



UK Engagement with Space Committee

Corrected oral evidence

Monday 17 March 2025

3.35 pm

Watch the meeting

Members present: Lord Clement-Jones (The Chair); Lord Booth-Smith; Baroness Donaghy; Lord Lansley; Viscount Stansgate; Baroness Stowell of Beeston; Lord Tarassenko.

Evidence Session No. 4

Heard in Public

Questions 35 – 44

Witnesses

I: Will Lecky, Co-founder, know.space; Rasmus Flytkjaer, Partner, London
Economics Ltd and LE Europe.



Examination of witnesses

Will Lecky and Rasmus Flytkjaer.

Q35 **The Chair:** Good afternoon, and welcome to this evidence session of the UK Engagement with Space Committee. I would like to welcome our two witnesses this afternoon; Will Lecky is the co-founder and director of know.space, and Rasmus Flytkjaer is partner and head of space at London Economics. I am afraid to say that we may have votes during this session. If we do, we will be adjourning the meeting for 15 minutes to allow members to vote. We will hasten back as soon as we possibly can, but we are anticipating some votes.

I am going to ask you both the first question: which areas of space does the UK exhibit global leadership in, and where are our comparative advantages?

Rasmus Flytkjaer: Thank you for the introduction. I am a partner and the head of the space team at London Economics. By way of background, I have worked on the economics of space for just over 13 years, and I was involved in the first—for me—*Size and Health of the UK Space Industry* in 2014. So I have some longevity.

One clear area of global leadership that the UK is good at is PNT resilience. The Blakett review and the report on the impact of the loss of GNSS that came out in 2017 and 2018 drew a line in the sand for how dependent we are on GNSS for position, navigation and timing, and expanded the discourse that existed within the strong community that the Royal Institute of Navigation has on that dependence. That is certainly an area where the UK was ahead, although there has been a bit of catching up, especially from the US. On the industrial side, there are good companies in the UK: Spirent Communications comes to mind as a test provider for PNT. The UK is very good in NavISP, the navigation innovation and support programme, which is an ESA programme, and a lot of UK companies have had a big role in Galileo. So overall, there is strength in the UK on PNT.

The Chair: Will, do you agree with that?

Will Lecky: Yes, I do. I echo the thanks for the introduction and the opportunity to be here; it is a great pleasure. As a very brief introduction, I co-founded my company, know.space, a little over five years ago. Before that, I was a civil servant, economist and senior economist specialising in the economics of science, innovation and space, so my journey with space started around a decade ago.

This question on global leadership is tricky. There are real UK strengths that we can point to. However, I would caveat it slightly by saying that, when you actually look at leadership as in being number one, I am not convinced there are that many areas where we are truly leading. We can point to a number of areas of strength. We did some work with the Space



HOUSE OF LORDS

Partnership, as did other consultancies, looking at this very question. We divided it into macro view, micro view and broader ecosystem. I will not try to list everything, or we will be here for far too long, but from a macro sense we have clear strengths in space science; for example, two of the top five universities for physics and astronomy globally are here in the UK and we have 2,000 post-doctoral and beyond researchers who are active in space science.

From some previous research we did, there is a strong heritage on telecoms. There is ECSAT, the ESA European Centre for Space Applications and Telecommunications; the activity around the Moonlight programme with companies such as SSTL playing a strong role; Goonhilly and some companies in addition to the ones Rasmus mentioned such as Viasat-Inmarsat, Eutelsat OneWeb and SatixFy. Many of you may have heard the statistic that Airbus makes a quarter of the world's telecommunications satellites, with roughly half of that activity taking place here in the UK.

The UK is also good at low-volume—I emphasise low volume—small satellite manufacturing, and the applications side, which is the majority of the space sector where there are over 1,000 companies with an active space applications focus.

Of the micro-level capabilities, optical systems and photonics are a real strength. Companies such as Teledyne e2v in Chelmsford produce charge-coupled devices, CCDs, which are very important for space science missions and, indeed, many other areas such as medical and elsewhere. We are good in earth and climate monitoring, and we have a strong ecosystem, good regulation, access to finance, insurance and ancillary services including but not limited to consultancy support. Together, that makes the competitive advantage for the UK.

The Chair: On the converse, where is the UK weak? What do we not do well, Rasmus?

