HOUSE OF COMMONS

Scottish Affairs Committee

Oral evidence: Scotland's space sector, HC 150

Monday 18 March 2024

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Watch the meeting

Members present: Pete Wishart (Chair); Alan Brown; Christine Jardine; Ms Anum Qaisar; Douglas Ross.

Questions 285-362

Witnesses

I: Steve Greenland, Managing Director, Craft Prospect Ltd, and Tom Walkinshaw, CEO, Alba Orbital.

II: Allan Cannon, CEO, Krucial, and Sarah Middlemiss, Strategic Project Manager, EcoOnline.

Examination of witnesses

Witnesses: Steve Greenland and Tom Walkinshaw.

Q285 **Chair:** Welcome to the Scottish Affairs Committee in our ongoing inquiry into the space sector in Scotland. Today, we are joined by the satellite manufacturers and those involved in satellite applications. We have the satellite manufacturers first, representatives of a couple of companies operating in Scotland. We will now have them introduce themselves and say anything by way of a short introductory statement.

Steve Greenland: Good afternoon. My name is Steve Greenland. I am the managing director of Craft Prospect. We are a company based in Govan in Glasgow, employee-owned and about 25 people, and we were formed in 2017. We work on bringing new technologies in quantum and AI into space technologies, and getting those flown for next-generation-type missions, which include secure telecoms, Earth observation and climate monitoring. In 2021, we raised close to £1.5 million, which we used to secure a mission called VOLT, Versatile Optical Laboratory for Telecoms, which is an ESA and UKSA-supported programme of about €17 million. That allows us to work within the Scottish supply chain in particular to develop all the tools that we need to be able to deliver next-generation capabilities. Prior to the setting up Craft Prospect, I was the technical lead on Scotland's first satellite, UKube-1, which was launched in 2014. I think you have heard from some of the companies that benefited from that previously.

Tom Walkinshaw: Hello, everyone. I am Tom Walkinshaw. I am the founder and CEO of Alba Orbital Ltd. We design, build and launch PocketQube satellites. This in my hand is an example of a satellite we have in orbit just now, so you can get the size. It is Unicorn-2, named after the national animal of Scotland, the unicorn. We have launched 41 satellites—

Q286 **Chair:** Can you just tell us what that does? The viewers at home will be intrigued.

Tom Walkinshaw: If you want, you can touch it, and prod it and stuff. Alba is famous basically for building satellites of under 1 kg—we are the world leaders in that sort of technology. Globally, we run the developer conference in Glasgow every year for all the developers. This satellite is Unicorn-2, so it has a camera configuration—you can see the camera. That basically takes pictures in space of Earth. We have antennas, solar panels that pop out, control systems, reaction wheels and magnetorquers. Basically, it is a fully functional little satellite that does everything that a bigger satellite can do, but in a smaller form factor. Currently, six of these are in orbit—

Q287 **Chair:** Do they work as effectively as the bigger satellites that we have

seen already?

Tom Walkinshaw: Yes. The resolution is smaller—so, they have a smaller camera lens. That is the main difference really, between a small satellite and a large one when it comes to optics: the resolution. The interesting thing is that if we make them really small, we can do lots of them and build bigger constellations. That is really where Alba sits. So far, we have launched 41 satellites into space: I think 15 are Unicorns we built in Glasgow, and the rest are ride-share customers from around the world, such as Argentina, Spain, Germany, Turkey, Malaysia—all over the place really.

Alba has raised US $3.4 million from Y Combinator in the US and a bunch of silicon valley-based angels—a bunch of random folks as investors, such as the CEO of Fitbit or Joe Montana, the American footballer. We have just the most eclectic bunch of folks. We run a 5,000 square feet facility in Hillington that we just opened up in Glasgow to mass-produce this type of satellite and ground stations. That is kind of the gist of it. I started the company about 11 years ago in my bedroom, and now we have launched 41 satellites.

Chair: It is probably the first time ever that a satellite has been produced at a Westminster Select Committee, so congratulations. You are a trailblazer in that regard.

Tom Walkinshaw: It was fun trying to get through security with it.

Chair: I bet it was! "It's only a satellite, Mr Officer, honestly."

Tom Walkinshaw: Yes, we had to explain what it was, but they were cool.

Q288 **Chair:** Just for our many viewers at home, Mr Walkinshaw is being typically modest perhaps, because he is listed in the *Forbes* "30 Under 30" list of young leaders and entrepreneurs.

I am intrigued about something you said in an interview you did with *Wired*—we never get interviewed by *Wired*, but that happens for you guys all the time—where you said, "Space is really capital-intensive…I had to start my own company really. It was my only option." Tell us a bit about that and why you felt that.

Tom Walkinshaw: We officially incorporated the first version of Alba in 2012. Back then in Glasgow, there was only one other company, which Steve worked at as well, that was really doing anything. I wouldn't really call it a sector if there was only one company. I don't think they had even flown a full satellite at that point. I essentially had to either move away somewhere where satellites were happening or I had to start a company, and those were the only two options if I wanted to do something in space, so I obviously chose to start a company. In terms of space being capital intensive, as I mentioned earlier, we have raised capital in America now. We did a Delaware flip about two or three years ago, which is basically when you change your headquarters from the UK to the US, as part of the

Y Combinator programme. That was to raise capital because we found that—

Q289 **Chair:** We will come on to that in a minute because we are intrigued about that. You are both obviously Scotland based, and we will discuss some of the headquartering issues in a minute. What we are trying to do in this report as much as possible is to just speak up the scale of the Scottish sector, its potential and the range of activities that we do. Are we right in that regard? Is Scotland a good place for you guys to do business, and is it something that you are excited about in the future—Scotland being there as a major player?

Steve Greenland: Absolutely. The potential we have in Scotland is massive, and that is because we can go from the R&D in the universities, through launch, through developing the satellites, through operations and then into the downstream and the data processing that goes along with it, so I think there is the opportunity there. There are definitely challenges, which we can go into, around financing, skills and all the normal challenges that go along with trying to start and maintain a small business, but I would have a large amount of optimism for the space industry.

Tom Walkinshaw: In terms of optimism for Scotland in space, I guess I am a product of that optimism. I wouldn't be doing this and sitting here if I was not optimistic about the Scottish space sector. I was probably optimistic when no one was optimistic. Certainly, if we compare the sector today with 10 years ago or even 20 years ago, it is like night and day. There are probably hundreds of satellites that have been built in Glasgow and have launched. We have done 15. Spire and Clyde Space have done a fair number. Spire is probably over a hundred now. I am not sure on the Clyde Space numbers. We are talking hundreds of satellites that have been produced in Scotland.

Q290 **Chair:** It does seem to be in specific sectors, such as, obviously, small satellites—although we have not seen another as small as yours. Are those the sorts of areas that we tend to be dominant in and are exploring?

Tom Walkinshaw: Yes. It is a little bit self-fulfilling, as in people start companies in small satellites and then people like Steve move to Scotland to work on small satellites and then start their own companies on small satellites, so it is a virtuous circle where the more we do it, the more we get the sort of excellence where people want to move. People move from the south-east of England to go to Glasgow to work on these things. What sector would you say that happens in? That is pretty rare, right? If that is what is happening, I think it is a real thing and hopefully it keeps continuing.

Chair: Okay. Let's talk about your headquartering, because you are currently both headquartered in Glasgow. What we have heard, of course, is that there are huge temptations to link up with international partners, perhaps be bought over and move your enterprise beyond

Scotland. Tell us what that is like, if that is something that you are familiar with. What are you doing, if you are doing anything, to make sure you continue to be a Scottish company?

Tom Walkinshaw: Like a lot of space companies, we found that we had to be in multiple jurisdictions to get stuff done. We have a German company—that is really driven around our licensing—and we have a ground station just outside Berlin. We also have a US parent company, which essentially bought the UK and German operations about three years ago, when we did the Y Combinator. That was a condition of entry into the programme.

For those who are not aware, Y Combinator is the top programme in silicon valley for the next hot start-ups—so, you are talking about Airbnb, Dropbox or Reddit. These companies' first investment was YC. We were the first Scottish company to take investment from Y Combinator. That was a really huge thing for not just Alba and the space sector, but the whole tech industry in Scotland. We were the first guys to break that glass ceiling, so that we could say that a company started in Scotland could raise capital at this top programme in America. That had never happened.

In terms of the headquartering, technically we are headquartered in Delaware. That is more to help the fundraising aspect. Y Combinator does not allow limited companies in its programme, so you have to do what is called a Delaware flip, where you change the ownership to a US entity. We raised quite a lot of capital—around $3.4 million—in the space of about a month, basically. If we had not done that, we would not have been able to take part in the programme. In terms of our operations, most are in Glasgow. We have the factory in Glasgow, and we do our licensing through Germany. So we are spread out in a few different jurisdictions.

Steve Greenland: Our ambition is to stay in Scotland, in Glasgow. We have previously had satellite offices in Edinburgh, and we would be looking to set up with offices either in Europe or in the rest of the UK in the fullness of time. Our investment comes from within the UK; that is slightly different from Tom's. That allows us to have a more UK-centric stakeholder base, which at times slightly conflicts with some of the policies that take place around supporting inward investment. Our money comes from London, which maybe does not get as well supported as money that might come from the US—maybe not in Tom's case but in other companies' cases.

Q291 **Chair:** A big part of the work that we are doing here is having a look at the UK and Scottish Governments' strategies, because obviously they have thought long and hard about how they want to grow this sector. They recognise the opportunities and the progress that has been made, particularly around Glasgow. Are you familiar with what the UK and Scottish Governments are attempting to achieve? What do you make of what you have observed so far? We will start with you, Mr Greenland.

