



Science, Innovation and Technology Committee

Oral evidence: UK space strategy and UK satellite infrastructure, HC 100

Wednesday 17 May 2023

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[Watch the meeting](#)

Members present: Greg Clark (Chair); Aaron Bell; Dawn Butler; Chris Clarkson; Tracey Crouch; Rebecca Long Bailey; Stephen Metcalfe; Carol Monaghan; Graham Stringer.

Questions 620 - 713

Witnesses

I: Frank Strang MBE, CEO, SaxaVord Spaceport; and Dave Ballance, Launch Operations Manager, SaxaVord Spaceport.

II: Mario Kobald, CEO, HyImpulse Technologies; and Jonas Bjarnø, Chief Technical Officer, Orbex.

III: Colin Macleod, Head of Space Regulation, Civil Aviation Authority; and Rob Bishton, Joint Chief Executive, Civil Aviation Authority.

IIII: George Freeman MP, Minister of State, Department for Science, Innovation and Technology; and Rebecca Evernden, Director, Space Directorate, Department for Science, Innovation and Technology.

Written evidence from witnesses:

- [UK Civil Aviation Authority](#)
- [Supplementary evidence](#)



Examination of witnesses

Witnesses: Frank Strang and Dave Ballance.

Chair: The Science, Innovation and Technology Committee is continuing some follow-up to our report on the UK space strategy and satellite infrastructure. In that respect, our colleague Chris Clarkson has interests to declare.

Chris Clarkson: Yes. I am a former employee of the Virgin Group and had a tangential relationship with Virgin Orbit during that time, so I will avoid asking any questions about them.

Q620 **Chair:** As no other colleagues have anything to declare, let me introduce our first pair of witnesses.

We are very grateful to have Frank Strang MBE, who is the chief executive of SaxaVord Spaceport, a vertical spaceport that is being established in the Shetland Isles. Mr Strang is a former RAF pilot. He is joined by another former RAF pilot, Dave Ballance, who is the launch operations manager at SaxaVord Spaceport, a position that he has had since March 2020.

Thank you very much for coming—and for coming in person. Can you tell us about how things are going and when you expect the first launch from your spaceport to take place?

Frank Strang: Certainly. First, on a small point of order, as otherwise I will get a hard time from my pilot friends, I was not a pilot, fortunately—or unfortunately—but I was an Air Force officer.

Q621 **Chair:** I see. You were an officer but not a pilot.

Frank Strang: Another point that I would like to make is that at SaxaVord we are not just about vertical launch. It is very important to understand that what we are building is a spaceport, so I need diversity of income and we need to build a sustainable business. Our business model is based on launch, on bringing down the data from the satellites and on accommodation and support services. We are not relying on one thing.

We got planning permission on 23 March last year. Since then, we have spent £28 million of our money. We have built new roads. We have crafted out three launch pads. We have laid the concrete and steel for launch pad 1—launch pad Fredo—which is the first new vertical orbital launch site in Europe. One of our clients, Rocket Factory Augsburg, has erected its launch stool—about €13 million-worth of infrastructure—on our site. One of our other clients, which you will talk to later—HyImpulse—has conducted its seventh successful engine test on site in the last three years.

Over the course of the next couple of months, we have HyImpulse doing engine testing. Today, we have a French company, from Paris, testing



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engines. Rocket Factory will do its stage 1 and 2 testing in July. We have built our first ground stations on Shetland and are taking down data as we speak.

We are an operational spaceport. We have just secured a £139 million debt facility from the markets, which will allow us to drive forward. There is a lot going on. We have 80 employees today, from four six years ago.

Q622 **Chair:** Very good. I think that you are privately funded. Have you received any public funds from any of the public bodies?

Frank Strang: That is a sore point. We have fought and bitten and scratched our way to where we are now. To be fair to the Space Agency, just before Christmas we secured a small grant to build a launch rail to support our suborbital launches, but all the moneys that we have spent to date have been private funds.

Q623 **Chair:** Have the Cornwall spaceport and the Sutherland spaceport had Government grants in one form or another?

Frank Strang: All the other prospective spaceports have had public sector funding. It is a sore point, but I would point out that we are very close to our first launch. We have created a siege mentality. It has been painful.

There is always a balance. Public sector funding can slow you down, but unless you secure public sector funding nobody believes that you are real. I would not say no now.

I would throw out a challenge to Government to match us pound for pound and to look at all the initiatives that we are putting out there from our STEM programme, for example. I know that that is very close to Government. Two months ago, we had a quarter of a million children sign up to our online STEM lessons. That is pretty cool. There were 7,000 from Liverpool alone, but they were from all over the world. Again, we have funded that privately.

Q624 **Chair:** Can you tell us why you are in Shetland—and not just in Shetland, but in the northernmost island of the British Isles, Unst? I assume that there is a geographical reason.

Frank Strang: I will let Dave answer that in a minute. What I will say is that space is about geography, maths and physics, and the geography does not lie.

Space bookends the United Kingdom, from Shetland in the north to Cornwall in the south—and we have a spine of space activity down the middle. I will let my colleague answer that question.

Q625 **Chair:** Mr Ballance, tell us why the geography of Shetland is significant.

Dave Ballance: There are two reasons, when you break it down to the basics. The first is the type of orbits that we will be targeting with the



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launch vehicles that we will be using. The further north you are, the better, so the latitude is good.

The second is that we have a very clear area to launch into. We are on the peninsula in the far north-east corner of Unst. We will be looking to launch towards the north. Above us we have a large sea tract, so from a safety point of view it is a very safe place to launch.

Those are the two fundamental reasons why it is a good place to launch from.

Q626 **Chair:** As the launch operations manager, you will have a close view of the technology. A lot of it is new technology. How confident are you that it is ready? Is it ready, or does it have some way to go before it is ready for deployment and launch?

Dave Ballance: The technology is ready, on the whole. Each new launch vehicle manufacturer comes along and has a development process it needs to get through. Does the technology to utilise our spaceport exist already today? Yes, but we also have new players approaching us.

Chair: Good. My colleagues have some questions about the licensing and the regulatory process.

Q627 **Stephen Metcalfe:** Thanks for setting that up nicely. Where are we with the licensing process for the spaceport?

Frank Strang: I will let David answer that one.

Dave Ballance: My primary job at the moment is working the spaceport licence. We are also actively pursuing a range licence. Our colleague Jimmy Slaughter is running that. He is not here today, so I will talk to the spaceport licence.

We submitted it through the CAA portal in March 2022. We are currently working through some RFIs for that.

Stephen Metcalfe: What are you working through?

Dave Ballance: Some requests for information. We submitted the documents that we needed to submit and are going through iterations to answer questions from the CAA.

In the latest round of requests for information, we have got about half of the stuff back to it. That is about it, really. That is probably a good starting point.

Q628 **Stephen Metcalfe:** Okay. You are in this process. Presumably it is a relatively new process across the whole UK.

Dave Ballance: Yes.

Q629 **Stephen Metcalfe:** How are you finding it? When do you expect to receive a licence?



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Dave Ballance: It is fair to say that, from our perspective, the process got off to a slow start in March last year. This is the first vertical launch spaceport licence in process. It is definitely a learning process on both sides. For ourselves, that is because we do not have a metric to compare ourselves to in the UK. We have other metrics around the world we can compare ourselves to, but, in terms of the UK regulations, it is new. From my perspective, I would say that we got off to a slow start, but we have a very good relationship with the space regulation team and are progressing the licence well at the minute.

You asked when I think that the licence will come out. I do not know the answer to that. I will let Frank say what we would like to happen, but when we will get a licence is a difficult question.

Frank Strang: I think that the country needs a licensed vertical launch spaceport sooner rather than later. It can have conditions. You need checks and balances. As David said, it is new for both parties.

Every country in the world has a space economy, and they all want to be part of this space race. It is moving very quickly. I bang on about this, but this is how quickly aerospace and space are moving.

The first manned flight was on 17 December 1903. Only 68 years later, man walked on the moon. On 22 December 2022, up at Unst, we completed our first launch pad. That is 100 years. It is moving very quickly.

We need to work with the regulator to ensure, and to show the world, that we are open for business, because there are lots of young companies that want to come here.

Q630 **Stephen Metcalfe:** I appreciate the point that you made about this needing to happen sooner rather than later. Is not having a licence in place acting as a barrier yet? When would you like to have a licence? You would like to have one as soon as possible, but when realistically? Are you talking about three months, six months or a year?

Frank Strang: I would like to see a licence in three months. Is it acting as a barrier? No, because we are working on concurrent activity all the time. That is because we are privately funded and I have to drive forward.

What this Committee needs to understand is that the industry is moving so quickly. There are lots of young companies out there that are driving. They are all at a stage with their R&D where the water is coming to the top of the dam. They will all be looking to build their businesses more or less within six months to a year of one another, so we need to be ready. But we need to be regulated and to be safe. Things will go wrong, so I get this balance.

To answer your question: three months, please.



Q631 **Stephen Metcalfe:** Getting a licence in three months will not hamper the business. If it takes longer, it will start to have an impact on our viability as a space nation.

Frank Strang: I think so.

Q632 **Chair:** Is the CAA apprised of the need to accommodate that timetable, if it is safe to do so?

Frank Strang: Yes. It is very easy to beat up the CAA. As David said, we got off to a slow start. I am the guy who had the CAA up against the wall. It understands, but it has a job to do. The Government should give it some discretion. We live in a blame society, as you guys and ladies know only too well. Give the CAA some discretion to work within the rules. It is fully aware of the requirement.

I go back to your earlier statement. All the other spaceports are publicly funded, and a lot of the launch companies have large tranches of public sector support. They are happy just to plod along. The CAA can go along only at the pace of what it is being asked to do.

We are a bit different. We are in this new space economy. It is very difficult for a regulator in a civil service department to start to move at pace, but the CAA is aware—and is trying. I have to say that it is trying.

Q633 **Graham Stringer:** Can I show my ignorance? Dave, I did not understand why the launch has to be further north. The earth is more or less a sphere, isn't it? Why does it make any difference where you launch from?

Dave Ballance: It has to do with the orbits that you can access. The easiest way to explain that is to think of a Sky satellite dish on the side of your house. It points quite low down because it is pointing at a satellite that is in an equatorial orbit. The best place to launch those is the traditional big places, such as French Guiana and Cape Canaveral—places that are close to the equator. For a low-earth orbit, where the satellite is much closer to the earth, they run north-south. Because of the spin of the earth, the further north you are, the less penalty there is, whereas with an equatorial launch you are taking advantage of the speed of rotation of the earth. It is physics.

Q634 **Graham Stringer:** I think that I am closer to understanding it. Are the regulations for spaceports separate from the regulations for space flight?

Dave Ballance: Yes, as in the different licences that are available. The ones we are concentrating on are the spaceport licence and the range service provision licence. Then you need a launch operator's licence to do a launch and a return operator's licence to bring something back from orbit to earth. You have an on-orbit licence as well.

Q635 **Graham Stringer:** Are the two separate sets of regulations fit for purpose?



Dave Ballance: There is one set of regulations that covers everything. It is a difficult question. Are we working our way through them, and have we presented a licence application to the CAA that meets the requirements of the space industry regulations? I believe that we have. Could they be better? Probably, but because of the time issue we have to work with what we have. I am confident that we can get our licences approved using the existing regulations.

Q636 **Graham Stringer:** Previous witnesses told us that the regulations were likely to stop investment, certainly in Cornwall. You do not think that they are a hindrance to investment.

Frank Strang: I would suggest that there were other agendas from those witnesses. I saw some of it. The regulations are the regulations. Are they fit for purpose? Could they do with tweaking? Probably, yes, but this is the first stab. Cornwall got its licence, if that is what we are alluding to. It got its range licence. The technology failed, not the spaceport. That is important.

