

Scottish Affairs Committee

Oral evidence: [Scotland's space sector, HC 1582](#)

Monday 16 October 2023

Ordered by the House of Commons to be published on 16 October 2023.

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Members present: Pete Wishart (Chair); Wendy Chamberlain; David Duguid; Christine Jardine; and Douglas Ross.

Questions 1 to 80

Witnesses

[I](#): Doug Liddle, Vice Chair, UKspace, and Andrew Stanniland, Vice President, Space, ADS Group.

[II](#): Dr Hina Khan, Executive Director, Space Scotland, and Professor Iain Woodhouse, Chair, Scottish Space Academic Forum.

Examination of witnesses

Witnesses: Doug Liddle and Andrew Stanniland.

Q1 Chair: Welcome to the Scottish Affairs Committee and our first evidence session on Scotland's space sector. We are all really excited to be undertaking this inquiry; we have been looking forward to it for quite a while, and the issue came up quite regularly in our previous inquiry into defence in the High North.

We are delighted to have two star-studded panels, who are going to help us out with a lot of the background to Scotland's space sector's relationship with the rest of the UK and Europe, some of the strengths and weaknesses, and some of the issues that we should be looking at. Without any further ado, I will let our first two guests introduce themselves. We will start with you, Mr Liddle.

Doug Liddle: Thank you very much. My name is Doug Liddle. I am the CEO of In-Space Missions, but I am here today in my capacity as the vice-chair of UKSpace, the trade body.

Andrew Stanniland: I am Andrew Stanniland, the chief executive officer of Thales Alenia Space in the UK. Today I am here in my capacity as the VP of space for the trade body ADS.

Q2 Chair: Thank you both, gentlemen. I do not know why we are surprised at this, but we have had many submissions from people who are interested in this sector and a wide range of different contributions, which have informed the Committee about the strengths, the strategies and how we go forward. The first question in this inquiry is: do you think that the UK and Scottish Governments' space strategies have the right priorities for the Scottish space sector? We will start with you, Mr Liddle.

Doug Liddle: When you look at the priorities of the UK's national space sector and national space strategy, you see something that is focused much more on the applications of the technologies. It is focused on a number of different areas—whether it be Earth observation, telecoms and so on. There is a regional element to it, around the clusters and helping to support the growth of clusters, and obviously there is an element to do with launch, which is another thing that is key in Scotland.

In terms of whether there is an alignment with Scotland and the Scottish space strategy, not massively, but I do not think there is an alignment with the Cornish space strategy or the north-west space strategy. There is a policy-led strategy for the UK. In the Scottish space strategy, we see a—

Q3 Chair: So have we a UK space strategy, then? Is it the right one?

Doug Liddle: Yes. We have a UK space strategy, which talks to what we as a country should be doing and our place in the universe—our place in the world.



Q4 **Chair:** In your words, could you tell us exactly your understanding of what the UK is trying to achieve with this strategy?

Doug Liddle: It is trying to achieve a number of things, among them economic growth in the UK. It is looking at elements like soft power and exports. There is an element around regional growth, and being a science and technology powerhouse as well. There are a number of different elements inside that, as well as the skills piece, which comes along with it, so it is quite a broad, wide-ranging strategy, whereas the Scottish one is much more about economic growth. I think that is partly because space being a reserved matter means that it is very difficult to talk about the policy elements of space when you are having a Scottish space strategy.

Q5 **Chair:** We have Scottish colleagues coming after you guys have given your evidence, so we will ask them more in just a bit about how that works, in terms of this being almost exclusively a reserved responsibility and Scotland's strategy when it comes to that. Mr Stanniland, we have been talking about the strengths of—if we can call it this—the Scottish sector. There is the small satellite manufacturing.

We have heard already from Mr Liddle about launch capability and space ports. Is that what we should be focusing on in this inquiry—looking at the strengths of what Scotland does? Are those roughly the areas where you believe Scotland has something specific to offer?

Andrew Stanniland: I think the Scottish space sector is quite reflective of the rest of the UK's space sector, in some parts. It is dominated by SMEs; it is dominated by companies that started off with a vision and then a mission and started to implement that vision for themselves—sometimes with some VC funding and sometimes with some Government funding, but largely by growing as far as they can to where they are today.

I think that yes, you absolutely should focus on exploitation of those strengths, but clearly there are some endemic weaknesses in having a predomination of SMEs in the country. It is the same across the whole UK, and you can see it in the national space strategy and the regional space strategies that have been published. It is now a question of how you scale up those SMEs to exploit what they have done so far and their position in both the regional marketplace and the globe as a whole.

Q6 **Chair:** In submissions that we have had thus far, scaling up seems to be the predominant issue. A lot of those involved and interested in the sector have identified that as a place that we should look at more keenly. Is there any view that we could resolve some of this? What do we do to get round this need to scale up? I understand the need to scale up quickly, because it is a fast-changing technology—I am sure innovations are coming along almost weekly or monthly. What do we do to keep pace with all the different things that we need to look at?

Andrew Stanniland: In terms of what you could do, there are a few areas. The national space strategy was intended to take a very broad, very ambitious view of everybody in the UK and to try to capture all those areas where we already have a strength—maybe not a “No. 1 in the world”

strength but certainly a regional strength and something that could be developed.

Really, the challenges of our sector as a whole in the UK—Scotland is no different—are in infrastructure, and how you get your footprint to be bigger and wider and able to exploit the technology you have got. It is about moving through what we call the technology readiness levels, from typical R&D all the way up to things that can go into space to be ready to deliver a service. Then it is a question of how you get sufficient skills—in both quantity and quality—to do that exploitation.

It is relatively straightforward in the UK to get enough support to turn an idea into a four, five, 10 or 20-person company, but once you get beyond 50, you are into, “Where do I get the skills from?” Our members are always talking about this. We see a need for more skills, in more depth and more breadth. We see a need for bigger infrastructure and support for that infrastructure, and we see a need to get through the R&D phase and into that mission and procurement phase, to exploit those technologies.

- Q7 **Chair:** We want to come specifically to skills, because that is really important. Again, a number of the submissions that we have had have referenced this and said that there is a bit of a challenge to get the necessary personnel, do we will come to that, but I am curious about the strategies. Do you believe, Mr Stanniland, that the Scottish space sector is properly taken into account when the UK is determining its own space strategy?

Andrew Stanniland: Yes. The overall UK space strategy is a national space strategy. It takes into account both civil and defence viewpoints, so it has at its heart a synergistic view of the sector as a whole. It wants to exploit budgets across both the defence and the civil sectors. This is the first time we have ever had that as a mission, a goal, for the country. It is intended to make sure that we learn from both sectors. The civil sector is predominantly characterised by single-year settlements in the spending review—that is changing slowly—and defence is much longer term. So there are areas where that can be taken into account.

In terms of the regional aspect, as Mr Little said, there are elements in the national space strategy that talk about the regionalistic nature of our future and a need to move funding and capability away from their traditional base in the south-east. Since the publication of the strategy, there has been movement within the activities to do some of that funding, but our members do not believe that it has gone far enough yet. There are movements in that direction, but it is not there yet.

- Q8 **Chair:** Are your members reasonably satisfied with what they see as the UK space strategy? Is it something that they feel is the right direction—that this is what we need to be doing to develop this?

Andrew Stanniland: Broadly, yes. I think there is always a need to do more, go faster and want more. We both represent industry, and industry is always wanting more, but in general terms it is a strategy that reflects where the country is and where it wants to go. Since the publication two



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years ago, a lot of work has been done, and is still ongoing, into how we turn those strategies into action and concrete plans that can be implemented in the future.

- Q9 **Chair:** I am presuming, Mr Liddle, that you are invited regularly to roundtables with Government and all the decision makers who are compiling the strategy.

Doug Liddle: There is certainly a level of engagement for the trade body with Government. Obviously some things are done more autonomously than others, but industry tends to be consulted, and we are fairly satisfied, as Mr Stanniland says, with the outcomes—reflecting on the fact that the national space strategy talks through a 10-year programme. They have broken it into phases that are reminiscent of launching a rocket—we are in the “ignite” phase at the moment, and we are about to go into the next phase. I forget what it is called.

Andrew Stanniland: Take-off.

Doug Liddle: Take-off—thank you.

Chair: You guys know this.

Doug Liddle: You would think I would remember what was after “ignite”. As a consequence, it is moving a bit more slowly than we would like, but the direction of travel in what they are trying to do is right, and industry is behind it. Referring back to Scotland again, it is interesting that, from our members’ point of view, in Scotland we have a sector that is a fully joined-up value chain. Once we actually have launch going out of Scotland, we have everything from—

- Q10 **Chair:** Specifically on your membership, what proportion are Scottish businesses?

Doug Liddle: The proportion of UKspace membership? I would need to—

Chair: Just roughly. You can come back with detailed numbers if you have them.

Andrew Stanniland: About 10% to 15% of UKspace companies are based in Scotland.

Doug Liddle: My estimate was going to be 10%. It is somewhere around that.

- Q11 **Chair:** Well, that is above our population share. Do you make sure that these voices are properly listened to and that there is good representation from the Scottish space sector?

Doug Liddle: Absolutely. The agency will look across a number of different areas, such as Earth observation, telecoms and so on. We organised the trade body in a similar way. We have a launch committee, and that launch committee has what you would probably argue is a disproportionate percentage of Scottish interests—the membership, the drive in terms of policy and the other things that we then take to

Government and say, "This is what we want to do"—but you might find less in other areas.