Steve Greenland: The recently released "Space Industrial Plan" is good, on the whole. It has lots of actions, and it is quite action-oriented. It needs

to be delivered on. Obviously the budgets are only set for the next year, and I think the next thing that needs to happen is longer-term thinking about how space is developed as critical national infrastructure and as a science base—all of these things. We need longer-term confidence in where the money is going to be coming from. We cannot survive on how it has been in previous years. For example, my business was well supported for a period of seven months, and then that disappeared as a result of changes in Government policy. That was very difficult to navigate. Once you have taken on staff, you are in the middle—

Q292 **Chair:** Which changes are you referring to?

Steve Greenland: This was through a particular programme of the UK Space Agency, which did not follow through into the next phase of project. For a business that is balancing the commercial and the R&D—we reinvest our profits from the commercial side in the R&D, as match funding, so that we can keep progressing and innovating—when that model disappears because something suddenly changes, that can be really difficult. Fortunately, we managed to move over into securing the ESA mission, VOLT, which has allowed us to continue on a journey to get the flight heritage that we need to deliver new services. We now have customers or end users like BT and AWS lined up, so that we can demonstrate services to them and then look to turn them more into customers in the future.

Q293 **Chair:** Excellent. Thank you. Mr Walkinshaw, what do you make of what our respective Governments are doing to help you to grow your business and achieve world domination in the space sector?

Tom Walkinshaw: That may be a loaded question. There are obviously lots of different levels of Government and lots of different interactions with different folks, going from local councils all the way through to the UK and Scottish Governments, and now even European Governments with ESA. Our experience was that initially we got a lot of support from the European Space Agency and the original UK delegates, which was via Innovate UK. I think 2018 or 2019 was the last time we won a major contract with ESA or UKSA backing that, or Innovate UK as it was a few years ago with the delegates. So we haven't really had a major Government contract in maybe three or four years. We actually got audited; we had a lot of audits from ESA. We won four or five contracts and then we had two years of audits. The problem with audits is that if a Government Department decide to start auditing you—we had one bookkeeper, part time, and we were getting special treatment from ESA on these audits, which wasn't appreciated, but we had no option other than to comply. That was really what forced us to do the YC programme. It went from, "Here's money to do what you guys need to get done," to, "We're going to go through every single line item." That was really painful for us and forced us to go the YC route.

In terms of regulation in the UK, we have set up the Germany company to license our satellites. Unfortunately, none of our customers—we have launched 41 satellites into space, and none of them has been UK flagged. Basically, you can think of it like ships of the sea. Every ship has a port

that flags the spaceship or ship. We license in Germany. Germany have been really friendly to us; they have been really easy to work with. The UK regulations are quite out of date. They are very geostationary satellite focused, which was big in the 1980s but we're no longer in the '80s. Reform of that has been talked about, but I have not seen anything actually change at the frontlines. That has really forced us to go via Germany and DLR—the German space agency—and BNetzA, the German version of Ofcom.

Q294 **Chair:** The five major goals in the UK Government's national space strategy are: grow and level up our space economy; promote the values of global Britain; lead pioneering scientific discovery and inspire the nation; protect and defend our national interests; and use space to deliver for UK citizens and the world—a rather lofty ambition. Are we getting there on the goals set out very clearly by the UK strategy?

Tom Walkinshaw: When you run a start-up, it's cool that there's all this stuff going on around you, but you're really just focused on getting customers and making them happy. It's great that there's a lot of fanfare and a lot of people shouting from the sidelines rather than booing us. Generally, it's nice to be loved rather than hated. Yes, it's cool. As to whether it really affects us in our day-to-day operations, not really. Hopefully it will. Hopefully it will open up more opportunities to work with Governments. We work with the National Park Service of America, for example, and we don't work with anybody in the UK on national parks; this is with our imaging service. If those sorts of things came our way, great, but at the end of the day, we are just trying to find customers, make them happy, look after them, and hopefully they will come back. Most of our customers do come back, so we're doing okay on that front.

Q295 **Chair:** Lastly from me for now, some of the evidence we have received thus far suggests that being located in Scotland presents an additional challenge to small companies engaging at UK level. Have any of your businesses experienced disadvantage as a result of being based in Scotland? How could we, the UK Government and other bodies help to rectify that?

Steve Greenland: It can be a disadvantage. There can be a bias towards areas like Harwell and London, but Scotland fares no better than other regions in the UK. It is fantastic that we have a Scottish ecosystem. For me and my business, the way we tried to overcome that was to get more involved in UKspace, the trade body, and to try to get our voice heard more at the national level. That has started to work, and we are starting to see that reflected in some of the things we see coming back from Governments, but that takes time—it is a long process.

When we are starting to think about things like Government procurement of satellite services, it is really key to ensure that that is accessible to SMEs like ours. If that is going to happen, and it is going to happen fast to respond to the emergent needs, then it would be very easy for us to be neglected. The answer is to ensure that there is more Government presence within Scotland—MOD, DSIT or whatever—so there can be more

one-to-one dialogues between industry that is based there and those organisations. One of the risks in having too many support organisations is that that voice can get diluted and gatekept. It needs to be as direct as possible within the resource constraints on both sides.

Q296 **Chair:** Have you any views on that, Mr Walkinshaw? We are second when it comes to the nations and regions of the UK, aren't we? London and the south-east is obviously the biggest part of the sector, but we are good second, aren't we?

Tom Walkinshaw: By number of satellites built, Scotland is miles ahead, just empirically. The numbers are probably out there, or somebody could compile them, but in terms of the number of satellites, Scotland has probably built more satellites than England just in general. I think I am right in saying that; it's worth somebody fact checking it, but it is probably true. Glasgow is No. 1 in Europe in terms of the number of satellites built. We are probably No. 3 globally, behind San Francisco and Seattle, because you have Starlink in Seattle, with SpaceX, and Planet Labs and a bunch of other start-ups are in San Francisco. So I think we are No. 3 globally for number of satellites built.

Our challenge is more that at the ESA delegate level it is hard to get hold of or meet the right person because they are based in south-east England. For us, it is something that is nice for our business, but we are just trying to make a real business with customers, so if we can get an ESA contract, as we have had in the past but not recently, then great. It is quite hard to figure out who does what and when. If you come to visit Scotland, obviously you guys would be welcome to come to Alba Orbital whenever. Generally speaking, there is a risk, because how do you know what you have missed if you are not around? It is hard to quantify that.

Q297 **Chair:** Where is your business based? I know it started in your bedroom but I presume it is not there anymore.

Tom Walkinshaw: It's not currently in my bedroom, no. We moved on a little bit—we overgrew the facilities. We are in Hillington, which is near the airport in Glasgow—something like two miles from the airport. It's near Braehead.

Chair: Excellent. Thank you.

Q298 **Douglas Ross:** Good afternoon to our witnesses. Mr Walkinshaw, can I start with a question about the Delaware flip? You mentioned the *Wired* article about capital. From starting in your bedroom, then moving to Hillington and that flip, at what stage did it happen? Obviously, you could have done with it, but you didn't get that capital investment early on. Can you go through the timeline so that we understand how your business has grown?

Tom Walkinshaw: It has been about 11 years so there is a lot to talk about, but I will try to keep it relevant. We were bootstrapped for the first eight years: bootstrapped basically means that you make progress without raising capital and start-up investment.

Douglas Ross: Is that because you cannot raise capital?

Tom Walkinshaw: It is a combination. The tech investment scene in Scotland in particular, and in the UK, is far behind Silicon Valley. I don't think that is a super-controversial statement—there is just a lot more of an ecosystem in other parts of the world. We did try to raise capital periodically, and failed miserably, but it wasn't like we didn't try. When we went over to the States, the fact that we had managed to bootstrap our first six satellites to orbit was seen as a marker of a true hardcore entrepreneur. The fact that we had been able to pull that off without any investment got us a tonne of attention in America.

Q299 **Douglas Ross:** Do you think that without that you wouldn't have got the investment millions that you eventually got from Delaware?

Tom Walkinshaw: It is hard to say exactly what is the cause and effect. Certainly not being able to raise capital sooner slowed us down. Starting off in Glasgow has its pros and cons. I'm not sure there has ever been a $1 billion unicorn company founded in Glasgow, so you don't have an example, a playbook or things nearby to go off. We were the first Scottish company to do YC, so there was no real precedent in Scotland for going down that route. Ironically, our first investor was Scottish, because he was a founder who had gone out to silicon valley. Actually, I think the first and second of our 40 investors were Scots in America who were associated with that, in a weird twist of fate sort of thing.

Ultimately, all the money is spent in Scotland anyway, so we very much wanted to build stuff in Scotland and basically use America as a vehicle to get us in the door and get the capital we need. We wanted to have a somewhat level playing field with a lot of the other companies that are starting out in America, because there is such a handicap being based in Scotland and the UK, from a tech and fundraising perspective. People in the same group as me have raised hundreds of millions. I have raised $3.4 million, which is embarrassingly small compared with Stoke Space, which raised something like $150 million. It is a good group to be part of, and the bar and the ambition is so much higher. You don't really get that anywhere in the world apart from YC.

Q300 **Douglas Ross:** Where are you at now with staffing levels and such like?

Tom Walkinshaw: We are about 15. It fluctuates, but we are around about there.

Q301 **Douglas Ross:** I will come to Mr Greenland in a minute. Can I ask about licensing and the fact that Germany is more user-friendly at the moment? I think you described the current rules here as a bit dated. Could we lift what they have in Germany and implement it here? If we did, what difference would that make to your business and to what we do here in the UK?