Rasmus Flytkjaer: The UK and Europe have a weakness in semiconductors. When I started looking at the market for satellite navigation, Cambridge Silicon Radio, a UK company, made about 10% of the GPS chips at the time. That was bought by Qualcomm and is no longer a UK company. Qualcomm has UK activities, but it does not have the same position as a UK company. Arm is another company that was a leader in its field, which was acquired by SoftBank.

More broadly, the UK has attempted to do everything with some graduation. It has done a lot on telecommunications and, as Will mentioned, that has been successful. It has done a lot less on human spaceflight until more recently and on launch as well. There are companies that do very well in niches—for example, space-grade cables for satellites. This is an old stat, but I heard at one point that 80% of satellites flew a UK cable. It is probably not true anymore with all the CubeSats, but that is a separate discussion entirely. Generally, other



HOUSE OF LORDS

countries, Luxembourg springs to mind, focus very hard on very few things and try to generate a leader in the field. Historically, the UK has not done that; it has always been a large country with a large sphere of interest.

Will Lecky: Perhaps some underlying causes stem from funding, which ultimately dictates a lot of what you are able to do. There are many areas you could point to with weaknesses: skills, challenges of public procurement and the rest, but funding is what I would like to focus on mainly because, in my view and many others' views, we simply underfund space. If you look at the latest OECD statistics, we just about scrape the top 10 in terms of absolute spend and just about scrape the top 20 in terms of per cent of GDP spent on space.

It is not entirely negative though as it has led to the emergence of a relatively lean commercially focused industry, which can be a strength in other ways. But when, for example, we are fourth in ESA, a long way behind France, Germany and Italy, that affects the influence that we have within the organisation. We talk a good talk, and we at know.space, Rasmus and his colleagues at London Economics and many other consultancies, have produced a wide array of monitoring and evaluation reports looking at what the UK Space Agency and UK Research and Innovation and others have got for their funding. It varies programme by programme, but it is fairly safe to draw a general conclusion that the returns are high. There are good returns from UK public space funding. It is often framed as we punch above our weight, but I sometimes use the analogy that, if you are a lightweight punching up into middleweight, you are still not a heavyweight, are you?

Lord Tarassenko: Could I have a short supplementary? It was a very surprising answer, Rasmus, to where our weaknesses are; you said semiconductors. It would not have sprung to mind for most people, I would have thought. The space programme in the US gave a huge boost to the development of transistors by Bell Labs and others, but why did you point to semiconductors now as a really key technology for space?

Rasmus Flytkjaer: With the disruption of supply chains in the pandemic, for example, it was suddenly very difficult to get access to the chips that we really needed. The EU published the European Chips Act 2024; I forget the number, but it was several billion euros to try to get some of that activity reshored. The same is true in the UK. I acknowledge that there is a company called EnSilica that makes semiconductors in the UK, but it is not a global leader. UK-owned companies in that industry could have been considered, certainly in niches, global leaders, but that is not really happening anymore. Several years ago, a flood in Thailand essentially made it impossible to get hard drives, and with those sorts of issues happening, this is not necessarily the space industry per se, but we cannot do space with those problems.

The Chair: Yes, it is sort of generic.



Q36 **Baroness Donaghy:** Looking to the future, what do you think the areas of growth are in the global space economy? Bearing in mind there might be some overlap with the first question, how well is the UK equipped to exploit those opportunities?

Will Lecky: We are still seeing the long-term rollout of certain megatrends in the space economy, which have been encapsulated by falling launch costs by a factor of 10 or so, depending on your frame of reference, which in turn has enabled the deployment of mega-constellations. Technical improvement on the ground leads to the development of smaller, better, cheaper satellites, while AI and machine learning is enabling that data to be exploited more effectively. So all this together is leading to what we frame as a broadening of the use of space, where—to put it crudely—more stuff in space with more and better data is exploited in new ways, and that underpins economic growth and welfare on the ground. Those will continue to play out in the coming years.

As we look ahead to the longer term, we have emerging markets, for example, in in-orbit servicing, assembly and manufacture, which are undoubtedly important future areas of growth. If you look ahead 50 years or 100 years, it is hard to imagine the in-space economy without substantial activities in this area. But again, it depends on your time horizon, because if we are looking in the immediate next decade or so, I do not think that is really going to be where significant growth is coming from. It is about laying the foundations for the future.

