

Defence Committee

Oral evidence: Space Defence, HC 271

Tuesday 8 March 2022

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Members present: John Spellar (Chair); Stuart Anderson; Sarah Atherton; Dave Doogan; Richard Drax; Mr Mark Francois; Mr Kevan Jones; Mrs Emma Lewell-Buck; Gavin Robinson; Derek Twigg.

Questions 192-274

Witnesses

I: James Heappey MP, Minister for the Armed Forces, George Freeman MP, Minister for Science, Research and Innovation, Air Vice-Marshal Harvey Smyth, Director Space, Ministry of Defence, and Rebecca Evernden, Director for Space, Department for Business, Energy and Industrial Strategy.

Examination of witnesses

Witnesses: James Heappey MP, George Freeman MP, Air Vice-Marshal Harvey Smyth and Rebecca Evernden.

Chair: This is the last of our hearings in our inquiry into space defence. We have both Ministers and the senior directors from the Departments before us. For the record and the public, I would be grateful if those giving evidence introduced themselves.

James Heappey: Good afternoon. I am James Heappey, Minister for the Armed Forces.

Air Vice-Marshal Smyth: Good afternoon. I am Air Vice-Marshal Harvey Smyth. I am Director, Space, within the Ministry of Defence.

George Freeman: Good afternoon. I am George Freeman, Minister for Science, Research and Innovation at the Department for Business, Energy and Industrial Strategy.

Rebecca Evernden: Good afternoon. I am Rebecca Evernden, Director for Space at BEIS.

Q192 **Chair:** Thank you very much for coming. I think you have already had notification that there will be a couple of questions at the start for our Defence colleagues, or the Defence Minister, on current events in Ukraine. Before I ask colleagues to lead off on that, I thank you, Minister, and your team—convey this—for the information provided by Defence Intelligence, not just to us but to all Members of Parliament, in a very informative and balanced way. That has been immensely helpful in enabling them to comprehend the situation.

The first question that I want to pose is, we are seeing reports now of a proposed role for the Ministry of Defence—or for the Armed Forces, rather—in visa processing. We are not entirely clear about what that means. We wonder whether you have any information that could enlighten us.

James Heappey: Yes. Thank you. During the summer, the precedent was set, during Op Pitting. As we still want to do all the biometric tests—there is a good argument for doing so, as a number of people were picked up off flights in from Kabul over the summer who had pinged on the Border Force database—last summer we assisted UKVI with a bit of extra staffing, just to give them some surge capacity so that they could make decisions at the speed and volume required.

Fundamentally, however, as you would expect, Chair, the decision on whether to grant a visa still sits in the hands of someone who is a trained UKVI/Border Force official. It is just a case of thickening, to give a bit of resilience and a bit more speed to the process, as we saw so successfully in Kabul.



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Q193 **Chair:** Are we, then, talking about assessing those back here in the UK, or are we talking about doing that in countries adjacent to Ukraine, or within Ukraine, which I think we basically pulled back from?

James Heappey: Definitely not in Ukraine itself, in terms of a place where you can go to get your biometrics done. In the Baron Hotel in the summer, the biometrics were being done by the consular and UKVI teams that had flown forwards. My expectation would be that if we have any role in neighbouring countries, that is probably more to do with the facilitation of any sort of surge capacity that might exist, but it would be the Border Force/UKVI professionals who do the biometrics.

Actually, the more meaningful role that we played—forgive me if my first answer didn't make this clear—during Op Pitting was by sending service personnel to I think Sheffield, from memory, which was the place where the surge staffing capacity was necessary to help with the decision. Actually, the biometric process itself is relatively quick. The issue thereafter is the speed at which you can process the data and make a decision.

Q194 **Chair:** Finally, the comparison with Afghanistan is that we are not anticipating British forces being involved, basically, in a military defensive position in order to safeguard any facility. This is very much in a civilian capacity, if I can put it that way. Even if they are in uniform, they are basically operating in a civilian capacity.

James Heappey: That is it exactly. Think of this, if you like, as MACA-push. We recognise that the demand to come here is great, that the political will is to respond to that demand, but that the UKVI system is not equipped to deal with that demand at the speed that, rightly, the public and our political leadership requires, so the Secretary of State has offered to the Home Secretary MACA support in order to help the processing be done more quickly, which I think will meet political intent and public expectation.

Q195 **Chair:** That is very helpful clarification, although we may need to look in the future as to whether the military being the fourth blue light service is really an appropriate use, particularly in the changing environment.

James Heappey: Your colleagues in the Department would be grateful if you did so.

Chair: I now ask Derek Twigg to raise a couple of questions on equipment supply.

Q196 **Derek Twigg:** Minister, does the MoD remain confident that we can continue to get both lethal and non-lethal equipment and supplies through to Ukrainians in the foreseeable future?

James Heappey: Yes.

Q197 **Derek Twigg:** You see no impediment in the next week or two to our being able to continue to make deliveries at the level we are doing now.

James Heappey: There is huge impediment, and there is a will on the Russian side, obviously, to disrupt these supply lines. Clearly, I am not going to go into detail of how, what, where, when, but it is getting through.

Q198 **Derek Twigg:** You remain confident that we can continue with that for the foreseeable future.

James Heappey: Yes.

Q199 **Chair:** Although, Minister, some other countries have been fairly specific in the volumes of equipment that they have been providing or are going to provide.

James Heappey: Some countries have been specific up front; most have been specific retrospectively. I think we have every intent to do so, and this Committee and the House deserve to know what we have given.

What we are just trying to avoid is—you can see on Flightradar where all of the C-17s and A-400s from around NATO are flying into, so it is pretty hard to disguise the air point of entry into theatre, but the magic is in what happens next. There ain't a lot of magic—there are only so many roads and so many routes forward—but all the obfuscation that we can achieve and all of the operational security that we can maintain increases the chances of these vital supplies getting further east into Ukraine.

Let's be clear: they are not needed in the first 150 km inside the border—they are needed further across into central and eastern Ukraine, and that requires quite a lot of bravery on the part of those who are the doing the running and it requires as much OPSEC as we can manage, to give those convoys the best chance of getting through.

Now, you will have seen that the Russians have failed to establish air superiority. They have, I think therefore, left an environment that is sufficiently porous, hence the confidence with which I was able to answer Mr Twigg's question. However, I think that you all, or most of you, have been on this Committee for more than long enough to know that there are some things that I probably just need to share the detail about with you after the event. But suffice it to say that supplies are getting through and continue to have an effect.

Chair: Thank you very much. Now we will move on to the questions on the subject for today. I think that it will probably be obvious which Department each question is directed at. To get through the business, the other Department should not feel the need to answer, but equally should not feel in any way constrained. We look forward to hearing the answers.

Our first question, on threats and hazards, comes from Dave Doogan.

Q200 **Dave Doogan:** Thanks, Chair. Good afternoon, Minister. Russia's willingness to aggressively pursue its foreign policy objective is now beyond doubt and we know that China, too, is making rapid progress with its defence space programmes. What steps is the UK taking to protect UK



space assets from the growing threat from our adversaries?

James Heappey: Mr Doogan, the most public answer that one can give is that it's around situational awareness in space and the degree to which we understand what is there, what it can do and what threat it poses. That sounds like a statement of the bloomin' obvious, and yet it requires quite a lot of investment to have that awareness in the first place.

Regarding how we might seek to achieve space control, I think that the fact that is an aim is in the public domain; the detail of what that looks like, not just for the UK but for any country, is necessarily classified.

However, I do think that there are two interesting things to reflect on from the last few weeks. First, I would never get too excited to say that the Russo-China relationship is fracturing, but I do think that China has got a bit of an interesting decision on its hands about who its mates are right now. There is also a practical issue over whether a broke Russia can afford to collaborate on the sorts of projects that China might want to collaborate on.

Q201 **Dave Doogan:** That is helpful. So, just to expand on that, you don't see that fracturing, so therefore you definitely don't see it—the relationship between China and Russia—deepening in this domain.

James Heappey: It could deepen; it could be that this is a moment when pariah states of the world unite. But China hasn't behaved like that in the UN. It clearly doesn't want to be an international pariah. So, I think there is an interesting moment of challenge to Beijing about the role they want to play in the world, who their friends are and who they want to collaborate with on capability. However, as I said, I don't want to get carried away or be overly optimistic; it may well be that they do indeed want to maintain these collaborations.

I think there is a hard reality to how badly the Russian economy will suffer as a consequence of the war itself and the sanctions thereafter, and the degree to which they have got the money with which to invest in this capability going forwards.

However, the other thing that I just wanted to offer as an initial observation—it may be that you were going to come back to this more explicitly—is the degree to which space is playing a role in the conflict. The reality is that in the immediate day-to-day operations of both sides, there is not tonnes of evidence of space being in any way decisive; in fact, Harv and I were arguing over this before we came over. But that's not to say that therefore we can learn lessons from space as a domain and say it's less of a focus, because I think if you have got the technologically enabled capabilities on your side, space becomes a very necessary enabler for those capabilities.

There are all sorts of lessons that we are learning from what is going on—all sorts of opportunities; a few threats. But fundamentally I think this is a really interesting moment, not just on space but across the whole range of their relationship, for Russia and China.



Q202 Dave Doogan: Finally from me, one of those threats is that both China and Russia have opposed attempts to achieve a consensus on norms of behaviour in space. Is there any realistic prospect that they will row back from that? Well, clearly there is obviously not in terms of Russia just now, but is there any realistic prospect in the longer term that they will row back from that aggressor position? And if not, without Russia and China is there hope of any agreement on norms of behaviour in space?

James Heappey: Again, I don't want to get carried away. Certainly, I think there is hope of an agreement, because there is a sort of mutually assured disadvantage if you get it wrong up there.

I am desperate not to overstate it, because it could just as easily go the other way, but I think there is a moment of choice for Beijing. If Russia did do something stupid in blowing up one of its own satellites, if Russia were to be irresponsible in space, again, as part of this, the volume of Chinese assets in space now is such that that would not be welcome in Beijing at all. One would imagine there is some pressure from Beijing.