Tom Walkinshaw: Certainly, the German process is much more streamlined. The UK process is quite heavy because they came up with it when they were building 1-tonne geostationary satellites, so it is very

involved and there is lots of risk on the person applying for the licence. There is a lot of up-front cost, and there is an insurance premium expected for UK companies that is not applied in a lot of other countries, which makes it disproportionately hard for smaller satellites to get licensed versus larger satellites. There is a bunch of things that could be improved, which I think is well known. There has been committees and a lot of talk of consultations where you put out surveys of people's opinions.

Q302 **Douglas Ross:** Are you involved in them? Do you feel like your voice is heard?

Tom Walkinshaw: I mean, like, 10 years ago. I would love something that actionable to happen, but I am not going to change the workings of Government.

Douglas Ross: You never know. Maybe through the Scottish Affairs Committee you will.

Tom Walkinshaw: Well, hopefully. If you guys can surprise me, I'd love it. Power to you guys if you want to get stuck into that issue. It is a huge issue, to be fair, and it is one of those that is there in plain sight and could get fixed if enough critical mass got put on it.

The question is about what you want people to do. If you want people to fly satellites, then try to make life easier for people to fly satellites. If you fly satellites and you can operate them, you can make money selling the data from the satellites. Scotland is already a huge player in that game, so the more you can enable that or make life easier on the Government side, that would be welcomed by everybody in the sector. I don't think anybody would be complaining about more German-like regulation.

Q303 **Douglas Ross:** Thank you. Mr Greenland, I have looked at your written evidence and there are a couple of points I would like you to expand on. You state, "In my view, historically Space Scotland did not always sufficiently represent industry as a whole to the detriment of some aspects of industry." Could you explain that a bit more? Has it improved? You also say that it is particularly important given that Space Scotland is so strongly linked to the Scottish Government. There may be tensions or otherwise with that.

Steve Greenland: For us as a business, we found more ability to engage through UKspace at a national level.

Douglas Ross: Even as a company based in Scotland?

Steve Greenland: That felt easier at the time. This was 2017, 2018, when we were setting up. I think it was the predecessor to Space Scotland—the Space Leadership Council or something like that. That felt a bit difficult for us to engage with, and quite close to the Scottish Government at the time. We chose to look more southward, and that required quite a lot of travel on my part. I was going down and meeting people—I was going to Harwell and coming into London—and building those relationships. That then allowed us to grow in time, but a lot of

effort and travel was required. I believe that is now changing, and Space Scotland can become more of a vehicle for the whole of industry and the ecosystem in Scotland.

Q304 **Douglas Ross:** You go on—I think you alluded to this in response to the Chair—to say: "The government through SDI is seen by some to over-reward inward investment from non-UK countries, and can ignore organically grown opportunities or investment from rest of UK." Is that still a concern you have?

Steve Greenland: That does reflect my frustration. I think something was raised in the previous evidence around how some companies have been supported to move over here. That can create jobs displacement, rather than jobs creation, so we end up in a skills-limited environment, not incubating the skills that we need, and just seeing people move around. There is a need to make sure that when we are writing policies like that, we get it right in terms of there being one type of business or one growth journey for a business, because there are lots of different and diverse types of industry, and we need to get it understood and right for all of them so that we have a more level playing field. That is the goal I am trying to get to.

Q305 **Douglas Ross:** Skills is something we have raised a lot in this inquiry. You said in your opening remarks that you have 25 employees. Is that correct?

Steve Greenland: Yes, it is between 25 and 30.

Douglas Ross: And Mr Walkinshaw has about 15. How difficult or not has it been to recruit people with the right skillset and get them to be based in Scotland? Are they Scottish students? Are they Scottish employees? Have they come from elsewhere in the UK, Europe or around the world? What are the challenges or opportunities in recruiting people to Scotland?

Steve Greenland: Our workforce is probably younger than some other businesses. We tend to take graduates, but also non-traditional kinds of entries. We invest quite a lot in building up those skills, so there is a need to ensure that we can maintain those skills and that there are not then distortions in the market that mean that our investment in those people suddenly disappears to other organisations that might have been more highly supported by funding mechanisms.

Q306 **Douglas Ross:** Where are your 25 to 30 mainly from? Are they Scottish-based? Are they internationally sourced?

Steve Greenland: The majority of them will have either studied or lived in Scotland, so we do not tend to manage to bring people over. I would say that 80% would have been based in Scotland before we employed them. But we do employ a different base: we have ex-service and we have people who were not able to get on with university and looked to have a different route in, so they took apprenticeships and that type of route in.

We need to be quite innovative, as smaller businesses, in finding those really niche talents and trying to find ways of maintaining and keeping

them there. That is the goal with Craft, where we have the employee ownership model. It is about ensuring that the team are able to come along with me and other shareholders on the journey and get some reward based on that. We have an employee ownership trust that holds part of the business. All individuals in the company can hold shares in their own name and that sort of thing. That is how we can differentiate ourselves a little bit from other organisations and try to maintain those really key skills.

Tom Walkinshaw: We are the same. We have a stock options plan to try to align people with the financial outcomes of the company. It is probably a challenge for every business in the UK to try to find good people. Our demographic is probably very similar to Steve's in terms of graduates, PhDs and folks who have been floating around some other industries.

I think the space is obviously pretty cool and interesting, so that attracts a certain type of person. You ultimately want people who want to do it regardless of the business and just want to be involved in the space sector, and I think a lot of people at Alba are like that. Working on satellites is cool, getting your fingerprints in space is cool, and that is really something that drives it a lot. It has been difficult recruiting generally in the UK. Obviously, the regulations have changed a lot recently, in the past few years, and that hurt us a lot. We had a lot of EU engineers, and just now, it is—

Q307 **Douglas Ross:** Mr Greenland was about 80% Scottish-based; how about you?

Tom Walkinshaw: If I think back to maybe 2017 or 2018, our engineering team was probably about 70% to 80% from the EU, and now it is probably 20%, or something like that, so it has really hurt us a lot in trying to get skilled people. A lot of people were coming to Scotland to work, and we don't really see that as much as we did. Obviously, there are more regulations to try to get people on visas and things, and we have not really gone down that rabbit hole yet, but we will definitely have to look into that as an option. We had a Canadian guy join us as well, so we have started picking people up from Canada now as well.

I think it is a challenge for literally any business, and we are no different from everyone else. Trying to get folks to stay with the company as we progress is a challenge as well, but I was looking into our retention numbers, and we are above the UK average for our retention and churn and all these things. We ran the numbers last week just to get a handle on where we sit globally, or within the UK at least. So we are doing better than average, but we are always trying to improve it.

Q308 **Douglas Ross:** For both of you, what is the gender balance of your workforce?

Steve Greenland: Ours is about 60:40 in favour of males.

Tom Walkinshaw: Yes, ours is predominantly male. It is probably, like, 75:25, or something like that.

Q309 **Douglas Ross:** Finally, do you both see staffing and recruitment as a handicap or barrier going forward, or do you think that there will still be—as we have heard a lot—the excitement of saying you are involved in space? It is an industry that younger people—everyone—want to have a handle of. Is that something that you are worried about, as you continue to grow, or do you think you will be able to meet those challenges as you expand?

Steve Greenland: I hope that we can, for sure. With the types of missions that we are able to work on that does attract, as Tom said, some really amazing talent, and they will be the people who will lead companies in the future—they are that way inclined. From an economic point of view, I think it is all positive, in that ultimately those skills will hopefully disperse around Scotland and the rest of the UK. From the company point of view, for sure, worrying about where the next people, especially slightly more senior-type people, will come from is where I would be more concerned.

Douglas Ross: You're nodding, Mr Walkinshaw.

Tom Walkinshaw: Yes; it is hard to find good people who want to stay with you for the journey. It is just a hard game, you know? Certainly, there is the early-stage hires and keeping them in the company. Just trying to get the right folks on the bus is always the challenge, and keeping them happy in the long term. In our management team, I think our average retention is around seven years now, so our management team is really solid in terms of churn and things. We are only an 11-year-old company, so I am not even sure how that is possible, but that is what the numbers say. That is really good.

Outside of that team, we definitely have challenges in engineering, and just generally, like with manufacturing. Our company is still relatively small, so we do not have lots of bench depth—because we are just a small company and that is the challenge for small companies. Sometimes you are fixing the toilets and sometimes you are building satellites; that is just the way it works. Some people are open to that and cool with it and some people are not, and trying to find those people is the trick, right?

Q310 **Alan Brown:** Good afternoon. Can I start with Mr Walkinshaw? To go back to the Delaware flip, you did the Delaware flip and that allowed the investment into the company that you were looking for. Since then, have there been any pressures to look at relocating to the States, given that is it US investment and you have the IRA, which incentivises manufacturing in the States?

Tom Walkinshaw: Not really. There may be business opportunities that we would get more access to if we had more presence there—a lot of the defence stuff in the US is contingent on some sort of presence, probably—but there is no real pressure from our current investor base to relocate. They just want us to grow a big company; they are not too hung up on which jurisdiction it is based in. They want the company to be really valuable, whether its ops are here or its ops are there. That is fundamentally what matters to them.

Q311 **Alan Brown:** Just to look at Government support in terms of contracts versus grants, we heard from other companies—this has been touched on today already—that would much rather have contracts, which are revenue generating and provide a bit of sustainability. Is that still a trick that is getting missed by each of the respective Governments? What are the barriers to finding out about and to accessing contracts? I know you mentioned the audit issue, but are there are other barriers?

Tom Walkinshaw: The audit issue is more a cultural issue. We were getting tied up in knots over this. Five people in another department were coming after us, and there was, like, a part-time bookkeeper—they could not differentiate between an SME and Airbus, so we kind of got treated in the same bucket, which was a little bit unfortunate but it all passed, obviously, and it was successful. Sorry, what was the other question?