Finally, the new security reality we find ourselves in means that we are likely to see rising investment in security and resilience as perhaps European countries are less able to rely on traditional allies for access to shared resources, which will lead to rising funding for security and resilience. On how the UK is equipped, the strengths in science, manufacturing, applications, and the ecosystem that we discussed previously are all positive. We can lose the march to others with deeper pockets quickly. Skills are a challenge. We did some work with the excellent team at the Space Skills Alliance on a space skills survey, where 95% of firms responding said that they face some skills challenges. The wider security and resilience trends are true, but we also need not to lose focus on the fact that space can be inherently globally collaborative internationally in many regards. So, in some areas, it is not about the UK being able to do everything, but it is about what we can bring to the party.

Rasmus Flytkjaer: There are probably two broad areas of growth. There are the well-known markets that may even be considered mature in the aggregate. For example, the PNT downstream market is forecast by the European Union Agency for the Space Programme to grow at 8% per year for devices and services. There is a market that needs to be served—for example, LEO SATCOM; we have seen the disruption from SpaceX. We have also seen recently that some potential customers may be pulling out a bit. Eutelsat OneWeb's share prices certainly reacted to those



HOUSE OF LORDS

announcements. The UK, with its ownership of OneWeb and the fact that it is in London, is able to capitalise on that market.

As for the PNT market, as I mentioned, there is a good environment, and there are a lot of academics that lead on and provide reference material for PNT in the global academic space.

The other markets, Will has mentioned some, are those that look like a very big prize at the end of it but require a lot of risk-taking to get there. Space-based solar power, for example, is a development that in Europe was led initially out of a study commissioned by BEIS to try to get a handle on what this space-based solar power concept was, which led to an ESA study and the Department for Energy Security and Net Zero now has a study on the same topic. Although, just to pull back a little from the excitement, the Chinese have announced that they will launch a solar panel with one kilometre diameter. I am not entirely sure when, but they call it an equivalent to the Three Gorges Dam. So there may be leadership; the UK has European leadership and there are obviously others that are looking at this, but we may also be playing catch-up to China.

Other parts to mention are that the UK has an advantage in space debris removal, and there is a lot of tech that is required for the in-space economy. For debris removal, you need to get to the piece of debris without breaking it and then get hold of it and get it out of orbit. For space-based solar power, a panel of one kilometre diameter is not possible to launch in one go, it needs to be put together in orbit. The UK has a strength in the enabling technologies and has companies that are ahead of that development that could capitalise if and when these big tickets eventually come to pass.

Baroness Donaghy: Could I ask about the nuclear engine before I finish? Do you have any thoughts on the Rolls-Royce work on nuclear engines and whether that is part of the future?

Will Lecky: I should declare that we are providing monitoring and evaluation support to the UK Space Agency on the programme, where they are receiving funding for that. That is very much an in-progress activity, so I would not like to comment in detail.

Rasmus Flytkjaer: I know very little of it. I spoke to them at the UK Space Conference last year and all I can say is that it sounds very interesting. Some source of power will be required for whatever habitation happens in space, and much like the energy market here, the sun is great when the earth is pointing to the sun and there are no clouds. The clouds are not a problem in space but the orientation is. So, if there is a back-up or base-load source of power that is not from battery, that could be advantageous.

Q37 **Baroness Stowell of Beeston:** I want to talk to you about scale-ups in the UK space sector. From work that we have done on previous



HOUSE OF LORDS

committees, some of us are familiar with the challenges for the tech industry of all kinds when it comes to scaling up. Is there anything specific in terms of barriers or challenges to the space industry for scaling up, particularly in the context of public and private funding?

Mr Lecky, you referred earlier to questions around funding; I do not know whether that was something more distinctive from scale-ups, but what particularly is the access like for the space industry if they are to scale up?

Will Lecky: Thank you; that is a great question. I would like to think I could bring some personal experience as well to this question. When we think about the space industry we tend to think of the hardware, but know.space is also a space company; co-founding it five years ago and growing to 15 people now has not been without its challenges. You are right that space is not unique, but there are certain aspects that perhaps flavour some challenges. I do not think the categories of challenges are fundamentally that different, access to finance being a big one.

