite a lot from it being a truly collaborative programme among partner nations. That is the first time things have been done in this way; there are lessons to be learned for the GCAP from that. Being in the fifth-generation aircraft game means that we are better equipped to look to the sixth-generation aircraft game. We have gained from that; if you like, those are the first lessons. I do not necessarily see that we are learning in order to have similar US-UK collaboration; it is more about collaborations more broadly and other collaborations that we might have. The US-UK point comes back to the question on the F47. The reason why we would not do that is because we are in a different geopolitical situation.

I will come back to weapons because we do have a problem there. There is not a lot of point in having an F-35 that does not have a standoff weapon because all of its stealth capabilities, which make it able to get to a target but stand off far enough to survive, are then moot. I raise that as a lesson learned as well. In whatever programme we take part in going forward, you cannot decouple weapons from an aircraft; that is just mad, frankly.

**Dr Justin Bronk:** One thing with which we have had an issue in terms of weapons—it has had an impact on the UK-US bit of co-operation in the F-35 programme—is that, in many cases, we have been insistent about getting UK weapon requirements on to the aircraft quickly, but then, according to what I have been told by American sources, when those UK weapons have initially arrived for test integration, they have not worked well or they have been defective and late. That has created frustration not only because it adds further delay but because the testing, sorties, allocation and capacity could have been more usefully used for other things. There have been issues with the way in which the UK and MBDA, in particular, have managed the weapons integration on F-35. Of course, there have been plenty of issues from the US Joint Program Office side as well, but that has created friction on both sides.

There are areas where the UK still has a very good level of interoperability and co-operation within the F-35 programme with the US. In particular, there is a respect for the quality of UK pilot training. RAF and Royal Navy F-35 crews are still seen as extremely well trained and very dependable in a multinational planning and operating context. We are still seen as producing very good operators. The UK's ability to

manage security standards is also still seen as very good among our allies. That is partly why you still see the strong “Three Eyes” partnership between the Australians, the UK and the US on ACURL, the reprogramming lab.

There is significant respect in the US system for UK expertise in analysing and doing processing and dissemination work on electromagnetic and signals intelligence, as well as around feeding that in as a joint effort within US-UK collaborative programmes to produce things such as new mission data loads for F-35 and other things. Again, that is helped by the fact that we are a member of the RC-135 Rivet Joint programme—Airseeker R.1 in RAF terminology.

There are areas where we still have unique access and are seen as uniquely valuable among allies, from a US perspective, that relate directly to the F-35. It is just a shame that that is always tempered in the US view: “Of course, it is a shame that you operate the short-range version, have only a free-fall bomb to deploy off it and have such a tiny number”.

**Q191 Baroness Fraser of Craigmaddie:** I want to come on to the lessons learned for supply chains. In this programme, obviously, the supply chains are predominantly managed by the US and its partners, but you mentioned the importance of keeping our own infrastructure, such as BAE Systems and Rolls-Royce. The other thing you mentioned earlier was Italy, Norway and others having their own reprogramming platforms. Is there something to be learned from this programme in terms of where we need to put the emphasis in our procurement and our relationships with industry, both with the big guys and with smaller, innovative software? Should we have our own reprogramming platform?

**Dr Justin Bronk:** On reprogramming specifically, there is the Norwegian-Italian Reprogramming Lab—the NIRL—which I believe the Netherlands may be joining as well. Part of the reason why most countries and most F-35 members do not have a reprogramming lab is that there is a cost premium, and a specialist personnel training and integration premium, in being able to do that work alongside the US from a capacity, permissions and security point of view.

Also, to make it worth doing, you need national collecting and processing capabilities that are sufficiently good to record, for example, the emissions of a Russian surface-to-air missile system radar that has changed the way in which it does its pulse repetition frequencies or whatever. You need to have strategic, or at least operational-level, intelligence, surveillance and reconnaissance assets that pick up data in the real world; notice that it is there among terabytes of other things; notice that it is different; and then download it, quickly and in a relevant fashion, on to an analysis medium of some kind.

You then need to have specialists dig it out and work out what it comes from. It is just a squiggle on a trace at a certain point. You need to work out exactly what radar it comes from; geolocate to where it is; confirm what it is; and work out whether it is just a junk emission designed to



spoof things or whether it is something you actually care about. You then need to work out how to translate that into a new defensive aid system programme so that, once you have loaded this data, when your fighter aircraft—your F-35, let us say—detects that new thing, it will know that it is a certain radar, give you an accurate threat warning and, ideally, do some defensive jamming that is specific to that signal.