- Q12 Chair:** We are going to Glasgow, and I think we are going to meet some of your members. We are all looking forward to it; it is part of our getting to know this sector just that little bit better. Is there anything that we should be asking them or looking at when we go there?

Doug Liddle: To my mind, it would be good to understand how, for example, a lot of the manufacturing of satellites that is done in Glasgow—it is often said that more satellites are built in Glasgow than in any other European city—would join up with our launch aspirations. A lot of the satellites are quite small, and I think there is a broader story about where the UK needs to come together. There are people south of the border who are building larger satellites that would make use of those rockets. It is interesting to see how it is joining up. That is worth a discussion with our colleagues in Glasgow and elsewhere.

- Q13 Chair:** We shall definitely take that advice. Do you have any good advice to offer us, Mr Stanniland, about the sorts of things that we should be asking about and looking at?

Andrew Stanniland: One of the things that we see from our members—we are a space sector, but space is an environment, not a sector, and that sector covers many, many markets. Although the different companies in Scotland are exploiting the use of space in some way, they have different aspirations.

When you talk to us as the trade body, we represent the average view of all those different companies. The companies in Scotland have different individual needs. Some of them are quite large compared with the rest of the UK population of companies and will be at a different place in their life cycle compared with some of the other companies. They will therefore have different specific challenges.

My personal view is the same as Mr Liddle's: how do you connect the different parts of the supply chain, the ecosystem, so that they use a UK national launch capability? How do you make sure that that becomes a crown jewel within Europe, so that we can start catching up with our European colleagues and competitors? Some of the companies will be really focused on the skills that we will touch on later. I would be very open-minded to the different needs of those different companies.

Chair: We very much look forward to that. Thank you. I call Christine Jardine.

- Q14 Christine Jardine:** Some of the written evidence that we have suggests that there is a specific challenge for Scottish companies looking to access funding to scale up, and I want to explore that a wee bit more. It seems to me from the written evidence that there is funding there for the start up, but not the scaling up. Is that a concern that you recognise from your Scottish members? Is that what you are hearing about?



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Doug Liddle: Absolutely. This is a national issue, though. This is not unique to Scotland. We have an issue in the UK. We are very good at getting companies through the first phase: getting up to the first million in revenues and the first five or 10 people in the organisation, and then it is very hard to get them up to the next step. I had the same issue myself when I was growing a company. We hear from a lot of our members in the UK space about finding ways to do that without having to immediately dilute ownership of the company and go and get the VC funding, which in itself is not always the right solution at that point.

When a company needs space to breathe and grow it is always a challenge. We see it in Scotland because, as I think Mr Stanniland said, Scotland is a collection of SMEs. The UK as a whole is dominated by prime, and there is a lot of supply chain around that prime. Scotland in particular is a collection of SMEs who are all very capable, but you can almost see the Scottish space sector as an SME that has got to a certain size and is bursting to make the next leap.

There is a feeling at the moment that we need to find a way to bring cash into the story that would allow these businesses to make the next step—whether that be by Government getting involved and procuring services or products from them or whether it is Government-backed loans or a number of different ways. You solve one problem and the next problem arises. As a small company where do you get the people from? There are scarce skills. That is found across the whole of the UK, but more keenly in Scotland we notice.

Q15 Christine Jardine: Mr Stanniland?

Andrew Stanniland: It is also worth pointing out that probably the main issue with scaling up is an infrastructure problem. How do you get bigger as a company? How do you get bigger facilities? Within the UK it is quite fragmented. With some of the entities in the UK who have benefited in recent years from significant Government investment to scale up their facilities, it has been not just regional but very local funding sources.

The National Satellite Test Facility in Harwell was funded by UKRI. The infrastructure in Leicester and Westcott was funded by local enterprise partnerships or by UKRI's Research England, which is a fund that can be used only in England. There are some areas in England that have very local funding solutions and there are entities that have been able to exploit those, but they are not available to Scottish companies.

Whether that means you need to investigate more localised funding solutions in Scotland or ensure that a whole-of-Government approach across the whole kingdom is in place—or a mixture of the two—is worth paying attention to as well.

Q16 Christine Jardine: That was going to be my next question. How can the Government help to fill that gap? Does the funding need to come from private enterprise, or should the Government step in more?

Andrew Stanniland: Probably a bit of both. The Government are stepping in on some of these issues. They recently closed the space clusters infrastructure fund, and the announcement of who was successful in those applications will be made in the next month or so. The majority of that funding was intended to be outside the south-east and for a mixture of industry and academia, but it was part of the levelling-up fund in the Space Agency, so it was intended to push funds further away.

We will wait and see which companies and entities were successful in that. The Government are taking strides when it comes to that change, but at the moment the change is quite small. We will see whether it makes a difference. The plan would be for that funding to improve, increase and have a longer lifetime.

Q17 **Christine Jardine:** In your joint submission, you suggested that the UK Government should use contracts rather than grants to encourage growth in the space sector. What would be the benefit of that approach?

Doug Liddle: The benefit would be that the UK Government would get something valuable in return. Growing a company for a grant is obviously a valuable thing, but at the end of it there is nothing tangible. If you buy services—buy some of the data that the satellites will generate, or buy national capabilities for defence or whatever you are talking about—you end up with a win-win.

In most cases, the company is prepared to suck up some of the NRE and the non-recurring stuff in order to deliver the service to the Government. The Government get a service or product at the end of it, and the company then has the ability to export that with a rubber stamp: “The UK Government buys this, so I can take this around the world now.” It is a fantastic way to grow capability in the UK and create a really strong export story.

Christine Jardine: Mr Stanniland, did you want to add anything to that?

Andrew Stanniland: There is another aspect to moving towards procurement of capability, rather than just giving grants. The levelling up in Government and Government agencies would be improved if we moved as a nation towards more missions and programmes. We are a country that is good at doing R&D, has excellent technology and some amazing scientists and engineers, and focuses very heavily on that early technology aspect. However, that also means that the Government are very good at doing that kind of work.

Once you start moving towards doing missions and capabilities, you level up the agencies and Government Departments responsible for those budgets, and you end up with a more intelligent customer, able to do more things. This is a stretch, but rather than writing a strategy and then thinking about how the plan comes along, you would be writing a strategy at the same time as an implementable plan; suddenly, all the timelines get concentrated into a much shorter period. That is one benefit that you would get.

The other thing is that if you move up the value chain from a technology grant to a mission, you start to bring the supply chain along with you. One of the things that our members complain about, no matter who the customer is, is that it is a huge burden to respond to requests for proposals, do the administrative side of those RFPs, and fill out those requests for funding.

If we take the requirement up a level, the supply chain does not have that burden of responding to many proposals, which is becoming quite high—particularly for the companies in that medium phase, in the “M” bit of “SME”: you are big enough to do the work, but not quite big enough to win the work, if that makes sense. If we have more missions at a high level, you put the burden of response on the larger companies, and they can then bring the smaller companies along.

- Q18 Christine Jardine:** One last, small thing: Mr Liddle mentioned data and data procurement. Are there specific kinds of space services that the UK and Scottish Governments could procure in Scotland that would be helpful?

Doug Liddle: There is a lot of stuff around earth observation data and imagery. A number of services will be coming online over the next five or 10 years—everything from understanding what is going on with carbon and greenhouse gas emissions, to understanding what is happening with forestry and coastal erosion, and the monitoring of algal blooms. Those are all things that you can do very simply and quickly from space.

This would normally involve people going out into the field with cameras and sticks and putting them in the water, but those jobs suddenly become much simpler with a satellite. The advantage, of course, is that if you can do it in Scotland, you can do it in Singapore, because the satellite goes around everywhere, eventually. It becomes an exportable service.

Scotland could certainly make more use of space data. We are aware that organisations such as the Satellite Applications Catapult have looked at a number of things that can be done with space data, whether that is monitoring illegal fishing or even town planning, which can be done simply by taking images from space. You might go on Google Maps and look at a picture, but it is months, or sometimes even years, old.

What you would really like is a regularly updated image of the area. If somebody suddenly built a massive shed on their farm, you could say, “That wasn’t there in January, but that was there on 15 March. Hang on a minute! They didn’t have planning permission.” It becomes a really interesting way to manage everything from very local things to very global things.

Having access to some of this data could bring about a more general contribution. As a country, we are re-joining Copernicus, which is trying to understand the planet and what is happening with climate change. Well, we can also create those missions in the UK; they can be nationally funded. They can be contributing missions, and we can bring value, using



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what we have in the UK, which is everything from academia—the really low technology readiness level stuff, and the real blue-sky thinking—all the way up to the implementation side. We have that in the UK, and, in a very concentrated form, we particularly have that in Scotland. There is a lot of capability there that we could exploit.

Christine Jardine: Thank you.

- Q19 **Wendy Chamberlain:** Mr Stanniland, I was thinking about your comments to Christine Jardine. Is there sufficient knowledge of the sector in Government, in the civil service, and, dare I say it, within Parliament, to enable us to ask the right questions and make the right offerings? *[Interruption.]*

Chair: Order. Unfortunately, we have to suspend proceedings as we have fallen below a quorum. Hopefully, that will be resolved, and we will be back as soon as we possibly can. Order.

Sitting suspended.

Following the suspension, Mr Liddle, Mr Stanniland and the remaining Members continued the discussion as an inquorate meeting. A summary note of this discussion can be read [here](#).

Examination of witnesses

Witnesses: Dr Hina Khan and Professor Iain Woodhouse.

- Q20 **Chair:** Welcome back to the Scottish Affairs Committee. We are now quorate, with the addition of Mr David Duguid, so we are ready to go into our second session on Scotland's space sector and we have representatives of the Scottish space sector, whom I will now allow to introduce themselves. We will start with you, Dr Khan.