If we take the public and private in turn, with private finance it is fair to say that the UK is leading in Europe in terms of access to space finance but is some distance from the US. The work of Seraphim Capital and other newer entrants recently is to be welcomed, though I would emphasise the behind-the-US point. We worked with a company a couple of years ago that was seeking venture capital funding. It had exhausted the UK routes, and our advice was simply to go out to California, which is a shame because you do not want to be recommending that.

Also, as people in these firms would be the first to say, it is not the right fit for every company. VC funds, for example, can seek returns of 10 times within five or 10 years, which is a lot, and it is not always going to be the right fit. This emphasises the role of public funding where there is not a suitable match. Again, I question whether the magnitude of the public funding is enough. There are lots of good ideas out there but, when you actually look at the funding available to get them through to reality, that is another question.

Baroness Stowell of Beeston: It is quite complex and complicated. In the inquiry that I did on AI first scaling up, I described it in the end as a bowl of spaghetti drowning in alphabet soup. I could never get my head around all the different schemes that were available. They were all very worthy, but the various different parts did not add up to a sum that was greater than them.

Will Lecky: We did some research on this. We had a fantastic intern who was funded through the SPIN scheme, the space internships scheme run by the Satellite Applications Catapult. He spent the entire summer last year mapping out the sources of funding; it took him the whole time. So, it is not easy, particularly if you are not familiar and do not have a starting reference point. There are resources out there, but it can be difficult to know where to start.



HOUSE OF LORDS

Baroness Stowell of Beeston: Mr Flytkjaer, do you see that challenge with financing having a serious detrimental effect on the opportunity to scale up and the opportunity for UK space companies to stay UK-based and UK-owned?

Rasmus Flytkjaer: Yes, even the UK funds seek a return and then seek to exit and move on, and they tend to exit not in the UK. So there is a risk that even companies that have scaled up get owned by non-UK entities.

The Chair: On that note, that is the Division Bell so we will adjourn the session for 15 minutes, and we will see you thereafter.

Sitting suspended.

The Chair: We can now resume our session with Will Lecky and Rasmus Flytkjaer, with Lord Tarassenko.

Q38 **Lord Tarassenko:** I am interested in the way that non-space firms use space-based data, space-based services and so on because, over the last 20 or 30 years, satellites have become general-purpose technology, so they are going to be used. We all benefit from satellite comms, but also position, navigation, timing, PNT services and Earth observation to monitor climate change, pollution and so on. It seems to me that one objective of the Satellite Applications Catapult is to be almost an open door for companies that are not in the space sector but want to use some outputs from the space sector. Is that happening? Do you think it is happening at a sufficient rate? Would you like to see it grow? We have the growth agenda. Is that something that we can grow faster? At the moment, we are not making enough use of the opportunities.

Rasmus Flytkjaer: First, you are right: satellite data and services are largely commoditised. All companies use space in some way. When we assess the proportion of UK GDP that is generated in sectors that use space beyond what the general population does, which is a slightly convoluted definition of it, we find 16% or something of the economy. That caveat is very important: "beyond what the general public do". For example, I used Google Maps to get here because I did not know exactly which door I was going to. Everyone does that.

The difficult bit for the space sector—its interest organisations and its agency and so on—is that, when companies are very successful, they graduate out of space. What we mean by that is when we send out the survey for the size and health of the UK space industry, we send it out to all the companies we can find that use space. I am sure Will can attest that he did the same. Sometimes, we get responses back saying, "But we are not a space company", despite it saying on their website that it uses earth observation imagery. So it is a space company, but they consider themselves a different kind of company altogether. A lot more is happening than necessarily gets tracked within those companies that actively use space to improve the service offer that they have.



HOUSE OF LORDS

There are also companies that definitely know that they use space. I wrote some various examples down when you sent the questions in advance. Anyone who has taken a minicab in the last several years and had the audacity to ask the driver which route they are taking often gets the answer I usually get which is, "Whatever Waze says". Because Waze is that great app that tells you how to get there fastest, not necessarily the shortest distance, but the fastest because it considers what everyone else is doing on the road.

The maritime transport sector is another we often mention. You need GPS for speed over ground if you cannot see anything other than the sea, and you need SATCOMs to communicate with head office to get weather information and all the things required. There is scope to increase the use of space. We did some studies a few years back on how space could be used for important sectors for government, and someone almost always has an idea that could help solve a problem. The Space for Smarter Government Programme was evaluated quite a number of years ago; it generally found that there were good solutions but there was not really any money to continue procuring the service, so there are some obstacles there.