Q312 **Alan Brown:** What barriers are there to getting Government contracts and even to finding out about them?

Tom Walkinshaw: It is a cultural thing, to be honest. For whatever reason, when these agencies or Government Departments were set up, a lot of it was co-funded and R&D grant-based and that seemed to be just the way they got set up. That seems to be the dominant type of funding structure in the UK for early and maybe middle-stage companies to engage with the Government on many levels. It is very R&D-centric—let's potentially create some jobs in that sector. I am not exactly sure of the mechanics of government, so forgive me for not fully understanding all the mechanisms.

This was probably said by the previous panels, but I think there is a big opportunity for the Government to take advantage of all the really interesting stuff that is happening here on their doorstep. We have only recently had our first UK customer for launch. We never had the Government launch a satellite. If you exclude the OneWeb constellation, I think that Alba could end up launching more satellites than the whole of the UK has in its history.

There are huge advantages, and companies such as mine and Steve's and those of all the others that you are talking to are doing really interesting stuff. We work with people around the world, and we don't really work on a contract basis with folks in Scotland or folks in the UK even. We work with people in Malaysia who are trying to put up IoT networks. We work with people in Argentina and people in Spain. These other countries are getting so much advantage from space—we just don't want to be left behind. The Scottish satellite sector is a bit of an outlier; it has just organically popped up without a lot of Government support. It has been really entrepreneur-driven and that is unusual in getting a critical mass behind that. That is really hard to get going, but now it is going and that is pretty rare globally. We are trying to help that to grow and to nurture and support it. I think that is probably a good thing for everyone.

Q313 **Alan Brown:** You mentioned earlier that you are providing data to the National Park Service of the United States. You just mentioned some

other countries. Is the reality that Governments and agencies that provide, effectively, arm's length functions for Government are just missing a trick in Scotland and the UK?

Tom Walkinshaw: I guess so. Obviously, I am not in the Government, so I cannot say if they are, but certainly it seems as though other countries are maybe more proactive in treating companies like a supplier. It just feels like the culture in the UK is more to—I would not say to treat entrepreneurs like beggars, but in the US, people who work in, say, Microsoft would get hit up by angel investors wanting to leave their job to start a company. There is a real celebration of entrepreneurs and a sense of, "This is amazing. You guys are building these big companies." It is a really different culture.

In the UK, you have all these amazing companies on the doorstep that are all doing amazing things for people all around the world. It seems as though the Government could be more efficient and could get a lot more capabilities. We talk about the war in Ukraine. It is a big thing. We have an Earth observation constellation, and we have never talked to the Ministry of Defence. We can provide a lot of interesting stuff there. There are a lot of humanitarian applications. We can track migrant boats with our satellites. We could do lots of things on these hot topical issues. We never have the conversations.

We would love to chat and figure out how to navigate the Government, but obviously it is a huge entity. I am sure lots of people are not aware of all the opportunities that are on the doorstep from all the companies that you're meeting.

Q314 **Alan Brown:** Mr Greenland, I do not know if you want to elaborate on that. You also mentioned almost getting kind of burnt by the UK Space Agency's changing tack. Do you have a view about the Government as a contractor in providing services, rather than the uncertain stop-start nature?

Steve Greenland: There are a number of opportunities for Government to procure services that have not yet been explored and will be good in future. From what I understand, that is policy moving forward in the space industrial plan. If you look at how some of the larger defence programmes have worked, which were procurement, the accessibility of those for smaller businesses like mine was pretty much non-existent. There is a risk, when moving to more of a procurement model, that companies get left behind, so there needs to be enough transparency and enough measures in place to ensure that it addresses the diverse industrial base that we want to see emerge.

Q315 **Alan Brown:** Are you seeing any evidence of officials in the MoD recognising that procurement process? Is there a big barrier to smaller companies and what they are doing to change that?

Steve Greenland: There is recognition. It is a huge thing to try and change that and also to introduce procurement across Government. It is something that we have to do. We need to move faster and place

contracts with more agility. We have to solve this problem. We have spoken—I have had conversations, most recently at the space conference in November, about ways that we could look at involving more small businesses in defence procurement, and, hopefully by association, in other types of Government procurement. There is a willingness to try and listen and learn. It is a two-way dialogue that hopefully this will a form part of.

Q316 **Alan Brown:** Do you envisage that coming about by a company like yours directly bidding in the procurement process, or would it be part of a supply chain? If I look at civil engineering contracting, for example—tier 1 contractors—they will bid for big jobs, but then they have that whole supply chain.

Steve Greenland: I think space is slightly different, in that companies like my own and like Tom's can deliver as the prime in a supply chain, even though we are a smaller size. For niche applications for niche services, it is possible that we are at that prime level and subcontracting out others. That is exactly what we are doing with something like VOLT. We are working with a whole heap of different companies within the Scottish industry to bring them into our supply chain to deliver and demonstrate new technologies and services. I think that the big guys will stay important for some types of services—they probably should do—but there is a heap of new and emerging services that SMEs should be allowed to access at the same level as the larger companies.

Q317 **Alan Brown:** And there are no barriers. If I go back to what I am more familiar with, in terms of civil engineering contracting, sometimes for smaller companies, barriers are put in the way in terms of insurances and liabilities that are disproportionate to the size of companies. Are there any issues like that?

Tom Walkinshaw: I do not have a lot of experience on the procurement side of the Government, to be honest. Certainly, a lot of stuff we are developing is so new that there tends to not be a real understanding of what it can do for different parts of the Government. To procure something, you need to know it exists first, so there is probably that challenge.

There are Departments that buy satellites, but it is not a continual programme. There is a lot of energy around one programme or one mission and then nothing for a long time. Often, requirements are driven by the class of satellite—satellites come in different shapes and sizes, and if you put out a requirement for a certain class of satellite, you will tend to have a company in mind for that, if that makes sense. There are probably only a few firms in the UK that can build skyscrapers; if you are building a skyscraper, you are not going to get some small family firm trying to build it. It is kind of like that, I think.

Q318 **Alan Brown:** To move on, can you explain what proportion of your revenue comes from exports, compared with domestic sales, Mr Greenland? How easy is it to identify and take advantage of export opportunities?

Steve Greenland: Some of the technologies that we work with fall under export control, so that can make it more difficult, especially as a smaller business, to understand the rules and get the right permissions in place. They are there for a reason, though, so we should be compliant with them, not arguing to remove them. For that side of things, I do not see too many barriers, especially working with allied countries.

I think there is a need on the financing side, because those opportunities take time to develop. The amount of resources that we need to apply to go after just one of those types of contracts—to get through the different stages of bidding—can be quite large. Through developing ourselves with other UK companies, we can present and do UK-oriented demonstrator missions, as we are doing, and then we can work together to present a more coherent opportunity for export with all the different parts of the industry working together.

Q319 **Alan Brown:** Do the Scottish Government or the UK Government not recognise that resource impact? You are talking about pursuing export opportunities and that collaboration. Does that just come about organically, or is there more any of the Governments could be doing to assist in that?

Tom Walkinshaw: It would just be help with the export control, really. It is a bit of a mystery to a lot of start-ups, with the regulations. There's a lot of dual use and questions around category—there are certain parts of satellites that are classed as more sensitive than others, and things like that.

Steve Greenland: Whenever we have reached out on specifics, it does take time, for sure. I guess one of the things they could do is to speed up the time it takes to get approvals.

Q320 **Alan Brown:** Export control licences are obviously a function of the UK Government. So, really, it would be the UK Government providing a bit more information or assistance in the pathway through that.

Tom Walkinshaw: I think you are seeing a lot more start-ups getting involved in space. There are obviously a lot of regulations historically, and export control is certainly one of them. It is about trying to help these start-ups—satellites can fit in a briefcase, so that is kind of an unusual thing. It is about how you handle that from an export control perspective, which is interesting. It is looking at what is dual use and what is not, and when something becomes dual use and when it does not.

Steve Greenland: One thing that would be helpful is knowing up front where the lines are—being able to get quick responses up front before we have sunk a lot of cost into an opportunity, because these opportunities do cost a lot. Having a clear steer one way or another that something could not ever get export-cleared would be really helpful. Again, I have not been through it since, but I had some positive conversations in November with Government officials about that, and we are currently exploring an opportunity like it—so fingers crossed.

Alan Brown: Good luck. Thanks, Chair.

Q321 **Christine Jardine:** My apologies for being late; I had to be in the Chamber. From what I caught of Mr Ross's questions, you may already have touched on this, but I was thinking about the skills that you need in the space workforce in Scotland. On our visit to Glasgow, we heard how difficult it is to attract the right people and keep them in the sector. Do you need more from the Scottish and UK Governments in terms of help to attract a workforce?

Tom Walkinshaw: We talked about this earlier on, but we will certainly take any help we can get. We are not fussy about where it comes from. Hiring is hard; it is hard for any company. Space has its own challenges. I think everybody's business has slightly different skills gaps and challenges.

People aren't moving to Glasgow to work in the space sector, generally speaking, albeit there is a lot more demand for space talent than there was 10 years ago. Ten years ago, there were probably 25 people working on spacecraft, and now there are probably 300 or 400. That is a huge exponential growth in demand for people. A lot of people who join Alba have never worked in the space sector before, and that is probably similar for Steve and other folks' companies. Trying to retain those people and look after them—and trying to get people who are there for the journey—is a big challenge.