That is incredibly difficult work to do. Bear in mind that Russia alone operates more than 40 different military radar systems and they regularly change on a weekly or monthly basis. If you are, for example, a smaller European nation that is buying F-35—let us say, Czechia or Switzerland—it probably does not make any sense to want your own national reprogramming lab because you have no ability to collect the data in anything like a relevant timeframe, let alone producing new mission updates. You are much better off relying on the Americans, who have the best collection and reprogramming capabilities in the world, to do it.

The UK and Australia have, partly because they have deep expertise that they have maintained in that area, made a choice that they want to be able to feed that into creating their own specialised loads for the F-35. For Norway, the Netherlands, potentially, and Italy, there is less capability there but there is some; they want to pay for it and develop the expertise. However, it is still a fraction of what the US can do, and most of what they are building will rely on US building blocks for, for example, threat libraries.

There is a danger of chasing meaningless sovereignty. As the old saying goes, the man in the desert on his own is sovereign but it does not do him much good. What do you want sovereignty for? Sovereignty is always a diluted factor. You sometimes hear arguments made for purchases of additional Typhoon, as compared to F-35, to have a sovereign capability. Well, the last time I checked, we have to get agreement from three other core partner nations to upgrade pathways and integration work on Typhoon as well, so that is not sovereign in the individual context either. Sweden has close to a sovereign capability but about 30% of the Gripen is UK IP and there is still US ITAR technology on the Gripen. Rafale is probably closest but, even there, there are some dependencies outside for the French; France has spent an enormous amount on maintaining that capability. You are always going to trade off different factors.

**Lord Houghton of Richmond:** Before I ask my question, I first need to declare an interest as a director of Draken; it is a Blackstone company that specialises in advanced combat air training here in the UK, in America and in the Middle East. Is this the last question?

**The Chair:** I do not know whether anyone else has any.

Q192 **Lord Houghton of Richmond:** This might be the sweep-up question involving you using an academic, strategic application of forecasting.

The main purpose of the committee's inquiry is the future strength,

health and direction of the special relationship. Historically, the defence and intelligence dimensions of that have always been the fundamental underpinning, to an extent. I would like you to conclude by expressing your view on what the airpower dimension tells you about the future of that relationship. We have now embarked on AUKUS, although that is still under review and is looking increasingly expensive and questionable from a UK position when it comes to the availability of submarines. From the airpower dimension, as you say, the F-35 programme is getting beyond its utility in political terms and UK defence prosperity terms; it has increasingly looked, for the past 10 years, to be something of a financial regulator for the balance of the conventional programme.

You said that the next-generation American aircraft is built for a different theatre and a different set of requirements. We are putting our money on a thing called GCAP. You are indicating to me that there is the start of an erosion and separation in our core interest, as viewed from the dimension of airpower. Is that a fair observation for us to take away from your evidence, or would you want to balance that in some way? Do you want to put it in a context that neuters whatever our concerns might be?

**Dr Sophy Antrobus:** It is an excellent question. Well, they have all been excellent questions—I am sorry; I should not single your question out.

The F-35 is due to be in service for decades to come. In that sense, the airpower relationship with the US and other partner nations will continue. A key way to answer your question is to think about the commitment that we have recently made to F-35A and the dual-capable aircraft nuclear mission, which Baroness Coussins referred to earlier. That is a significant commitment in terms of burden sharing with the US in that NATO mission. It will take a lot of groundwork, co-operation and collaboration.

From 2030 onwards, we have not defined exactly what we will offer and when. That is a good thing because we need to do a lot of analysis before we declare what we will offer, when and with what readiness. However, that is a long-term commitment and project that knits us further into the intelligence-sharing and security relationship you referred to. If I were to pick something out, I would say that that gives us a sense of direction.

The other area is not technically under airpower. I do not know whether you will talk to people about the US-UK space relationship, but that is significant now and in future; it is quite intertwined as well. Although I accept that the space domain is separate from the air domain in an academic sense, Space Command comes under the Royal Air Force at the moment, so I suggest that you might want to speak to space experts; I am not one of those.

The DCA commitment in particular means that the US-UK airpower relationship will continue very strongly—just in a different way.