Even if they have been willing to potentially turn a blind eye to what Putin has intended and then done, in the UN thereafter they have shown that they are not willing to be publicly supportive. I would be pretty confident that in Beijing they are making it very clear to Russia that they will not abide anything that threatens their own capabilities. In space is the most obvious place where that threat may manifest itself.

I do not want to be over-optimistic but I just think that China has a really interesting moment of decision on its hands.

Air Vice-Marshal Smyth: I think the point about space domain awareness up front is absolutely key. In our defence space programme we have allocated £85 million investment over the next 10 years to further deepen our space domain awareness capability. Core to that is collaboration with allies and our key ally on this being the US.

We have for many years enjoyed a very good space-derived data-sharing mechanism with the US, which helps us to understand what is going on in geostationary orbit 36,000 km from Earth. The stand-up of our new space command last year will declare initial operating capability this year and that will only help further deepen and cohere our approach to a proper understanding of what is going in the space environment.

We even saw that in terms of the goodness added from UK Space Command last November, when the Russians launched an anti-satellite missile and blew up one of their satellites. Our space command played a lead role globally in helping to understand what happened, and importantly understanding the follow-on impact of space debris creation and then tracking that debris, because that has now become 1,500-plus new pieces of space shrapnel, travelling at five miles a second.

On norms, I think the point to bring out is that almost despite where we see Russia and China going forward, the work that FCDO is leading, and we are supporting, into the UN is about establishing a baseline, because



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that baseline does not exist today. It is about establishing a baseline with as many nations across the globe from which we can then hold to account others in their day-to-day business in space.

At the moment we see nations like Russia try to establish new norms in space, and without a baseline that we can hold them to account against, it is very difficult to attribute actions.

Q203 **Chair:** Sarah Atherton will be coming in in just a minute to follow up on space domain awareness, but before she does, I call Kevan Jones.

Q204 **Mr Jones:** In terms of Russian threats, it wasn't a very clever move on OneWeb's part to rely on the Russians to launch its latest set of satellites. That is a company that we, as a Government, have quite a substantial stake in. Whose decision was that?

George Freeman: Within BEIS, I am responsible for developing our commercial space strategy. Actually the shareholding in OneWeb—19% going to 17%—actually sits with Minister Grimstone. We may discuss the OneWeb issue in more detail later, but the commercial contract OneWeb placed with Arianespace, and they have the launch contract in Russia.

One of the key reasons why we have made a commitment this year to establish UK launch capability is precisely for that reason, so that we can diversify and we have a more sovereign capability here in the UK. I don't think anyone 18 months ago, with the benefit of hindsight now that I might say was obvious, would have thought that there was that risk of an invasion in Ukraine and the level of tension we now have. That is why we are committing to a UK launch capability.

Q205 **Mr Jones:** That's fine, Minister, but the idea of allowing the Russians to launch your satellites—and I think you side-stepped the question. Who has ministerial responsibility for it? OneWeb?

George Freeman: OneWeb operations is the responsibility of OneWeb's board. They are a private company; we own 19% going to 17% and Minister Grimstone is the Minister responsible for our holding in OneWeb. We have three directors, I think it is, on the board of OneWeb, but I stress that it is a private company. Since we made our investment, it has raised substantial money. It is not a UK sovereign capability; it is a company, with a significant shareholding, in which we have a 19%, going on 17%, share.

Q206 **Mr Jones:** So we are quite satisfied and relaxed about the fact that we are allowing Russia to launch those satellites?

George Freeman: No, I didn't say that. That is why I made the point that we have made the commitment. This year—*[Interruption.]* It is an important point. We are committed to UK launch capability, in no small part because we want to reduce dependency on launch out of America as well as Russia. We see that as an important part of our space economy as well as our resilience.

Q207 **Mr Jones:** The Government did not have any concerns, as a major



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shareholder, about using Russian launch for those satellites?

George Freeman: Perhaps ask Rebecca, our lead official in BEIS, whether there is a history of debate. I have only come into this role recently. Since this situation has kicked off, we have been very aware of the danger, but I do not know whether historically there was debate about that over-reliance.

Rebecca Evernden: Probably the fact of the matter is that Europe as a whole, including the European Space Agency, has had a long history of collaboration with the Russian space agency with regard to launching into space. Whether or not that has been the right course of action, it has been the way that European companies have often chosen to launch into space and the way that the European Space Agency launches to the ISS, so ESA astronauts ride on Soyuz rockets to the ISS. ESA has many partnerships with Roscosmos and of course NASA, developing exploration programmes. All of these things are having to be reviewed in the light of where we find ourselves today. As the Minister says, the OneWeb contract is with Arianespace. That was a purely commercial decision on the part of OneWeb to get the best commercial rates for its launch into space. Some of those launches happen to have taken place from Baikonur. Some have gone from Kourou in French Guiana as well.

Q208 **Mr Jones:** You may not be aware of why we bought into OneWeb, but I am. You are saying to me that at no time have security issues or issues around that been raised with OneWeb about the fact that it is using Baikonur.

Rebecca Evernden: As the Minister has said, and I have said, those discussions have been purely between the company and its launch contractor, Arianespace.

Q209 **Mr Jones:** I find that absolutely remarkable.

George Freeman: Do you find it as remarkable as ESA relying on—

Mr Jones: No, I find it remarkable—it depends on what you know in terms of why we acquired our stake in OneWeb—that we are then allowing Russians to launch those satellites. Anyway, I will leave it there, Chair.

Chair: Given that there was supposed to be a security imperative for acquiring OneWeb, it does seem extraordinary that we didn't actually then keep a very close watch on the security issues surrounding it, but that may well emerge later.

Q210 **Sarah Atherton:** Air Vice-Marshal, can we go back to your comments on the UK's reliance on the US for situational space awareness? We have ballistic missile radar at RAF Fylingdales. The data is analysed at the space operations centre in High Wycombe, sent over to the US and returned back to the UK. Is that correct?

Air Vice-Marshal Smyth: Not always. There is a collaboration—a network—of centres around the globe, of which the radar at RAF Fylingdales contributes data to the overall collection. Amongst the alliance,



we take our role in analysing that data and turning it into viable product. Then that is shared across the collaboration, so that we all see exactly the same picture. In fact, the Minister and I visited Fylingdales recently and witnessed the real-world event of a ballistic missile launch, where the shared actions that were required were happening in real time. That may or may not have been Fylingdales's radar seeing that, but the Fylingdales crew were part of the decision making, as it happens.

Q211 Sarah Atherton: What safeguards are in place to protect UK critical defence information?

Air Vice-Marshal Smyth: We have multiple safeguards, as we would see in any Five Eyes sharing arrangement, in terms of how we manage our data across that construct. That system is a robust system across the whole of defence, not just for space, and is a sharing mechanism to protect the data.

Q212 Sarah Atherton: What system?

Air Vice-Marshal Smyth: Using the Five Eyes construct of "for Five Eyes only". We would only share that data across the Five Eyes construct.

James Heappey: If I may, Sarah, it is worth adding that what struck me about Fylingdales is that it is the most obvious example I have seen, beyond some of the most compartmented intelligence stuff, where the UK-US relationship is one of almost complete trust. I think I was told that we are the only non-US country able to operate that sort of system for the US. It is effectively to entrust in the hands of a partner a key part of the US's defence of the homeland against the most serious threat it can face. Your questions were around how we secure critical UK data. Actually, we are trusted with an extraordinary amount of US data as a consequence of operating that system for them. It is the most remarkable set-up.

Q213 Sarah Atherton: Minister, you mentioned China's new mates and that they are spending £23 billion with Argentina, which obviously puts a bit of pressure on the Falkland Islands. There is a capability gap in the low Earth orbit. If a radar was positioned in the Falklands, it would meet that capability gap. Has any thought gone into expanding the radar coverage?

James Heappey: Yes.

Sarah Atherton: That will do nicely, Minister.

James Heappey: I think everybody is acutely aware that these threats now present themselves the globe over. They move at a pace that means you really cannot take for granted your ability to see it with an existing sensor set later in the day, so of course everybody is looking at whatever geography they might have at their disposal in order to understand that. Geography on the equatorial belt is clearly prime real estate, but increasingly, geography that gives you some sight of space above the poles is equally helpful. It is not the sort of thing that anybody would ever disclose publicly, but obviously there is a conversation that you have with all your allies—not just Washington, but other Five Eyes partners too—

around what geography might be available to help develop that situational awareness.

Chair: On collaboration, that leads seamlessly to Richard Drax.

Q214 **Richard Drax:** Thank you. Good afternoon to you all. The defence space strategy is about deepening collaboration on space with international partners, including NATO. What are the existing barriers to collaboration, and how do you intend to overcome them?

Air Vice-Marshal Smyth: The reality is that there are very few barriers to the collaboration. I think the narrative on space, particularly in the last five years, has really gained traction across NATO, across what we call the CSpO alliance—the Combined Space Operations alliance, which is the Five Eyes community plus France and Germany—and through bilateral conversations with other nations that, historically, we maybe have not had relationships with on space, such as Japan. There is a nascent conversation with them. We are finding—particularly as we have committed to a new national space strategy, committed to a new defence space strategy, and committed new funding to a more ambitious defence space programme—that that has helped give us a seat at the table for discussions around more meaningful collaboration and sharing. It has opened multiple new doors, particularly with the US, on how they see a future partnership emerging over the next decade plus.

Personally, through a military lens, I do not see any barriers to future collaboration—in fact, the opposite. We are almost being inundated with invitations for future collaboration and partnering. Certainly, from a US perspective, they see this idea of a future space alliance, where many nations are collaborating together, sharing data, leveraging each other's capabilities, much like we do in other alliances like NATO, as almost the next generation of where we go, as we see space become more contested.

Q215 **Richard Drax:** And more expensive.

Air Vice-Marshal Smyth: Not necessarily, as we see new technology and this paradigm shift in the space domain. A great example of this is what we see Elon Musk's SpaceX company do. A decade ago, it cost in the order of \$27,000 per kilogram to launch something to space. Today, because of technology that the likes of SpaceX has developed, that price is reduced to \$2,700 per kilogram. There is an aspiration that by the end of this decade it could be as low as \$10.