Steve Greenland: For me, when we did UKube-1, it was great at bringing this talent pool together within academia and industry, and we started to get an ecosystem. That brought in the first skills. You then look at the impact of that 10 years on—we launched that 10 years ago—and you see the skills out there in other businesses. There are six companies now that have been started by those who were involved in the early days at Clyde Space. In terms of innovation and sustainable innovation within an ecosystem, having those kinds of capability demonstrators, which are probably now more focused towards new types of service that we can deliver from space, can provide a focal point for a whole ecosystem and for different skills to be developed, as well as attracting that talent into a critical mass.

Q322 **Christine Jardine:** One of the things that I have found is that there still appears to be a general lack of awareness of the scale and the potential of the industry in Scotland. That is even with the publicity about SaxaVord, and people talking about Glasgow especially.

I wondered if there were any parallels on lessons to be drawn from the way that the games industry in Scotland grew, and the problems that they had originally being so closely tied with Abertay University and the growth there. I don't mean in terms of the skills and the industries being similar, but I wonder whether there is something similar with the growth potential and the need for new skills. Are there lessons that you can draw from that? Is there a parallel?

Tom Walkinshaw: I know a little bit about the games sector in Dundee. I do not necessarily know the details of what came before and what happened after, in terms of the sort of skills. I am so in the weeds of the sector that it is really hard for me to be objective as to what the guy in the street thinks about the space sector in Glasgow. It is my baby.

Q323 **Christine Jardine:** Do you think the guy in the street knows about the space sector in Glasgow?

Tom Walkinshaw: You would have to ask him, I guess. I would hope so. I am so out of touch with what people would know in Glasgow, or in Scotland generally. When you are a small company, it is hard to spend a lot of time trying to bang the drum because you have got to keep your customers happy, and you have got to find your customers. There is an implied assumption of leadership, and that we should be out there going on every news channel and pumping out articles saying, "Look at this! Look at this!" It is quite hard as a small company to do that.

We run a conference in Glasgow every year—the PocketQube developer conference—and we bring people from all around the world. That is starting to get a bit of attention. We have hundreds of people coming to that event now, so that is quite exciting. That is growing. But whether the average person in Glasgow knows or not, I couldn't tell you. I would hope so. Hopefully, someone has run into somebody who works at a company, or someone's cousin's auntie's sister's brother has worked somewhere, or knows someone who did.

Q324 **Christine Jardine:** Word of mouth is not really what I mean. It is more about attracting the first-year university students who are interested in science, and them knowing that the potential is there.

Tom Walkinshaw: It's kind of tricky, because the people we hire know we exist. It is selection bias. We do not know how many great people we are missing, and if we did, we would be trying to fix that. We get a lot of CVs, and we probably miss a lot of people. We only have so many seats—you can only do so much as a small company. I am very biased towards space and small satellites—small always works. I will tell anybody that will listen to me that we are doing this, and that is why I am here.

Q325 **Christine Jardine:** Mr Greenland, in your written evidence, you said that more In-Orbit demonstrations procured by Government customers would inspire more people into space careers. Why do you think that is currently not happening?

Steve Greenland: I do not think I can answer that. Government have not necessarily had a will to place procurement contracts in the past. We have been fortunate in getting the mission supported by UKSA and ESA through that process, and we fundraised in order to do it, but that is quite a long journey to have to go on. It takes a lot of time to get all the pieces in place. There might be more opportunities if Government gave out more signals about what is needed. Around that, CDT programmes within universities and skills force development within the companies can attract talent.

Why has that not happened to date? One of the reasons is that we can be quite risk averse. When we put a lot of money on one particular thing and say, "This is what we are doing. We're going to go and launch this type of satellite for this type of application", it garners a lot of interest. It draws attention to it. We should be treating it as, "We want five of them in different locations or for different types of application." Then we are spreading the risk, because space is still a challenging environment to develop systems. If you want to develop skills and develop younger people to be able to deliver these types of systems, you have to be able to fail. Some types of Government procurement will not accept any type of failure.

Tom Walkinshaw: We also do not really have a culture of universities flying satellites in the UK. In America, a lot of people who end up in the space sector and work at SpaceX, or wherever, have flown a satellite at university. That is something that has never really happened in the UK, for a bunch of different reasons. Regulatory is a big piece; it is very difficult to get a launch licence. I was recently in ESA, which does the Fly Your Satellite! programme. They had eight teams from around Europe, and they started doing PocketQubes for the first time, but no UK teams were represented. We do not really have a culture of flying satellites, but we have a culture of starting companies that fly satellites. There is a weird mix in the UK between cultures. Within government, it is much easier to sign off a 500 k grant for some random piece of technology than to sign off 500 k to get the prototype flying. There are all the barriers to getting the regulations sorted for flying as well. There is not really a culture of that here. A lot of well-meaning people are trying to get that going, but it just fizzles out without critical mass.

Q326 **Christine Jardine:** I am fascinated by what you said about university satellites in the US. Is it commonplace for them to do that now?

Tom Walkinshaw: We have launched 41 satellites so far. We built 15 of those for our own use and internal customers, but we do rideshare: we buy space on a SpaceX Falcon 9, and then sub-sell that out to customers around the world. We have Hungarian and Romanian customers. One of our customers is a Hungarian university that has flown four or five satellites now. They do approximately one a year. The Hungarian space programme is basically that university. We just launched with a bunch of high-school kids from Romania—they flew their first two satellites.

Q327 **Christine Jardine:** High-school kids from Romania?

Tom Walkinshaw: Yes, these are like 15 or 16-year-old kids. It is a private school—it is sort of like the Eton of Romania, if you will. They wanted to fly a satellite, so they got the funding together and they came to us. We launched two of their satellites, which are now in orbit. You do not really see that in the UK, unfortunately.

Q328 **Christine Jardine:** What can we use them for in the UK? What would, say, Edinburgh University use them for?

Tom Walkinshaw: I mentioned that the satellites are predominantly for imaging Earth at night. The night-time use cases are things like—one of our customers is the National Park Service in America, so we image national parks. There is a lot of stuff around population. Let's say you wanted to figure out the population of Afghanistan—how would you do that? A big indication, if you could image it at night, is seeing how much light is produced over the whole country. If you go to one village and count how many people there are there, you could start to get census data for different locations.

Q329 **Christine Jardine:** So it is a research tool?

Tom Walkinshaw: It is a research tool. During covid, there was a lot of interest in pictures of what was happening in different parts of the world at night, such as whether they were in lockdown. Obviously, the UK knows what is going in the UK, but does it know what is going on in Argentina, China or Brazil? From Earth observation, you can get that capability to say, "Oh, China seems currently to be in a lockdown. It has not announced it but it is. We can tell that there are fewer people on the roads because they are not producing as much light." It is things like that. There is so much intelligence about the world you can gather from small satellites.

Q330 **Christine Jardine:** Universities?

Tom Walkinshaw: Universities—yes, obviously. Every university has its own thing that it cares about, so it is hard to generalise. If you can imagine it, you can fly it.

Q331 **Ms Qaisar:** Thank you to the panel for joining us today. I am really interested to learn a little bit more about the challenges that you face with staff retention. It is something that we have discussed quite a lot, and when we had our Committee session last year in Glasgow, it definitely came up. I am interested to hear your perspectives. What challenges do you face in both finding and retaining staff? Tom, do you want to start first?

Tom Walkinshaw: Certainly, it is tough to find good people just generally, whether it is in the space sector or any sector. We have lots of great people working at Alba, but certainly it is quite difficult to find people with the combination of skills, the appetite and the desire to stay with you for the long term. We have had many different strategies, such as interns, graduates and people coming from other industries. I think every company is still trying to figure out what works for them, to be honest, and it is a bit of trial and error as well. It is more like making an omelette than anything. You have to get the right people on the bus, you have to get them motivated, and you have to get them all getting along with one another and being constructive. Yes, every company seems to have that challenge.

Q332 **Ms Qaisar:** Steve, is there anything you would like to add to that?

Steve Greenland: Probably not more than what I have already said around how we would see it. We expect quite a lot from our team, so we need to ensure that we are rewarding them with things like shares and

ownership so that they are able to develop and learn more about business. Ultimately, those are the types of people we need within the economy in the future, and I think that that takes time. As Tom was saying, there were not many space engineers in Glasgow when I was fortunate enough to move there—it is a fantastic place to live—and now there are.

There need to be programmes that keep people there and keep them inspired. You cannot just focus on skills within schools and universities. You have to look at continuous workforce improvement and training, including hands-on training. It has not been the case historically that there is enough hands-on training in universities, so that is the part that we have to play as small businesses.

Tom Walkinshaw: I would just like to follow up on the shares scheme. We do a share scheme: 10% of our company is up for employees for remuneration. In Scotland and the UK more generally, there is clearly not a big weighting on share options in that respect. I feel that companies have it hard both ways. If you do not do it, then it feels like you are holding something back, but if you do, people maybe feel that they should get it in salary or do not appreciate it as much.

Culturally, it is a tricky balance, because while we raise capital in silicon valley and share options are very well understood there—that is how a lot of people made their money—it seems like the average person in Scotland does not know anybody who made any money with share options. There is a misunderstanding of that kind of tool, generally. People in Glasgow or Scotland are not necessarily aware of the whole startup culture as they are in San Francisco.

Q333 **Ms Qaisar:** Do you think that culture has changed since you first joined the space sector, in terms of shares in companies?

Tom Walkinshaw: It has slightly improved. We still have a long way to go. I think generally trying to support people building things in the world is a good thing. We should try to help the builders of things and not demoralise them, or they probably will not build anything.