From our perspective, it is about the agility and the speed of getting to that point so that our clients can come in. I was in a meeting in Whitehall two weeks ago. I said to the politician, "Go and talk to our clients—the French company that is testing its engines, the two German clients and the Americans. They are not coming to us because we tell nice jokes and they want to see Shetland ponies. They are coming because the UK is the right place to be and we have something to offer."

There are regulations everywhere. There are regulations in Germany—the DLR—but we have two German companies testing engines at our spaceport right now. It is very easy to hide behind the regulations. It is about how you approach solving them and putting a team in place. We have a team of eight working full time on our licensing process. It costs money, but most of them, unlike me, are ex-RAF pilots, and they are working their way through it.

Q637 **Graham Stringer:** I would not be doing my job properly if I did not ask you what the agendas were.

Frank Strang: I am not close enough to it, but if you look at what the outcome was, it looked as if that company was running out of money and was looking to blame the Government. That is how it looked to me, on the outside, looking in. The launch happened. The technology failed. Don't blame the licensor. Don't blame the UK Government for that. They got it away.

If you are not into risk, don't get into the space industry. Manage the messaging. Look at what happened with SpaceX just recently. It managed that messaging brilliantly. We know that 80% of your first launches are going to fail, but eventually your cadence will build up and up, and the rockets will leave like buses. Just tell the truth.

Q638 **Graham Stringer:** You have been very positive about the role of the



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CAA as the regulator. There must have been some difficulties. This is a new and complicated process that is about health and safety. What have been the biggest problems?

Frank Strang: Dave is right in among the weeds, but, at my level, initially it is about an understanding of the marketplace. There is old space and there is new space. Old space is the guys with the blue suits and the white shirts. New space is the 14-year-old with a PhD who is an international, very bright young man or woman. These are the people who are in a hurry.

The CAA came into this from a standing start. Traditionally, we have looked at the BAEs and the Boeings—all these big aerospace companies. We are trying to get under the skin of these young companies, which have raised lots of money and are in a hurry. Remember: it is all about satellite technology; it is all about the mobile phone.

It took time for the CAA to try to get under the skin of the sector. I genuinely believe that it is trying now. Some of them are behind us here. As one of them reminded me, only three years ago I had one of them up against the wall, saying, "You're not listening." I genuinely believe that they are listening.

The other thing is this. I am probably not allowed to swear on television—

Chair: You had best not.

Frank Strang: To be fair to the CAA, there are so many smoking mirrors around this industry. I do not know whether you ski, Chairman, but if I ask you, "Do you ski?", you will say, "I have skied for 40 years." What you mean is that you have skied for only a week a year for 40 years. It is like men playing golf. The space industry is full of promises. Initially, the CAA will have listened to companies saying, "We are going to launch in the summer of '22", or, "We are going to launch in the spring of '23", but it did not really know. There is a learning process on both sides.

What I would counsel is that the space industry is not new. They have been doing it in America for a long time, safely. They have done it in Russia. Take the lessons learned from those other space nations. The CAA has been working with the FAA. It has actually helped us to work with the FAA.

I never thought that I would say this after three years, but I cannot fault it. I genuinely cannot fault it. I can fault the lack of support that we as a spaceport have had from Government. I can show the moneys that we have invested, that we have a three-dimensional spaceport and that we are doing all these initiatives by ourselves, but I cannot fault the regulator—genuinely.

Dave Ballance: I will add a couple of comments. From our point of view, for the licensing, we have tried very deliberately to keep the licensing knowledge within our company. We are not contracting it out. There is a



large element of knowledge base in the UK that we need to build. We are trying to keep that within our own company so that we know going forward, when we need to change things, how to change things.

It is fair to say that, from the CAA's point of view, it is learning as well, in the same way as we are. It about building that knowledge base. As we have started the licensing process, that knowledge base has probably not been there as much as it should be, on either side. Our plan is to keep that knowledge in the company. I do not know how the CAA is managing that, but we are definitely seeing more individuals on the teams we are engaging with on specific areas. My hope would be that that knowledge base is retained and expanded.

Q639 Graham Stringer: The process has got better. I think that that is a fair summary of what you are saying. How could it be improved further?

Dave Ballance: For us, the issue is speed. It is difficult with the requests for information on technical matters. It takes time for us to work those through, give the information back to the CAA and let the CAA work through it and assess whether we have answered the question that it asked. That is where it comes into the knowledge base.

Do we have the people who can work that quickly, and do we have enough people working on it? It cuts both ways. Obviously, we have a team. We have split out the range team from the spaceport team to streamline that internally. Certainly, it is getting better as we go along.

Q640 Chair: You both mentioned the regulations and said that they might be able to be tweaked. The regulations were put in place in anticipation of launch in the UK. It is pretty likely that, in practice, you will discover things that you wish you had known at the time. Without criticising the regulations, can you say whether there are any particular respects in which you think that, in anticipation, they did not capture what you are now experiencing?

Frank Strang: I will let Dave answer that. The one thing that I would say is that, in our opinion, when the regulations were first crafted, they were not expecting a spaceport up in the north of Shetland to have a multi-use site. The regulations were probably crafted looking at a one-user, one-pad spaceport. I think that there has had to be some adjustment there.

Dave Ballance: That summarises it best. That is where we run into difficulties—in trying to explain our concept of operations. We have a good launch site, we have a lot of available trajectories where the launch vehicles can go. Building the safety case for that is quite difficult. I do not think that the regs necessarily help us with that. That is the single biggest overarching comment. I will stop there.

Frank Strang: Can I add something? This aligns to regulation. It is not a criticism—it is just fact, if you go on the website. Tied to regulation is the commercial viability of the business. The Cornwall spaceport is licensed



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for two launches a year, with one user. That user may fail. Sadly, it did, although we were rooting for Cornwall to succeed. Two launches a year does not make for a commercial spaceport. It just cannot. It just does not. If that end user fails, you have neutered your spaceport.

You have to look at what will make the spaceport sustainable. I have an obligation—not just to shareholders, but to communities and to the country—to make sure that we are a viable spaceport 30 years from now. I get letters from eight-year-old girls looking for jobs in space, such is the interest in the economy. Align the regulation to the commercial viability of the spaceport, as then you have a long-term industry. Don't look for one-hit wonders.

Q641 Carol Monaghan: Frank, a few times this morning you have mentioned the lack of public funding. Can you give us some reasons why you have been unsuccessful in that?

Frank Strang: Whoa. For both Governments—both Scottish and UK—we came to the party late. You do not have time for the whole story. You need to read the book. We are doing a Netflix series. We were not taken seriously. Government were looking at publicly funded sites in the UK, and we came in two years later.

We got our planning permission a year ago, two years after another site, and we are almost finished. I just do not think that we were taken seriously. Shetland is out there, but the Shetland economy is based on its geography, as you know: oil and gas, renewables, aquaculture, fishing and now space.

I just do not think that anyone took us seriously. When Government go down a line, it is like a supertanker. To shift that supertanker takes a lot.

Had we got the public funding, we would be ready now—trust me. I would like to invite the whole Committee to come up and visit. What I say is, "Use us as the exemplar—back success." If we are successful up there, the rest will filter all the way back down. If you get Cornwall working, we can meet in the middle. We have a lot going on. I would be happy to talk to Carol about it offline.

Q642 Carol Monaghan: I remember that a number of years ago there was a prominent MSP—he was a Tory MSP, but I will not name him—who talked about Scotland's ambitions in space as being science fiction.

Frank Strang: Oh, rubbish.

Carol Monaghan: That went across the front page of the papers. He caused quite a lot of upset. Do you think that part of the issue is that people still do not look at the UK as a viable player?

Frank Strang: You have hit the nail on the head. I never saw that one, as otherwise I would be with you, shouting.



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We have a pilot here. My background is in physical education. If somebody had told me in 1976, when I went to the Scottish School of PE, or in 1983, when I went to the Royal Air Force College Cranwell, that I would be building a spaceport on Shetland, I would have said, "You are smoking rope. What am I doing building a spaceport?"

When we started this journey five years ago—and my colleague Scott spoke to you the last time—we really did not understand. We genuinely did not understand. We know a lot about aviation and defence. As we walked the streets of Europe and America and met these 17-year-olds with PhDs, got the letters from the young kids and worked with the HyImpulses and RFAs of this world, we have realised the size of this economy. To me, genuinely, it is like a new industrial revolution.

You are absolutely right. People did not believe. When I briefed Shetland Islands Council four years ago, I started off by saying, "This is not an April fool," because we just did not know. Now, you need to understand that we are not selling ourselves to the companies that are coming to us. They are coming because the geography, the maths and the physics work. Scotland has the ability to be a genuine space nation.

As for the UK, a couple of weeks ago somebody asked me, "Where do we sit in the league table?" I think that we are halfway up the championship. We are not in the premier league. We have the ability, if you look at what is going on with our education system and our manufacturing—certainly in the central belt of Scotland and in Surrey—to be in the premier league. We really need to move quickly and aggressively, but we can. I agree with you.

Q643 **Carol Monaghan:** Can I ask a couple of questions? You have said that two launches a year is not financially viable. What are you looking at?

Frank Strang: We are at 30. Our licence application is for 30 launches.

Q644 **Carol Monaghan:** And weekly?

Frank Strang: Virtually, yes.

Q645 **Carol Monaghan:** Will it be season-dependent? Will there be more in the summer?

Frank Strang: That is another very good question. As you will be well aware, Shetland is way up there in the north. We got 10 years-worth of Met data on the winds in Shetland. To launch, you need three hours of 30 knots or less of wind. In the months from the spring to the autumn, believe it or not, 95% of days have three hours—it could be three in the morning, of course—of suitable winds. In the winter, it is one day in three. Yes, we can achieve that. Based on the discussions that we are having with our clients, I think that eventually we will go back to the CAA to get an extension to 40 or 50 slots.



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Again, it is very important to say that we are not wholly reliant on launch. We are bringing down data. We also have a tourism element to what we are doing. If, for some reason, launch is delayed, we have revenues coming in from elsewhere.

Q646 Carol Monaghan: Some members of the Committee would certainly be very keen to take you up on your offer to see it; it would be useful for us to see what is going on at the site. Can you tell me how many companies you are planning to work with on your 30 launches a year?

Frank Strang: Today—I was talking to the CAA earlier—launch pad 1 is gone. It is contracted to a German company called Rocket Factory Augsburg.

Carol Monaghan: And that is for their exclusive use.

Frank Strang: That is for them, yes. We have HyImpulse. We are working with nine international companies on launch, and we are working with three on data. They have all, I stress, come to us. They are from Germany, France, Italy, India, Turkey and, obviously, America.

Q647 Carol Monaghan: I have a couple of questions about support. Is there anything else that the CAA or the Government could be doing to support the industry?

Frank Strang: Do you want to talk about regulation, on that?

Dave Ballance: I think we have already talked the regulation piece through. I do not think I have anything more to add.

Frank Strang: I think the problem the Government have is that you need to spread your net wide. You have to be seen to be company-agnostic. I would say you need to start backing winners, because if the winners win the rest will spread out. I think they are trying to be all things to all men, and it is not quite working.

Sometimes, Government try to put projects in places for political rather than practical reasons, and I think there is a need to change that; but in our education STEM is being promoted big time, and we are looking at climate change. We are looking to build a space environmental climate control centre up in Shetland, and if we can use that data well I think all the Government initiatives are there.

There may be something you should look at—I never thought I would say this: for me there are too many organisations. There are too many membership organisations. I would appoint someone we might call a space tsar. I do not mean someone with the usual DNA, from the same gene pool, but someone who understands new space, old space, defence and the internationalism of it, and the way the regulations work, to pull it together. As I say, the wave is coming up on the UK and we are in a great place, but if we are not careful we will lose out.