So what we are seeing is the opposite. The cost of access to space is now readily achievable by many people. For example, academic institutions that hitherto would have built a little space satellite to test on the bench, which would be as far as they could go, have the wherewithal today within their grant funding to launch to space. All of that adds to a more congested environment, but it also offers opportunity for a much greater space ecosystem: if we can bring it together through collaboration and partnerships then we get greater than the sum of the parts.

Q216 **Richard Drax:** Launching things into space must be pretty crucial,



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because you have to get things there. I understand from a meeting we had just before you arrived that we rely a great deal on Russia to launch much of our stuff from—I did not know that—and the US. Are there plans to have something similar that NATO can use, now that Russia is out of the question with everything that is going on, so that we have our own launchpad and our own ability to put both people and kit up there? Is that happening?

Air Vice-Marshal Smyth: I will talk to NATO and then maybe the BEIS Minister might want to talk about the UK space launch programme.

It is fair to say that the conversation on how NATO moves forward as an alliance on space is in the fairly early stages. They have recently formally declared space an operational domain in its own right, which was a major step forward. They also recently declared that article 5 could apply to space in certain circumstances.

What we are seeing in our early discussions with the broader NATO cohort is an appetite for NATO partners to bring their sovereign capabilities to NATO and offer, in many ways like we do with other capabilities, and not necessarily for NATO to build its own bespoke NATO capability; but that conversation is live, and perhaps current things that we are seeing happen on the world stage may change that approach, but we have to work that through with NATO. It is probably best for the Minister for BEIS to take on the approach to the UK sovereign launch.

George Freeman: Thank you, Air Vice-Marshal. To the point that Mr Jones made earlier, we are pretty advanced in delivering on the commitment to develop launch capability. The plan is that this year we will launch horizontal launch out of Newquay spaceport, Cornwall, and we have an advanced programme, dare I say glidepath, to launch being worked on daily and weekly with the Virgin Group around that, and two consortia working up in Scotland—Shetland and Sutherland—targeting the end of this year or the first part of next year.

From our point of view, principally we are looking to develop a civil commercial launch capability for the huge volume of satellites that will be going up. We will probably get into dual purpose in due course, but this is an area where it is a capability with civil and, if MoD colleagues want to use it, potentially security benefits as well. It is all part of the point that Mr Jones raised earlier about being a bit more strategic about how we operate in this fast-growing space domain.

Q217 Richard Drax: So, we are looking at having our own commercial/military launch capability in this country.

George Freeman indicated assent.

Q218 Richard Drax: And not in Europe, for example—in a NATO country elsewhere.

George Freeman indicated assent.

Q219 Richard Drax: Are other NATO countries doing this as well? I presume that they are.

George Freeman indicated assent.

James Heappey: As I was learning about space over the past weeks, I was very interested to see that it is not just security that one considers when looking at the efficacy of a launch site. There are some bits of geography that are beneath less congested bits of space, so although it might feel very neat to say that you want to be able to have a launch capability on your own sovereign territory because that feels secure, it does not necessarily mean that it is beneath the best bit of space to have the most options for launch. There is an interesting trade-off to be made between sovereignty and security, and utility and the width of your launch windows.

Q220 Richard Drax: How far have your decisions about where to invest been influenced by gaps in overall Allied capability?

Air Vice-Marshal Smyth: We are working very closely with the CSpO alliance that I mentioned earlier—Five Eyes plus France and Germany. Through the CSpO alliance, we have clearly led out all of our capabilities and our future aspirations for space capability. We laid it all out on a table, mapped in on top of each other, and looked to where the gaps were. As we developed the UK space programme and more ambitious defence space programme through the last 18 months, we used that mapping exercise to help us identify where we could bring new capability to the CSpO to fill some of those gaps, or to build additional resilience on capability that already existed but was maybe just one deep. We did the analysis both of what is right for the UK and what would be right for the alliance, and of how we take that forward to be a good partner.

Richard Drax: If you were to say—

Chair: Richard, Emma wants to come in.

Mrs Lewell-Buck: Chair, the Air Vice-Marshal has just answered the question I was going to ask.

Chair: In that case, Richard, you can have one more question, and then I will bring in Mark Francois.

Q221 Richard Drax: What would you say our biggest gap was?

Air Vice-Marshal Smyth: For us in the UK, it was an approach to sovereign Earth observation or what we call ISR—intelligence, surveillance and reconnaissance. We have relied predominantly on partners and allies to provide us space-derived ISR data.

Richard Drax: Sorry—for the viewers, ISR data is, in English, what?

Air Vice-Marshal Smyth: Think of a satellite flying around in low Earth orbit, 500 km high, using sensors to look at, and work out what is going on, on Earth. We have historically not had a sovereign capability there, but

through the new defence space programme, we have invested £970 million over the next 10 years to build our own.

Q222 Mr Francois: Mr Freeman, the board of OneWeb voted last week to suspend launches from Baikonur in Russia, so for the moment that, at the very least, remains in abeyance. You were talking about a future UK launch capability. How soon could we realistically launch OneWeb-type satellites from the UK, either from Cornwall or from Scotland?

George Freeman: That is a great question.

Mr Francois: I do my best.

George Freeman: The first step is obviously to get first launch away. For the CAA, the regulatory clearance is quite a change. You will not be surprised to know that right now there is a lot of work going on, with Virgin, which has clearance with the FAA in America, going through CAA procedures. Obviously Cornwall is not the desert. There are quite good airspace opportunities to go out across ocean without too much overflight, but the CAA is going through that right now.

Once we have established that, the aim of this programme is to ensure that we then establish a rhythm of routine launch from both Cornwall and Scotland—in due course, as you say—so that we do have some ability to help ensure that the manufacturing, launch capability and plans for growth of companies like OneWeb, and OneWeb specifically, link back to the UK. That is the strategy. Perhaps Rebecca, if there is a supplementary on the detail of OneWeb's involvement—

Q223 Mr Francois: I follow your logic but, with respect, “in due course” doesn't assist the Committee very much. If we assume that the Russian launch opportunities are lost to OneWeb for the foreseeable future, the question really is, in what year could we start launching partly British owned OneWeb satellites from the United Kingdom? Is it 2023, or 2024? When, realistically, might that become a viable option?

George Freeman: And—if I may—where might OneWeb be able to get alternative launch in the meantime?

Rebecca Evernden: There are two parts to that. As the Minister said, we are hoping for the first launch from Scotland at the back end of 2022, which will be a vertical launch. That would be the launch capability that would have the potential to launch OneWeb satellites.

The issue that we are facing around OneWeb is that the current or very recent launch plans to launch from Baikonur would have launched 36 satellites at a time. The launch capability that we are building in Scotland, from Shetland and Sutherland, is for a smaller launch capability than the heavy launch that the Soyuz rocket would offer from Baikonur. So, yes, Scotland would have the potential to launch OneWeb satellites, potentially within the next six months to 18 months, depending on how the process moves, but it would mean smaller batches of satellites initially going into orbit rather than the larger batches that were going from Baikonur.



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Q224 **Mr Francois:** You could launch 36 from Baikonur. Are we talking about one at a time or a handful?

Rebecca Evernden: My understanding from the UK Space Agency who are in charge of the launch programme is that it could be up to about six from Scotland. Hence, OneWeb are currently looking at other plans in the short term and we and the UK Space Agency are assisting them in that work looking at other launch providers—potentially the US or other places—that could launch, in the shorter term. When it comes to the second generation of OneWeb, further down the track, there is a lot more potential to use UK launch services perhaps than there is for this first generation, when they probably need to look elsewhere to get those bigger batches of satellites into space quickly.

Q225 **Mr Francois:** Ariane—is that an option?

Rebecca Evernden: Yes, their existing contract is still with Ariane. They will be working with Ariane to look at alternative options.

James Heappey: I scribbled some notes to Harv as that exchange was going on, because my understanding was that SpaceX has an even greater launch capacity than in Kazakhstan. That is indeed the case. It is perfectly possible for us to launch through our most trusted ally the sort of volumes we were expecting, but, clearly, there is a nascent UK launch industry and it is a great customer, to be able to get that up and running. There is no loss of volume, because we could do it through the US, but it would be a pretty good vehicle to get UK launch up and running by using—

Q226 **Mr Francois:** OneWeb are a commercial entity with a Government stake. Do we understand that they are being fleet of foot and those negotiations with the US are already under way?

Rebecca Evernden: Yes, we understand that they are talking to the US as well as to other potential companies around the world that might offer these services.

Q227 **Mr Francois:** Hopefully we are talking about a hiatus of weeks or months, and not years.

James Heappey: Yes.

Q228 **Mr Jones:** Can I get some understanding of what our capacity is going to be? Several years ago, I had the privilege of going to French Guiana to see a satellite being launched and it is quite an impressive set-up there. As you know, Minister, geography is all important in terms of where you can launch satellites into which different spheres. In terms of the UK, Rebecca has talked about numbers. What can we launch from the UK—into which orbits? There is a big difference between putting something into low Earth orbit and putting something further out. What is the capability that we will eventually have from the UK?

Rebecca Evernden: We are looking to launch into low Earth orbit.

Q229 **Mr Jones:** So the higher stuff will still have to be done from equatorial French Guiana and so on.



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George Freeman: This is not a replacement for equatorial launch. This is low Earth—horizontal Cornwall, vertical Scotland.

Q230 **Mr Jones:** I understand that, but that is quite a competitive market. People have got that sewn up already, haven't they? You mentioned SpaceX and others. So what realistic prospect is there of people choosing the UK rather than going to SpaceX?

George Freeman: All the signals we have had in the four or five months since I have been in this job have been of huge interest, and really the answer to your question is: because of the volumes. The volumes over the next five or 10 years, the numbers of satellites going up, are exponential; and the move from military/sovereign defence capabilities to civil and commercial is the vast bulk of that increase. That is the point of the national space strategy—to try to harness that growth in the UK. We are seeing huge growth in the appetite for that sort of launch capability, so we are confident the demand is there. The key is that we need to get the first launch away and the CAA regime right.

Q231 **Mr Jones:** I appreciate that and I will come back to military in a minute, but there are also limitations, because northern Scotland or Cornwall is very different from, for example, French Guiana. The airspace above that is pretty empty, compared with the north Atlantic or transatlantic air corridors. How limiting a factor is that going to be in actually getting numbers, or is there a way of separating—I know you have done it before when you have launched things from Scotland and you have cleared airspace, for example. Where are we at with that?