**Dr Justin Bronk:** There is probably a bit more continuity than there appears to be on the surface. We have the combination of continuing commitments within the F-35 programme over the coming decade or so,

with an increasing share in the period towards GCAP and with the main emphasis from at least the mid-2030s onwards being recapitalisation of Typhoon, with, presumably, Tempest as the core part of GCAP.

Broadly speaking, that fits with the pattern we have seen before of the UK having a European—in this case, including Japan as well, which is new—co-developed, multinational component to its air capabilities, such as Tornado before that and Typhoon; in that sense, there is some continuity with Tempest. There is also a significant American component, whether that be weapons, aircraft or other systems, such as C-130 before that; F-35 is clearly one of them. Those too will, I suspect, interoperate perfectly well with F-35 and, increasingly, GCAP in the 2030s and 2040s as Typhoon phases out. In that sense, there is some continuity in programme terms.

For now—at least, for the next decade—F-35 is absolutely critical to European defence requirements. The primary determinant of whether we can deter and, if necessary, defeat Russian forces in any aggression directly against a European NATO member is whether we can roll back their ground-based air defences. F-35 is tailor-made for that task; nothing else we have is.

Our main problem in Europe with airpower concerns weapons rather than platforms. Tactics, techniques and procedures are broadly there. Greater interoperability and exercising would be good in the sense of trying to bring everybody up to the same level, or as close to that as possible. However, broadly speaking, based on the aircraft that we have on order and the aircraft inventory against the Russian threat, on platforms, we should be fine if we have the right weapons—but, right now, we do not. That is where I would look at the core requirement.

The F-35 commitments that we have made are, I believe, for 14 F-35As<sup>1</sup>, with the remainder of the 27 order presumably being F-35Bs. That will complete a fleet of somewhere in the region of 74 by the early 2030s, which seems reasonable enough to me. It will enable us to cover as much as we can realistically programme and take delivery of at this point, in the period of greatest threat, based on Russian economic trends and European rearmament. Based on investments now, that should be well under steam by the end of the decade, but we have a serious gap before 2030.

In terms of US political divergence and concentration on the Indo-Pacific, ultimately, Europe remains and will remain an enormous part of its core economic market, as well as a significant source of both industrial and security co-operation. Although you will probably continue to see a decoupling of political alignment—particularly in terms of domestic politics and some of the geopolitical alignment, which we have seen radically change since January—it is worth remembering that we have deeply embedded defence commitments and, in some cases, alliance

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<sup>1</sup> Witness clarified afterwards that the commitment was for 12 F-35As.

commitments with a host of nations that have very different politics to us.

The Gulf states are good examples. Saudi Arabia and the UAE have interesting approaches to things. Previously, we would have seen ourselves as very aligned with the Americans—perhaps less so these days. Equally, we have close relations in certain areas with NATO members such as Turkey and Hungary, which, again, have very different approaches to large parts of geopolitics and domestic politics than we do.

It is probably the end of the perception, at least, of close political alignment between the US and the UK. Therefore, that security and industrial relationship, which will remain fundamental, is likely to have to take place on a rather more pragmatic basis. The key thing is that the old tendency to assume that, ultimately, it will be fine, because the Americans will come in and save the day, is not safe any more. Even if they want to do so politically, if they have a concurrent problem with China in the Indo-Pacific, they cannot do both at once. We need to be able to stand on our own two feet, as US-enabled but primarily European-led NATO, against the Russian threat. That is the key balance.

**Q193 Lord Robertson of Port Ellen:** Following up on what Dr Antrobus said about the joining of the NATO DCA arrangement, does that have a lot more to do with the politics of connecting the two countries than it has to do with any military capability? It was not a recommendation in the strategic defence review, but it was a decision taken by the UK Government. Is it largely political and, in terms of the remit of this committee, which is looking at British-American relations, more to do with that?

**Dr Sophy Antrobus:** This is my personal view, rather than a Royal Aeronautical Society view. My view is that the Royal Air Force wanted F-35As, particularly for the OCU, so that it could train faster, more effectively and better. The A offered much more capability at a lower price. I do not sense that the RAF was lobbying heavily for the DCA nuclear mission. My judgment is that it was more of a political decision and reinforces the US-UK relationship in some way, over and beyond the current US Administration—as well as the Vance one to come, since there will no doubt be one in future.