Q648 Carol Monaghan: I was just about to ask you about a piece of evidence



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from our last session—that sometimes there are too many different things, and people do not quite know: there seems to be a lack of coordination.

Frank Strang: I agree.

Q649 **Carol Monaghan:** So some sort of portal where people can go, where regulations and licensing are understood, would make things easier.

Dave Ballance: Yes, is the short answer to that. We have talked a lot about regs, and about licences, but those are only the licences required under the Space Industry Act. There are also others, such as marine licences, so for us to encourage people to come and launch from us we have to make it simpler. It is quite complicated, with the number of bodies that have to be engaged with.

Q650 **Carol Monaghan:** It is complicated for you, because you have to learn about all the different agencies. Is it difficult for the agencies, as well, to work with each other?

Dave Ballance: Yes, because we are new. As an example, COMAH exists for the control of major accident hazards at major industrial facilities, such as a petroleum facility. We will come under that because of the qualities of the materials that we will have on the site, but no one has ever done that before, for a spaceport in the UK. Once we have it done, it will be done, and that is great. That is not something that a potential customer would deal with, but for a customer coming to us we will say, "You need to get an SIA licence." They say, "That's great—how do we do it?" But there are all the other things that go with it, and that is where it needs to be a bit more joined up.

Q651 **Chair:** To complete the picture on the CAA, as Graham says, you have given a positive review of your experience with it improving over time. One of the things that we heard about establishing space within the CAA was that it was going to be dominated by civil aviation. There might not be enough people. What is your experience of the attention from individuals? Have you had to wait in a queue, or do you think they have enough resource?

Dave Ballance: As I said earlier, we got off to a slow start. From our perspective, it felt as if stuff was going into the CAA and not coming back. Some of that is due to the licensing process, because to get from the initial screening through to the assessment phase the process is set up so that everything has to go at the same time. For example, we had to revisit one particular area several times. All the other stuff that was ready, from our perspective, was not being assessed. Whether it could have been assessed at that time, I do not know.

So, from the outside, the process is slow to get going. Part of that is the way it is set up. Whether it is also due to resources within the CAA, I do not know. Certainly, at the moment, in my engagement directly with the teams in the CAA, I am seeing more people, so from my perspective I



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see more resources on the CAA side. At the moment we seem to be ticking along quite nicely.

Frank Strang: It takes time to build up resource. Coming back to the speed of movement of the industry, I suspect that in the CAA it was not realised how fast this sector was going to move and how important it would be. Again, I am trying to be fair.

Being cynical, I would also say that probably a lot of that resource was pointed towards Cornwall, quite rightly, to get that away; but I would also point out that on stats from the FAA only 10% of launches will be horizontal. The other 90% will be verticals—ourselves and Orbex in Sutherland, etc. So how does the CAA manage that resource? It takes time to find them and get them trained up.

I keep saying that we are in a hurry—because we have to be—and the system sometimes cannot move that quickly. It probably sounds as if, because they are behind us just now with guns pointed at us, we are being nice about them, but, trust me, we are being pretty pragmatic. We have no issues at the moment.

Q652 **Chair:** You have made an interesting recommendation that there should be a space and satellite tsar to pull everything together. In the absence of that, there is a UK Government national space strategy, which was published in September 2021. Is that a document that you engage with? Is it helpful or meaningful to you?

Frank Strang: Do you want the honest truth?

Chair: Yes.

Frank Strang: No. Going back to things being fit for purpose, it is like when the consultation went out, before, for the regulations. We all—not just us but everyone—inputted; but none of our recommendations was accepted, which was a very poor starting point.

I keep coming back to this industry being about the HyImpulses, the RFAs, the Orbexes—these young companies coming through. You all have your mobile phones in front of you. It is all about satellite technology. The mobile phone is the six-gun of the 21st century. It controls our lives—but it changes. You change your phone every couple of years. Our space strategy needs to move with the times.

Again, we are in a sad state of affairs and the world order has changed. Ukraine has changed a lot of people's attitudes to space, and future wars are, unfortunately, going to be up there in space. Everything needs to be pulled together and I would say we should take a more holistic overview of space.

To go back to the young people, I am 65—I was 65 last week. What am I doing here building a spaceport? It is because these young people are driving us. Trust me, Chairman: we have spent £27 million in a year



building a spaceport, and I would not be doing that, and I would not have come all the way from Shetland today, unless I believed in the sector.

Chair: It is very clear that you do, and we are grateful that you both made the journey from Shetland to join us today. I thank Mr Strang and Mr Ballance for your evidence today.

Frank Strang: You should come and see us.

Chair: Yes, please. Thank you.

Examination of witnesses

Witnesses: Mario Kobald and Jonas Bjarnø.

Q653 **Chair:** I welcome our next pair of witnesses. Dr Mario Kobald is the chief executive officer of HyImpulse technologies, which has been referred to already. HyImpulse is a German company that is developing a small launch system for small satellites. Welcome, and thank you.

Jonas Bjarnø is appearing virtually. Mr Bjarnø is the chief technology officer of Orbex, which is developing a low-carbon orbital microlaunch system and intends to make use of the proposed Sutherland spaceport. He previously worked at Denmark's National Space Institute.

Thank you very much indeed, both of you, for joining us today.

Perhaps I could ask a basic question, starting with Dr Kobald. Would you describe what your business and technology do, and how close they are to fruition?

Mario Kobald: Thank you for having me here today. HyImpulse is a new space start-up. We were founded in 2018 in Germany and are working on sounding rockets and small launchers, based on using our special technology, called hybrid rocket propulsion. That gives us some nice competitive advantages. The founders of HyImpulse were already, as students, demonstrating the technology, and now we are working on preparing for the first launch this year.

Testing rocket motors is not easy in general, because of regulation—and because of the operation itself. We had difficulties doing it at large scale in Germany. We met our colleagues from SaxaVord two or three years ago. We were looking for possibilities for engine testing, as well as, of course, looking for a future launch site.

That is when our collaboration started, and they enabled us to start doing our test campaigns in the Shetland Islands. Since then, in the last two years or so, we have already done eight test campaigns for the development of our rocket motors. Some weeks ago, in April, we had our last successful campaign, which showed that the technology is fully ready for a first launch, together with SaxaVord, this October.



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Q654 **Chair:** What attracted you to the UK and to Shetland, in particular? Presumably you looked at other places before deciding on Shetland.

Mario Kobald: Yes, I think it has already been explained a bit. Of course, there are technical restrictions on places where you can launch. In Europe there are not that many places. There are some other launch sites for us in, for example, Sweden or Norway; but in the UK it is, basically, about the technical requirements—and the Shetland Islands are the best place from a geographical point of view, as well. The collaboration with SaxaVord has been pretty nice, all the time. They operate like us, as a start-up, and try to move and get things done, and to work efficiently. That is another important point for success.

Q655 **Chair:** Thank you. Let me turn to our other witness. I did not introduce him as Dr Bjarnø, but I understand that, not surprisingly, working in this sector, he too has a PhD. Dr Bjarnø, tell us a bit about your company and why you have chosen Sutherland as the place to target launch.

Jonas Bjarnø: Thank you very much for having me here today.

Orbex is probably best described as a combination of what you heard about from your previous two witnesses. It is an end-to-end solution delivering both a launch vehicle and a spaceport solution to facilitate the operations of that launch vehicle.

We were founded in 2016 and went at the problem of developing a clean-sheet type of launch system. We had the opportunity to choose solutions freely, with no a priori commitment to technology. For that reason, we ended up with a system that is fully propelled by a green propellant, or biopropellant—quite uniquely in the sector. We found, essentially, a system solution that enabled us to operate that from a minimalist spaceport located in the highlands region, in Sutherland, on the A'Mhoine peninsula.

As for why we chose that location, our journey started quite early in 2016. At that time, we looked at various options for launch. In Europe there were not many to choose from. At that stage we had only Kourou in South America as an option. A colleague and I had aspirational thoughts, but beyond that there was not really anything. Of course, you are trading a lot of different metrics, but our system is a so-called microlauncher. One of the important metrics is proximity: physically having your systems—test, production, launch and operations facilities—located close to each other, simply as a cost-saving measure and a way to build a sustainable business case.

The real game changer for us came with the combination of the Space Industry Act 2018 and the initiation of the LaunchUK programme at around that time, which enabled us, together with Highlands and Islands Enterprise and Lockheed Martin, to field a combined proposal for the Sutherland spaceport, and for us to set up a permanent presence in the UK.



Q656 **Chair:** You have chosen Sutherland. When do you expect construction of the spaceport in Sutherland to be complete?

Jonas Bjarnø: We broke ground in Sutherland earlier this month. The project is a 10-month effort, to field the initial capability. Then we will move our launch furniture, so to speak, on to the launch site in the period that follows. We should achieve an operational capability in the second half of 2024.

Q657 **Dawn Butler:** Thank you, Chair. Dr Bjarnø, it sounds really great that you have the low-carbon launch system. I do not know what that means, but it sounds futuristic. When do you expect Sutherland spaceport to receive its spaceport licence?

Jonas Bjarnø: At this point in time we are working closely with the CAA to prepare our licence application. We will expect that to pass through the CAA, with the cadence that they currently project to be in the order of a year. So our submission is due for June, and the licence will be issued about a year after that. Naturally, that is subject to the application flow.

Q658 **Dawn Butler:** You don't see any issues or problems with that licence, at all. You think that will be quite straightforward.

Jonas Bjarnø: We put in our launch vehicle licence application in February last year. Of course, being an end-to-end solution, we have to cater to both the launch service provider licence and the launch site operator's licence—both facets of it. It has been a good process so far, with the CAA. We expect the collaboration with them to continue at the same level as it has done. Of course, all this will be guided by the safety case and the analysis that goes into it. I am an engineer at heart, so I never expect anything to be problem-free, but I would expect this to be the simpler of the two applications, if I can put it like that.

Q659 **Dawn Butler:** How does your relationship with, or your experience of, the CAA differ from that with other regulatory agencies?

Jonas Bjarnø: We can say that Orbex, in the UK, engages primarily with the CAA as the regulatory body. Initially when we started the process for the launch licence application, for the vehicle, a year ago, we were off to a somewhat slow start and sluggish interaction with them. That has picked up tremendously over the last seven, eight or nine months, and we are now on a regular meeting cadence with them. We have regular face-to-face meetings as well as site visits. We had a site visit three weeks ago and have a follow-up meeting today. All in all, I think we have a solid working relationship and good, competent technical engagement with them.

Q660 **Dawn Butler:** A last question to both of you: for our understanding of the CAA, is there anything more they could do? Would you like them to work in a different way? Would you like to add anything about that?

Jonas Bjarnø: We clearly see that the licensing process is developing. We would not expect anything else. We always feel it is a tête-à-tête



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between them and us, because we are developing a vehicle and at the same time they are developing a process for issuing a licence for the vehicle.

There are elements where we have seen some discrepancy between what was required by the regulation and what was needed by the CAA, to implement that. We have had some issues with clarity in that regard. They have been able to provide that as the engagement has matured.

The key issue for us is always the time it takes for a feedback loop, and the time it takes for an engagement. The quicker we are able to turn around questions and answers, the quicker we are able to progress to a solid implementation of the licence. That is our desire. We are a start-up, like the other panel members, so we are very time-conscious about things that we do.

Q661 **Dawn Butler:** Mr Kobald, is there anything that you would like the CAA to do differently?

Mario Kobald: Yes. First, I think that the interactions have been very positive overall, and they have been open to the feedback we provided, which they implemented.