George Freeman: This is one of the first questions I asked: isn't there an awful lot of traffic up there for us to be blasting through? That has been carefully thought through. Rebecca might be able to provide a bit of detail on where we are on that. It is not the big constraining factor that one might have expected.

Rebecca Evernden: I have just a couple of things to add. The analysis that the Space Agency has done shows there is strong potential for a commercial market in Europe. I think the key point is that there is no other small satellite launch facility in Europe at the moment and so our goal is to be the first and therefore capture that market from European companies who wish to be able to launch from somewhere that is not too far away from where they are based, and of course also to be able to provide for our sector that end-to-end capability so that small satellites can be designed in the UK, built here—we have great expertise in that—and then launched from the UK. That has the potential to speed up the whole process, so that's part of the rationale for why we think a commercial small satellite launch facility has a very strong economic case underpinning it.

With regard to the airspace point, airspace is not my area of expertise, but the way the legislation was designed under the Space Industry Act was to allow for opening and closing of airspace—maybe Harv wants to come in on this point as well—to allow launch in a fairly agile and flexible way, so



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that you do not have to close airspace for very long periods of time in order to facilitate launch.

Q232 **Mr Jones:** Can I ask about the military side? Therefore the military aren't really going to be using the UK, are they? Are you actually going to be using the UK for launching low-Earth—

Air Vice-Marshal Smyth: We could do, yes.

Q233 **Mr Jones:** Could do or are going to?

Air Vice-Marshal Smyth: At the moment, for the inaugural launches, we have plans to have military payloads on each launch. The thing that sometimes we forget as this idea of new space really starts to play is that, with the next generation of space technology, it is not things the size of double-decker buses that we are sending to space anymore; they are little toaster-sized, shoebox-sized satellites that have enormous capability. We visited last week a company in Glasgow called Spire, who specialise in little nanosats, and the capability that these satellites can deliver is just exceptional. They can do everything from monitoring climate change, right through to the intelligence collection that we discussed earlier. When you think of technology that is that size, you can still, despite the smaller fairing on a UK launch platform, launch a meaningful number of small nanosats, form a constellation really quickly and have a meaningful capability. That said, for our bigger satellites, we will still need to look for an alternative launch solution. An example is the next generation of Skynet, our large comms satellite that will go all the way to GEO. That satellite will need a heavy launch capability. From an MoD perspective, our requirement is for it to be assured launch—that is the term we use—so we know when we can book it, we know we are going to get the right slot and it is going to go to the right part of space, and we know that people are not going to tinker with our payload once it is sent to the launch provider.

Q234 **Mr Jones:** The option in the UK is going to be for smaller satellites, so for the heavier stuff—the stuff that is going to geo-orbit—you will still be relying on French Guiana and places.

Air Vice-Marshal Smyth: That could be Arianespace, it could be SpaceX, it could be United Launch Alliance—there is any amount of heavy launch capability across the globe that we would call assured launch.

Mr Jones: Not Baikonur.

Air Vice-Marshal Smyth: Not necessarily there, no.

To your point on access to orbits and whether the UK is the right place, and to Rebecca's point about airspace, booking and controlling airspace is nothing new. We do it routinely in the military for high-end tests and evaluation—missile tests and so on—particularly in areas like the Hebrides, which is close to where we are doing the Scottish launch. This is not a new thing; there is a very well-trodden path on how we book out airspace.

The other point that we should try to take away from today is the idea of the flexibility that having a horizontal launch platform provides the UK.



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This is not a fixed launch site; we can put our rocket on a 747 and fly it to where we need to launch. If you want an equatorial orbit, you go to the Azores and launch it there; if you want a polar orbit, you go north of Norway and you launch it there, but it takes off from UK soil. That is exceptional flexibility for UK sovereign space.

James Heappey: It is perhaps unfair to cast this fly so late in your inquiry, but as Sarah asked earlier, there are other bits of geography around the world that the UK has some access to. What the utility of that other geography could be and what sort of opportunities that provides are something that we are considering, and you may want to make some recommendations about it. The airspace management thing is not insurmountable, but we should not be fixed that the UK homeland is the only opportunity for this. We as a Department are certainly giving some thought to what the utility could be elsewhere.

Chair: Thank you very much for that. We need to crack on a little through some of the questions and answers. The next question will come from Stuart Anderson.

Q235 **Stuart Anderson:** Air Vice-Marshal, before I come to my main question, let me follow up something you mentioned earlier. You mentioned NATO in space with article 5. Will that relate to other countries' own satellites, or do you see the opportunity arising for countries to claim areas in space?

Air Vice-Marshal Smyth: My understanding is that it would apply to destruction of satellites and so on. Let's say we had a constellation of satellites that was British and it was critical to national infrastructure; if another nation were to remove that in a kinetic way—let's say it sent missiles up and started blowing satellites up—then, from the latest tech from NATO, that could lead to a discussion around how we would respond to that collectively.

Q236 **Stuart Anderson:** Thank you. You have talked a lot about future collaboration and partnerships, the CSpOC alliance, Five Eyes, France, Germany and all that. Can you update us on where we are at the moment with the European space industry, particularly along the lines of research and projects?

Air Vice-Marshal Smyth: I am afraid that question needs to be directed to the BEIS Minister. From a military perspective, in the way our programmes have matured over recent decades, the UK military has tended to partner—and it has historically—across the Atlantic with the US, and the civil side has tended to lean more to ESA. That question is probably more for Minister Freeman, I am afraid.

James Heappey: I am just going to make the MoD political point. We thought this question might come up, and it is really important for those who might want to make mischief over what happened over the last few years that absolutely no military capability has been lost whatsoever through any access or otherwise to ESA. It is totally inconsequential to the MoD and our space operations.

Stuart Anderson: That is very good to hear from the military point of view.

Q237 **Chair:** That might be true about ESA, but what about Galileo?

Air Vice-Marshal Smyth: I can talk to that. From a PNT resilience/military perspective, we have full access to UK GPS, and more importantly we have full access to UK GPS M-Code, the encrypted code that we use for our operations and employment of things like precision weapons. We also have commitment from the US for full access to the next generation of GPS which is starting to be built out at the moment. From a military perspective, we are content with that approach, and of course the work that is going on in the post-Galileo era, in terms of a space-based PNT programme, is being run through BEIS and we support it, as a supporting element.

Q238 **Mr Francois:** But UK GPS is US GPS, isn't it? There is no UK GPS.

Air Vice-Marshal Smyth: That is absolutely correct.

Q239 **Chair:** Let us hear from the Minister.

George Freeman: On the ESA question, I was there two weeks ago for the ESA space summit and I will happily share some reflections on our ambition. Perhaps I can put it in the broader context first, in terms of where space fits in to our BEIS industrial strategy. We are really in the process now of implementing the integrated review, and that is about thinking much more strategically and geopolitically about science, research, innovation and technology, and where that fits in.

We have two parts to that—first, science superpower. In a world where China is investing \$140 billion-odd a year and America just shy of that, how do we make our £20 billion, increased from £14 billion, punch above its weight? How do we make sure the UK is harnessing that for serious global impact? It is about world-class research and talent, helping to tackle global challenges from melting ice caps to clean oceans to sustainable space, and harnessing that soft power for geopolitical influence. I would argue that we have probably done as much for global security through the Ebola, Zika and COVID vaccines as we have done in some of the military engagements: those are two sides of geopolitical security. We have recognised that in the integrated review.

The second half of the project is innovation nation—how do we make sure that that science leadership drives an innovation economy? If you take a sectoral approach, our first industrial strategy has paid dividends in the life science sector, and we are looking at space as the next obvious big growth sector. It is already £16 billion. If you mapped the global commercial space sector, you would say that the UK has great strengths and expertise in some areas. I have elsewhere likened it to being in a Formula 1 pit lane where we do not have a car. OneWeb is part of a car, and the launch capability gives us another part. The aim really is to surf that wave of the commercial investment in space, as we evolve from a very civil, sovereign,



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integrated vertical space ecosystem to a much more international one. So we see space as a huge part of that growth.

In terms of BEIS's budget, we are spending £1.5 billion over the next three years, and 75%-odd of our UK spend goes through ESA. We are the third biggest contributor—Germany are at about £1.1 billion and France at about £900 million-odd, with us at £400 million, and then there is a bit of a drop to the others. I am in the process, as part of this work and now that the Chancellor has given us a three-year settlement, of thinking about how we use that ESA membership to drive and build on UK strengths and where the UK really adds value to that ESA ecosystem.

It was very interesting going two weeks ago and hearing from other countries who are major contributors. You will have heard President Macron and Commissioner Bruno Lemaire set out an ambition for ESA to launch—guess what?—a LEO constellation much like OneWeb. A number of contributors there said to me, "Oh, you already have a LEO constellation called OneWeb: couldn't we do some collaboration with you?" We need to think a bit about how, for that £400 million, we help to develop the European space economy which we will benefit from.

Q240 Stuart Anderson: On that point, given the current security situation with Ukraine and Russia, and watching as the West has united together—it is brilliant to see—do you think those collaborations will be easier and more closely linked moving forwards?

George Freeman: I will answer to the geo-diplomacy of that and then perhaps pass to the Air Vice-Marshal. On Horizon, Copernicus, Galileo and many of these research programmes, I am certainly detecting a thawing of some of the tensions. The Committee may be aware that we have been kept out of Horizon, having agreed to be members, and one can detect a strong sense that, given the emergency, everyone is much more focused on what we have in common and how we can avoid divisions. I think one can feel a strengthening of the smaller European coalition—if I can put it that way—which will hopefully be reflected in the science and research side. I defer to the Air Vice-Marshal on the specifics of the Ukraine situation.

Air Vice-Marshal Smyth: To be honest, I do not have much more to add.

James Heappey: It is quite political. It will not surprise you that there are some countries that are keener to protect their sovereign industry, and thus any opportunity not to collaborate with another country is well taken, but I think that this is a moment of renewal for Euro-Atlantic security. It is in our interests. The MoD view is that this is a moment to renew our Atlanticism and to see what partnerships one makes within Europe and with Canada and the US, and we are very keen to guard against this being used as a vehicle for EU-European strategic autonomy, which we think would be unhelpful to NATO. That applies to all domains equally.