Q334 **Ms Qaisar:** It is a really interesting concept, because I suppose on the one hand, you are ensuring that your staff and employees are built into the business and invested in it, and they want to ensure that youse do well as a company, and have that personal touch. Steve, it was interesting to hear you talk about training. From what we have heard in Committee, it seems that the responsibility and onus is on industry to fund that training, rather than anyone else, which can then become a burden on SMEs. Do you recognise this, and if so, what do you think should be done about it?

Steve Greenland: We spend a fair amount per person on training. One of the challenges we have faced—this is a very specific problem—is that while there is some support for skills-based training within Scottish Enterprise, by the time it has been processed usually that training programme has already finished. You cannot then use the money on that training programme. We need to expect that training will happen beyond just

undergraduates. Continual learning for the first five years or so of an individual's career is critical in space.

We probably need some sort of fund to match some of the investment that companies make, because we are making a lot. Currently, those mechanisms might exist, but they are quite inflexible. We struggle to actually use them, and they take a lot of effort. It would be useful if there was an understanding that we will be investing and that this can therefore be matched in some way. Whether or not that person then chooses to stay with our business or moves to Tom's business or somewhere else, that is still valuable for the UK. We can all move forward by investing in those kinds of skills, and you would get more visibility about what training is required, because it would be genuinely based on the training the companies are paying for. It would be a 50:50-type arrangement, and you could use that to make better decisions in future.

Q335 **Ms Qaisar:** It is interesting to hear you frame investing in staff as valuable to the UK, because when we as a Committee met different businesses, one of the concerns we heard was that some companies might be a little bit hesitant to invest in staff because there is a fear that they might go off not just to other businesses within the sector, but to other sectors. What could be done to help Scottish companies invest in the workforce?

Tom Walkinshaw: It is a good question. We run a conference, which is sort of a CPD. We are fortunate, in that we basically bring all the developers of PocketQubes in the world to Glasgow, and we bring all our staff to that event, so they get to meet every expert in the world who is working on it. Our software engineers can meet and learn from five or 10 other software engineers who are developing satellites that are flying—ADCS, pointing systems, cameras or whatnot. A big part of our CPD is our conference, networking and things like that. It is tricky in a start-up, because you are looking for people who are self-aware enough to fill in their own gaps. That is very hard as a small company; a bigger company has more leeway to have someone allocated full-time to worrying about it, but when you only have 15 seats there is a high opportunity cost to freeing up a seat for somebody to worry about that problem. It ends up being tricky to reallocate enough internal resources because you are small in numbers. If you have 150 people, it is much easier to allocate one person to worrying about training, versus 15 people where the opportunity cost is quite high.

For most companies, it is trial and error. It depends on their role; we are trying to go towards more process-based operations where we document our workload. There is procedure that lies in building a satellite, and we have videos that explain how to build a unicorn satellite, all the steps that it takes, and the training to do it. We have not had any external support for that; it has mainly been an internal, best-practice type of thing that we are working on. There are many conflicting things that we need to do, so it is hard to put the amount of man hours into that that we would like. Obviously, if we had more support to do that then we would do more of it.

Steve Greenland: You really cannot get over the experience that is needed. For me, it comes back to having these capability demonstrators, because they allow you to develop the skills and bring people in. They allow a business like us to reach out to universities and pull in something that they have got there into the business. There can then be a nucleus for everything that comes next. Of course, the people within the space industry are what make the space industry.

Tom Walkinshaw: The best thing to do to fly satellites is to learn about how to fly satellites. Steve is a great example of that, having done UKube and now Craft. The more people who have hands-on experience and learn, the better. You fly, you try, you learn, you fly again; that is generally how it is done. You get experience by learning through action.

Chair: Thank you. We will suspend briefly to let our other witnesses come and join us. Thank you both very much. I think there were a couple of things that you might get back to us about. I cannot remember, but if there were I am sure the Clerks will be chasing you up about that after your attendance this afternoon.

Tom Walkinshaw: Do you guys want to see the satellite?

Christine Jardine: Yes.

Chair: Please pass it around. We have to get straight on with the next witnesses.

Examination of Witnesses

Witnesses: Allan Cannon and Sarah Middlemiss

Q336 **Chair:** Welcome back to the Scottish Affairs Committee. We will now hear from a couple of representatives from the satellite application sector. We will now allow them to introduce themselves. Could you tell us about your company, what you do and what your interest in this inquiry is? We will start with you, Ms Middlemiss.

Sarah Middlemiss: I am Sarah Middlemiss, formerly chief operating officer of a company called Ecometrica. We were acquired towards the end of last year by another company called EcoOnline, but I will give you the basis of what Ecometrica does. We are a sustainability software company founded in 2008. We help companies measure and report on their environmental and sustainability impact. That is very much driven by regulations—UK mandatory carbon reporting and regulations in the EU on corporate reporting. I joined the business in 2014, and that is when the geospatial part of the business, which uses satellite data, was really starting to take off—no pun intended. That complements and adds to GHG accounting by looking at the context and other environmental impacts, such as land-use change and deforestation.

Over the past few years, companies have had to use the regulations and the reporting requirements information to look at physical climate risk across their operations and supply chains, or deforestation with supply chains of cocoa, palm oil and that kind of thing. As I say, we were acquired last year by a company called EcoOnline, which is headquartered in London and is a software company that looks at environmental health and safety, as well as chemical management. We form a third pillar, which is ESG for that company. We are still going through the integration process.

Allan Cannon: I am Allan Cannon. I am the CEO and co-founder of Krucial. I have a background in both defence and space. Previously, I worked with Clyde Space as the head of missions, working with customers such as NASA, the European Space Agency and a whole load of Silicon Valley start-ups. In 2018, I started my business alongside my co-founder who was also with Clyde Space, and have grown the business to 25 people in Scotland. Krucial helps organisations become more sustainable. We help them reduce their risk and increase their profitability. How do we do that? We help them connect their assets and operations to the cloud. We use a satellite-enabled connectivity platform, which means that we can move data from any sensor, from any location on the planet, to any data application. We build solutions, and we help our customers and partners to build solutions on top of our platform. We are working with some of the biggest organisations in the world. We are starting to export our products into international markets.

Q337 **Chair:** In your introductory remarks, you have just described moving from company to company. Is that a feature of growing sectors such as space in Scotland? Would you expect to move to different companies within the sector over, say, a short or medium period of time?

Allan Cannon: Working with Clyde Space at a time when they were the only such company in Scotland was interesting. That coincided with a real change in the space industry. Clyde Space was—it still is—an extremely innovative company, working with some of the major organisations out there, but that coincided with what we call New Space, which has essentially been enabled by the types of satellite platforms that Tom had in front of you—small satellites, CubeSats, which Clyde Space builds—and that has enabled, essentially, a democratisation of the space industry so it is no longer just Government agencies and large corporates that can afford to purchase and procure space data and space assets—small start-ups can do that.

Q338 **Chair:** Do you all know each other quite well in the sector? I got that sense from other colleagues who joined us. It seems to be a relatively small community, and you tend to work together and collaborate when necessary. Is that how you would characterise the sector?

Sarah Middlemiss: Yes, I would say so. It is quite a tight-knit ecosystem. Everyone does pretty much know everyone, and we have that full cycle across the space supply chain. I think that is probably quite a strength of the sector, that idea that we on the application side are typically speaking

to customers who might not have that much knowledge of space, sensors or what they need, but we can digest and say, "Well, this is the problem", feeding that back through the supply chain so that the satellites being launched are meaningful in addressing real challenges, rather than going up for the sake of research for research's sake.

Q339 **Chair:** I don't think we have had a chance to visit any of the application businesses in Scotland, although obviously we have been shown around Clyde Space, Clydeport in Glasgow and the other satellite businesses. Is Scotland a good place for you guys? Is what you have an emerging part of the sector? How do you see your prospects, being based in Scotland? How do you contribute to the ongoing progress of Scotland's space sector?

Allan Cannon: We have some fantastic universities across Scotland—world-class in a lot of the areas that they focus on. The talent coming out into the Scottish market is extremely well regarded. I think that the industry is in a very strong position to continue to grow and to expand and deliver return into the UK coffers.

We now have end-to-end capability, by which I mean the ability to launch, build satellites and take the data that we are collecting and turn it into meaningful valuable data that can then be sold. We have that ability in Scotland.

I was recently in Malaysia and Singapore on a trade mission. Malaysia are looking at what we have done in Scotland as an industry and looking to work with Scottish businesses that have grown up within that ecosystem but also with the Scottish and UK Governments to build their own industry.

We are at a stage now where we have a set of products or a product that we can export. A number of companies are looking to export that as part of that initiative. I think we are in a very strong position. We are starting to build businesses of scale. We are at a critical point where businesses are starting to break out. There are certainly challenges that we need to address, some of which were covered earlier, such as financing, skills and so on, but we have a very strong foundation for growth.

Q340 **Chair:** Do you have the same experience, Ms Middlemiss? Is Scotland a good place to be when it comes to your business?

Sarah Middlemiss: I would say so. The network of universities and pool of talent are a real advantage. Similarly, we recruit a lot of young graduates, a large proportion of whom come from Scottish universities. There is a huge amount of talent and research excellence, particularly across the central belt, in data applications. You see an emerging fintech sector within Scotland, and those skills are very transferrable; it is about being able to leverage them across both sectors.

There are definitely still challenges, although I do not think this is necessarily unique to Scotland, in the scale-up phase when it comes to unlocking investment and the cost of being a small business. But in

general being part of this ecosystem of knowledge and skills and having that end-to-end capability is a real advantage.

Q341 **Chair:** I understand that you have just been acquired by EcoOnline, which is based in Norway. Is that correct?

Sarah Middlemiss: Yes, although they recently moved headquarters to London.