That is my personal view. The Royal Air Force in particular—but the Navy as well—had a wish to acquire some F-35As. I do not think that it was particularly pushing for the nuclear role. I am not saying, though, that it does not welcome it or that it is not doing everything it can now to get itself in the right headspace and prepared, because that will have quite a large impact on the Royal Air Force.

This comes back to the risk point. Right now, the military writ large, the Air Force and the Chief of the Air Staff—the last one, the one before the last one and the current one, Air Chief Marshal Harv Smyth—talk about the need for the military to be able to take more risk, to have a more risk-sensible appetite, to be disruptive, to be innovative and to be

prepared to fail. In procurement, too, we have heard these statements made; in fact, part of the strategic defence review was about risk appetite. However, the nuclear mission is a no-fail thing. You cannot have any risk. It will be interesting to have both cultures having to develop alongside each other. That is a bit of a challenge for the Air Force, but it knows that.

Going back—I am sorry; this is a very long-winded answer—I think that, yes, it probably is a political decision.

**Dr Justin Bronk:** It is worth reflecting that, as with all NATO nuclear-sharing nations with the dual-capable aircraft programme, the scenario in which it might operationally be used is one in which the US President authorises the use of an American tactical nuclear weapon against, presumably, Russian forces and then chooses to delegate the execution of that task to a third-party nation as opposed to the US doing it itself. I am not saying that that is an impossible scenario, but it is certainly a very niche one—or one in which there is such large-scale exchange that, to be honest, who cares, if that many bombs are going off? It is overwhelmingly political on the nuclear side but, then again, nuclear weapons are fundamentally political.

On the F-35As, I echo everything that Dr Antrobus just said. The fact that the Operational Conversion Unit does not need to land on a carrier means that, with the A models, you can do every bit of the training you want with better availability and at significantly lower cost; it is somewhere in the region of £20 million pounds per aircraft cheaper, I believe. Incidentally, you also have the option to carry and launch a significantly wider range of much more relevant weapons from land, in a counter-Russia context—if we ever go to war—than the B variant can take, because the A has the full-size weapon base. It is a cost saving that enables the OCU to be more efficient over time, but it also gives us significantly increased conventional options in a conflict. Presumably, if the balloon goes up, so to speak, those A models would be used for combat missions at that point. For example, they could land, interoperate and, potentially, use weapons from partners throughout Europe who have A models and a much wider range of weapons. There is a lot to recommend the As, even if the nuclear side of things is probably almost entirely political.

Q194 **Lord Houghton of Richmond:** I do not want to abuse the committee's time but I am mindful that there is a Ukraine debate on Friday. You have left a very bleak picture of the continuing Russian threat. There are other, more siren, voices that suggest that, however humiliating the imposition of a ceasefire on Ukraine might be for it, nevertheless, Russia will exit this campaign in strategic deficit. The original decision by Putin was a strategic miscalculation. Sweden and Finland have been added to NATO. The Baltic has become a NATO lake. We are well on the way to establishing the northern bastion. The rest of NATO in Europe has woken up to the fact that it needs to spend, albeit more quickly, 5% of GDP in a given time. Russia is being economically exhausted by this. I find it quite

difficult to accept the bleakness of your position. Do you want to moderate it in any way?

**Dr Justin Bronk:** I would, once again, put it into timeframes. If we got to 2030 without a war with the Russians, I would be much more of your view in that, by that point, there will be significant European rearmament and the Russian economy—and demographics, by the way—can be expected to be in very bad shape.

However, what I am much more concerned about is the two-year to three-year outlook, where you have a Russia that is looking at a wall, from an economic point of view, but has enormous military output and huge mobilisation scale—far in excess of anything we have—and can choose to concentrate those things where and when it wishes. We, as the defender, cannot do that. Also, crucially, Russia will have a use-it-or-lose-it problem, because it will not be able to sustain that to the end of the decade or beyond. It will have a window of marked local military superiority, as well as a significant grudge and a potential desire to demonstrate that Article 5 is a bluff before it loses the opportunity to do so—especially if it coincides with something that the Chinese might do in Taiwan.

To give an idea of context, when the Kursk pocket finally collapsed and Ukraine withdrew, just around Kursk, it freed up 22 brigades of the Russian army to deploy elsewhere. The British Army would currently struggle to deploy two brigades. That is the scale of fighting we are talking about. When you look at Europeans discussing a potential coalition of the willing or a security assistance force to Ukraine, were things to start to go to hell or were there to be some sort of ceasefire, there were discussions about 10,000 to 20,000 troops—10,000 being more realistic on any sustained basis. The Ukrainian Armed Forces are fighting with around 320,000 troops, and the Russian Armed Forces have above 650,000 troops committed to operations in Ukraine. The idea that we are ready or prepared for this is mad.