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George Freeman: To add to that, countries such as Japan, South Korea and Australia—quite a lot of our allies who share a lot our global security threats—share with us a strong interest in safe space. I think there is an opportunity for us there.

Q241 **Gavin Robinson:** Air Vice-Marshall, tell me if it is unfair to go into more detail on NATO's potential recognition or protection of operations in space, but when you were going through a hypothetical scenario, you talked about a constellation of satellites that were critical to national infrastructure. Is there a threshold at this stage? Do you get a sense that it would have to be in that sphere—something sensitive to critical national infrastructure—to be relevant to NATO, or do you believe that the threshold could be lower than that?

Air Vice-Marshall Smyth: Honestly, I would not like to comment at this point. The fact the NATO has taken the step to publicly declare that article 5 could apply to space is in itself a major step forward and an overt recognition from the alliance that space is a critical domain for everything they need to do in terms of being a deterrent alliance. I think each particular scenario would be debated on its strengths and merits.

Q242 **Gavin Robinson:** Minister Freeman, we know that the Prime Minister has talked about the UK being a meaningful player in space. I think you have recognised, fairly, that we are starting from a low position, that our investment, in ESA terms, lags behind some of our near neighbours, and that across the industry, we could be doing more. Do you feel we are right to focus on building direct capability and capacity, or would it be better for us to focus on soft power efforts to collaborate with and encourage others?

George Freeman: It is not as binary a choice. I understand and will unpack the question. I accept that if one did a league table of global space sectors by volume and size, I think—I have not got it in front of me—you would have three big global integrated vertical programmes, and then you would have a number of countries, including Japan, Australia, Canada, Italy and Norway. We are quite low down that second division—or the championship, if you like—but we are recognised as having very, very strong capabilities in a number of particular areas. That is quite a familiar UK industrial trait: we have lacked the big industrial majors—the tier 1s that will pull through—but we have very strong so-called downstream strengths in everything from satellite manufacturing to robotics, materials, imaging and optics.

To answer your question specifically, and in answer to the point Mr Jones made, on capability we think that having LEO satellite and small-payload satellite launch capability is important if we are going to fulfil our ambition to be a major player in the commercial satellite sector over the next decade and beyond.

Equally, if you look at the Earth observation capabilities that we are developing, such as the ISTARI programme and the space domain awareness work we are doing—the Air Vice-Marshall might want to come



on to those—I would argue that these are quite strong capabilities that are recognised in ESA, as well as elsewhere. Leaving aside the debate about how the decision was taken, as civil space Minister I would be saying, “If only we had a very strong share in a LEO constellation right now.” That would be incredibly powerful, particularly if you had all the spectrum licences. I think we have got some capability.

For me, the real challenge is, how do we ride this hockey stick of commercial space interest and make the UK a real leader? It is partly about using capability, but I am just as excited by some of the regulatory opportunities. If you talk to anyone in the space sector, they will tell you that it lacks proper up-to-date modern regulations, such as smart regulations for safe space, debris management and satellite retrieval. The UK has an opportunity there post Brexit, dare I say it. We have the freedom to move a bit more quickly.

That links to insurance, and I think we could envisage the UK being a place where you would want to get your launch licensed. We could create an ecosystem that is very British and speaks to our agile financing system, floating and financing start-up companies. Some of that requires a bit of capability. You are not much good as a Formula 1 pit lane if you haven’t got a car. Equally, a lot of the value for the economy is in the broader ecosystem of financing, technology and development, and I am very focused on how we can grow that.

Q243 Gavin Robinson: What is our focus then? Is it being a major player in the major leagues or being in the Vauxhall Conference and looking for progression incrementally? Or is it a dual-track approach? Are you saying that we have given the nod to launch capability in the commercial and civil sphere, but there is much more that we can do besides to make that ecosystem a reality?

George Freeman: Yes. I will pass to Rebecca in a minute because she led the work in BEIS on the strategy. I think it sets out quite clearly in those 10 domains a very powerful vision for how the UK, over the next decade, sees itself and where the opportunities are for us to lead, whether that is in space sustainability, small satellite manufacturing or robotics. The real strategy question is how we move through those gears. Where do we start? Where do we establish leadership quickly? What is the sequencing?

The launch piece is important, and we are putting a lot of effort into establishing that launch capability this year. There is a regulatory piece that we now have the opportunity to move on, and there is a financing piece. If you look at companies like Arqit and Inmarsat, or companies that are doing satellite retrieval, we are growing some quite significant companies and the challenge is how we grow them.

I am focused on creating an ecosystem in which those companies can grow and flourish here, as much as thinking about investing in key strategic infrastructure. The strength of this approach, with MoD procurement opening, and some competitions and challenges, is that we can start to create an ecosystem where civil space companies in the UK



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are opening up competitive tendering where they can, creating an ecosystem and have launch and strong technology sets. Rebecca, is there anything you wanted to add on the sequencing of implementing the strategy?

Rebecca Evernden: Just a couple of brief points, if I may. The space strategy tries to set out some choices that we have made in three tranches. We need to grow the areas that we are good at now, and that means continuing to work closely with some of the key companies we have in our space sector ecosystem and making sure there are opportunities for them to work with us in developing new capabilities.

Harv and I spend a lot of time having conversations at the moment about how we can work more closely together, joining up the civil and military interests so that, further down the track, capabilities have more potential to offer dual-use purposes perhaps than they have traditionally. It is a process that is going to be iterative—we are right at the start of it—but if we can make some progress, that would really set us ahead of where many other countries are at the moment, where you still see a very rigid divide between civilian use and military use of capabilities. That is one area of work that we are looking at. How we talk to companies about our interests, whether for civil or defence purposes, is also really important, so that they get a joined-up view from the Government about what we want. That is one point.

Secondly, the strategy talks about the importance of being able to exploit the hugely exploding growth area of downstream applications, which is something that we are very good at. We have got great expertise on the Harwell Campus around this and with the Satellite Applications Catapult. That is something that we are going to be putting a lot of effort into.

Then, I think, as Minister Freeman said, there are a few areas where we think we can develop new capabilities which are right at the cutting edge and which are going to be essential for operating in space successfully in the future. That is debris removal, in-orbit servicing and manufacturing materials for space. We have some fantastically innovative companies that we are working very closely with, to try to foster a new set of capabilities to bolt on to the very strong existing set that we have got already.

George Freeman: The acid test will be, do we grow companies like Astroscale, Arqit, Space Forge? Are they growing here, not just starting up here and then going overseas? For me, that is a real focus—can we grow a serious cluster?

Chair: Minister, you mentioned the lack of tier 1 companies in the UK. Bluntly, as in so many areas, a lot of that is down to the adamant refusal of the British Government as a customer to back those companies. That is a discussion for another day. Kevan Jones.

Q244 **Mr Jones:** I agree with you; I think this is a very exciting area and we have some great companies, large and small—things like Airbus, a European company, with its presence here in terms of satellites and so



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on—but £400 million invested in OneWeb is a drop in the bucket, isn't it, compared with the amount of money that we see SpaceX and other people spending in this area? I have nothing against trying to increase niche technologies, but ultimately the idea that we are going to launch things from here is not going to make a real difference—it is the technology that is going to be the interesting issue.

In terms of dual use, defence and commercial, I accept that for non-sensitive things that is quite an easy option—there are some options there. Realistically, from the MoD point of view, if we are talking about highly classified things—Skynet and other things—I accept we should be trying to encourage UK companies being involved in that and taking a lead in that, but our main partner is going to be the US, isn't it? It is not going to be us doing that alone.

James Heappey: I will let Harv smack the TS STRAP 2 buzzer whenever I am straying. I think there can be dual use. It is perfectly possible to have a military application and military-grade fidelity on the same platform as a commercial sensor that is probably operating at a lower fidelity. So far, so good—no buzzer.

We are also clear-eyed. We want this to be a cross-Government partnership. It is better if there is dual use, with industry unlocked by BEIS and other colleagues around Government, but we are very clear about what our requirement is and what we won't do is compromise on the requirement we have in the name of delivering dual use.

I am confident that our military spec can comfortably sit alongside other uses, and that is our preferred outcome, but it is not a showstopper—if there is no appetite for dual use, we will just push on and deliver the capability we need.

Q245 **Mr Jones:** Is that why you are against OneWeb?

James Heappey: Oh, Kevan.

Q246 **Mrs Lewell-Buck:** In the DSS, there was no thorough assessment regarding the nature of industrial capabilities or support needs in the UK, but there was a commitment to say, "We will do those assessments." Just listening to the comments so far, it looks like you are thinking about this, but those assessments have not been concluded yet. When will they be concluded so that you actually have a proper industrial strategy?

George Freeman: I will start and then I will hand over to the Air Vice-Marshal. Part of both the opportunity and the challenge of a proper industrial strategy is working across Departments. I have been very committed to that. If we are going to go from £15 billion to £20 billion a year R&D, 75% of that comes through me and BEIS—that is going to 70%. A big chunk goes into MoD; a big chunk into DH; a big chunk into DCMS, DEFRA and DFT. Ultimately, we do not have the luxury of doing everything in siloes.

In a world where China is at \$240 billion and America at \$180 billion, we have to be smart. Part of being smart is working out how each thing we do



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in Government can pull through two or three things. Look at Arqit, which is a quantum encryption company. The space programme and our deep investment in quantum are key. Look at AI and healthcare; the increasing use of AI in healthcare and procurement by DH is driving AI leadership in the UK. We are trying to think strategically about how we can use both capability and procurement.

In this situation, it is clear that we would not want or expect the MoD to compromise any decisions that they want to make on security grounds. But the aim is procurement that can be opened up to competition, where we can start to create an ecosystem where companies can bid in. To your specific point, Minister Quin—the Minister for Defence Procurement—and I are working closely with Rebecca and Harv. We are on six-weekly meetings to define exactly that. We have a Venn diagram, with some things that are MoD and only MoD, some things that are BEIS and that only BEIS can do, and then a lot in the middle, where we can work together. I would not underestimate that: Ministers from two Departments with one joined-up vision. We are doing the same in the Department of Health, in DFT and in DEFRA. That joined-up working is how we will turn each UK £1 into more.