As a general introduction, we have a suborbital flight licence currently pending with the CAA under the ANO and a second suborbital flight and future orbital flights are planned under the CAA. The process under the ANO licence has taken quite a bit of time. We were told it would work faster than the CAA. I think it is clear that it is also a new topic for the CAA, and they approach the safety margins, for example, probably more conservatively than the FAA.

Q662 **Stephen Metcalfe:** It is clearly the ambition of the UK to be a successful space nation. There is a lot of activity, but we heard in our last session that there is potentially a need for more co-ordination and more of a sense of purpose, direction and urgency. The idea of a space tsar was floated. There was discussion of creating a single point of contact for licensing and applications. What are your views on that? What interventions could there be? What more can the UK do, whether it is the CAA, the Government, or other Government agencies, to help us meet our ambitions?

Mario Kobald: Probably the most important part would be to be flexible in adapting airspace for launching. Currently, for us, there can be very short launch windows, because of the progress of airspace change. These windows also expire after a short period. It can take time to prepare a launch and there can be minor technical delays that introduce a waiting time.

We also have to wait for acceptable weather conditions. Then, if the window passes or expires during the delay, we need to go around again. That is a huge cost and unnecessary further delay.



Jonas Bjarnø: From our perspective, the point of contact for licensing, or a single point of entry into not only the CAA part of licensing but airspace and marine air licensing, is a sensible suggestion.

On the strategy of a space tsar, we tend from our perspective to look at these things a little more holistically, if possible. It is about the UK making the most of the effort deployed here. We feel strongly that the point of us being in the UK is not just to come in, execute a launch, and leave. We can also generate, locally, a wider socioeconomic impact from being present in the UK. Those impacts can go far and wide. We are in Forres, just outside Inverness, and we picked that location for a number of reasons—specifically because of its proximity to a test site, to strong industry partners and to the launch site, eventually.

There is also the benefit of the UK supply chain that we are leveraging heavily. You only really gain those deeper benefits by the implementation of sovereign capability, if I may put it like that. This is where we see our role in the UK space side coming full circle. We are able to provide end-to-end capability that will serve to increase the capability of the wider community—stimulate spin-offs and start-ups.

Q663 **Stephen Metcalfe:** The purpose of these sessions is to gather evidence and make recommendations to the Government. Is there any one thing that you would like front and centre in our report to Government, for them to try to address?

Jonas Bjarnø: I can add at least one point that is critical from our perspective—and again I am referring to the vertical integration situation that we face. It is about the talent pool in the UK. We try strictly to acquire a UK engineering base, and UK technicians and staff, whenever that is practical and possible—preferably local staff; but we face limitations in certain areas, specifically relating to launch vehicle development and propulsion systems, which are not things the UK has pursued for many years.

We are forced to bring in that type of headcount from abroad. That comes with a considerable overhead on visa fees, but it does not give the full benefit of what we could be doing in the UK.

From our perspective, an initiative to stimulate university-level graduates or aerospace technician development in this sector would go a long way. You have to appreciate that the public funding that is made available here is being geared quite heavily, at least in our case, with private funding—on a one to five ratio. We are moving a lot of people into the sector but we have to bring them out of other sectors; to be able to sustain growth and develop a sustainable capability for the long term, we need more talent.

Mario Kobald: The UK overall has been very encouraging in the role of initiatives that are positive for the UK launch industry. It is notable that



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the UK national space strategy launcher is currently No. 1 in the 10-point plan, which is also encouraging for us.

Hylmpulse has a UK subsidiary, which we established two years ago. That is basically involved in testing. We also have an office base in Edinburgh, with engineers working there.

Going back to UKSA, there is the space flight phase 2 plan, which would procure launchers and payloads from small launchers. This service would help the satellite industry to build satellites and plan launches and give some incentive for launch providers like us to do the launches. Last December, this programme was put on hold. It would be good to continue this. It would also be helpful to establish the UK's future role in the new space industry as a global player.

Q664 Tracey Crouch: Mr Kobald, I want to follow up what Jonas Bjarnø said about the talent pool. Given that you have a UK subsidiary, do you have any comments or views on the talent pool available to you, and perhaps what more we need to do to encourage expansion of that pool?

Mario Kobald: There is quite some talent available. We are an international company and we have a lot of different employees from all over Europe and other international employees. Of course, we have employees from the UK; we also have employees working locally in Edinburgh.

Overall, I think the new space movement is a good advertisement, with the satellite launches and all the infrastructure around. Frank Strang mentioned tourism, which will be allowed to take part in the launch campaigns, so it is interesting from that point of view.

We work in a high-tech area, which I think is attractive for many young people. This will also help new students to undertake STEM studies.

Q665 Tracey Crouch: Do you have any challenges with visas for the talent coming here? I see a smile. Are there any immigration or visa issues for your international staff?

Mario Kobald: It is sometimes a long process.

Tracey Crouch: We have the Minister coming later. That is a potential area we can explore with him.

Q666 Chair: It is a long process. Is it reliable? Do people come out the other end, or are you frustrated that you do not get the people you need to have for your operation?

Mario Kobald: We can get the people. As was mentioned, some of the international visa process can take some time, but it is what we also experience in Germany.

Q667 Chair: Jonas Bjarnø, building on something Dawn Butler asked at the beginning, you talked about low-carbon launches by Orbex. We do not



think of space launch as being particularly environmentally sound in the fuel that is consumed. Tell us a bit about the low-carbon aspect and how it compares with other launch systems.

Jonas Bjarnø: The interesting element is that it does not really compare with other launch systems, because basically most of the existing systems use either solid fuels—kerosene-based fuels—or, in extreme cases, anoxic fuels. All of these create emissions when they are burned, and those emissions are put into the atmosphere and essentially create what is known as the carbon umbrella, which will have detrimental effects on the environment.

It goes wider in the sense that it makes our ground operations relatively benign. Ours is a biopropane, meaning it is fully road transportable and it is easy to store. If you spill it, it does not seep into the ground and create hazards or contamination over time.

All in all, you end up with a vehicle that becomes not only very versatile but has a very benign carbon footprint both in its creation and operation. We do not really see many of those out and about in the industry.

We also see it as a commercial differentiator. We see customers picking up on that element very well, mainly because of the ongoing clean space initiatives that are in their infancy across the European Space Agency and other agencies in the world. That is the direction in which the world is moving, and we were just fortunate to pick a solution that allowed us to move first.

Chair: Thank you very much indeed. It has been very useful to hear from two of the companies involved.

Examination of witnesses

Witnesses: Colin Macleod and Rob Bishton.

Q668 **Chair:** We move to our third panel of witnesses. Joining us in the room is Colin Macleod, who is the head of space regulation at the Civil Aviation Authority—the CAA—which has been much referred to already this morning. Joining us virtually is Rob Bishton, joint chief executive of the CAA. Thank you both very much indeed for joining us today.

I am sure you will have heard the evidence this morning and also in our previous session. You have obviously had pretty good reviews from the witnesses this morning, but there is also perhaps a bit of a challenge. We heard evidence from Mr Strang that it is very important that their licence is available within a few months. I think he referred to three months. Starting with Mr Bishton, is that a realistic timeframe for them to be aspiring to?

Rob Bishton: Good morning, Chair, and members of the Committee. Thank you very much for allowing me the opportunity to talk to you



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today representing the CAA in my role as the interim joint chief executive. I am at a board meeting today in Glasgow. I apologise that I could not be there with you. Yesterday, having come up to Scotland, I met the Scottish Transport Minister. Space was on the agenda. On Ms Monaghan's reference to previous newspaper articles, it is definitely not science fiction; it is definitely about scientists and innovators throughout the UK and in Scotland.

I also met Skyrora yesterday afternoon at their test facility. They were able to describe to me the progress that they are making and also the connections to academia here in Scotland with various academic institutions. As a board, it was a very positive trip for us to Scotland on space.

I think the references and feedback you have received from witnesses to date show that the CAA has listened, made a lot of progress and is still looking to make improvement in the regulatory process.

On your question, the point comes back to speed. The basis of progress when it comes to speed is largely around the understanding of the regulatory process. We have spent a lot of time making sure that we are better able to describe that for applicants so that submissions are dealt with in a timely manner. A lot of reference is made to speed in other regulatory jurisdictions, but we have to look at national interests, national security, ground hazard airspace and environment very much through the UK lens, as I am sure you would expect the regulator to do.

Colin might be able to comment specifically on the state of progress with regard to Mr Strang's organisation's application, but Mr Ballance's feedback and that of other witnesses today has been very balanced and fair. We accept the challenges and indeed some of the areas where it has been indicated that improvement could be made—for instance, the co-ordination role across numerous agencies when it comes to these applications. But, today, we feel we are aligning with the 10 key points in the UK's strategy to make sure that the UK is open for business, to deal with Mr Strang's very clear point. As for progress to date, since July 2021 when we took over this role, we have approved 343 licences; we have 763 British satellites in low orbit constellation, which is the second biggest constellation of satellites—the OneWeb satellite constellation. We have 25 active applications in progress in the UK.

I hope, Chair and members of the Committee, that, referencing previous discussions, we have shown that we have responded to a lot of that challenge. We have taken on board the current challenges that are being tabled by an industry that is now very good at articulating what it needs and, hopefully, a regulator that is clearly attuned to listening to that.

Q669 Chair: Thank you for that. We can hear you clearly but you are a little faint, so I will ask our technical colleagues to turn up the volume in the room a bit.



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Mr Macleod, you heard the evidence in the previous session. There seems to be a good engagement between the partners, but obviously part of that is co-ordinating your expectations in terms of timeframes. If people are operating to a completely different expectation from the one that you think is realistic, that is not very productive. What is your response to the suggestion from Mr Strang that a three-month licence window is what they need?

Colin Macleod: Thank you, Chair and the Committee, and the previous speakers. It was very good to hear their feedback. As Rob said, we have been developing and changing how we approach things. I think the evidence from the previous speakers has also indicated that hopefully we are on an upward trajectory of improvement across all of these activities.

As for timing, there are a few aspects worth bringing to the attention of the Committee. The first is that in the time that we have been the regulator we have not caused any delay to any space operations, whether launch or satellite, since we started. Indeed, on Rob's comment we signed off another two licences yesterday, so we are now at 345. That is not to say we do not want to make them better and improve the pace.

Also, Frank earlier mentioned some of the ambitions or timescales that industry put forward. Sometimes public deadlines or announcements for launch can be well ahead of when they are technically ready. Even in the past six weeks we have seen four significant failures in space. The SpaceX one was very high profile. We also saw that a rocket launched from Sweden accidentally landed in Norway. We saw a new rocket in America from Relativity Space also have anomaly in its first launch. Ninety per cent. of first launches are still failing. That just shows how incredibly difficult this is.

To add to the complexity of this, from the evidence you have heard today and the last time from Virgin, you have talked to three different rocket manufacturers. One uses jet fuel and not liquid oxygen; one uses solid fuel; and one uses a new eco-friendly fuel. They all have different navigation systems, engines and propulsion systems, so they are all very difficult and complicated things.

As for the application for SaxaVord, it is not right for us to talk in detail about what that is or where it is at the moment, but we do not foresee a particular problem as we sit here today in being able to license that in the summer, assuming all the tests can be met. Again, that will be ahead of the readiness of the rocket. What we are trying to do in the CAA is also balance the requirements of all the applications that we have. For example, in the past week we have managed to license in a very short space of time a very experienced UK satellite manufacturer which had its deadlines shifted by its launch company by six to eight weeks unexpectedly. We were able to move things around to meet that, which caused some pauses in some of their applications, but it is not stopping the actual operations or the technical readiness of those companies.