Dr Khan: Good afternoon. Thank you very much for the ability to come and talk here. My name is Dr Hina Khan. I am the executive director for Space Scotland.

Professor Woodhouse: I am Iain Woodhouse. I'm a professor of applied Earth observation at the University of Edinburgh. I also chair the Scottish Space Academic Forum. For full disclosure, I'm also a co-founder and part-time employee of Earth Blox, an SME based out of Edinburgh.

- Q21 **Chair:** You seem like the perfect couple to come and help us out with all the issues about Scotland's space sector, so we'll get down to it. Given that this is one of our introductory sessions, what are the distinctive strengths and weaknesses of the Scottish space sector? We'll start with you, Dr Khan.

Dr Khan: I think there is a lot to be proud of in the Scottish space sector. Just to give you a bit of an introduction to Space Scotland itself, Space Scotland is a not-for-profit organisation. It is there to support and add value to the Scottish space industry. It's a community-run, industry-led forum, where the community come together.



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Space Scotland as an entity tries to support that but also engages with UK and Scottish Government colleagues to drive the growth of the sector, alongside our academic forum partners as well. It's not so much a membership organisation—there is no trade body here; it is a community group—but we have partners from the industry forum. We listen to them and try to articulate their challenges; and then in fora like this, we are able to provide a representation of that.

When you think about the Scottish space sector over the last 15 to 20 years or so, we have been on a journey from the world-leading excellence in the academic forum. Then there was the development of small industries and individuals, entrepreneurs, who came and started to think about how we develop capability from the base of an educational framework. That has mainly been on the engineering and manufacturing side, but also on data applications. Really it was a development in the nascent small satellites.

As you miniaturised technology in our mobile phones, and as general technology became much smaller and accessible, individuals realised that there was an ability to take that and put it into a form factor that could then be used to monitor our global environment. There were a number of things that you could say happened quite surreptitiously and advantageously, and which coupled together the technology expertise in the academic forum and the development of these new capabilities in small miniaturisation—and then being able to put that on to a form factor that could be launched and could provide excellence and value from space. That is what happened over the last decade or so.

Q22 Chair: That is really interesting. Thank you for explaining and defining your organisation; it is helpful for us to hear exactly what you do. We were quite surprised and have been knocked out by the number of submissions that we have had on this. It is really encouraging that there seems to be a great interest in Scotland's space sector, and a lot of people have many things to say about it.

From our submissions, the strengths that seem to be coming back are—as you mentioned, Dr Khan—the small satellites and our launch capability, and I think there are quite a number of representations about the strength of our SME sector. Are those roughly the strengths that we should be looking at, Professor Woodhouse, when we go through this inquiry? We hope we are going to meet some of your colleagues next week, and they can maybe help us a bit more about what they are specifically doing. Are small satellites, launch capability and SMEs the areas of strength?

Professor Woodhouse: Once we have the capability of launch, it is the fact that we have the end-to-end process, so that there are companies, university research centres and lots of activity across all the different components from end to end: designing, building, launching—well, soon to launch—and then analysing the data when it is brought back to earth. It is the fact that we will, at some point, have that end-to-end process.



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- Q23 **Chair:** How important is it that we get that? There have been lots of conversations for a good number of years now about getting that launch facility. I know that we are pretty close to it, but how important is it to the Scottish space sector?

Professor Woodhouse: I guess we will get on to the weaknesses in a minute, but the potential strength is that it is a much better story to tell. You can attend any international platform, tell a clear, unique, identifiable story about Scotland and help to put the Scottish space sector on the map. Without that end-to-end process, arguably, yes, it is quite difficult to go to an international forum and make a case for why Scotland is different from a whole number of small and large companies that are now potentially catching up.

- Q24 **Chair:** We are starting to get into the weaknesses now. I would suspect that you would agree that that is something that we require in Scotland very quickly. Is that the case?

Dr Khan: Yes, I think it is about that: how do we make sure that, in the story that we are telling, but also in the reality of the situation that we have in Scotland in terms of the sector, we are a differentiator? You could say that there are a number of space nations globally, but what differentiates Scotland from any number of small and large nations such that it would allow companies either to come and invest in Scotland or to see it as a position for them to want to build their space capability? Also, how do we make sure that Scotland has a position in that global space and environment?

The discussion around end to end, which Professor Woodhouse has just mentioned, is very much a unique selling point that we have. With the missing puzzle piece of the launch being hopefully realised in a successful way over the next few months, we will have that whole discussion piece: you can now build and test capability, launch, and get that data down to deliver the services and the applications that we all need and use, and which will put the world in a better stead.

- Q25 **Chair:** I think you heard most of the session with UK-wide colleagues. We have a UK space strategy, as you would expect of a nation of the UK's size, but we have a Scottish strategy too. How do they work together? Obviously, most of the issues are reserved, as we have heard, and real ministerial responsibility will be down here in Whitehall and UK Government. How does a Scottish space strategy fit in with a general UK strategy? Do they work together seamlessly, or do they create any difficulties or problems for you?

Dr Khan: I think the idea behind the Scottish space strategy was to champion and understand where the value assets were in Scotland. What is it that Scotland can really shout about? What are the challenges where there could be interventions from a Scottish Government perspective, as you mentioned—not necessarily dealing with the policy side of things? What interventions can Scottish Government make, and the industry and academic forum as a whole put in place, that will allow the Scottish space sector to grow?



The Scottish space environment is quite different from the rest of the landscape across the UK, partly because of its size and geography, but also in the make-up of the industry segment, as we heard in the previous session. It is much, much more of the SME—the small and medium-sized enterprises. There are no primes, as we would imagine a prime industry to look like. There are no primes in Scotland per se.

There are larger companies that have a footprint in Scotland, but the majority of the companies are sub-100 to 100 personnel. Because of that there are various challenges—we will talk about the challenges in a second. That also means that there can be support mechanism. As Space Scotland, I can work with Government and our academic colleagues to say, “How do we partner together to make the best use of that?”

There are also some key interesting elements that the Scottish Government have decided that they want to take a lead on: obviously, a just transition, looking at net zero, looking at how sustainability can be embedded across a variety of key sectors. Space has been identified in the national economic transformation strategy, which was launched by the Scottish Government last year. Space has been identified as a key priority. So how do we ensure that the elements of Scottish Government policy as a whole are also implemented within our space strategy?

There were key things that we wanted to focus on, which are distinct from what the UK is trying to do, but absolutely trying to align with them as well. So we are not looking to do things differently. We are just looking to do things that are slightly more attuned to the Scottish environment.

- Q26 **Chair:** So this is really making sure that we play to our strengths and absolutely support the sector that we have in Scotland. That makes sense. It seems we are able to fit in with what the UK strategy seems to be trying to work towards. Is that your experience of what is happening, Professor Woodhouse? What do you make of the Scottish space strategy? Are we starting to meet its intentions and roles? What are your observations on what we are doing?

Professor Woodhouse: There are two things that I would make an observation on. One is that everybody should have a space strategy. The fact that there is a Scottish space strategy and a UK space strategy should make us wonder why every Government body in the UK has not got a clear strategy for how they are going to incorporate the huge growth in space data in particular, and how that will be used and what they are going to do with it. It makes perfect sense that different parts of the UK would have a space strategy.

On a little bit more of a critical slant, I would say that neither strategy is so specific that you could say, “One strategy says we will do this”, and the other strategy says, “No, we won’t do that. We’ll do something else.” The documents are quite old now, so we have moved on a little bit since then.

- Q27 **Chair:** Do we need more milestones and measurable targets?



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Professor Woodhouse: Yes—very specific things. The UK Space Agency's north star metric is total investment into the UK. Who will argue with that? It is not something where you would develop a strategy and say, "No, no. Our strategy is to avoid any more investment into the UK." It is very easy to align it if your strategy documents are relatively general and are making quite broad statements. That was appropriate for the time. We now have to start getting a bit more specific and have a little bit more clarity on exactly where—

Q28 Chair: Have we got enough detailed data on the scale of the space sector in Scotland? Do we know what we are doing?

Dr Khan: There have been UK-wide studies. The UK Space Agency in partnership with know.space, or London Economics, launched the size and health report, which was issued last year, I think. That gives a perspective across the whole of the UK.

Trying to delineate out the Scottish element in that is sometimes quite challenging, but Scottish Enterprise did a dissection of the previous size and health report, which gave some of the statistics. Those numbers are quite old. They are from 2017-18, so we are five years on from that, but that still shows a growth of the sector and a higher proportion of jobs in Scotland relative to what you could say is appropriate to the size of the nation and the general population. So there is still a significantly higher number of high value jobs in the space sector in Scotland and also the growth of the SME in the industry that is happening. Perhaps what we need to think about is how the interventions are being put in place that will allow that to really flourish.

Q29 Chair: Before I hand over to Mr Duguid, I should say that a lot of the submissions that we have had have been genuinely positive and encouraging. They talk about Scotland's potential—what we are hearing is that we have the potential to be a leader when it comes to the space sector and developing space facilities and resources. Is that your view? Do we need to do anything specific to meet that ambition and realise ourselves as a major player—not on a NASA scale, obviously? But is this a good opportunity for us as a small nation with our geography?

Dr Khan: I think there is a good opportunity but there absolutely are things that need to be done to realise it; I don't think it will happen if we stand by and watch. I also don't think it will happen if we leave it to industry and say, "Right—off you go and find your own way. When you're ready, let us know and we'll give you a high-five."