Q247 Mrs Lewell-Buck: The Prime Minister has said that you want to move at pace with this, but it looks like that work is still in progress. The DSS was put out, but you still do not have the building blocks there to know what industrial capabilities and support needs there are in the UK. That is what I am looking for.

George Freeman: No, no, no—sorry I have not done that justice. I will pass that to Harv. There is quite a lot of work. I could list five or six points, but they are probably better coming from the Air Vice-Marshal.

Mrs Lewell-Buck: I will hang fire.

Air Vice-Marshal Smyth: On your comment about the analysis, we actually did a ton of analysis to inform the DSS, but we did it collaboratively with BEIS in the co-authorship of the national space strategy, of which the defence space strategy is an addendum; it just puts more meat on the bones of the fourth pillar of the overall NSS. That analysis did happen. Prior to that, we had about five years of analysis through various reviews in the MoD, defence reviews and so on, and we leveraged all that work.

That said, Rebecca and I co-chair the national space board, which convenes cross-Government. In fact, we have our next session this Thursday. The main effort through the national space board at present is to take the national space strategy, break it down into relevant work streams and turn that into implementation planning, with the view to publish what we are calling a space sector policy early this autumn. That will cater not just for the national effort, but the defence part.

We have been determined in defence that, where we can, we will collaborate through the lens of the national strategy. The last thing we



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want is this stovepipe of defence activity that is then not integrated across the national efforts. Obviously, the role of defence is to provide the protect and defend function for the national effort. That work is ongoing, and it should be a pretty good piece of work when it comes out. It will be worked on through the summer to deliver in the autumn.

The other important point is that we are not doing that in isolation, but are working closely with the sector. The Minister for Defence Procurement for the MoD, and Minister Freeman, are co-chairing work with the UKspace trade body, which effectively give us their input and we are bringing them with us on the journey. This is a proper national collaboration, in terms of, "How do we do this in the right way to help the sector and help deliver the requirement for Government in terms of the overall space strategy?"

Mrs Lewell-Buck: Thank you. I am happy to leave it there, Chair.

Q248 Mr Francois: As we know, space has both commercial and military applications, but I will just focus on the military, quickly. Min AF, space is an enabler—you could say a super enabler—and now, as the Air Vice-Marshall has told us, NATO has formally declared it as a domain. Nonetheless, a satellite still cannot take or hold ground. There are things that space can help us with, but others that it cannot do. How does the MoD balance its investment between space and all of the other important capabilities that it needs to fund?

James Heapey: This is exactly the debate—I called it an argument earlier, but it is a debate—that we were having in my office before coming over here. If you look at what is going on in Ukraine right now, it all feels quite analogue and reversed, really reversionary. There is a bit of GPS denial and a bit of EW but, frankly, it is pretty old-school. For all of us who have sat around having the discussions about multi-domain integration, space, cyber, and everything else, that is not what is playing out in Ukraine, and that is quite surprising. It is as surprising to us as, I suspect, it is to you.

I was like, "QED, Harv; we're wasting our money on you, mate." Harv pushed back—rightly hard—with two things. First, the fact that London and Washington knew what was likely to happen is because of a combination of a number of intelligence assets, including some extraordinarily good stuff with which to see stuff. That clearly justifies, to some degree, the investment. Secondly, the Russians just do not have the same type of sophistication in their weaponry as we do in the west. A lot of that sophistication is enabled from space.

You could get into a slightly nihilistic argument at this point and say, "Look, if it's perfectly possible to have an entirely reversionary analogue war, why bother with the expense?" That includes the expense of avoiding denial of space, and the kind of cat-and-mouse game that gets played out up there. In all honesty, I am not sure I accept that. The reality is that, if NATO were in this, the technology that we would bring to bear, enabled from space, would allow NATO to operate at a tempo, with a precision, and at a depth, that it has turned out that the Russians cannot operate at.



Q249 Mr Francois: For the avoidance of doubt, I am not suggesting that it is entirely black and white. None the less, you could argue that part of the trouble that we are in in the Ukraine derives, at least partly, from the fact that NATO was defeated in Afghanistan. We were run out of town by what some ill-informed commentators—in my view—described as a bunch of country boys. They didn't have a satellite between them, but they still kicked us out of Kabul pretty brutally. I do not think it is an absolutist argument, but after what happened in Afghanistan and Ukraine, it makes your balance of investment decisions even more difficult to make, does it not?

James Heappey: I do not think that I agree entirely. We have all been very open with colleagues around the House that it is threat-based policy making. I think that the balance of investments in the IR was right, in that it was impossible for us not to invest more in the space and cyber domains particularly. I think the thing that is driving your question is a question about mass in the land domain. I don't know that we are seeing operational analysis that really says that you want a return to massed armour. In fact, I think the question we are asking ourselves is, "Blooming heck, if a small bunch of determined people with NLAW and Stinger can wreak this sort of havoc, what is the model for dispersal? How do we learn from the operational analysis that we are seeing to bring real lethality to bear on a peer adversary, because our method of operating is so disruptive?" That has to be technologically enabled to a degree, and that stuff is expensive.

It may well be that at the end of all this, you say that what we need to do is to maintain course on space and maintain course on cyber, but the big up arrow—if an up arrow is provided to us—is around precision deep fires, logistics, enablement and all the things that allow dispersal.

But we have our eyes wide open. We are aware of the growing debate around budget. We continue to be very grateful to the Prime Minister and the Chancellor for the very significant increase in the defence budget last time round. But like the many Defence Ministers who are sitting around this table, no one ever minds more.

Mr Francois: Very quickly, it is not just about mass; it is about readiness and about whether we have taken too much risk in the IR too early. But we have got a report in draft on that, so maybe we'll leave that for another day.

Q250 Chair: Earlier, you talked about being smart and putting things together, but we have probably got about 10 principal Government Departments and agencies with responsibility in this area. And I would suggest that there is a danger that something that is everybody's responsibility is nobody's responsibility, and it then ends up slipping down in the order of priorities within the Whitehall machinery.

So, the question really is this: don't we need a Cabinet-level Minister for space to advocate at the highest levels of Government and to provide the focus and impetus for delivery? I see George smiling at that. We await his



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bid.

George Freeman: I am smiling because the MinAF and I have debated at length the calls for, “We must have a Cabinet Minister for—” If you had a Cabinet Minister for every single priority, you would have a Cabinet of about 100 people.

Mr Francois: We are not far off now, George!

George Freeman: Let me answer that question in two ways. First, on the dual-use point, I think there is a danger—and the Air Vice-Marshal hinted at this—that this phrase suggests that we are starting completely from scratch and that this is a wholly new concept, but of course it isn’t. We have been at this in the last few years and we have got better and better at it, and it isn’t all about the opening up of major procurement.

If you just look at things like the national space operations centre, the ISTARI work on Earth observations, Skynet 6, SATCOM and DSTL, that alone is quite a powerful ecosystem for international investors to look and say, “Actually, if we put that together with OneWeb and Launch, and BEIS’s £1.5 billion, this is the beginnings of something that could be more exciting.”

Just on your point, the PM would say—rightly, I think—that he has made this an absolute priority. The pressure for launch—for delivery of launch—this year is a personal mandate from him. The national space board is doing a lot of heavy lifting.

I think you’re looking at the two key Departments. If we can get it right, then I think there’s a benefit for DEFRA on Earth observation. There’s a benefit from a lot of the health research work that has been done on the International Space Station, and for transport logistics. However, it is these two key Departments really that have to get it right.

Nothing is ever perfect in Whitehall, but I think we’re able to achieve a lot. We’ve set out a lot of things that we have to deliver now. I think that must be the focus.

Q251 **Chair:** If we are saying, “Who are the point Ministers on space?”, inside Government it is yourselves.

George Freeman: For civil space and the growth of our space economy, it’s me, and for security, military, MoD in space, it’s MinDP.

Q252 **Chair:** Okay. So, if we don’t make progress, we know who to blame.

Obviously, one of the key factors is to get buy-in from the public. Is there a need to better educate the public about our reliance on space and why it’s important to the national interest? If so, how are we going to do that?

George Freeman: Yes, very important, and I’m glad you asked, Mr Spellar. If you went down to the apocryphal Dog and Duck and asked, “How big is the UK space sector?” I think most people would probably give quite a small number. When I say, “It’s £16 billion today”, people are always amazed at the scale.



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I think that a lot of people do not understand what the growth potential is, but I am sure also that a lot of your constituents, and those of other colleagues here in the room and mine, look at some of the big challenges that we all face today, or this month—cost of living and energy bills—and wonder, “Is this really all about American billionaires and vainglorious missions?”

The key message is: no, this is about daily comms—whether your phone and car GPS works. It is about the daily reality of the economy today. It is about resilience and security—research security, cyber-security for research, for intellectual property. This is about security, and it is about huge economic growth. All of us need to keep hammering that message home because I think the initial preconception is, “This is America, China, Russia and a few billionaires, and we are not really a player.” The message that needs to go forth is, “No, this is about a modern, resilient, digital connected economy.” It is resilience and security for all of us, and incredible economic opportunities—from Newquay spaceport, to Shetlands, to Leicester, to Glasgow advanced manufacturing, to the Thames corridor—with great companies creating great opportunities.

Chair: Thank you. We are going need to pick up a bit of speed now.

Q253 Mr Jones: In terms of defence space, we have fallen behind our competitors. The Defence Space Strategy was an impetus to show that we are going to get real about this, but I always think that when strategies come out, you have a lot of fanfare and then it sits on a shelf. How are we going to measure how it is going to work? Are there going to be timelines and milestones that we are going to hit?

To get a clarification, is this defence portfolio yours or does it lie with procurement? Where does it lie within the Department? Clearly, there is a policy side to it, but then there is also the procurement side. Picking up on what John said earlier on—clearly, he will hit the STRAP button—where does intelligence, not just Defence Intelligence, fit into this spend? That is an important aspect of your work as well, isn't it?

James Heappey: First, on ministerial responsibilities, it is just like anything else, Kevan. The policy about how we operate in space sits with me. Procurement and the industrial strategy sit with Jeremy, and then there is a bit of collaboration around the front-end capability identification as I do my job, he does his and we converse about what is required. That is the same for cyber. It is the same for shipbuilding, fast air and land platforms.