Chair: We will take some questions from colleagues, but I think it is worth putting on record that you perform a very important regulatory role. If a launch were to fail as a result of a failure of regulation, this Committee would have some very severe questions. We know that you have to balance that against the understandable sense of urgency that commercial companies and indeed the public have for launch. We very much respect that. I do not think we would expect you to make specific commitments on timescales about a particular application, but we have heard Mr Strang's aspirations on that. Let me go to Aaron Bell first and then Chris Clarkson.

Q670 **Aaron Bell:** Could we go back again to the Cornwall spaceport failed launch? We had Sir Stephen Hillier and Tim Johnson in front of us in the session on 1 March. There was quite a bit of follow-up from other witnesses, yourselves and so on, in writing to the Committee after that. Can you provide us with any further updates on the lessons learning activities that have taken place at the CAA since the failed launch? I don't mind who answers that—whichever is best placed to do that.

Rob Bishton: I am happy to start, Chair, if that is okay, and I hope you can hear me a little bit more clearly now.

That particular event and the scenario leading up to it provided a lot of learning opportunities for us as the regulator, particularly in terms of engagement and when you have an organisation that is used to one regulatory regime but obviously then has to submit an application to fit in with a different regulatory regime. There are things for which you cannot take credit no matter what your collaboration is in this case with the FAA as a regulator. I think we maximised the knowledge and information exchange with the FAA. There were specific things to be looked at by us as the regulator for the UK through that national lens. As I said, national security interest issues and ground hazard, particularly with the Cornwall launch, as you can imagine, provided a different set of situations that had to be assessed by the team.

As for airspace, there was a lot of interaction with Portugal, Ireland and Spain to make sure that the airspace and maritime aspects were managed. We have to recognise that, while we have a dedicated space team in the CAA of 48, we did enrol most of the rest of the organisation. One of the learnings of the CAA is that with a particularly complex activity that is a singular activity, on Mr Strang's point, it consumes a lot of the organisation. One of the learnings for us was how to balance off the broader sector interests and the interests of other applicants. That was definitely a key learning, but in trying to simplify and clarify through engagement what we expect in our regulatory regime I do not think the question was around the fitness of purpose of the Space Act, or the framework within which we are working; it is more to do with understanding of the applicant and our team's approach to processing those applications.



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We also learned a lot about precedents as in where you set conditions within licensing. As for the condition precedents that you set within licensing, I think that we have learned that with particularly complex operations you can still move to approve the licence. That does not necessarily mean launch, but it means that the regulatory process has been completed and then you place the onus back on the organisation, in this case Virgin Orbit and Cornwall spaceport, and you monitor them in their undertaking post licensing. There was a lot of learning around that.

Another point we learnt, which came out from the previous witnesses today, was co-ordination across multiple agencies: HSE, UK Space Agency, Ofcom, environmental, maritime and Office of Nuclear Regulation. I could go on. There is a key opportunity for us all within this system now to make sure that that co-ordination role, whether it is with the CAA or not, is clarified for the sake of applicants and ultimately speed of decision making. Colin may wish to build on that.

Q671 Aaron Bell: You said that you have learned lessons about resourcing essentially and the needs of one particular applicant against the space sector more generally, and presumably against your other duties in the CAA and how you balance all of that. Do you think you are now sufficiently resourced to support the nascent space industry in the UK?

Rob Bishton: The evidence given by witnesses talks hopefully to the very clear and active engagement ongoing now across a number of stakeholders, particularly those with more mature applications. There is a dedicated team of 48. We are very well funded by DFT to maintain that core team, but a benefit of the CAA having this role is that we are able to enrol the rest of the organisation. The airspace team in the CAA is three times as big as the space team, and the airspace team was really involved in this. The flight ops team is three times the size of the space team. The flight ops team was involved particularly because of that platform being a 747 departing from—while a spaceport—also a licensed aerodrome. Our airworthiness team, which again is over three times as big as the space team, was enrolled in making sure that their knowledge and expertise in terms of the operation of the 747 was used.

To answer your question, we have a great ability to flex the organisation in supporting space, not just obviously the dedicated space team, which we would grow if need be, but at this point we believe we have the correct resourcing.

Q672 Aaron Bell: We lost you there for a moment, Mr Bishton, but I think we got the sense of the answer.

Turning to Mr Macleod in the room, if somebody else wanted to repeat basically what Virgin Orbit did with a 747 horizontal launch, would they be subject to exactly the same tests for the licence and the criteria that you put in place around that launch, or would it have evolved based on the learning from that launch?



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Colin Macleod: The tests remain the same. If you are asking if Virgin came back in another form—

Aaron Bell: Yes.

Colin Macleod: Depending on the contractual arrangements and the set-up of the company, the licence could be transferred, or it might need to be reapplied for. As for a number of the tests, for example, around finances, the skills and expertise of the people in the organisation and prescribed roles in law, like the security manager, if they all change, obviously we have to revisit it; but if the fundamentals are the same in terms of the safety case and the new organisation's access to that, it will make it a bit easier for them, because the Virgin Orbit licence is extant; the spaceport licence is extant, but those two licences are also very closely aligned.

To go back to your original question about lessons learned, perhaps I may expand on what Rob has said. A key learning for us is the interaction between the spaceport and the operator. The launch application down in Newquay is very closely iterated between those two companies. This morning you heard about Shetland that is looking to have a multi-user spaceport with potentially up to seven companies. Then you have Orbex, which is one spaceport and one space company. The interactions of how that works is important because the responsibilities between the spaceport operator and the launch operator can be slightly different on the contractual arrangements.

To close, a final key learning was on why the accident happened. We do not yet know formally the actual result. The Space Accident Investigation Agency, which is an arm of the AAIB in the UK, is working with the FAA. We understand that Virgin has just about closed off the report on what did happen. When that is sent to the FAA and we have access to it, we will be able to understand what that means. That could also have an influence on the ability of a future operation using the same technology, because it depends on the cause of it and what the solution is, and that will impact on the safety case if they need to get a licence to launch again in the UK.

Q673 **Aaron Bell:** On that safety case, other companies have written in in support of your position and role before that launch. One of them was Newton Launch Systems, which said you were taking the correct approach to safety, but it also raised two concerns. One was about the proximity of spectators to the launch site in the very unlikely event of any explosion happening on the ground; the other was that in their view the actual launch site chosen was too close to the Canary Islands and was an unnecessary risk. Do you recognise either of those points, and do you have any observations on their comments?

Colin Macleod: The way the regulatory system works is that the operator and spaceport come to us and set out the safety case to us. We do not tell them how big it should be, where they should operate or how



they need to organise their flight path. They set out a safety analysis for us and our team of experts looks at that. In the case of the Virgin launch, which required an FAA licence as well, we had excellent support from our partners in America and we were able to compare our assessments with the FAA's assessments. In terms of the ground operations at Newquay airport, while it is space, it is very similar to other high-hazard industries, which we understand well in the UK. The safety exclusion zone put in place and proposed by Spaceport Cornwall in our view met the requirements, and the mitigations that they put in place were adequate. That was how we were able to issue a licence for that operation.

Q674 **Aaron Bell:** On the point about the mid-air launch being too close to the Canary Islands, did you assess that in consultation with the FAA as well?

Colin Macleod: The FAA undertook its assessment and we undertook ours. We had a lot of support from the airspace team in the CAA. We organise corridors of safety for aircraft regularly. This is a normal tactical activity that takes place often in international space. It was also a good exemplar of how the CAA works with its international counterparts in Spain, Italy and Ireland to co-ordinate those activities.

To go back to the comment from the Chair at the start, in terms of failing safely, we agreed the corridor of airspace and that was to allow the activity to fail safely. It did fail and it failed within parameters, and there was no risk to aircraft because of the safety zones put in place.

Q675 **Chair:** On the question of airspace shared with other countries, obviously that was a bespoke solution for the Virgin launch and you worked very hard with neighbouring jurisdictions. Is it possible and desirable to establish a framework agreement with neighbouring states that may be useful for future launches without having to negotiate each individually each time?

Colin Macleod: Yes, and that is under discussion and under way at the moment. There are two aspects to this. I talked about the tactical elements just now in terms of the CAA and other regulators internationally managing how it happens. The layer above that is the political comfort to undertake these activities in partners' airspaces. That is where it is slightly more complicated. That is something on which the Government lead. The Government lead on Government-to-Government conversations with other states. The Department for Transport is currently doing that in terms of the airspace requirements for north of Scotland and Shetland spaceports.

Rob Bishton: May I build on the airspace point? In my substantive role when I am not the interim joint chief exec, I am the safety in airspace director. I was in the process of swapping notes and formal letters of agreement with my counterparts in the countries where the Virgin Orbit launch touched. Your question about the future opportunities to regularise that relationship is one that we are working through, to Colin's point. However, it is important for the Committee to note that the



agreement from those other countries, both from a safety perspective and political perspective, to support the activity was on the basis of the confidence they had in the UK's assessment of safety and the mitigations. That was made clear to me expressly by every one of my counterparts with whom I eventually had to swap formal notes. They have confidence in the risk assessment methodology of the UK and they know we are very used to managing, organising and improving very complex activity in our airspace, which is by definition a very complex airspace block.

There is a lot to leverage in that, but also a lot to lose. If you do not do that well and rigorously, that confidence goes. Politically, it is very easy for that collaboration to stop if they have that justification. That is something we very clearly need to protect.

Q676 **Chair:** Indeed. If there were to be a framework agreement to make permanent what you did in the case of the Cornwall launch, is there a body that would be responsible for that, or is that in a sense a series of bilateral discussions between the UK and other countries? If so, who is the lead? Is it the CAA or the Department for Transport?

Rob Bishton: The lead would be the Department for Transport on the policy position, but in enacting that it is usually the CAA's partners. As you can imagine, within a normal airspace system we have long-established and very strong relationships with a number of airspace partners. Those have been renewed and refreshed post exit from the EU as well. Those relationships are very strong, productive and collaborative, and space is just an activity within the broader airspace piece. I do not think we should say it is different; it is just a question of maintaining that strong framework and those relationships and information exchange with those bordering countries.

Q677 **Chris Clarkson:** I would like to talk a little about licensing. In the previous evidence session the Committee heard from a number of witnesses, including the CAA, that it might be useful to have a central body or portal. I think Mr Strang spoke about a space tsar, which sounds like a Marvel movie but it might not be a bad idea. Have you made any progress in that area, and what steps have you taken to try to centralise that process to co-ordinate all the people involved in licensing?

Colin Macleod: I am not sure that we said we were going to do that. We are learning the lessons from the first launch. We are operating at the moment with five launch companies which are coming forward, and we have also improved how we co-ordinate with the marine organisations, for example, across airspace and the Health and Safety Executive. There is also local geographical impact around what regulations may or may not be required. There is definitely not a simple solution to this, but we are working very closely with all these other partner bodies to try to make sure we can get to the companies involved earlier with all these regulatory bodies that have to issue licences which support the space licence.



Q678 **Chris Clarkson:** From that process, would you say that you are developing almost best practice for how these things can be done more efficiently?

Colin Macleod: We are certainly learning good lessons, as are our other partner organisations. We have some examples. Previous speakers talked about the COMAH regulations on high-hazard activities. These are well understood regulatory requirements for organisations in those environments. What we are able to do now more clearly is that, when a new applicant comes in the door, we can identify for them which organisations we think they need to be speaking to, because ultimately the licences for some of these need to be issued by other regulators under law. We cannot issue a COMAH certificate or licence. Clearly, we can signify and indicate to companies where they have to go.

Another good example under Virgin was the requirement for an explosives certificate. Most rockets use explosives to split apart the stages in a controlled way. Obviously, there are lots of requirements around how you handle and store explosives safely. We have the expertise and we are learning more and more about how to signpost these to new applicants when they come in the door so they can start that journey themselves, because they have to do it in direct co-ordination with some of the other legal bodies.