Q342 **Chair:** Is headquartering an issue? Obviously, we would all like to think that all the initiative and creativity going into building your business could be retained. Is the fact that it is not specifically owned and headquartered in Scotland an issue?

Sarah Middlemiss: I don't think so. The core bit of what we do around sustainability, climate indicators and using data will still be based in Scotland. Having a larger company behind us in the London headquarters and offices across the world makes it easier for the customer-facing and sales bits. Not very many of our customers are in Scotland, but a lot are headquartered in London and there are a lot internationally as well. It is the best of both worlds: we have the talent and the ESG engine, as I like to call it, within Scotland but we can also leverage being part of a bigger company that can flex on the world stage.

Q343 **Chair:** And you are Scottish-headquartered and owned. Is that correct?

Allan Cannon: Yes, although we do have international investors, so we have investors in the US and also—

Q344 **Chair:** Are you tempted? Are you looking about? Are there any people who are thinking about maybe taking off to wherever around the world?

Allan Cannon: There is always a commercial decision to be made about where the best place to base your business is, but I see an opportunity to build a large Scottish, or UK-based, business that has offices in other parts of the world. Our technology has no geographic boundaries, and we therefore have customers globally. We will be looking globally for investment, partners and customers, but it is our aspiration to build a large Scottish business that has the majority of our team in Scotland. There are a number of reasons for that. If I were to headquarter and grow my business in Silicon Valley, the cost of staffing that would be about five times as much as it would be in Scotland, so we have an advantage building a business in Scotland that a lot of US investors do not really appreciate until you sit them down and explain that we can make their money go further. There are a lot of aspects to that, and that is something we should capitalise on.

Q345 **Chair:** I think you listened to the previous session with your colleagues from the satellite business. We were asking about their awareness and what they made of the respective UK and Scottish Governments' space strategies. Do you have a view about what you have observed? I listed some of the goals that were indicated in the UK strategy. What do you make of the strategy? Do you have a great awareness of it? Does it make a difference to what you are doing? If you could basically tell us what you

think about it.

Sarah Middlemiss: I think the goals are admirable, but the proof is in the pudding, I suppose, and delivery is and could be a challenge. The levelling up of space and really scaling growth probably needs a bit more investment. It is really hard to scale a small business in Scotland and in the rest of the UK as well. As a small business, we are always terms takers, whether that is on the customer side when we are contracting with larger clients or even when we are procuring our own services. That is a lot of risk and burden that small companies have to take on.

There is a real cost of business. Particularly in Scotland, there is such a huge proportion of small businesses, and that is a large chunk of the economy taking on a risk that is disproportionate to its size. Also, just leveraging that scale-up capital is really difficult. I think it was alluded to in the previous session that that kind of appetite for risk from both Government and private investment is not there in the same way as it is in California. Granted, the level of funding is also not there, but there have to be some big bets placed to unlock that scale, because it is a bottleneck at the moment, for sure.

Q346 **Chair:** What is your view of the respective UK and Scottish Governments' space strategies, Mr Cannon?

Allan Cannon: I like the fact that we have a strategy in the first place—that is a great thing.

Chair: It is reassuring, isn't it?

Allan Cannon: Yes, exactly. It stimulates conversation around what the strategy should be and what the next iteration of that strategy should be. I think it is a great first step. There are opportunities for us to engage with more of this space ecosystem. There is a lot of focus on the upstream aspect, the launch and satellite aspects. A huge proportion of the space industry is in the downstream aspect, so closer to the application and to the problems. Actually, a lot of the return on investment will come through that part of the ecosystem. However, it is a great first step that we have a strategy. Also, to add to what Sarah said, I think the capital side of things is the biggest challenge. Maybe a bit of focus on how we leverage both public and private finance to accelerate the sector would be a great next step.

Q347 **Christine Jardine:** You will have heard what was said by the previous witnesses, and thank you for coming along and being here for all the afternoon. When we are looking at the future of the industry, what would you say are the main obstacles to scaling up a Scottish space business?

Allan Cannon: I think that we are at a massive disadvantage from the ecosystem perspective. What I mean by that is that the ecosystem for start-ups and scale-ups is not as mature as an ecosystem such as London, Silicon Valley or some of the other more established ones. That means that we have to go elsewhere to look for the experience or the talent that is required—the talent that has gone through a scaling journey. We do not

have that within Scotland. We do not have the same level of capital that is available in more developed ecosystems. We do not have the successful businesses that have gone through an exit—present company excluded—with the talent and the capital then returning back into the ecosystem and helping to stimulate it.

The more companies that we see breaking out, the more that we will start to create a flywheel effect, where more of that money and talent will come back into the ecosystem and help do it. Yes, the big focus, the big challenges, that we need to look at is how we can create more scale-up businesses in the sector and unlock some of the regulation that we have around procurement, etc. Beyond this session, I would love to talk to someone about how we can work with Government and how we can use Government as a potential customer within our business. I would love to see how to how to unlock that. That would be a good thing.

One of the biggest challenges—I am sure for my peers who run businesses in Scotland and elsewhere in the UK—and the best way to grow a business is to have customers, so it is finding ways to get new customers. I would rather grow my business organically than sell portions of my business off to investors, but it is very difficult to do in the early stages when the risk is high and we are trying to convince multinational businesses to take a risk on what is a small and fragile business. If Government could help to balance that risk, essentially, and help to unlock some potential contracts, that would be a really good way to stimulate early-stage businesses.

Sarah Middlemiss: I completely agree with all those points, and access to capital is a huge one. That is a really good point about the expertise of people who know how to scale a business. When we have talked about talent and skills, we have talked a lot about maybe more of the technical skills, the graduates and the doctoral programmes, and they are amazing because that is what builds the product, but in terms of what builds the business beyond that start-up phase, that kind of expertise is missing and it is difficult to get in, for sure.

To the point on customers, that is a huge one, and it is a challenge, particularly at our end, at the applications end, because we are right at the end of that space-data value chain. Our customers—ours in particular—do not really see us as a space company. I would say that they probably do not care that we are a space company. If I have a Garmin watch and am tracking my run, I am not thinking, "Well, I will put my space watch on"; I am thinking, "Okay, I am going to be able to see how long I've run"—I will probably not even necessarily think about GPS. Ideally, that is what our customers are thinking as well: they are thinking, "Okay, I can measure or report on these specific things that I need from using these experts."

This is part of the challenge—it is a strength and a weakness of the space sector in Scotland—and because we are this big ecosystem, it is a bit more challenging to support those applications, because our customers and our verticals are not in the space sector. They could be in the finance sector, in big ag, or elsewhere. Making those links and being able to support that,

whether it is Scottish Enterprise or the UK Government, it is sort of an extra leap and looking beyond just the insular sector.

Q348 **Christine Jardine:** That is interesting. Rather than simply thinking about dealing with the UK Space Agency and Scottish Government, you really want to be thinking about dealing with agricultural companies for weather satellites—I am trying to think—

Sarah Middlemiss: Yes, of course—

Q349 **Christine Jardine:** Out of the box. You are not looking at expanding by having better contacts within the space sector; you are looking at expanding by having better contacts in other sectors. How useful then is working with not only the Space Agency, maybe, but other Government bodies? Which particular Government bodies would be useful to you in growing your businesses? Which Government Departments would be useful? Would it be DSIT? Would it be DEFRA? Would it be that sort of thing?

Sarah Middlemiss: Definitely DSIT and DEFRA would be among them. Historically, we have worked quite closely with the UK Government. Back when DfID was DfID, we had a two to three-year contract with them and it was about monitoring their investments in protecting forests internationally. Obviously, anything to do with trade or industrial strategy is a key one for us. But to go back to some of the points that have been raised so far, that constant engagement with Government is quite time consuming. For a small business, it can really sap a lot of energy. It is something that we invested a lot in pre-2020, and we did get some growth as a result, but most of our growth has come through a much more commercial route—engaging with customers directly. It is difficult to find that balance, particularly as a smaller company.

Q350 **Christine Jardine:** What do you think the UK and Scottish Governments could do more of to help you to scale up? Would it be direct funding or attracting investment from elsewhere? Are there specific things that you think they could do?

Sarah Middlemiss: There are things like the Scottish National Investment Bank and other investment banks that are around, but again, it is a question of the appetite for risk. I fully appreciate there is a balance there; it is taxpayers' money. However, if you really want to unlock that growth, you have to make some bets. As Steve was saying, you have to be prepared to fail, but know that you have spread your bets enough that the successes will counteract that. That is why California works—that fail-fast mentality. We don't have here the sort of money that they have, but I think encouraging that culture could make a huge difference.

Q351 **Alan Brown:** Good afternoon. I want to go back to the theme about Government as customer. I asked the first witnesses about it, and Christine touched on it there, but if we are writing a report, which we will be doing, what are the key recommendations we should be making for the Government to be a customer? What are the barriers and what do Government need to change to allow them to be a meaningful customer

for you, and for Governments and agencies to realise the benefits that they are presumably missing out on at the moment?

Sarah Middlemiss: From my perspective, one of the challenges that historically we have seen, particularly around EO applications, is that it is very bitty and project based. There are lots of well-intentioned programmes that maybe are R&D based, with the intention of having a contract at the end of it, but once the concept has been proved and the business case is made, there is a new Government or a spending review, so the budget just isn't there. You are investing a lot of time to have no contract at the end of it.

I think there is so much use of Earth observation data across Government, across different Departments, that it is not particularly consolidated or rationalised. I think things like the geospatial strategy and commission should start to bring that together, but I have not personally seen what the outputs of that are yet. As I say, that might be because I am not as engaged as I used to be in Government goings-on. If it works, it will be an effective—good—step.