You are absolutely right that at the heart of all of this is an understanding of threat, and there is some very sobering, very high-sci reporting around capabilities that our adversaries and competitors may have, which focuses the mind on the sort of capabilities that we might need as a consequence. I think there is an advantage, or at least this is what I have persuaded myself, in the sense that sometimes—if you are right in the premise of your question that we have fallen behind—having others out in the market in front of you, and for once being the people who can try to identify the



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\$100 solution to the \$1 million challenge, rather than us endlessly being a \$1 million challenge for others to tackle with a \$100 solution, can be a position of advantage.

I think that the strategy Jeremy announced is an opportunity for us to look at how to take advantage of some disruptive technologies to get into the space business at a far lower cost than many of our competitors. The ambition for this IR is to be doing concept development prototype work. You are not going to see a UK space force at scale in this IR, but—this is something that many members of the Committee will have often thought—actually, having the courage to be willing to fail, to look at disruptive capabilities, to get in with prototypes and to see what works is in itself a good thing. I am not for a second suggesting that stuff will fail, but I just think that there is an approach to space that is quite liberating, because we are able to get into the market having seen others succeed and others fail.

Q254 Mr Jones: There is, but you have a tendency as a Department, over the last few years, to buy off the shelf from America. That seems to be the default position of 30% of your procurement budget. If we are going to meet the challenge of ensuring that we have home-grown business, I would like to understand this, although perhaps you are the wrong person to ask about procurement. I have been banging on to your Department, because you accepted the social value paper from Philip Dunne. I have asked the NAO umpteen how you quantify that, and you haven't got the answer. When you are doing procurement, how are you evaluating the effect in terms of broader policy and what has been outlined earlier on, as opposed to saying, "Well, actually, the Americans have got some so we will just buy it off them"?

James Heappey: You will appreciate that Jeremy would be nervous if he saw me even begin to try and answer your question in any detail.

Mr Jones: He cannot answer—that is the problem. I keep asking him.

James Heappey: There is an acute awareness of, on the one hand, our responsibility to procure capability of the highest sophistication and for the greatest possible mass, for the best value for money.

Mr Jones: Don't get me started—

Chair: We can't, Kevin, because we need to move on.

Q255 Mr Jones: You have actually outlined quite an ambitious programme of collaboration on UK investment. All I am saying is that we have to make sure that you, with your money, spend it in the UK, rather than just look abroad.

James Heappey: In the interest of brevity, I do not know that there is any guarantee that it will be spent in the UK; there is clearly a hope and an expectation that it would be. We need to be clear-eyed about the priority being military capability. I cannot give you a hard-and-fast



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commitment that all £1.4 billion will be spent in the UK—we hope that it is.

Q256 **Mr Jones:** Given your track record, you will not spend a great deal in the UK. Is £1.4 billion enough to deliver that strategy?

James Heappey: Yes, because, as I said, this first IR is about getting into the domain with exploratory prototype capabilities—stuff that will catalyse a nascent industry. That feels achievable with that amount of money. When we see what works and what sticks, that is the time to go after it at scale.

Q257 **Mr Francois:** James, if you do not want to get him going on procurement, don't get me going either, given that the Public Accounts Committee has declared your procurement system "broken".

Let's focus on PNT. We have got the American GPS and, as you rightly say, all sorts of military capabilities that we have now depend on access to that—no one is denying that. We had a second option for a signal via Galileo, but then we were excluded from the core part of Galileo that provided the signal. The UK Government then said that they would develop our own unilateral option. Where are we on that? When will the space-based PNT conclude, and is the prospect of a sovereign UK system still on the table, or has that gone away?

James Heappey: I am going to delegate to Harvey.

Air Vice-Marshal Smyth: If I can be so bold, that is a point for BEIS—*[Interruption.]*

Q258 **Mr Francois:** We giggle, but this has been the fundamental point all the way through. The MoD has pointed to BEIS, and BEIS has pointed to the MoD; both Departments are fully in favour of it, providing that the other one pays for it. If we can cut the waffle, are we going to have a UK unilateral system or not? Yes or no, George?

George Freeman: The honest answer is—

Mr Francois: No.

George Freeman: The work has been done on what the options might look like.

Mr Francois: Right.

George Freeman: There are a whole raft of different ways that one could do it and different cost profiles. Conversations are going on at a very high level about the right way to do it. Those are frankly above my pay grade. However, the work has been done; BEIS and MoD teams have worked up a series of options for how you develop that. But you're right: it comes down to some quite big decisions about finance and some of the geopolitical issues that we were talking about earlier. I think my best read of the situation is that, right now, given everything else that is going on, the judgment has been taken that this is not the time to have that conversation. We need to get through, and there are an awful lot of



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lessons being learned at the moment. At the risk of passing right the way along, I may just—

Q259 Mr Francois: I do not mean to be rude, but the Chair is reminding us that we have a hard stop at 4. Sorry if I press you, but it is only to save time.

According to people in the industry, if you wanted to do this in a “traditional manner”, à la Galileo, you are talking about something, in a rough order of magnitude, that would cost about £5 billion—something in that bailiwick. I can see that Rebecca is nodding helpfully. Assuming you do not have a spare £5 billion in your budget—we know for a fact that the MoD do not have a spare £5 billion in theirs—and we cannot do it that way, are there other ways we could do it? Could we, for instance, use some variant of OneWeb to provide this at much less cost? Is that being looked at?

George Freeman: Yes, it is on the table. But I’d better pass to Rebecca for the detail.

Rebecca Evernden: I think what you have said is right, if you were going to do a similar sort of system to Galileo. The figures you have quoted are the order of magnitude that you would be looking at.

Mr Francois: It is a wrong number, yes.

Rebecca Evernden: The question that is being debated is whether you want a similar sort of system to Galileo or, as you have rightly intimated, whether there are other ways that you can provide that resilience, which is what has been committed to in the IR and through the national space strategy, but without having to do a replica system of Galileo and GPS. That is exactly the debate that is being had at the moment.

Your direct question is whether OneWeb could provide this capability. I think the answer is possibly. At the moment, we are talking to the company about what the second generation of the system could look like, and it could take a number of different forms. Whether it could provide PNT is one of the conversations that we are having. It could also provide other opportunities around, for example, Earth observation, so the company is considering a whole range of issues about what it wants to provide as well as what the Government might want from the company. Without going on for too long on this, the answer is potentially.

Q260 Mr Francois: In fairness to the Americans, if they were to start denying people access to the GPS signal, I think we would probably be the last non-Americans, other than perhaps the Israelis, for whom they would turn off the signal. Much of this debate has centred around a Suez-type scenario, which hopefully is very unlikely. None the less, for some of those reasons, people think it would be better to have a unilateral option. What you are telling the Committee is that there is work under way, perhaps to provide that “in an alternative manner” via OneWeb, but there is no definitive decision. We have understood the condition.

Rebecca Evernden: I think that is fair.

George Freeman: I would add one thing to that: the technology of the Gen 1/Gen 2 change. I was not here when the conversation was being had, but there is a big difference, and I think everyone is looking at the Gen 2 technology and thinking, "Well, that is a different kettle of fish."

Q261 **Mr Francois:** That is helpful. Very quickly, have MoD got anything to add to that from your perspective?

James Heappey: Mark, you have nailed that, within departmental budgets, the cash ain't there to do this immediately. If there are opportunities to do it another way, that is clearly a good thing, but I completely share your analysis. While it would be a "nice to have" and, in extremis, there are circumstances one could envision where a sovereign capability would be useful, I just think we are in a very, very extraordinary place when the US are denying us access to GPS.

Mr Francois: I suspect that many on the Committee would share your instinct on that.

Q262 **Derek Twigg:** Before I get into the procurement processes and how we improve them, can I ask what may be a silly question? Is there actually a limit on the satellites and stuff that we can stick up in orbit around the Earth without causing major problems in terms of smashes, crashes and the ability to manoeuvre?

James Heappey: I will hand over to the technical ninjas, but I saw an extraordinary animation—I think it is on YouTube—of the growth in satellites in orbit, and it is genuinely eye-watering. One would think, therefore, that you reach a point of near-saturation, although with the vastness of space, I suspect that it is only at certain altitudes that you could reach that point. It strikes me that it brings with it opportunity and threat—the threat of collision and everything else grows, but so too does the opportunity around servicing in space and the ability to remove redundant assets from orbit, and I suspect that that will end up being an opportunity. I sat on the Energy and Climate Change Committee before I joined the Government, and everybody talks about the money that the oil companies make from extracting oil, but there is huge value in decommissioning oilfields as well.

Derek Twigg: That is going to be a problem anyway.

James Heappey: My instinct is that there is an industry there—if the UK chose that as a niche, I suspect it would be quite lucrative.

Q263 **Derek Twigg:** So no one has done any sort of work yet on whether there is a limit to avoid collisions—

George Freeman: I defer to the AVM, but the answer to the question is that, if you regulate and control properly, you can increase capacity. As a wild west, it is not sustainable. That is one of the reasons we have made sustainability, management of space, space domain awareness and the national space control centre an important part of the vision. Interestingly, when I talk to satellite companies, they say, "Minister, you—someone—will have to regulate this sensibly. Isn't that a role for the UK?" Harv may have



some better numbers for, at the moment, the sustainability of the current system if we keep chucking satellites up there.

Air Vice-Marshal Smyth: Certainly from the research we have done, no one has ever put a number on it, but the assessment that space is becoming much more congested is, absolutely, fair. A way to measure it to bring it to life is access to launch windows—trying to fire a rocket up into space and getting through everything that is already up there. Five to 10 years ago, you could easily get launch windows of seven to 10 minutes in the day; today, it is three minutes and reducing. That is not just satellites in orbit, but the increase in space debris which, last December, ESA estimated at about 170 million pieces of space debris, of which we are able to track only about 24,000. We have the capability to track only something the size of an orange or bigger, but a fleck of paint travelling in low-Earth orbit at 5 miles a second that hits a critical component of the space station can still do a lot of damage.