Q679 **Chris Clarkson:** Based on that, do you think you will be able to meet the necessary timescales to fulfil our vertical launch ambitions?

Colin Macleod: As we sit today and as I said earlier, we have not failed or stopped one of these activities taking place within the schedule of their technical readiness, as Sir Stephen Hillier said at the previous Committee hearing. Looking at the timescales of the applications in front of us, we do not see that we are in a position where we will stop any of these rocket companies launching when they are technically ready to launch. As to our intention and the lessons learned, as Rob said earlier, we are moving to try to increase precedents before launch. We are not a licensing body; we are a regulator. We want to issue the licence with conditions and then move towards much greater levels of oversight. That gives far greater control to the applicants to focus on operating safely. They can have their licence and they will have a list of things to do before they can launch, and we will support and oversee those through to the point of launch, but they decide when they launch, not us.

Q680 **Tracey Crouch:** There has been much consultation around the issue of the variable liability approach. This Committee's report on space and satellites recommended that the Government should develop proposals for the variable liability approach and that it should be implemented by June 2023, which is next month. Many of our witnesses have called for this approach to be taken during this Committee's inquiry. Sir Patrick Vallance's report on the pro-innovation regulation of digital technologies endorsed this Committee's recommendation, but the Government in their response said that they were finalising their proposal on the variable limit



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approach and it was unlikely to be implemented until early 2024.

Mr Macleod, what are your views on that delay, and do you see a significant continuation of disincentive for investment, which is what some of our witnesses think?

Colin Macleod: As for the proposals, that is not led by the CAA but by Government. The Minister is coming next, and he will probably speak to that, because I think there will be more engagement with industry shortly.

In terms of investment, we certainly do not see any reduction or change in investment at the moment. As Rob said earlier, we have 25 key applications in the pipeline at the moment. We have issued licences to 19 companies in the last year and a half from across the globe. We are seeing increasing interest from all countries to come to the UK, partly because of the regulatory access and certainty that we have; it is also to do with the stable legal framework in the UK which encourages new investment to come forward. I am sure that the Minister will talk about the proposals linking all that to liabilities and insurance. So we do not see any reduction.

To come back all the way to the start of some of the discussions around regulations, the regulations from our perspective certainly work. We now use them in anger in almost every application that they could be used for, but they are also outcome-focused regulations, which means they allow us to handle innovation very well, because it is up to the applicant to bring forward their new idea and show us it is safe. That is why we have companies like Space Forge, which were in a previous evidence session, coming up with fantastic innovative ideas. We have lots of new ideas around debris removal and increasing numbers of constellations wanting to come to the UK. We are now an acknowledged expert. I have spoken at the United Nations in Vienna on constellations and our expertise on how to regulate them for other countries. We have been asked to go and speak again next month. I certainly do not see any reduction in interest in satellites or launching in the UK.

Q681 **Tracey Crouch:** Mr Bishton, while we are waiting for the Minister to arrive, can I just ask a completely separate and slightly off-script question? We have heard from other witnesses this morning, but also previously, about the talent pool. Obviously, the CAA is a technical regulator. Are you seeing challenges to recruitment within the CAA? What can we do to improve talent being developed or recruited here? Do you have any views or comments on that?

Rob Bishton: Thank you for the question. It is front and centre, and when I resume the board meeting shortly I expect it to be a topic that our board continues to scrutinise and explore, across not just space but new novel technologies and the innovation sector. I was recently in Bristol visiting Vertical Aerospace, which is an advanced aerial mobility platform. They were talking about their own challenges to recruitment,



but, a little like the story I heard from Skyrora on site yesterday, as an industry they are connecting with academic organisations and trying to design courses so that they get a stream of talented young minds into these various emerging sectors.

As a regulator, we have been very active in the STEM programme, again supported by DFT. The question is: do we need to do more? The answer is yes. Do we have some skill shortages as it stands based on some of the issues and technical expertise that we need in our system? Yes, we do have some areas we have highlighted where we need more resilience: software, battery specialists and propulsion. Propulsion is becoming important not just in space but, as you can imagine, the entire aviation ecosystem with its sustainability challenge. Propulsion is one of the areas where we think we need to do much more, much more quickly. Again, I will be talking about some of the activity and ideas that we have in our board meeting when I rejoin it in a few minutes.

Q682 Tracey Crouch: I am very grateful to you for taking the time. I am asking this question as a filler for the Minister, who I am sure will be exceptionally grateful and reward you accordingly. Do you have any issues around diversity in the CAA? What more can be done to encourage greater diversity within the regulator?

Rob Bishton: As an executive committee, we have progressed the diversity conversation with a lot of focus over the past two or three years. We are mindful of the challenge, particularly when recruiting expertise from a sector where there is a lack of diversity, so you have to have a very long lens in working and developing with academic organisations pathways for young people to be attracted into sectors. In the Bristol area, there is an emergence of talent and diversity that we need to tap into, as indeed some of the innovators are doing directly themselves. It is no different when we engage with the space sector. The attraction of being involved in these new sectors is drawing in interest from a diverse range of people, ages, genders and ethnicities.

We need to make sure that as the regulator we mirror that. So we have programmes to try to develop that. No, it is not easy; there is no doubt it is not easy. Have we moved the dial at the pace and to the scale we would have wished over the last two or three years? No. What I would say is that, because we are a growing organisation as much as a learning one, we have the opportunity to use future growth plans to make sure that the net we throw is very broad, and that we give every opportunity for the most diverse sets of candidates to be ultimately brought through our recruitment processes and equally working with industry partners as well. At the moment, is it a picture that we accept? No, it is not, and there is a lot of challenge again from our board on that very point.

Q683 Chair: Thank you very much, Tracey. Can I just ask one final brief question to Mr Macleod? It has come up several times in this session and in the previous panel of witnesses that the need for a central gateway to co-ordinate the different agencies is desirable, and Sir Stephen Hillier



said that to us as well. Who should establish that? Who should co-ordinate it? Is that within the gift of the CAA, the Space Agency, or the Department for Transport?

Colin Macleod: That is a very difficult question for me to answer, Chair. We should always bear in mind that we have only done one launch. We have licensed one spaceport and one launcher. We are still learning the lessons from that. I would simply hesitate to make too many changes until we have tested them again in a couple more areas, because, as I said earlier, we have improved things significantly on our engagement with the marine organisations, health and safety, and other bodies. Whether or not that would be an immediate help or a hindrance or something else we would have to learn to do again for the next launch, I am not sure.

Certainly, from the lessons we are continuing to learn and from the next couple of key examples of a vertical spaceport and some launcher vehicles, that might be the time to revisit that question and see if it is worth us doing that, given the volume of applications and the variability between the different applications that we get.

Chair: Okay. We will leave it there for now. I am very grateful, Mr Macleod, for your appearance today, and to Mr Bishton for joining us from Glasgow and for interrupting your board meeting. Thank you very much indeed.

Examination of witnesses

Witnesses: George Freeman and Rebecca Evernden.

Q684 **Chair:** I now welcome our final pair of witnesses to the table, who are familiar to this Committee: George Freeman, the Minister of State in now the Department for Science, Innovation and Technology—welcome, Minister—and his official, Rebecca Evernden, who is director of the Space Directorate at that Department. Thank you very much indeed for coming.

This hearing and its previous one were a follow-up to the report that we issued on space and satellites, and it was triggered in particular by the launch in Cornwall that did not succeed. I think, Minister, you were there at the time. You were at Newquay on the evening, I seem to remember, and you wrote to me and to the Committee to express concerns that the evidence that we had received from Virgin told one side of the story, and that we needed a broader perspective as to what went right and what went wrong. So, help us out: what went right and what went wrong with that launch?

George Freeman: First, Chair, thank you for the opportunity to come before you. I really appreciate this Committee's leadership and interest on space policy. It is a fast-growing area, and we are really grateful for the chance to have this conversation.



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It is our view still that space is difficult. There is a whole series of things that go into a launch. I do not want to pretend that the whole mission was a success, but we do have Europe's first regulated, licensed spaceport, we got the launch away from the UK, and the first firing went well. The problem was a Virgin problem with its second firing, which I am sure you have taken evidence on. Since then, we have seen that JAXA in Japan has had a major problem with one of its launches, and even SpaceX has had problems, so we are in the foothills of a very fast-advancing sector.

We remain committed to our strategic commitment that we think over the next 10 years, given the growth in low-earth observation satellite launch, the UK realistically should aim to be—and we are—the biggest launch pad in Europe through a number of sites, including two important ones in Scotland, which will be the next launch. So we remain very committed to that.

In terms of the specifics of your question, there are lessons, clearly, to be learnt from a Virgin point of view technically, and that is a matter, obviously, for them. From our point of view, while we are really proud to have had the first spaceport licensed and lead—and the regulations we put in place in 2021 were an important part of that—we are aware that there are launch licences, orbital licences, spaceport licences, marine licences, and national and international airspace licences. We got through all of that, but as part of the regulatory review in the new Department I am keen to make sure with officials that we learn those lessons as well about how we can make this a more streamlined process, without in any way undermining what the public and all of us would absolutely rightly expect to be line 1, which is public safety and environmental sustainability.

Q685 Chair: Thank you. Let's come on to that. It is important to recognise, as the CAA in the last panel said, that the launch failed, but it failed safely. That is one of the prime responsibilities of the CAA, whatever else is to be said about it. You mentioned the number of different bodies involved and that as part of your regulatory review you are looking at how they could be better co-ordinated or whatever. Tell me a bit about that review. When is it going to conclude, who is conducting it, and when will its results be available to change the current practice?

George Freeman: Thank you. You will appreciate, Chair, that since I was last before the Committee we have a whole new Department. A major part of the Prime Minister's thinking behind creating DSIT, the Department for Science, Innovation and Technology, is to make sure that we are building a more coherent landscape across Government, and as part of our S&T framework we have set out regulation as one of the key parts of it. That is using innovative approaches to regulation, not to race to the bottom, but to use those Brexit freedoms to set standards. Perhaps we can pick up in due course the work that we are planning to use those freedoms on space sustainability.



It is also about making sure that we have a joined-up ecosystem. Perhaps I can turn to Rebecca as to when we may be able to come out with something. I have a big announcement coming in the autumn around regulation, and my thinking had been that we might package it all up with that. But there is work going on at the moment across the Department to look at, basically, what the lived experience for the applicant is.

Q686 Chair: Ms Evernden, when do you expect that consolidation or co-operation between the existing bodies to take place?

Rebecca Evernden: As the Minister said, the regulatory review consists of a set of different activities looking at different aspects of how we regulate space. Part of that is looking at what we did for the first launch, and there has been a lessons learning process that has been conducted looking at that, which is just concluding now. Some of that will be feeding into the work that the CAA and DFT are doing looking at the Space Industry Act and looking at the secondary legislation to see if there is anything in the future that we might want to revisit.

The Space Agency is about to publish a consultation on the orbital liability, which I know has been an issue that the Committee has raised before, and which we have listened to, and which was picked up in the Vallance regulatory review as well. There will be a consultation coming out on that shortly, essentially saying that we accept that we need to do this; we need to have orbital liability limits and licences, working with industry as to how we best do that.

There is a third aspect of it as well, which is sustainability and how we use our regulatory framework to best drive those ambitions that we have for a sustainable space environment. That is the work that we are doing both through the UN and domestically with industry to develop a voluntary standard, which we are calling the sustainability mark, which will help us to set standards to enable us to license both launch activities and orbital activities in a way that drives those sustainable behaviours. All those things are under the bracket that we are calling the regulatory review, and we would hope to make some progress by the autumn across all three bases.