There have to be significant and substantial interventions from a national, UK level and also from a Scottish perspective. There are clear potentials in terms of what we can do. People have also mentioned the way the data is used, how it is managed and procured and how we use in a practical way the information we are getting, which would then demonstrate that the country in which a company resides is seeing the value of the assets that they are delivering from. If we can start to make that story much more

compelling, then, yes, we start to see that the potential can move forward. But there is still a lot to be done to get to that point.

Q30 **Chair:** Have we got the potential, Professor Woodhouse?

Professor Woodhouse: We have the potential, but I see the biggest risk as the complacency of us thinking that our potential is sufficient and not taking it forward.

The other thing is potentially not playing to our strengths in a broader sense. We can get very focused when we talk about space. The National Robotarium, for example, is on the Heriot-Watt campus and it is the UK's National Robotarium and AI centre. The term "AI" only appears once in the entire UK strategy and not at all in the Scottish strategy. We need to look more broadly, outside the focus on launch, small satellites and everything else, to consider that there are other strengths that Scotland has that we need to make sure are joined up with what we are doing in space.

Dr Khan and Space Scotland are making some effort in linking up with FinTech Scotland and the Robotarium, for example. At the EPCC, for example, Edinburgh just got the DSIT go-ahead for the Exascale computing; we are not doing a very good job of linking that up with the space strategy in terms of a powerhouse for super-computing. We heard in the earlier session about how much data we have to try to analyse. We need to make better links between those as well.

Chair: Excellent; thank you for that.

Q31 **David Duguid:** Thank you both for coming along today to speak to us. Professor Woodhouse, you were saying earlier how important it is to have the end-to-end industry covered in Scotland. From the written submissions we have received so far, there is clearly a fairly decent history now of where businesses in Scotland have excelled worldwide—with small satellites and other aspects, for example. The space launch is one of the aspects, but there is the whole end-to-end process of space activity, as you were describing it.

You have already described what the value would be in having everything we need, essentially, in Scotland. How should we go about addressing any risk of holding ourselves back until we have everything we need in Scotland? Obviously, we can work as part of the UK and we can work with the European Space Agency and other space agencies to at least make sure that we are progressing along with the industries we already have. Is there anything you would suggest that we need to think about when it comes to how we avoid holding ourselves back until we have everything?

Professor Woodhouse: I would just add to what I was saying about linking up the areas of expertise that we already have in Scotland, which are not necessarily engaged in the space. As far as I know, the Robotarium has never put in an application to a robotics call-in from the European Space Agency, in terms of georeturn and everything. But we are contributing a lot of money to something that includes a robotics programme at the European Space Agency.



It is not all just about small satellites and launch and data, so we have to ensure that we engage with them. Scotland would be a hotbed of activity in the space sector even if we did not have the end-to-end. I would argue that the real value in the end-to-end is that it makes a much better story to tell and makes us unique; having something to say that nobody else can say gives an advantage to all the companies across the whole chain.

Even without that, we are still world-class in lots of sectors in the space industry. I do not think that there is any sense of holding back. Nobody is twiddling their thumbs waiting for launch to happen; they are all running as fast as they can to make their businesses work anyway. The universities are still collaborating internationally, and we are still looking at R&D projects. The universities are not particularly reliant on having Scottish launch in order to make a big difference.

Q32 David Duguid: Dr Khan, do you have anything to add?

Dr Khan: I would echo that. From where I sit in Space Scotland, looking at the industry segment, the more and more I see it linking in with those sectors that perhaps do not really consider themselves to be part of or to have any value in the space sector.

However, the applications and how you can use and manoeuvre the data in a way actually make it useful. It is working with the Innovation Network across Scotland, which is quite an expansive and cross-sectoral forum, from the data lab and Scottish aquaculture to the built environment and smarter transformation for the built environment, and potentially the construction of an innovation centre. How do we link into those sectors to see the value that space can add into that for them to then go and become more engaged with some of the funding or opportunities available to them?

Part of my role in Space Scotland is to provide that uplift of knowledge across sectors, working with financial services companies—the big four, essentially, in financial services—because they have a need to understand how data is used and managed in a way that helps their clients. By having those conversations, we uplift all the sector. We then have those additionalities, which are where I think we will get the value and start to address a number of different things with skills, as well as a workforce that is more informed about how space can be used in a variety of ways.

Q33 David Duguid: Given that space policy is reserved to the UK Government and Parliament, is there anything that you think we as a Committee should be looking at recommending to the UK Government that would represent the gap in that? Are there certain activities happening in Scotland that may not be happening elsewhere in the UK that we would maybe need to drive that focus towards?

Dr Khan: There is definitely activity happening in Scotland that is at the forefront of activity happening elsewhere across the UK; I mentioned just a moment ago the idea of and the development in space sustainability. How do we use space data and applications to make our world and our space domain more sustainable, and applications in the sector that can be



in themselves more sustainable? I know that the UK Space Agency is beginning to start really looking at that in earnest, and there has been a lot of work over the last 12 months or so at a national UK level on that front. That is really fantastic to see. In Scotland, we have been looking at that for quite some time previously, so we want to be able to share the knowledge that we have gained and the value that we have had in engaging with the sector community.

Again, it comes back to the fact that because the sector in Scotland is an SME sector, we are able to have conversations with them at a different level, because there are smaller, slightly more agile companies able to implement changes to their supply chain and processes that are perhaps a little more challenging for some of the more established organisations across the rest of the UK.

We can test various different capabilities, looking at carbon audits and credits and looking at how you become more of a sustainable manufacturer, and work with national organisations such as the National Manufacturing Institute Scotland, NMIS, which have a mandate to really think about sustainable manufacturing. We can take our SME community in the sector along this journey and then demonstrate that this is how you can manoeuvre a sector to become more sustainable.

We talked about launch, looking at sustainable and responsive launch and starting to think about those elements. By doing those in Scotland, it is almost like a little test bed ecosystem that you can develop capability in and then be able to say that you can start to roll this out across both the UK and Europe. If there is something that I would ask you to do, it is to encourage that visibility of what is happening in Scotland, but also to have those conversations that I am having—more so now than previously—with the UK Government to understand what that benefit is.

Q34 David Duguid: That kind of answers the next question I was going to ask, which is how good the relationship is between Space Scotland and the UK Space Agency to facilitate those discussions.

Dr Khan: Space Scotland, as an entity in this form, is just less than 12 months old. Since I came into this position less than 12 months ago, that engagement has definitely been strengthening. We are seeing more engagement with the UK Government, both in terms of committees and of visitation and understanding of what is happening in the sector. The one thing I would say is that it would be better if it were more proactive, rather than reactive as it is at the moment, but that is the nature of the beast. But it is definitely improving, and I think it can get better. The conversations are slightly more informed on both sides now to help move things.

Q35 David Duguid: The Space Scotland submission said that Scottish companies lack visibility in the rest of the UK—presumably within the space sector specifically. Can you say more about that, and why that is?

Dr Khan: It relates to the point that I have just mentioned: there is a lot happening, and the sector in Scotland is moving very quickly. New



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companies are forming, and new technology is being developed. Sometimes that is happening internally in companies, but also within the forum as a whole.

The UK is obviously a much larger geography. Partly because of engagement and partly because of the various different forums that you need to be involved in, there is not necessarily the capacity or resource within a Scottish SME to engage all the different committees and organisations that you would need to be involved in to have visibility.

One thing I am trying to do is provide linkage between the SME community and the likes of UKspace, ADS and the UK Space Agency—that front door element, so that not every space company within Scotland has to be part of all those different forums. I can provide that network.

- Q36 **David Duguid:** So rather than trying to put yourself up as a replacement for the UK Space Agency, you are acting as a front door service, as you call it, to the wider UK machine.

Dr Khan: Yes.

- Q37 **David Duguid:** Professor Woodhouse, who would you say are the global peers and competitors for the Scottish industry? Obviously not the likes of NASA and ESA, but who else around the world is in a similar position to where Scotland is right now?

Professor Woodhouse: In terms of having end-to-end capability, I cannot think of anybody off the top of my head.

- Q38 **David Duguid:** Let me ask it a different way. Are there any countries out there that we need to keep an eye on?

Professor Woodhouse: Certainly, for a while, it looked like Luxembourg would be one to take a look at. We have also had discussions with companies we have tried to attract to Scotland that have looked at Portugal, because there are preferential terms for starting up there. These are data companies, to be clear—my expertise is more in the data side, so I always have a bias towards it. The thing about the data side is that as long as you have an internet connection, you can be on an island in the Caribbean and set up a company doing data analytics.

David Duguid: Not in my constituency, then.

Professor Woodhouse: It sounds very tempting. You could be anywhere, so any country that gives you the best terms, in terms of setting up, to help you get started is potentially attractive for data companies. As was mentioned in the earlier session, the challenge is that the growth potential is harder. If Scotland—in fact, the UK generally—can find a way to support the growth of those SMEs into medium-sized companies, that would be a key to unlock a lot of interest globally and make us much more competitive.

- Q39 **David Duguid:** This is a question for both of you. Do you think there is an opportunity for not just data but Scottish space businesses to co-



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operate with other businesses from other equally aspirational countries around the world?

Professor Woodhouse: Yes, and I think that already happens. Dr Khan will comment more on the hardware side, but on the data side there is a fair amount of international collaboration and recognition. Weather Stream, which has its data processing in Edinburgh, is an American company based out of Colorado. The Colorado side builds the hardware—although I believe it also uses Glasgow companies for some of its hardware—but it does its data processing in Edinburgh. The idea of being in different places for different components is one of the elements of the space sector.