Similarly, there are procurement barriers for small companies. It is hard. You are a terms taker. The contracts are 150 pages long. There are various audit requirements, policies you have to have in place, and certifications. Really, it is worth your while only if there is going to be a big contract at the end of it; and for there to be a big contract at the end of it, there needs to be a strategy around how Earth observation data is used or how communications are used—whatever it might be—and that is obviously quite a long play in Government.

Allan Cannon: There are probably some frameworks that the UK Government could look at, such as the SBIR grant in the US, which is a multi-phase framework with a small feasibility element to it. On successful completion, you move into a larger phase and then commercial procurement off the back of that. There are other methods to grow that manage the risk for the Government, but it also provides a framework and clear road. If phases 1 and 2 are successful, you have a nice, clear framework to then move into. I guess that that is a way of balancing the risk of a start-up and the technology, but also of giving clear guidance to not only the start-ups but the start-ups' investors to say, "Once you have gone through this, there is a potential multi-million pound contract off the back of it." That solves quite a lot of problems. We do not really have anything like that here in the UK that would allow start-ups to leverage that model.

Q352 **Alan Brown:** Earlier on, you mentioned the Government helping to unlock contracts. Is that what you had in mind? Are there other things that the UK or Scottish Government should be doing to help to unlock and provide access to contracts?

Allan Cannon: That particular point is more focused on Government procurement, rather than other aspects of supporting commercial contracts. However, certainly in the early stages, if commercial

opportunities were there to be unlocked, I would love to see how the UK and Scottish Governments could help to come alongside small businesses to open up those contracts and essentially provide assurances underwriting those contracts with some mechanism. That would really help and balance risk for both the customer and the start-up.

Q353 **Alan Brown:** Is there a barrier in terms of who you speak to or engage with to say, "Here is what we could do for you", or, "Here is what you have been doing, but we can do it so much better if you give us an opportunity"? Is there any sort of disconnect in being able to do that joined-up discussion?

Allan Cannon: Would you be able to explain the question a little more, please?

Q354 **Alan Brown:** What I am thinking is that we talk about Government as a customer, which, in many ways, actually means different Departments or agencies. I am just wondering if there is a disconnect. How do you go up to somebody's door and say, "Here is what we could do for you. Here is a service that you have been doing in this way for 20 years, but give us an opportunity and we can deliver a process for you much more cheaply"?

Allan Cannon: There is no single entry point; I think that is the problem. There are so many different Departments and ways for businesses to look at, and we only have so much time. I think it has been mentioned quite a lot throughout this panel that start-ups are resource-constrained, bandwidth-constrained and financially constrained, so it would be great if there was essentially an account manager who could point us in their direction. We have had account managers, for example, in Scottish Enterprise, Scottish Development International and DBT, which helps in some sense. However, having that level of engagement where someone essentially takes ownership of you and helps you to navigate the Government agencies, so that they spend time educating themselves on the business and the business value that it could bring to Government, and then essentially work on your behalf in Government, could be an effective model.

Sarah Middlemiss: I think that that is a role that the UK Space Agency, or some part of the UK Space Agency, can and should play. Perhaps it should not be that account manager role, but it could almost flip it on its head and go to Government and say, "What are your challenges? What are the gaps? What are the constraints? There are a lot of companies in our remit that could help to solve those." It could provide that linkage between the two. I think most companies in the space ecosystem have some kind of interaction with the UK Space Agency, but they might not have that directly with DSIT, DEFRA or whoever it might be. The UK Space Agency could really have a role to play there.

Q355 **Alan Brown:** We have been told that in theory, any company could be a space company. You have really touched on how so much of it is actually about data management and analysis and the like, and you have clearly been acquired by a broader environmental data company. Could more

Scottish space firms benefit from that type of branching out? If so, what kind of support is needed to grasp those wider opportunities?

Sarah Middlemiss: That is a good question. Yes, I definitely think they can branch out. Something that the sector is trying to beat the drum of is that space has many applications and can feed into many different sectors. On linking up where there are different clusters and different sectors that the Government are already pushing—they are in a place to link up. I alluded to fintech earlier; that has got quite a strong ecosystem in Scotland and there is work going on to pull those together.

Particularly looking at export opportunities, that is something that SDI are very enthusiastic about—although they maybe have not quite got it right—because they have this network of people in different countries. For us, that could be a real opportunity to link us up with potential partners. We are probably not going to sell directly into Singapore, but if we had a channel partner who could then do the selling, that would be a real opportunity. But the challenge there is that, because we are applications and not space, we have to specify and say, "These are the kind of partners that might be interested." They comprise quite a range—they could be environmental consultants; they could be accountants. It is a challenge, but more can be done.

Q356 **Alan Brown:** Allan, your company is effectively centred on the internet of things, if I can use that phrase. Is there anything else that the UK and Scottish Governments could be doing to support the growth of satellite applications other than simply Earth observation?

Allan Cannon: Absolutely. There is definitely more to the space industry on the application side than Earth observation. There is the data analytics that utilises the Earth-observation data, but there is also the connectivity piece which is enabling digital transformation for many enterprises globally. What we focus on is helping organisations connect their assets, and that data then comes back to the cloud and can be combined with Earth-observation data to provide more value to the customer.

To give a couple of examples, we are working with a large organisation to help digitise water basins. That essentially involves collecting environmental data from water to help them manage and mitigate the effects of climate change. That cannot be done with Earth observation alone; Earth observation can provide an insight as to whether there is a pollution event happening within a water course, but it cannot tell you which nitrates or phosphates, and so on, are there. In order to get the maximum value, in-situ data has to be taken in a lot of cases. That is what we do, and that is where we can help.

Another example would be in the aquaculture industry. The aquaculture industry is an incredible industry, and we are helping them get the data that they need to both grow and become more sustainable. A lot of the operations tend to be in remote and rural areas, and therefore there is a barrier to digitisation in that they need to send people to collect data. The

technologies that we and others are developing have a real, positive impact on the economy from a digitisation perspective. Digitisation can happen, and all the benefits that can come with digitisation that sometimes can only happen in connected areas. The technology is now there to break down that barrier and stimulate growth and sustainability off the back of that.

Q357 **Alan Brown:** Okay, so you have clear examples of how it benefits in growth opportunities, but is there anything that the UK or Scottish Government should be doing to help maximise those opportunities?

Allan Cannon: Again, it comes down to the previous comments about how, when there are companies that have the ability to become a scale-up, we really need to try and get behind them from a customer perspective. We need to think about how we can unlock new customers from a talent perspective, and how we can support a business in creating the talent and the training. Also, on the finance side of things, how we can help grow that business. We are competing with US companies and large European companies. They have access to capital much easier than we do, so those are the areas that are going to give us the advantage. As I said earlier, once we get a number of these scale-ups that are breaking through, there is then a positive impact that comes back into the ecosystem that we can leverage.

Q358 **Chair:** Lastly, you heard the conversation we had with your colleagues about staff, skills and retention. You are a very specialised subsector—if that is an elegant way to categorise what you do. Is that an issue for you? Do you find that you get the people you require to grow your businesses?

Allan Cannon: We have actually been okay. We have been able to get access to the talent that we need, and we have been able to retain that talent. The areas where we have really struggled are actually on the business side, for example, with sales and having access to professional sales capabilities and adding that to the business. If you were to look at the US, sales is a revered profession, whereas in the UK it is almost like a second thought.

Q359 **Chair:** I think you are not alone. A lot of sectors are having that issue.

Allan Cannon: An aspect there that is not appreciated is that space businesses are just like other businesses. We have the requirements for marketing, finance and sales, etc, as well the specialist engineer talent.

Q360 **Chair:** I am interested in the specialist staff. What we heard from a number of your colleagues in the sector is that there is an attraction for people who may be interested in your line, whether that be the renewables sector or other scientific endeavours. Is it a small pool of people that you recruit from, Ms Middlemiss?

Sarah Middlemiss: Yes, I would say so. In terms of specialist skills, the key ones for us are software engineers and people with subject-matter expertise in climate policy and climate reporting. Perfection is when you find someone who has all of those skills. That is slightly more challenging,

but we are in a position where we can pull them together. Over the past 12 to 18 months hiring those software engineers has become slightly easier with the knock-on effect of what has been happening in Silicon Valley, but it was really challenging for a while. For us, retention is the challenge. We are a small business, and we are a sustainability business, so on salaries we just cannot compete.

Q361 **Chair:** One of the things that impressed us when we visited a couple of companies in Glasgow was that there was quite an international staff base. There were people from all over the world there. Is that roughly the same in your sectors? Are you encountering any difficulty getting the international staff you require?

Sarah Middlemiss: Our business used to be more international than it is now. We used to have a lot of EU citizens on our payroll, and we have fewer now. Typically, we recruit from Scottish and UK universities—that is where the graduates come from—but EU students are not sticking around quite so much. It is a little bit more difficult. Diversity is always a bit of a challenge for smaller companies, but it is certainly something that we see.

Q362 **Chair:** Diversity-related issues are another feature that has come up. It is good that we have a very diverse panel today. It is good to see you in your role, Ms Middlemiss. Are there enough women like you coming forward and leading companies in the sector?

Sarah Middlemiss: I think it is getting there. Certainly, when I started dipping my toe into the space sector, the panel discussions you would go to at conferences all looked the same—and they didn't look like me. It is definitely improving; there is a real acknowledgment in the sector that it needs to change. That goes right back beyond companies; that is about education and academics encouraging women to go into STEM, and to go into business as well.

Chair: Good for you. I hope you set an example for other women to get involved in the space sector. Thank you both for coming down today, and thanks to all the witnesses. It has been a fascinating session; we have learned an awful lot about the issues, challenges and opportunities that are there in the Scottish space sector.