Q687 Chair: On the point about bringing together and better co-ordinating the large number of bodies involved, when do you expect that to be different in terms of the experience of the companies in the sector?

George Freeman: First, I do not want to tread on my excellent colleague Jesse Norman's toes as Minister for the CAA at DFT. DFT and DSIT worked incredibly closely together in the lead-up to the Virgin launch, and we are working very closely in terms of learning the lessons from Virgin. That is the first starting point.

Obviously, they lead on the CAA regulatory piece. We are leading more on trying to make sure that the lived experience across the whole



ecosystem for applicants is more streamlined and more coherent. To be honest, we all learnt a lot through preparing for Newquay and living through that launch, and we very much hope that the Scottish launches will be rather easier and more streamlined as a result of it.

I am happy, Chair, to take the action and come back to you. In my mind, there is an autumn moment when we are going to be setting out our sustainability-specific regulatory proposals for the sustainable kitemark for accelerated licensing, cheaper insurance and cheaper finance for compliant companies, and at that point I would certainly want us to have completed that, so perhaps I can come back to you then.

Q688 Chair: We have heard throughout our main inquiry and the follow-up inquiries just what pace there is in this sector and that other companies are advancing quickly. Minister and Ms Evernden, you both know that very well. We need to get on with it. Is it not possible to make some early progress on it before the autumn? You do not need to hold things back for a big announcement, do you, if you have made some progress already?

George Freeman: No. With respect, we are moving at pace. Space is moving quickly. Having come back from the G7, I can tell you we are winning plaudits for the pace and leadership that we are providing on sustainability, on European launch, and on insisting on international global collaboration. If we can come back more quickly we will, but there are some quite important both cross-Government and international pieces that have to be sorted in making sure that the sustainability piece links to the UN and it links to pulling other countries along with us. I have been building a consortium of space nations around the world that agree with us so that we are not isolated on this. There is a lot of work going on behind the scenes, but I absolutely take your challenge, and if we can come back to you with the proposals on the regulatory lessons learnt, we will do so before the summer.

Q689 Chair: Thank you very much. Finally, specifically on the Cornwall launch, obviously that was a great disappointment to everyone. What steps are the Government taking to make sure that they learn the lessons, in particular from the progress made at Spaceport Cornwall? We were very impressed by the evidence that we heard from Spaceport Cornwall. It would be a great shame if that did not succeed in the future. Are you able to do anything, Minister, to make sure that that spaceport has a future with or without Virgin?

George Freeman: Yes, we are. I completely agree with what you said. I will pass to Rebecca to brief you on the specifics of that piece of work. Spaceport Cornwall is a flagship spaceport. It is the first licensed spaceport in Europe. Now, as a result of the Virgin launch, it is in a number of important conversations with other launch parties both here and around the world that want to consider it as a base for launch. Indeed, I have just come back from Japan where JAXA said, "We are very keen to pursue JAXA launches from the UK."



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There is a raft of ongoing launch conversations that I am delighted Newquay Spaceport are having. They are a commercial organisation. I pay tribute to their energy and pace. In this interim period while the next launches are sorted, they have, rightly and impressively, set up their enterprise and innovation hub. At the heart of that Cornish space cluster, with Goonhilly down the road earth observation coding, we see them not just as a launch centre, but a hub for the small commercial companies that are emerging in this space. I will pass to Rebecca to talk you through the specifics of what we are doing.

Q690 **Chair:** Just briefly if you would, Ms Evernden, as we have other things we want to come on to. What are you doing to make sure that Cornwall continues as a spaceport?

Rebecca Evernden: Two main things. The UK Space Agency continues to work with Spaceport Cornwall to help identify any future launch providers that might wish to launch from there. For example, there is a new MOU that the spaceport signed with Sierra Space in order to bring Sierra Space to use Cornwall's facilities. That is a positive development. The other thing the Minister has already mentioned is supporting Cornwall through the broader clusters' funding so that they can develop the cluster as a whole and be an attractive place for space businesses to come into. Those are the two main strands.

Chair: All right, thank you very much. Let us go to our colleagues, starting with Aaron Bell and then Chris Clarkson.

Q691 **Aaron Bell:** Thank you, Chair. Thank you, Minister and Ms Evernden as well. I have a couple of follow-ups from the Chair's questions. You talked about the progress at Spaceport Cornwall not being wasted. Is the Department taking any interest in what has happened to Virgin Orbit, which is currently going through bankruptcy protection in Delaware, as I understand, and is hoping to sell its assets to Stratolaunch? Have the Government taken any interest in what is happening there and tried to secure, essentially, the company not being broken up so that whoever purchases it can get back to Cornwall as soon as possible?

George Freeman: Yes, we have taken a close interest. Let me just stress that we recognise that Virgin is a private company and a commercial operation, so it is up to them to decide how and where they fit in, in this fast-moving global race. We are keen to make sure that we develop and deliver our obligation, which is our commitment, which is to make the UK a leading LEO launch destination for all and any providers that want to come here. We are keen to make sure that every opportunity for maintaining value in the UK is pursued, but we are not sitting here thinking of making a major acquisition and acquiring and developing a UK sovereign launch capability.

Q692 **Aaron Bell:** Understood. We heard from the CAA that the licence is still extant for Virgin to launch there. Has anyone sought any potential purchases of Virgin Orbit's assets? Has anyone sought any potential



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undertakings from the Government or from the CAA about the fact that that licence would be transferable to anyone who purchased the company?

George Freeman: As I said, matters for the CAA would have to be addressed to DFT and my colleague, Jesse Norman, as the Minister. As Minister for the space industry, we stand ready to support a specific proposal that looks financially sustainable and commercially sustainable, but we are not in the business of making a major UK investment in acquiring a platform that hasn't worked. We are keen to make sure we support people who want to build and grow in the UK.

Q693 **Aaron Bell:** Thank you, Minister. Just on the overall regulation point and the desire we have heard to have a central entity or portal, Dan Hart, the CEO of Virgin Orbit, listed—and I will list them quickly because they are of interest and they should be on the record—the different organisations they had to deal with: the Civil Aviation Authority, the UK Space Agency, the Department for Transport, the Health and Safety Executive, the Maritime and Coastguard Agency, the Marine Management Organisation, the UK Hydrographic Office, the Coastguard, the Maritime Rescue Coordination Centre, the Ministry of Defence, National Air Traffic Services, Cornwall police, the airport fire department and MI5.

They all have a valid interest here, and I am sure your excellent new Department has an interest as well, so they could be added to the list. He said that it is not just the fact that you had to deal with these; it is that they were being asked for the same information rehashed again and again. You have said that you want to put that right.

George Freeman: Yes.

Q694 **Aaron Bell:** Would that be a separate organisation, or would that be something that sits with the CAA, in your vision?

George Freeman: Yes. That is why in my opening remarks I made the point that it is no mean feat to achieve first launch from Europe, and that there were a lot of lessons to be learnt. One of them that I wanted to highlight was that regulatory alignment. Each of the organisations you have mentioned has a role and an important statutory duty. We need to make sure that the public can see that we are not cutting any corners and that we are doing space launch in a sustainable and safe way. Inevitably, the first time you do something you are breaking new ground, and there are a lot of lessons about how we can do it more quickly next time and not repeat and duplicate without in any way undermining different statutory obligations.

As per the earlier question, Minister Norman and I are keen to make sure that across the board we have a more streamlined system, it is easier and people are not asked the same questions again. It should not be beyond the wit of Government when they have asked somebody a set of questions—this goes across into other sectors like health—to be able to capture them digitally and use them in the next application rather than



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require them to keep giving you the same information. At a very basic level, we really ought to be able to make it more streamlined.

Q695 **Aaron Bell:** You think that would be a central Government function rather than the CAA. You probably caught the last answer from the CAA as you came in. I think they are a little reluctant to take on that clearing-house role given that they want to specialise in what they do best.

George Freeman: We do not in any way want to undermine the statutory duties of each regulator, but we want to make sure that, from the point of view of applicants, the system and the process is more streamlined and clear, and that should be possible in a 21st century digital world.

Q696 **Aaron Bell:** That could be provided by DFT or DSIT as a Government function.

George Freeman: Yes, we view it as an important part of delivering the S&T framework, the Vallance review, and smarter, more digital, agile regulation in the global race. It is a cross-Government responsibility.

Aaron Bell: Thank you.

Q697 **Chris Clarkson:** Sir Patrick Vallance has endorsed this Committee's recommendation about moving towards a variable liability system by June of this year. The Government have indicated now that they are looking at doing that in early 2024. I know from my experience working with you, Minister, that you are a doer and you are trying to make the lived experience more accessible for people. Will you be taking any steps to expedite that process? What steps will you be taking in order to ensure the competitiveness of this sector?

George Freeman: As Rebecca just said, we have taken the advice that we heard via this Committee and others, and we have made the move and the commitment to address it. Perhaps I can invite Rebecca to explain the timetable and any options for accelerating it.

Rebecca Evernden: The consultation is being led by the UK Space Agency. We want to leave enough time during that consultation for industry to respond so that we get the right answer here. You could expedite it, but you probably need a bit of time for the industry and the insurance community to think about what they want to say.

If the consultation is being published next month, which I believe is the aim, and will close at the end of September, a couple of months after that for the Government to publish their response in early 2024 is a fairly reasonable timeline for what will be quite a significant policy change for the Government.

Once you have signalled that this is what you intend to do, that is the important thing, and businesses will take that signal positively—at least that is what we are hearing from industry—and be able to make their



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investment decisions based on the signals that they are hearing from Government about the direction of travel.

George Freeman: We plan a major moment, as I mentioned, in October, where we will be setting out the detail of our new sustainability regulatory framework. We have a working group with Lloyd's of London, the City of London, the Space Agency and DSIT officials. We intend that to be quite a moment where the UK sets out a new regulatory framework that rewards those that are compliant with quicker access to financing cheaper insurance and, if we can do it, speedier regulatory approval. This all goes to a piece. Without compromising the importance of industry having a clear voice, if we can get it out before the end of Q4, it is all to the good in terms of showing leadership in a new regulatory framework.

Q698 **Chris Clarkson:** The lawyer in me is slightly cynical. When I see a phrase like "early 2024", I have to ask, what is early 2024? If you are saying now possibly by Q4, is it just a case of making sure the due diligence is done before anything goes out?

George Freeman: Yes, there is no reason to hold it back as long as we have had proper consultation with industry and it fits with the package that we announced in October. We do not want to give contradictory signals. If I could, I would love to get it away by the end of 2023. If it means early 2024, I am thinking first week of 2024 rather than Q1, which takes it through to Easter.

Chris Clarkson: Okay. Thank you very much, Minister.

Q699 **Rebecca Long Bailey:** Minister, the Government have continued to delay the publication of a national position, navigation and timing strategy. That is a capability that is critical to UK infrastructure. Can you confirm whether a strategy will be published and what the timelines for that will be?

George Freeman: It is a great question. Yes, I can confirm that. You will appreciate, Ms Long Bailey, the scale and the pace in the last year of international geopolitical interest in PNT. Since the appalling invasion of Ukraine by the Russians, we have seen just in the last 12 months a huge geopolitical race for access to and integrated approaches by allies to some of that PNT technology and data. There is a huge amount going on. Indeed, it was an important topic at the G7 where we discussed how to make sure that we create frameworks for integrated commercial data use in space that would also allow for proper secure use and security uses by trusted allies and partners. It is very live, and it is something that we are discussing in the economic security Cabinet Committee that the Prime Minister has set up.

Perhaps I could turn to Rebecca again for timings and likelihood and when we expect to be able to put something up.