That goes back to your earlier question about the fact that end to end is not necessarily a thing in itself. Dr Khan might disagree with that, but I see it more as a key element of the storytelling than an absolute requirement. You can build the space components, put them together and analyse the data, and you can do that in lots of different countries. To go back to your original question, it is quite difficult to see countries that can match that. Sweden or Norway may well be in the geographical location to launch polar satellites, but they do not have anywhere near the capability in terms of data analytics, for example, or building the actual sensors and platforms.

David Duguid: Dr Khan, would you disagree with that? Could you expand on the hardware side of things?

Dr Khan: A lot of what Iain says is absolutely right. The end-to-end capability gives us a talking point and a hook that gets international forums and organisations to sit up and see that a small country in the north of the UK is developing a lot of this capability, and that you can do all these things within the sector from a geographical domain that is not very large.

We can use that in a practical way. Space is, in its nature, a global enterprise. Companies are globally located. If they are worth their salt, they will be globally located, because they have to trade and market at that level. We have small satellite and data capabilities in Scotland. Yes, if you can launch the satellite from Scotland it is an added advantage, assuming the terms and conditions are appropriate, but that does not mean that if it does not happen those companies that are building and testing satellites are all of a sudden not going to be able to go anywhere. They can already do those things. It is arguably a little bit more technically challenging, but it is not an insoluble problem. It does not hinder the development of any capability that we have already.

Professor Woodhouse: One other thing about the end-to-end capability is the potential for attracting the talent internally by convincing graduates or even schoolkids that when we talk about a space sector in Scotland it is end to end: for any bit of the space chain they are interested in, there will be a job for them in that sector.

I would argue that that is an important thing from a university perspective and from our perspective, because it makes us a space nation that does all the bits and pieces.

- Q40 **David Duguid:** The last remarks you have both made remind me of the previous study we did on Scotland's international image. In terms of international trade, would you say that there is an opportunity for those interested in investing in the sector to come to Scotland to see small satellites, launch capacity or data handling? Do you agree that if we have more of an end-to-end capability, they might stay and see other parts of the sector that may not be so globally well-established, but could be, as a result of being linked to some of the other aspects?

Dr Khan: We are seeing that. Scottish Development International, the trade body within Scottish Enterprise, see space as the cherry on the cake when they go and talk internationally about what Scotland has to offer. It really is a hook for them to use, and rightly so; we have some world-leading capability.

Scotland has had some significant inward investment, such as FDI and coming in to set up base. A number of things add value to that—not just the business offerings that Scottish Enterprise and other development agencies across Scotland can offer, but also the hook of the academic base that you have access to and what you want to achieve in terms of developing your business.

What is interesting is that we are getting to the point now, as we talked about, where we are an SME nation of space companies, so we want to see our own companies in Scotland develop and grow as well. We have to be mindful of what companies are coming in and how they are going to be developed. Where are the support mechanisms in place for them to grow their business? As was mentioned in the previous session—though I would not go as far as saying “cannibalisation”—how do we ensure that the resources, the staffing and the skills base are not being diluted to a degree that becomes harmful for our companies that are already there?

A number of different things need to be considered. I think they are all soluble in the longer or shorter term, but as we bring in new investment and new companies to Scotland, which is a great thing to do, we need to be aware of what that looks like for the landscape of the ecosystem, and how we make sure that the skills in the pipeline behind it will be able to furnish it.

- Q41 **Chair:** Many contributions to our inquiry highlight the challenges that Scottish space companies face in accessing both private and Government support. Dr Khan, your submission from Space Scotland particularly highlighted the challenges that companies face in scaling up their operations. What type of support do they need to counter that and get over it?

Dr Khan: There are a number of things. If you ask any private company or organisation, they will say they want contracts. They want to be able to sell their products and their services in a competitive market. Grants are



good to a degree for them to do their R&D and develop technology to a particular point, but ultimately their investors are looking for the bottom line to be met—investors want to reap their reward as well—and companies want to be able to become profitable. That will not happen through grants, so you get to a point where grants are no longer the bread and butter that perhaps they were at the beginning of a company's journey. It has to be something slightly different.

The companies are not necessarily at the scale where they can deliver on the tens of millions of pounds-worth of contracts that perhaps some of the other larger organisations, companies and primes could do, but they are also not looking for a few hundred k here and there, which is usually co-funded at a 50% level and then has various milestones and ties.

- Q42 **Chair:** A number of our submissions said exactly what you say: it is contracts, not grants, that will make a significant difference to their ability to scale up and operate efficiently. What sorts of companies would benefit from these types of contract awards?

Dr Khan: These are companies that are at 50, 100, 100-plus people. They have developed technology and services and have been able to demonstrate the market value for what they are looking to achieve and sell some parts of their business offering, but they want to take the business up to the next level. They want to start to deliver on either a much higher production level capability or—

- Q43 **Chair:** What type of contract are we describing here? Is this direct Government support?

Dr Khan: It could be. There are a number of interventions that could happen—Governments using services that are home-built. When we look at data services or observation—Iain can add to this from his experience—there are a number of applications that you can think about from a Government perspective, like understanding flood plains across the UK. Across Scotland, flooding is a huge issue. Do we use space data in some of those applications, or the monitoring of these things? Not very much.

- Q44 **Chair:** Do we not use space data for that?

Dr Khan: Not a huge amount. *[Interruption.]* Iain is going to counter that. It is not done at a baseline level where it is being used day to day. I think there is added value there, but there is still less of an uptake than there could be of how this data is used.

Chair: I know Professor Woodhouse is bursting to come in.

Professor Woodhouse: On the data side, the analogy I use is the typing pool. I am old enough to remember my first job at what was then called the Marconi Research Centre. It had a typing pool. People would hand-write their reports for ESA and somebody in the typing pool—it would be a woman, usually—would type up the report. That has all gone now because we all have Word. We basically pay Microsoft instead of paying typists to do our typing, and we have to do that element ourselves. The software



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does all the spellchecking, checks your grammar and formats everything for you.

We are on that cusp now on the data side. There are lots of Government Departments that have small numbers of experts—a bit like the typing pool—that do some of that data analysis. It doesn't work very effectively, because there are just a small number of them and they are not usually well resourced. Instead of contracting out to a service supplier who can grow on that and provide those services across different Government entities or other Governments globally, and export those services as well as providing them within the UK, it is all being done in-house, in little piecemeal components.

I do not know how it applies across the space industry, but certainly on the space data side I can see that we are still using a typing pool model, when taking that expertise into the software and then allowing companies to provide that service would be a much more scalable route. That scalability is not just about getting those contracts; it is about the fact that once you get regular contracts, you can open the door to the investor who will give you some growth capital to build on that, because you have enough money to keep the lights on and it is a much less risky investment.

- Q45 **Chair:** I think it is coming as a bit of a surprise to colleagues here that this is not being utilised just now. With the dreadful weather in the past couple of weeks—I know my constituency was affected and I suspect Mr Duguid's constituency was, too—I would have presumed we were using space technology to map it out, to predict the difficulties we were going to experience and perhaps to offer a way towards some sort of mitigation.

Professor Woodhouse: Space data is used, and it is primarily used in that context. The Met Office will be using it. Meteorological data is one of the long-lasting examples of how space data is a core part of that industry—I guess it is an industry now, as there are lots more commercial suppliers for weather forecasting and the like.

I don't want to pick on individual components of the UK Government infrastructure, but there are lots of places where they will be doing some analysis that will use satellite data. However, they are less likely to contract that out to a service supplier to provide that.

- Q46 **Chair:** Right—I think I understand exactly the issue here. We are already thinking of a number of things to suggest to Government about all this.

The UK's national space strategy talks about improving public services with space technology. What opportunities does that present for Scottish companies, if that is the ethos in delivering this type of approach?

Professor Woodhouse: There was an example recently—again, I don't want to go into the details, because it is more about the model than the specifics—but the £20 million-worth of funding that was required for doing forests and biomass mapping globally went to a UN organisation in Italy,



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rather than all or even part of it being put out as a procurement contract for the UK. That applies to the whole of the UK, not just Scotland, but it is about the opportunities for UK companies to bid for that work and deliver that service.

Those kinds of models have an additional multiplying negative factor, which is that they make it look like the UK Government does not trust its own national service suppliers sufficiently to put out these contracts to the local companies, so it puts it out somewhere else.

The specific details of that contract are not so important; it is just that that is the general kind of model, where there is not enough joined-up thinking. This is something that the US, for example, would do entirely differently: they would not dream of contracting out to a UN supplier when they could contract out to US-based companies, delivering services that match that.

- Q47 **Chair:** We need to look quite closely at procurement, then, and at the award of contracts in the growing space sector. What you are suggesting is that that would go some way to resolving some of the scaling-up issues when it comes to developing the sector. Is that right?

Dr Khan: It also comes back to the previous point about just having an awareness of what the capability looks like, either across the UK or in Scotland. In that particular instance, there is capability that could have addressed that need. Was there a lack of visibility, was there a lack of time to put that information out, or was it just that it was easier and quicker to do it on that side?

I think there is a discussion to be had. How do we make sure that when these things are being discussed at a Government level, there is an awareness that there is some capability in-house, within the UK environment and the UK ecosystem, that can support the delivery, before you look elsewhere?

- Q48 **Chair:** That is really helpful evidence; thanks for that. I think it is something that we will want to explore, particularly when we go to Glasgow next week to meet some of the companies directly and hear about things from their own experience.