That links right back to our very first discussion on space domain awareness and increasing our ability to understand properly what is going on in the domain, and then to manage that. There is a lot of discussion around the future of the space traffic management capability, akin to what we have across the globe for the air domain. One hundred years ago, someone looking up at the airspace over Heathrow would never have thought that we would have an air traffic service to allow aeroplanes with 250 people in them to land at 90-second intervals in weather, but that is where we are today. I can foresee a time in the future when we will need a similar type of traffic management construct for space, to keep it safe and sustainable. That is a key point—the sustainability of space going forward.

Q264 **Derek Twigg:** This is probably a question for the MoD. The Secretary of State, in his foreword to the defence space strategy, talked about operationalising the space domain “at pace”. What specific changes will you make to the procurement process to enable you to bring new technologies online before they become obsolete? We are also talking here about more agile acquisitions, perhaps considering a unique model for space acquisitions.

James Heappey: I think I gave the top-line answer to that earlier, in the exchange with Kevan. This is money to be spent on proof-of-concept prototypes—

Derek Twigg: But how do you become more agile—

James Heappey: I will hand over to Harv on the detail of how that is done.

Air Vice-Marshal Smyth: Thank you, Minister. That is a very valid challenge, and something that we have been alive to from the very start of the work two years ago on what the new defence space programme would look like. Defence is very alive to doing procurement in a much more agile manner.



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The start to this is how we have set up Space Command. We established a bespoke capability arm to Space Command to do the capability development and delivery, then the pull-through to the operators, so that keeps it under a single unity of command, which keeps everything much slicker. More importantly, command of Space Command is in the process of adapting what we call a rapid capability approach. You may be aware that in the Air Force we have a rapid capability office, which can pull things through more quickly. In many ways, it cuts out some of the layers of process associated with our historic procurement processes. We are working closely with the US Space Rapid Capabilities Office to learn lessons and apply those to how we do procurement.

The first example of this has been what we are doing with a programme called Minerva, which actually started as a Dragon's Den moment. I pitched to four people as though on Dragon's Den for £140 million to establish what we called at the time the "space game changer" but what has now become programme Minerva. It builds the architecture for space—the digital backbone. From that initial one-PowerPoint-slide Dragon's Den pitch in five minutes, we have gone to a contract in just over a year. That first satellite, which is contracted through a UK company, will launch this time in 12 months. To me, having gone from nothing to already having our first contract in place and a plan to launch our first satellite this time next year is a pretty good example of how we have a more agile approach to procurement for space. Certainly, Commander Space Command sees that as a benchmark of how he will deliver the rest of the defence space programme.

Q265 Derek Twigg: You would judge the success of that by assuming that something does not go out of date before you get to use it?

Air Vice-Marshal Smyth: I can talk to that. Our programme is built on a three-to-five-year spiralled cycle. As the Minister for the Armed Forces was saying earlier, it would be exciting but slightly daunting if I were to sit here and say that we are spending a billion on this capability and it is going to deliver in 2029. I would undoubtedly have got it wrong.

The way we have built our programme allows us to make decisions as we go along in the three-to-five-year cycle, invest in concept demonstration and leverage new tech as it comes on to the market. A lot of the work we are doing is through a construct called the commercial integration cell, where we are working very closely with the space sector on, particularly the new space sector—I mentioned Spar earlier—to get after some of the stuff that it is really driving forward quickly, including nanosat technology and the like. That is how we will take this forward in a spiral approach. More importantly, the stuff we are putting into space will be software-definable, so we can reprogramme it from Earth. If you think of it like an iPhone in low-Earth orbit, when the next update to iOS comes along, you reprogramme it from Earth and the capability is effectively a new capability.

Q266 Derek Twigg: So it should not become obsolete?

Air Vice-Marshal Smyth: No.

Derek Twigg: I am going to hand back to the Chair, because we are tight on time.

Q267 **Chair:** Thank you very much. In order to maintain that industry at all levels, and particularly to operate this in the military, you have to attract, train and retain space specialists in the UK. How are you going to make space an attractive military career option? To use one example, the defence space strategy says you are considering extending the unified career management approach to space specialists. What difference would that make, and when are you going to make a decision on it?

Air Vice-Marshal Smyth: Again, that is a good challenge, and it is something we have been very alive to. Historically, working in the space domain and the military has been a little bit of a niche area. We are trying to normalise it with a lot of the work we are doing. Standing up UK Space Command was a good start to that. There is now a proper command structure, so that people can aspire to go up through the ranks and continue their way to the top.

Now, unlike two years ago, there is a legitimate path for someone to join the service—not just the Royal Air Force, but any of the three services—and have a very interesting and exciting career path all the way to the top of their service. That did not exist before. That in itself is a pull-through mechanism.

On the unified career model we are exploring, we are watching what is going on with the cyber model at the moment, because the services have adopted that approach and are just settling it—testing and adjusting it. We are waiting for that to settle to take the lessons from it. Then we can hopefully leapfrog that forward pretty quickly.

Q268 **Chair:** Is your own training system working alongside that, and are the universities co-operating as well?

Air Vice-Marshal Smyth: Yes, we are plugged into academia across the UK, and actually more broadly on the international scale. One of the funding lines that we developed through the defence space programme was this idea of a new defence space academy. The work is ongoing through a training needs analysis with Space Command at the moment. That out-briefs at the end of this month, and that will lay out the plans and the aspiration for what a defence space academy could look like in the future. I am very keen that we broaden that to actually be a collaborative effort across Government, so that it is not just military folk who go there.

Q269 **Mr Jones:** How are you going to compete with Minister Freeman?

George Freeman: I was about to say that, on the civil side, we have a workstream in BEIS looking at growth projections in key sectors and what the skills requirements are. Minister Donelan, the Minister for universities and HE, and I—

Q270 **Mr Jones:** I know, but the real problem that we have in cyber, for



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example, is that you can give people all the career paths that you like, but private industry, especially in this sector, if you are going to grow the private sector, is going to be headhunting people. How are you going to keep people?

James Heappey: Purely on cash you can't. In the course of the last two weeks, I have been briefed by brilliant people in the cyber-domain, brilliant people in the information domain and brilliant people who are working in space, all of whom could earn more than the Chief of the Defence Staff if they were working in civilian cyber-security, civilian advertising agencies or the civilian space industry. I often joke to them when they brief me, "Do you know how much you are worth on the outside?" They shake their heads and I say, "Good." Actually, they want to serve in uniform. You meet these absolute ninjas who are doing incredible things in information manoeuvre, and they do not want to go to work for an ad agency, because they love the subject matter that they are working with, particularly right now, given how we might be using those who do information manoeuvre at the moment.

I think we have to back ourselves, given that the call to serve your nation still resonates and that to serve in uniform is still special. We can't take the mick; we have to recognise that our career structures need adjustment. You come across these ridiculous situations where you meet an incredible flight sergeant who is delivering training in the space domain at Fylingdales and then has to go off and become a squadron sergeant-major somewhere because that is what you must do when you become a warrant officer. Clearly, we need to get beyond that, and we need to recognise that people who have specialities will forgo earnings to a point, but if they are an absolute ninja at bringing together open-source intelligence at Wyton, and writing the algorithms that trawl this stuff from social media, we should pay them whatever they are worth. Their rank is ridiculous and irrelevant; what matters is their speciality and the fact that they want to do that in uniform and in the service of our nation.

I feel like we are getting there. In the parts of defence where those capabilities are concentrated, we are ever more flexible. The other thing that we are increasingly doing is giving people who work for big civilian firms in those key, technologically demanding career streams the opportunity to serve as reservists. Then we just draw them in when their capability is needed. They love the opportunity to apply their skills in a different setting, and that flexibility really works for them. By the way, it allows them to remain at the cutting edge, working for whoever, and we get to draw on that ever-updated skillset.

Q271 **Chair:** Would you be able to send us a note on what you are doing to try to grow the sheer numbers of people who are going through this, in order to backfill on that, if necessary?

James Heappey: For space particularly, or across the piece?

Chair: For space in particular.

James Heappey: Yes, of course.



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Q272 **Mrs Lewell-Buck:** The MDI joint concept note in December 2020 identified that integrating the space and cyber-domains was at least as important as any other capability requirement. What progress have you made on that?

James Heapey: Some, but not enough is the honest answer, Emma.

Q273 **Mrs Lewell-Buck:** Okay. Can you tell us what the “some” is that you have achieved?

James Heapey: There are domains that clearly already are integrated; it is just that they are integrated in a more mandrauc way than you would like. The absolute sweet spot is when the algorithms are written. It is not something that you do in space, in the maritime domain or in the land domain. The sweet spot is DSTL’s work to write the algorithms that allow all of these capabilities to be properly integrated. I think that some progress has been made. I think that Commander StratCom is driving it hard.

To my earlier point that if we were doing what is going on right now in Ukraine, NATO would be able to be more precise, with more tempo and at more depth, you can only achieve that if your domains are properly integrated. Maybe we will write to you to give you a summary of progress to date, because it is quite late in the session to be going into that, and I am not sure that I have it immediately to hand.

Q274 **Mrs Lewell-Buck:** Just as a quick aside. I might be totally wrong here but is it a fact that you will never properly fully integrate them because they are changing all the time anyway?

James Heapey: That is why the integration needs to be a soft integration through algorithms. I think it is unrealistic that you could mandate that every ship, satellite, plane and armoured personnel carrier works on exactly the same information architecture. I think that you would just create a behemoth that would be unsustainable. The magic is in the work that DSTL does. If you are going to do MDI as a thing, Angela McLean, our chief scientist, is brilliant on this. That is where the alchemy really lies—in how you use clever code to bring together all the stuff that you are getting from different domains, and being able to move it quickly across domains, and from the strategic all the way down to the tactical level. You could do that in a very centralised way where you create a specific requirement for every platform that you procure for evermore. I just think that that is unwieldy. Doing it through an algorithm is much cleverer.

Mrs Lewell-Buck: I am happy to leave it there, if you want to send us a note. Thanks, Minister.

James Heapey: And have a chat with Angela. I think that you would find it really interesting.

Chair: Colleagues, thank you very much for a very informative session. We look forward not only to producing our report but to maintaining scrutiny over how you implement the initiatives that you have outlined to



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us today.