Lord Tarassenko: Following up on that, you talk about increased use of space. A slightly surprising use that comes out of the National Space Strategy is where it says satellite technology should be leveraged to improve public services by modernising public transport. What more can we do, apart from what you just told us about Waze and so on? Improving the NHS was even more surprising, and protecting the UK's borders is also there. All that is actually in the *National Space Strategy*. Would you care to comment as to what you think those three applications are, whether they are real or what your opinion is of them?

Rasmus Flytkjaer: I will take each in turn. We are seeing the public transport activity now. If you want to take the bus in London, you can see which bus is first because it is tracked using GPS. They need to know the accuracy of a bus to know which one is in which order, which is helpful, although one might argue that in London the buses come all the time, so it is not that important. But if you are somewhere that is less densely served, it can mean running to catch a bus because you know in advance that you need to run or you will miss it, which is an advantage.

On the NHS side, to be honest I do not know the entirety of what could be done. Telemedicine is relevant because being able to do something more complex in a more remote area because you can connect reliably to somebody who has the exact skills that are needed is useful. Robotic arms that are remote controlled from somewhere else are still a way off, unfortunately.

Lord Tarassenko: Telemedicine in this country may be relevant in Cornwall and Scotland, but in most places there are local doctors. Going on to something else which may also be slightly controversial, a paper from the IEEE—the Institute of Electrical and Electronics Engineers, the



HOUSE OF LORDS

American electrical engineers society—says that satellite comms, which are a fairly stable technology now, are about to undergo another turning point with, for example, non-terrestrial 5G networks, very low earth orbit (VELO) communications constellations, enhanced aeronautical and maritime tracking and more advanced communications between Earth and deep space. Again, is that just a slight exaggeration, or do you think there is a real potential for one or more of these applications to take off and grow substantially?

Will Lecky: There are certainly opportunities from the evolution in satellite communications. The massive disruption we see with the rise in the deployment of the so-called mega-constellations is very much disrupting the status quo. It is slightly linked to your previous question; space data and services are just data and services. I liked the way Brian Cox explained it when speaking to the inquiry that the space economy is the earth economy, in essence. This is all about whether space can provide faster, cheaper, better, more secure ways of doing things. Often, the end-user does not care about whether it is space or non-space. Rasmus, for example, wanted to find the right entrance to come here; it does not matter whether it is satellite-based or not.

But in terms of the evolution in SATCOMs, we are seeing a real growth in hybridisation, if you like, of ground-based and space-based solutions for a seamless integration of space and non-space based telecommunications services. You mentioned Cornwall. There is still real value in addressing the not spots—as anyone who has holidayed there, or perhaps rural Scotland, can attest to—and there is a well-demonstrated link between better connectivity and better economic performance. More directly, the rise of mega-constellations presents certain opportunities around hardware, infrastructure, services and potentially even launch customers in the future, as when there is a UK launch offer; there may be an opportunity for the UK to be a hub for regulatory innovation in that regard as we have some thought leadership there.

Also, on leveraging the UK's strengths in R&D, there is the next generation payload development, strengths in quantum communications and optical links. Again, with security and resilience only rising up the agenda, the need for secure government communications is another opportunity.

Finally, I do not see satellite communications as existing in isolation. We increasingly see the integration and the convergence of satellite communications with other areas such as earth observation and the internet of things, where combining imagery with real-time connectivity can lead to benefits—for example, in smart agriculture or helping insurers understand what is going on where and responding to that in real time. The list goes on. It is still very much an emerging story, and one where a lot more action is needed to embed space because space is often outside the day job for many people working in transport, energy or wherever



HOUSE OF LORDS

else, so a concerted effort is needed. We are seeing opportunities arise, but a concerted effort will be needed to put them into reality.

The Chair: We are going to have to be very short and sharp from now on. We are hearing some terrific answers, but we are going to have to move if we are going to hit our timetable.

Q39 **Lord Booth-Smith:** You have already quite extensively answered one of the questions I had planned to ask, so I am going to ask a short couple of subsidiaries.