I want now to go on to the European Space Agency. I am conscious that colleagues may want to contribute to this discussion, because we had an extended conversation on it with the UK representatives on the previous panel. I want to get to know first what your experience of all this is. Some of the figures that we have seen here are pretty awful. I am talking about Scotland getting only 3% of the UK's ESA return. It hardly seems worth the bother of applying if that is the return. Tell us a bit about your experience with this. Why does it not seem to be working on behalf of Scotland's companies, and what do we need to do to get a better return from ESA?

Dr Khan: I think it was commented in the last session, during the previous discussion, that to understand that number—unfortunately, I

don't have the background to that figure directly, but we need to understand how many people are applying, what the success rate is and then where the return lands as a result of that. My own experience in the sector and from being part of industry but also working with industry is that not that many people go through the fairly arduous process of putting through an application.

Chair: Yes, we heard a bit about just how arduous that was.

Dr Khan: You have to know how to do it in order to do it, and some companies just don't have the time or the capacity to put in these sorts of applications. Also, there is the time it takes from you having an idea to then going to—with most of the programmes, you have to go through the UK Space Agency to get national delegate support, so you first put together a business case or business plan that goes to the UK Space Agency. They have to accept and appreciate that "that's fine; we want to put this forward."

Then you go forward and go through the process with the European Space Agency, and that in itself can take anywhere from six to nine months. So you are looking at just shy of 12 months from when you have had an idea to even seeing whether you are going to get an output, positive or negative. Most companies haven't got that amount of time to be able—

Wendy Chamberlain: And they are trying to keep the lights on.

Dr Khan: Exactly. So unless you have the ability to have other things happening in the background, this becomes a "nice to have"; it is not really going to be a higher priority. There also is that iteration—you go through it a number of times; you understand what they need and then you get better at it and can start to make that model work. The other element of it is that, as with any large bureaucratic operation, there are so many ways into ESA. There are so many different programmes available, and different funding routes. One of the other challenges is: do the SME community have full visibility of that? I am not sure the answer to that is—

Q49 **Chair:** Is there an exercise in properly explaining what ESA do, how the funding works and operates and how to make your applications? Is that something that we need to work on in order to get the best—

Dr Khan: Part of it is about the funding and the application, but another part is that there is a lot of technical expertise in the European Space Agency—arguably, significantly more than what is in the UK Space Agency. Because of that, you can have discussions at a technical level in the European Space Agency that you wouldn't necessarily have at a UK level. So understanding the nuances of that is quite important.

Another part, which was talked about earlier in the session, is that the UK contribute, through their funding, to ESA on a variety of programmes, and if those programmes don't match what the SME community are wanting to see come out or have technical expertise to engage in, they are not going to apply for that. So again it comes back to the facilitation between what the Scottish SMEs are looking to do and where their technical expertise is,

and how that matches what the UK are actually putting into the programme. Sometimes that's—there's a little bit more challenge.

Q50 Chair: Professor Woodhouse, what is your experience with this?

Professor Woodhouse: I don't know whether I am allowed to do this, but I would like to ask you a question, Dr Khan.

Chair: Rather unorthodox for a Select Committee, but go on—I am interested to hear what it is.

Professor Woodhouse: I don't know what the forensics are of that 3% value, but the emphasis on the Scottish space sector has a lot to do with SmallSats and CubeSats and the new space model, and that is something that ESA has only recently been catching up with; it generally is not putting out procurement contracts for that model. So the nature of the expertise in Scotland doesn't necessarily—following up what you just said, Dr Khan—match what ESA is asking for. So it is not necessarily a sign that we are doing something wrong; it may be a misalignment as opposed to a—

Q51 Chair: Here's a question for you two, then. Is there any way we could get a sense of Scotland's relationship with ESA? I know in Scotland we are a sub-national state; the UK is obviously the predominant player when it comes to all this, but it would be good to get a sense of what bids are coming from Scotland.

I had it whispered in my ear by Clerks who know that the 3% figure probably comes from the Scottish Government, but it would be good to get a sound basis for all this. I don't know how we achieve that, but I am looking at Space Scotland to help us out.

Professor Woodhouse: We were talking about that earlier. That could still be a 100% success rate.

Chair: Yes, that is exactly it. We need to better understand this figure and whether it is relevant. Mr Duguid wants to come in.

Q52 David Duguid: I was perhaps getting too hung up on the actual percentage as well. Given that the population of Scotland in proportion to the rest of the UK is about 8%, is that 3% roughly half what we think it should be, or should we be more ambitious?

Professor Woodhouse: More.

Dr Khan: It should be more, considering that 20% of all space jobs across the UK are in Scotland.

Professor Woodhouse: The UK Space Agency had never, before we nudged them, talked to the UK's National Robotarium. The UK puts in over £200 million to the ESA programme that includes robotics. That is the opportunity for getting more ESA money. It is not the CubeSat, new space kind of thing.

Q53 Chair: We have discussed the geo-return, which seems to be a



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reasonably robust concept. Obviously, that will apply to the UK, not Scotland, so the UK would expect to get back what it puts in in terms of funding ESA, but for Scotland that is not necessarily the case, as we are not funding it. It is coming from the UK.

Professor Woodhouse: Traditionally, the UK has not been very good at getting its geo-return anyway. I would see great advantage to everybody if we could encourage some of the sectors in Scotland that do not traditionally go into ESA funding, either by convincing them or finding a way to support them on the paperwork and everything else.

Q54 **Chair:** This is our first session and we will obviously get into this a lot more, but is ESA really important to the space sector? Do we need to get absolutely right the relationship with it?

Dr Khan: I think there are a number of advantages to working alongside ESA. I have seen it from a variety of different sides—in an academic environment and in an industry environment. ESA provides a very high level of technical expertise. If you are looking to develop technology and really push it to the edge of what you want to do, then ESA has an array of technical experts across all the member states who can provide input and support. That is really important for companies that are trying to grow their business and build up that capability.

The other thing is that ESA provide credibility. If you have worked with ESA and successfully delivered on a programme, that gives you the opportunity to go and have conversations with larger companies or investors that you would not be able to open doors with. The point Professor Woodhouse made earlier about meteorological data and working with the Met Office was interesting.

There have been some opportunities and elements of work where companies tried to have those conversations with national agencies on a variety of different data products and data services, and they were not able to have those conversations. It was only through a programme of work that was supported through ESA that those doors started to open. It adds credibility to a very high degree. It also opens doors to the US, because NASA and ESA work very closely together. If you have had a partnership with ESA that has been successful and well received, you have the opportunity to go further.

Q55 **Chair:** It is a big deal, then, isn't it?

Dr Khan: Yes, I think we should get it right.

Q56 **Wendy Chamberlain:** I have a very basic question. It sounds like ESA is not putting its money in the areas where Scotland potentially has capability or expertise. Why is that? Why has the sector in Scotland developed in areas where ESA is not investing? Why has Scotland developed and not got into robotics?

Dr Khan: It is not ESA's money; the money has all come from the UK Space Agency and the UK Government. It is UK Government money that goes in. ESA has an array of programmes that it has capability and

expertise in, so the UK then bids into a variety of different programmes. That bidding process comes with a conversation with industry. That industry is obviously across the whole—

- Q57 **Wendy Chamberlain:** So this potentially comes back to the earlier question about Scottish visibility. If there is an issue around Scottish visibility, the UK Space Agency potentially is not picking up what the sector expertise is in Scotland in order to be able to bid into or fund the right ESA programmes. It is clearly an issue from a UK perspective as well if the UK is not seeing the return from ESA that other countries are.

Dr Khan: I think the challenge, coming back to the SME community, is also that the UK Government and UK Space Agency will look across the whole gamut of the UK space industry. There are a number of very large primes in the UK, in England, and they will have expertise that they want to drive forwards.

To be honest, at this point in time the SME community would not be able to furnish that level of delivery into those programmes. So the UK Space Agency is balancing out what it wants to see as part of national-level programmes, and the science mission programmes, which are also important. We want to make sure that we are part of those much larger science programmes, the Artemis missions and the like, which, again, SMEs may feed into, but they will not be the ones leading them. There is still this little disconnect—

Wendy Chamberlain: It just feels a little bit chicken and egg, and there are probably a couple of bold decisions that need to be made to crack it.

- Q58 **Chair:** I know that both Wendy Chamberlain and David Duguid have questions about skills. Those are really important, because we received a number of submissions about that, but I want to ask about something that we asked the previous panel about, because I am not quite sure of the answer. The Scottish space strategy commits to mapping the infrastructure needs of the sector to identify gaps. Have any gaps been identified so far? This may be one for you, Professor Woodhouse.

Professor Woodhouse: Are you going to me? It's the industry call, isn't it? The universities will respond to that by trying to deliver graduates in the necessary skilled areas.

Dr Khan: If you are talking about facilities—

Chair: Exactly. Well, facilities, capabilities and expertise.

Dr Khan: It was interesting that the previous panel talked about an infrastructure fund, the SCIF, which is a slightly prickly topic. It is about trying to understand where there are facilities that the SME community can use as they grow and actually have access to. We have facilities, such as the Astronomy Technology Centre and the Higgs Innovation Centre at the Royal Observatory in Edinburgh, which have a number of lab spaces and technical expertise there that companies can go and use as part of an incubation programme. Individual companies also have their own facilities,



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which they have grown over the years because they have had a need to do so, but by definition they will be quite closed to the rest of the community because it is individual companies. With the larger organisations that might open up some of their doors, you are on their schedule of activity.

- Q59 **Chair:** How do you practically map all this? Is it just data that you use in order to see where the problems are and try to address them?