Rebecca Evernden: Yes, I can comment, although the PNT team does not sit within my remit. It sits within a parallel team within DSIT. That is



because the Government took the decision to establish a cross-Government approach to PNT. That was the significant step, I believe, that was taken last year. Rather than it being the remit of a single Department, which meant that progress was quite difficult, other Departments came together to form a single unit to look at both terrestrial and space interests in PNT and the use cases. I know that team has made good progress over the past few months and has concluded its demonstrator project, and recommendations are going to Ministers at the moment to conclude that and to set out next steps. Subject to all of that, I hope that you hear from the PNT team within not a very long amount of time what those next steps are likely to be.

Q700 Rebecca Long Bailey: Are we looking within the next few months?

Rebecca Evernden: I would expect so, but, as I said, this is not within my remit at the moment, but certainly I would expect that to be the case, yes.

George Freeman: My note says, "The project team is in the final stages of assembling evidence for Ministers." "Final stages" sounds to me like weeks. I will happily come back to you, Ms Long Bailey, on that, if I may. It is a helpful question.

Q701 Rebecca Long Bailey: Lovely, thank you. I have one very brief question. In so far as the strategy is being developed at the moment, are you aware that it is going to involve the use of OneWeb satellites?

George Freeman: That is another very interesting question. Let me take it from the top. First, OneWeb's future direction is obviously a matter for OneWeb. It is a business, subject to commercial freedom. I am delighted, and I think I have said this to this Committee before, that I inherited our golden share. If I had not inherited it, I would be sitting here saying, "If only we had a golden share in the world's biggest LEO constellation and independent, global commercial business," and I am really delighted that they have achieved that status with their 622nd, I think it is, satellite. They are in discussion at the moment with Eutelsat, which is commercial and I would not want to compromise it by commenting on it, except to say that we view our shareholding in OneWeb as a major lever for our commercial space strategy.

We are in discussion, as you would expect, with the various partners in ESA and in the EU. Indeed, I have just been discussing it with European partners at the G7. We believe there is a very significant win-win here if OneWeb decides through their Eutelsat acquisition that they want to be, and can be, part of the European IRIS² system. There ought to be enough there to go around for all parties to benefit. We would certainly want to make sure that through our golden share we have a significant piece of the manufacturing in the UK and, potentially, launch in the UK.

There are some big issues sitting within the EU at the moment around how we make sure that a global and commercial open constellation can



also provide the right PNT security. There are technical solutions to that. I shouldn't go any further, but we think it is perfectly possible for the UK to secure our PNT strategic, military and defence requirements with OneWeb as part of a European constellation. The two are not in conflict.

Q702 **Chair:** Thank you, Rebecca. On the PNT strategy, we took evidence during our main inquiry that the PNT strategy had already been developed and consulted on within the industry, and yet it still has not come to you, Minister. It must have been 2021 when we heard that it was being discussed. We have discussed the pace that is required in this. Is there sufficient recognition of the need for pace within the Department?

George Freeman: Let me just be clear. In 2021 I saw—it is not that I am waiting to see the first documents on this. There has been substantial conversation across Government and Departments. There is a number who have an interest in this. We are waiting for the final set of proposals for us to agree and sign off.

Q703 **Chair:** You saw the first set of proposals in 2021. It is taking an awfully long time to get to the final ones, is it not? What is the problem?

George Freeman: I returned to Government just before Christmas in 2021. You will be aware that 2022 was both a politically and militarily tumultuous year. We had war in Europe, and we had a huge focus in Government on dealing with and responding to all of that. We have had some political turmoil. We have now had the creation of a new Department.

Q704 **Chair:** Are you saying the creation of a new Department has delayed things further?

George Freeman: No. I am saying that the Prime Minister has made strategic grip of global S&T for the UK in the context of global security far more of a priority than it was back in '21 as a result of Ukraine. These conversations are very live and very—

Q705 **Chair:** PNT is very important to the space sector. The space sector is very important to our science and technology ambitions and indeed to the country. So it would follow, I would hope, that the creation of a new Department and the appointment of a Prime Minister with these ambitions way back in the autumn might accelerate this, and yet here we are in May and we still do not have the PNT strategy that was referred to in draft in 2021.

George Freeman: For the reasons I have set out, I do not accept that that is, as it may look to you, a period of inactivity at all. It is quite the opposite; it has been a period of extraordinarily intense international collaboration around PNT in the face of an actual security threat, both military in Europe and economic threats to supply chains. There is a raft of very strategic conversations going on about our Five Eyes alliance, AUKUS, and how much we need to respond to make sure that key critical



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supply chains and facilities like this are within secure partnerships with secure allies. Please don't take the lack of the announcement of a strategy with this Committee as inaction at all. It is quite the opposite.

Q706 Chair: That is very helpful to hear. You have heard from Ms Evernden that something is coming to Ministers, and you interpret that, from your experience, as being weeks. You would agree with the Committee, I hope, that it could not, in conscience, be any more than weeks given the importance of it and the time that has been taken already.

George Freeman: I can only speak for myself, but, yes, there is the complexity of it. It crosses the Ministry of Defence, the Prime Minister's Office, the Treasury and DSIT. There are a huge number of conversations that have just come out of the G7 around security. This does not sit only with me. I have been pretty clear that this is geopolitically and economically important and urgent for clarity in the global race for space.

Chair: The final question is from Tracey Crouch.

Q707 Tracey Crouch: Speaking of cross-government discussions, the previous Prime Minister disbanded the National Space Council. It was re-established by this Prime Minister but as an inter-ministerial group. Has it met yet?

George Freeman: That is a good question. As the "capital S, capital C" Space Council, no, it has not met yet, and that is for a number of reasons. It is partly because of the creation of the NSTC, the National Science and Technology Council, which was also disbanded by the last Prime Minister and reinstated by the current Prime Minister, and which is the S&T equivalent of the National Security Council, where we take the big decisions about strategic technologies and sectors. Space has been included in the list of areas where the NSTC, not least for the reasons we have just discussed, needs to lead. The creation of the new Department, with me as Minister of State with the responsibility for space, and the Department convening S&T across Government, has meant that right now we are focusing on delivering the space strategy that we set out in October 2021 and the various topics we have considered.

It is my view that we ought to convene rather as we do in other key sectors like life sciences. The Life Sciences Council brings together industry leaders—big, medium and small—and political leaders. I think the space council should be constituted as a leadership forum for the nascent and emerging space sector, which is not quite how it was originally constituted, and I personally think it would be a good thing for us to do. First of all, we need to deliver some of the key things that we have been talking about this morning. I would like to see the space council up and running and having its first meeting before the end of this year, certainly. Particularly, perhaps given the announcements we are making in September/October, that would be a good time.

Q708 Tracey Crouch: I am slightly surprised and shocked, actually, with that response. This is obviously a thriving industry, which the Government are



making a huge amount from. Its value to the economy is enormous. The supply chain ecosystem is fantastic. It is driving talent and interest from around the world. You yourself, Minister, have talked repeatedly throughout the session about the cross-Government nature of space policy. To deliver a strategy, you need that support from all your colleagues across Departments. For the inter-ministerial group, by the sounds of it, to not even have been populated with Ministers, let alone met or had a meeting, is a bit disappointing.

George Freeman: Just to be clear, that is not the case. Sorry, I did not mean to give that impression. The space council, as it was originally proposed, has not met. I have regular routine meetings with the Minister for Defence Procurement, who leads in space. The Chancellor and I just last week convened the latest in a series of roundtables with industry leaders at No. 11. We have a routine heartbeat series of meetings with UKspace. I work very closely with Minister Norman on the CAA. I do not want you to feel that the fact that the space council has not met means that there is not extremely close co-operation across Government.

Q709 **Tracey Crouch:** In that case, was the previous Prime Minister right to scrap it? It sounds like it.

George Freeman: No. As I said in my answer, in my view, you need Ministers to do heavy lifting with their officials across Government. Space councils and life science councils provide a different role. My view is that they are not really delivery boards; they are annual moments where the whole sector comes together and looks at the KPIs and looks at the delivery. As we bed in the delivery of the space strategy, we need to make sure that we have a really coherent system across Government with the right people around the table who represent not just the big corporates but the emerging companies, the SMEs and the investors. I would like that space council to reflect the new space economy that is taking shape in the UK.

Q710 **Tracey Crouch:** Time is short. As much as I would like to keep probing you on this, it would be useful perhaps if you could write to the Committee with the vision for the council, when you expect it to meet—

George Freeman: Yes.

Q711 **Tracey Crouch:** —and what you expect it to do, because at the moment it does not feel like there is much urgency within that.

I have one final question from the witnesses this morning about talent. There was a desire to grow the talent pool. I am referring back to the fact that it is a thriving industry. What conversations are you having with Home Office colleagues in order to ensure that visas are being appropriately made available to high-skilled workers who want to come and work in the UK space sector?

George Freeman: Yes, thank you. This is a really important issue and it is important in our space strategy. It was one of the key elements. It is a really important part of the S&T strategy where schools, talent and



resourcing are essential elements. That is why I have asked space UK to provide for us a skills map over the next 10 years of exactly what jobs will be created and what the skills gaps are sectorally and regionally, which we are still waiting for, I believe. Let me pass to Rebecca for the detail on how we look to implement that over the next few years.

In terms of visas, you will have noticed that the Government set out a number of fast-track visas recently—visas for graduates, scientists and entrepreneurs. One of the reasons I have asked space UK to provide us with that map is that, as with other sectors, we need to make sure we have the actual numbers—I think they are going to be quite substantial numbers over the next 10 years—so that we can lock in with Minister Rob Halfon at the Department for Education and make sure that FE and HE colleges are providing what is coming.

Q712 Tracey Crouch: Before you pass over—forgive me, I know that we have to go to Prime Minister’s Questions—you started your evidence by saying how fast-paced this sector is and how it is moving constantly. We hear from witnesses about the global race on this. Asking people to go away and draw up a skills map sounds like something that is not very urgent in terms of its deliverables. People are crying out for talent into the sector now. Could I encourage you to go away and reflect on that and reflect on how we are getting people now into UK space?

George Freeman: Thank you. To be clear, I asked in February not for a complicated map but just a very basic practical list of what the UK space sector led by UKspace, the commercial body, sees as the actual skills required so that we can get into the specifics of what is needed where.

Q713 Chair: Thank you very much, Tracey. I have one final question. You said that the space council should be looking at KPIs, but there aren’t any KPIs—perhaps that is the reason the space council has not met—because the space strategy does not include them, as we pointed out in our report. In the Government’s response to our report, they acknowledged the importance of monitoring and evaluating progress, and said, “A monitoring and evaluation framework is being developed by DSIT.” It has not appeared. When is it going to?

George Freeman: I have just signed it off, and I will turn to Rebecca to confirm when it is coming. It is a very important part of setting out the 10-year delivery plan and how we are doing on it each year.

Rebecca Evernden: We are working towards a publication that will set out how we have made progress against the space strategy and where we are going to go next over the next couple of years.

Chair: KPIs.

Rebecca Evernden: Yes. That will set out progress and the monitoring and evaluation framework.

Chair: The Minister has just signed it off, so when is it going to be



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published?

George Freeman: On the KPIs, it is part of a broader departmental focus of mine that I want to see not just that we have ticked off the things we said we would do in the strategy, but that we set co-investment targets, we show what we are using, and how we are turning our—

Chair: When is it going to be published if you signed it off, Minister?

Rebecca Evernden: We have to go to a write-round and get collective agreement on it. That will happen very shortly. It has been signed off by Ministers in DSIT—collective agreement. We are hoping to get it published before the summer recess. That is our goal.

Chair: Thank you very much, Minister and Ms Evernden, for your evidence. That concludes this hearing of the Committee.