We have given away almost all of our artillery. It is not just us; many other countries in Europe have done the same. We have also, rightly, given away—and are giving away—most of our production. We cannot meet Ukraine's needs, let alone our own resupply needs, so we are choosing to keep Ukraine in the fight as a priority; that is correct. Given all that, we have no counter-UAS capability to speak of in our Armed Forces, while, of course, there are millions of UAVs being used at the tactical level every day by both sides in Ukraine. We are not prepared for that fight either.

This is why, again, I keep coming back to the point that, when it comes to deterring Russia, our only credible way to do so is to establish air superiority and use a mix of attack aviation and fixed-wing aircraft to destroy tanks, artillery and all of that. If we can achieve air superiority, I agree that we will be fine. The problem is that we cannot roll back their air defences. Currently, only the Americans can. That is where we are really vulnerable. If you look at the Russian ground-based air defence

network, there has been significant attrition in Ukraine, but production remains high and it is vastly better than it was before the war—especially at intercepting our munitions, such as anti-radiation missiles. We have given a lot of those to Ukraine but the Russians are now very good at shooting them down. The same goes for the GMLRS and the ATACMS, which, within NATO, only the US and Turkey have.

If you look at the Russian Air Force, it has significantly outproduced its losses. The losses in pilots that it has suffered have been light—most losses have either ejected on their own side or been on the ground—and those suffered early on, particularly among experienced pilots, have been vastly offset by the enormous growth in combat experience and basic experience among the entire Russian air crew cadre. Their submarines have not been touched—except for one Kilo in the Black Sea, which was not of concern to us.

In almost every area where we are concerned about the Russians militarily, they are much more of a threat today than they were four years ago—and they hated us before. Our intelligence, industrial assistance, training, assistance and targeting assistance have helped kill and maim 1.2 million Russians over four years. They really hate us now. So, no, I am not sanguine at all—I am very worried about the next two to three years.

**Dr Sophy Antrobus:** To summarise, going back to the question, I am afraid to finish on a depressing note but the depressing reality is that, when you talk of the Ukrainian ceasefire, that is the danger point. It is a horrible thing to contemplate but, basically, that is a brief summary of what Justin said.

**The Chair:** We have seriously overrun. Do you have time for one more question?

**Dr Sophy Antrobus:** Yes.

Q195 **Lord Soames of Fletching:** I will be very quick. Professor, you mentioned in an earlier answer how impressed the Americans are with the competence and operational capability of our pilots; that is very good news indeed. Are they equally as worried about the very slow pull-through of numbers of pilots ready for active duty?

**Dr Justin Bronk:** Broadly speaking, they are not aware of it. What they see is limited availability on the front line in terms of numbers of UK jets at exercises and elsewhere. I am not sure that they see the detail outside of their Air Education Training and Mobility Command, for example, which might have specific liaisons who are aware and have potentially seen requests for increased numbers of UK training slots in the US.

It is a common problem. There are specific UK training programme issues but, if you look across the board, there is a significant deficit in pilot training capacity. We are seeing massive oversubscription for spaces at the Italian International Flight Training School in Sardinia, for example. We are seeing significant oversubscription for ENJJPT, which is the

European jet training programme in the US. We are also seeing concurrently the ageing out of Hawk, Alpha Jet, Saab 105 and a whole host of other venerable fast jet trainers.

A number of forces are, in essence, trying to go from turboprop straight to fast front-line jets. That is workable, particularly if, like most of the ones that are doing that—Switzerland and France, for example—you have a lot of twin-seaters in your front line. However, we have three twin-seat Typhoons left, two of which are overdue for retirement.

There are some significant problems that the RAF and a lot of other air forces in Europe will have to deal with pretty quickly when it comes to the future of fast jet training. I must admit that, for me at least, the Red Arrows are the least of our concerns. If it is difficult to replace them with British aircraft, that is fine. In an era of peacetime, that would be a concern; right now, I would suggest that it is probably window dressing. The Americans generally see only the front-line numbers.

**The Chair:** Thank you for a sobering presentation. That concludes our session for today. We will make sure that you receive a copy of the transcript in case you have any minor comments or amendments to make.