Dr Khan: One of the things we can do is on the national facilities. We have the National Manufacturing Institute Scotland facility, the National Robotarium and other facilities like that, and there are a number of facilities down at the Prestwick spaceport. It is about trying to understand what we have already—there are a number of technical facilities that we can use in the university environment—looking at how it is mapped geographically and asking where there is a need to develop.

Chair: I understand that perfectly now. You explained it much more perfectly than our previous panel, so thank you for that.

We will come on to skills. Mr Ross is just joining us, and he might have a couple of questions that he wants to ask, but Wendy Chamberlain will introduce the first of these questions on skills, and I know that David Duguid wants to come in on this too.

- Q60 **Wendy Chamberlain:** Thank you both for being here today and for being there for the discussion with the previous panel, where we talked about skills quite a bit. Before we do that, can I ask you similar questions to those I asked the previous panel about Horizon and Copernicus and what the impact has been of our not being part of those programmes for the last few years, particularly at a point when the sector has grown quite quickly and in quite a broad way? Have you seen an impact for the Scottish space sector with regard to not being part of those programmes?

Dr Khan: I will look at it from an industry perspective, but I would like Iain to talk on that side, if that is okay. From an industry perspective, yes, there have been a number of programmes where there has perhaps been uncertainty while it was unclear whether we would be part of it or not.

There was then discussion that if the UK was not going to be part of it, the resources that were allocated for that programme would be diverted to a national fund. That happened all of a sudden and then disappeared just as quickly in various ways. The uncertainty was where people were part of discussions or starting to build consortia; they were left a bit high and dry. Most organisations had to pull out of that, and that was quite damaging, where they had put resources and pathways in place to take us forward. I am not entirely sure where we are today, so I will pass to Iain on some of that.

- Q61 **Wendy Chamberlain:** Absolutely. Professor Woodhouse, if I can add to my question, has that uncertainty had an impact from a skills perspective? Have people—graduates—potentially made decisions to look elsewhere as a result?

Professor Woodhouse: I don't have any evidence or data to back that up. I don't know.

- Q62 **Wendy Chamberlain:** So in comparison to the previous panel, you have not felt the impact of Horizon and Copernicus in the way that they were outlining.

Professor Woodhouse: At the level of the students and where they go, I can't think of any even anecdotal evidence that would suggest that it has a big impact. In terms of staff, it probably has an impact; Dr Khan mentioned not getting the telephone call about being part of a new proposal or a new team trying to put something new together.

- Q63 **Wendy Chamberlain:** Yes, and how do you quantify that?

Professor Woodhouse: Yes, it is difficult to see the things that are not happening. In terms of the companies themselves, from the data angle, if you are not doing the very rapid services, you can always access the Copernicus data anyway, just not on the fast stream. I am not aware specifically of any company in Scotland—

- Q64 **Wendy Chamberlain:** And I suppose it is still working its way through now, having come back into the programme; as the previous panel said, it is a different relationship anyway, so comparisons will be more difficult.

Moving on to skills, what do you see as the main workforce challenges? Dr Khan, did you recognise what the first panel were talking about?

Dr Khan: Yes. Nobody would say that there is not a skills challenge; there absolutely is, in terms of the amount of young people coming through—

- Q65 **Wendy Chamberlain:** I remember that you said earlier that "cannibalisation" was not necessarily a term that you would recognise. Can you say a bit more about that?

Dr Khan: When we bring in new companies, or when new companies are forming, then naturally they want to build a workforce. You are going to build a workforce from those people that you have within the sector, so, at the beginning of a company's journey, you are going to bring in people who are experts or have some technical expertise. Natural attrition across an ecosystem is quite normal; I would not say that is anything untoward.

The bit that is challenging is that there is no backfill within the sector to be able to pull through the other people who will fill those gaps. One of the things that we need to look at, and one of the things that Space Scotland is looking at, is how we make sure that we are upskilling our workforce prior to these things happening.

The previous panel mentioned that many of the skills are general skills; the space part of it is only a very small element. One of the things that we are doing is working with colleges to try to put in sub-level courses as additional items to the mechanical engineering and electrical engineering courses that they already run, which will put in a slight element of space technology. Those micro-credential courses have been developed with



industry to say, "Where are you having to put in additional resource to bring young people up to that level?"

- Q66 **Wendy Chamberlain:** And that is engagement you are having directly with further education colleges, not with the Scottish Government. Where are the Scottish Government in relation to this?

Dr Khan: We are having conversations with the Scottish Government as well. This particular piece of work has been funded through the UK Space Agency levelling-up programme. It was one of the things that we were able to get resource for from a UK level. We are also having conversations with the likes of Skills Development Scotland, and the Scottish Government directly, to say that there is a much bigger pipeline of skills that we need to develop as the sector grows. We need to be able to understand what the skill profile looks like, not just today but in five years' time, so that we plan for that and in five years we are not in a worse place than we are today.

- Q67 **Wendy Chamberlain:** It sounds to me, based on the earlier conversation, that even just having the visibility of the sector within a course might make somebody think about it. Professor Woodhouse, did you nod there? Do you agree that we need to broaden the understanding, when we are talking about STEM, around space being part of that?

Professor Woodhouse: Definitely. The Scottish Space Academic Forum is just starting an audit to try to look at the topics that students are graduating in and where the numbers are, so that we can match up with what the industry is saying that they are not getting.

There is also an issue—I think it is a UK issue for the space sector—that there are people with skills in marketing, management, sales and all these other things who do not know anything about space. Finding experienced people is also an issue. There are a lot of entrepreneurs in the space sector in Scotland, but not any who have gone through multiple cycles to be experienced entrepreneurs. We are still at quite an early stage, and that is not something a university sector can really tackle.

- Q68 **Wendy Chamberlain:** It can potentially provide the seedbed to help, but you are absolutely right in terms of the ongoing maturity.

Professor Woodhouse: Yes. On the STEM thing, it was mentioned in the previous session about getting more women into STEM. I don't think getting them into STEM is the problem; I think there is an attrition, because my undergraduate classes in remote sensing and earth observation for 20 years have been more than 50% female, but that is not reflected 20 years later in the industry, so there are other things. I know SpaceScotland and the New Voices group are very active in trying to tackle that in the Scottish sector, because there is potentially a huge mass of talent that is doing something else because, for some reason, they do not feel the space sector is where they belong. That message—

Wendy Chamberlain: Despite the initial interest.



Professor Woodhouse: Yes. We have to find out where those key points of loss are and tackle them, because I don't think it is such a—

Q69 **Wendy Chamberlain:** There is no point in keeping feeding people into the pipeline if they are coming out at other stages.

Dr Khan: One of the pieces of work we did quite early on in SpaceScotland was to develop an equality, diversity and inclusion guidance pack for industry to really look at and understand what it means to be an equal, diverse and inclusive employer and how you ensure that your workforce does have that element fundamental to your company or organisation. It came out of work that was done through a volunteer group called New Voices, which essentially was individuals who came together to try to articulate what it means to be in a sector that is predominately very middle class.

Wendy Chamberlain: If you want people to be thinking more widely—

Dr Khan: Exactly. There is quite a lot of work. We have developed that pack, but it is not just a piece of work that gets done and then is shelved; we actually take it and work with companies to talk them through how they can start to put in place interventions that will help them win over. It can be the simplest things, from the way that your website is worded to the way you are putting promotional material together and the language you use, so that it becomes more inclusive and so that people look at it and go, "That speaks to me." It is not speaking to somebody else.

Q70 **David Duguid:** Something that has come up in a number of inquiries we have done, whether that is energy, defence and now space, is these are reserved policy areas to the Westminster Government, but what we have just been talking about—skills, education, schools, colleges, universities, apprenticeships—are devolved. What opportunities should we be taking to try to have the UK Government and the devolved Administrations work closer together to try to bring those reserved, more strategic issues together with those devolved functions?

Dr Khan: It is a very good point, and it is something I have thought a lot about as well. Obviously, I grew up in Scotland and my whole education system was in Scotland, but then I moved to England and did my postgraduate work down there. What was clear to me was we have a distinct education system within Scotland, and it has its metrics and its various different levels. I would say that in England there is almost no visibility or even understanding of how that translates. Even today, I have conversations with my colleagues south of the border trying to get them to understand, "A Nat 5 is equivalent to a GCSE and a Higher..." I am still having that conversation.

It is having an alignment or a better understanding that if there is STEM engagement or interventions happening at a UK level but they are very much focused on the English/Welsh framework of education, we make sure that that translates into Scotland, so it can be equally delivered. Sometimes that is not as clear as it should or could be, because I think there is a lot of work being done both at the National Space Academy in

Leicester, and there are other STEM learning programmes that are based down in London, and it is how do we use that material so we can then translate it into the education forum in Scotland.

There is work being done directly in the Scottish Government to translate those tools, but that is an additional task that needs to be done—or individual teachers have to do it, which is a burden on them, and you do not want to add to their workload. There is a synergy in what we are looking to achieve, because ultimately everybody goes out into the workforce and has to be able to articulate their skills in the same way. As for how that can be used from a Government perspective, I do not know the answer to that, but better alignment would be valuable.

David Duguid: Professor Woodhouse, do you have anything to add?

Professor Woodhouse: I would not add much to that. There is quite a lot of UK-wide activity to provide support and outreach. Despite the challenges, there is good will generally, and enthusiasm for the subject, so I do not see any particular hurdles.

Q71 **David Duguid:** In the industry?

Professor Woodhouse: This is more from an academic perspective. That was probably well articulated through a lot of the activities during COP in Glasgow. There were a lot of space-related climate activities, which got Scottish-based companies involved in what the UK Space Agency was doing.

Q72 **Chair:** It is surprising to me that there is not a whole host of young people desperate to get into the space sector, and to chart some sort of career in it. I understand the recruitment issues to do with getting the right type of student from universities, but there must be something that we can do to encourage more young people into the sector.

Professor Woodhouse: The storytelling has to be much better. I was in Greenwich, at the Maritime Museum, and in a little corner of the shop all I could see were NASA logos. That is part of the problem. If someone growing up in the UK gets excited about space, they see “NASA” in lights in front of them, and they follow that.

Q73 **Chair:** We will have to think about this. Perhaps we could focus on the first Scottish space mission, or talk about the legacy of Scotty, the engineer from “Star Trek”. There must be things that we can do.

Dr Khan: It is about championing what is real, and what is happening. We will hopefully have a launch out of Scotland soon, but irrespective of that, there are launch companies developing rockets and technology in Scotland—and across the UK. We have to make sure that that is visible to everybody who wants to have this conversation. Launching rockets is only one part of this, and it will be relevant to only a very small percentage of people.

Q74 **Chair:** If we do get our first launch facility, as I am certain we will in the next few years, will that not generate excitement?



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Dr Khan: It will generate excitement among a subset of people who are already excited about space, but we want to ensure that everybody is excited about space, because this is about so much more than a rocket going off from an island off the top of Scotland. You mentioned kids going through their Highers and Nat 5s; I have young people at home, and I talk about space pretty much all the time, but they cannot be bothered listening to me.

Chair: Maybe that is the problem.

Dr Khan: Exactly. I ask them, “What is important to you?” and it is not that the subject is not relevant to them; they just do not see the value of it. They do not see how it relates to what they are worried about. This is about having a conversation with our young people that addresses the things that they are concerned about. As much as I love this sector and space—I have done this all my life—the conversation that we need to have with young people today is not necessarily the same as it has been. This is about having that discussion.

Chair: It really is interesting. Douglas Ross.

- Q75 **Douglas Ross:** Apologies to this panel and the previous one; I was in the Chamber, asking a question in the Israel/Gaza statement by the Prime Minister. If anything that I ask has already been asked, please just say so, and I will look at the answer in the transcript.

As David Duguid said, we have spoken about skills a lot in a number of inquiries—on renewables, defence and space. The issue about the Scottish and UK Governments comes up a lot, but so does the huge gap in the number of people needed. You are looking to the same people to fill significant roles in shipbuilding, in construction for renewables and offshore, and in space. What will be your USP? What will attract people with these skills over to space if they are in shipbuilding, renewables or another sector?

Dr Khan: One of the biggest attractions is that this is the space sector, and a lot of people get very excited about—

- Q76 **Douglas Ross:** Warships are quite exciting, though.

Dr Khan: Are they?

- Q77 **Douglas Ross:** This is a question we ask all sectors, and it is a difficult one. A number of people across Scotland have the skills that you are looking for, but there are not enough of them, and the competition is great. How do you deal with that competition?

Dr Khan: As I just mentioned, that partly comes back to what the young person wants to achieve in their life. Space could add value and make a difference in everyday life. When we talk about the planet, the detrimental effects of what is happening, and how we can ensure that the planet is in a form in which we can live and work and use in the future, space has a role to play in that.



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You can be doing something that positively impacts the world that we will live in in 10 or 20 years' time. You can be building satellites or be in data collection or analysing things, looking at things such as flooding or wildfire detection, or even the way that our fisheries are being monitored to ensure that sustainable farming is being used in a way that is useful.

You can start to have a conversation about there being real value when you look at space and at understanding how that data is used. That gets people quite excited about, "Well, actually, I could go and work in the defence sector,"—like you said, that is arguably one way to go—"or I can actually make a difference to the world that we live in in the future by using my skills in a different way." That is one of those elements.

The other element is that there is a slightly different perspective that you can have, so, while you might be doing something in the financial sector—doing data analytics or looking at how insurance claims can be used—you could be using space data in that forum. So you are not working in the space sector but in the financial services sector, but you are using space data to verify insurance claims because subsidence on someone's land has meant their house has fallen down. Was that land previously suspected of subsidence, or is it because of something has happened lately? You can use space data in that.

Now, you can say that the skills that you need are kind of space-based resources, but you are not in a space-sector environment personally. It comes back to what we talked about earlier; we want to start getting young people to think about the skills that we need across the whole domains of the industry, not just, "Oh, you've got to work in the space industry". You can be using space data in a variety of different forums, but that is still part of the expertise that you are looking to achieve.

Q78 Douglas Ross: I agree that, understandably, a lot of the focus is on young people, their education and bringing them on, but what about the people currently in these industries who have the skills that you need right now? What attracts them away from defence or renewables to go into space?

Professor Woodhouse: I am more on the data side of things, but what we see in the companies that I have been involved with is that a lot of the data companies can be purpose-driven companies that are, like you were saying, contributing to the solutions rather than to the problems. For many people, that is seen as a positive thing; they feel like there is a reason to get up in the morning—not just to do their work, but because their work is actually being productively used to tackle various things. I am trying to say that in a very generic way. I think that that is one of the things, and I think that a lot of companies will work quite hard to communicate that to their employees, to make sure that that is something that they are chosen for.

Q79 Douglas Ross: Dr Khan, you mentioned, in your response to the Chair, about how the launch could be of great interest to people who are already interested, because that is a big focal point. But, from what I



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have seen, a lot of these launches do not go particularly well to begin with.

Is there a risk, sometimes, of saying to young people, “Look at what’s going to happen at SaxaVord,” and so on and so on, when there is that first launch, and it does not go well? Is there an expectation-management issue within the industry about saying, “Look, actually, we get better because of the failures; it is not just a write-off”? I just worry that, sometimes, we put too many eggs in that basket. We saw it in Cornwall, and so on, and I wonder what the response is to that.

Dr Khan: I totally agree with you on that. I think that we need to ensure that—you know, this is a long-term game here. It is not, “First launch, then everything’s great and we all go home and everything is great,” it is long-term. These things are—people say it’s difficult, but it is not so much about the difficulty but a case of ensuring that you have the technical expertise up to a very high level in order to succeed.

So you are right: if you look at the global launch market, statistically you will see that many first launches of a variety of different companies will not necessarily be as successful as they had hoped, but they will still be successful in the way that they can develop technology moving forward. That what it needs to be talked about: as a stepping stone to where we want to get to.

If, on the first launch, they are able to launch off the launch pad and it goes so far up and something does not go according to plan, that does not make it a failure. It means that they were able to do this much and be able to get the regulations or the legislation in place—everything that needed to happen to meet that launch window and all the rest of it—and then they just do an iteration on the rest of that technology. We do have to manage expectations. We all hope for the best, and so we should, but we have to realise that actually, there are a lot of things that need to align in order to make that launch 100% successful. That does not mean to say that any less than is unsuccessful.

There are a lot of people out there—I meant this both in terms of the industry and the public domain—who still feel that it is a pipe dream. We need to start bringing that more into the norm. It is happening. The work that SaxaVord and Sutherland are doing to bring it into that normal day-to-day working within the media as well as within things like this, so that people become more familiar with the fact that this is going to be part of our industry and a career.

It was interesting that the last panel mentioned that, although we talk about getting young people excited about space, they are not the ones who need to be excited about it. It is the parents, guardians and carers that perhaps do not have as much visibility or knowledge, and might say, “Really? Are you going to do that?” I think that is still true today.

Q80 Douglas Ross: Finally on that point, I think it is really important because you would not think a constituency like Moray would have many links to the space sector, but with Orbex at Forres, it has brought that to an area



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of Scotland that traditionally would not have expected to be involved and a lot of interest.

Professor Woodhouse, I was really interested when you said that, for many years, your classes have been 50:50 male-female but the attrition rate of female candidates going through is so high. Why is that? Has it been going on for so long? Has it been looked at? What can be done? Where are they going with these skills, and why are they not staying in the sector?

Professor Woodhouse: "I have no idea" is the short answer. It is something that some of my colleagues are working on with the New Voices group and SpaceScotland. To be perfectly frank, it was a fairly recent realisation because I used to think that that diversity would just make its way through the career stages. I was making the argument to myself, and I thought, "I've been doing this for 20 years. All those students from 20 years ago should be reflecting." I am assuming that it is not just my classes, but that it is representative across the board.

This is on the data, rather than the hardware, side. Why are we not seeing that reflected? The statistics on how poorly funded female-led start-ups are, for example, from venture capitalists and other funding—there are so many different components in there that are working against trying to stop that attrition. I do not think there is a single answer to that, but we are trying to tackle some of it.

At Edinburgh, one of the things we are trying to do with our master's students in particular is also focusing on the male students and recognising that they have to learn the things that they have to do to change their habits and behaviours in the industry in order to change. There is too much of an emphasis on female participants being told, "Well, you have got to write better CVs and blow your own trumpet better and do all these other things", when in actual fact, the white male middle-aged managers need to be better at identifying talent when it is there. There are so many components, but I think Scotland is doing a better job than many other places at least at addressing it. We haven't solved it yet, I don't think.

Dr Khan: No.

Professor Woodhouse: But it is, at least, a high priority and it is a key component of the Scottish space strategy and a key component of what you are doing at SpaceScotland.

Douglas Ross: Thank you both very much and thank you, Chair.

Chair: Thank you both very much. It has been a fascinating, instructive and useful opening session. I think we all better understand some of the issues. As I said to the first panel, if there is anything else that you feel you could usefully contribute to this inquiry as we get under way, please get back in touch with us. Thank you for coming down from Scotland today. It has been a really interesting session.



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