We have talked a lot about in-space economy and the likely size and benefit of it. We have talked a little about in-space manufacturing and other things that are not a 10-year horizon prospect but something more akin to the 30 to 40-year horizon. If you think about the UK, and particularly the City of London, there is obviously currently a market around things like innovative finance, insurance and the ancillary support professional services around it. Can you explain a little how you see those things scaling and give regard in your answer to, for example, the current capacity of the space industry? I am thinking in particular about the number of entities, both government and corporate, that have launch capability.

Rasmus Flytkjaer: Are you asking about things that are scaling?

Lord Booth-Smith: I am thinking more about the professional services industry in London—to shorten it. How do you see that industry scaling over the coming decades, given the current dynamics of the space industry itself, if you think about the number of agents that are able to launch something into space?

Rasmus Flytkjaer: Generally, the capacity in the City to provide those services is way bigger than what is required within space. It is a matter of reallocating at most because, as you implied at least in your question, there are not that many companies that will require these services. The most recent announcement on insurance that I saw was that the space insurance market is not as big as it was and that, generally with mega-constellations, they tend not to insure individually. So there may be a shift, but it is necessary for the in-space economy to be able to insure what they are doing. As we said before, it is very complex and getting hold of what you need to review, de-orbit or whatever you need to do, is something that will require insurance, for sure.

Lord Booth-Smith: Picking up on your point and taking insurance as one example, that has fallen back because people are choosing to create the product and insure differently—for example, covering it in bulk to reduce the cost. If you want those professional services in which the UK has a comparative advantage to lots of other jurisdictions, it sounds to me that you would need to increase the total number of people who are companies with the capability to launch in order to get some significant scale within that industry. Do we need to see more and more companies



HOUSE OF LORDS

with the capability of putting things up there to enable the strategic benefit we have in professional services to come to the fore?

Will Lecky: I do not think it is fundamentally difficult to get satellites into space at the moment. For example, I had a chat at a conference around the UK launch, and someone said, "It is not a problem for me. I launch small satellites. I take them in my hand luggage to New Zealand and launch them from a Rocket Lab satellite there". We will see how the need for autonomy and security and non-reliance, et cetera, play out in coming years, but at the moment at least, it is easy enough to get your satellites into space with competition there. There is a huge number of launchers in development. I am unclear whether many of them will reach market, but the provision of insurance will follow the demand, and that may or may not be led by regulation, for example, and the need to insure. But I am sure that, if there is money to be made, the opportunities and the professional services companies will follow.

Lord Booth-Smith: I have one more question, which is back to your point about semiconductors and similar to the questions from Lord Tarassenko because I was interested in that. You talked about supply chain disruption. The thing that jumped out at me was just the order book bottleneck, for example, over the coming years in terms of supply, but were there any specifics around that that we did not quite get into before?

Rasmus Flytkjaer: No.

Q40 **Baroness Donaghy:** You said that we could pack up and go to New Zealand for an orbital launch, but it attracts a lot of attention; it gets the public on side, even if it is a satellite launch as opposed to a human launch. How big an opportunity is it? Are we missing out by not developing this area? There was a House of Commons science and technology committee report about three years ago which indicated that it would probably need public funding to get it off the ground. Would you think that was the most likely thing, and how important would you say it was?

Will Lecky: It is important in the sense that it is often framed as completing the end-to-end value chain, where in the UK we are good at designing the satellites, building them, operating them in space and using the data. The ability to launch is something that we do not have at the moment. We have seen a growth of the space industry despite a lack of launch, so it can be overegged but, at the same time, it would boost the UK's reputation and show that we are a serious space nation, so to speak. It gets you a seat at the top table, and it would likely have catalytic growth effects on the wider industry. Of course, the UK has geographical advantages being able to launch north into polar and geostationary¹ orbits without much in the way, and the legislation is now in place to enable it to happen.

¹ Mr Lecky has clarified in writing that he meant to say "Sun-synchronous" rather than



I had a quick look around the launch market. I could not find any particularly robust figures to use for the size of the global launch market, but let us say it is around \$10 billion a year, with SpaceX taking approximately half of that. I do not think that is the addressable market for the UK. Rocket Lab in New Zealand in 2024 got about \$100 million of revenue from its 16 launches.² Perhaps that is a better comparator. For me, the launch offer is not just about the money to be made on launch; it is about supporting the growth in the wider ecosystem and delivering reputational benefits for the UK sector and everything that stems from that.

Rasmus Flytkjaer: Government intervention is probably required because the market, as Will said, is essentially SpaceX and some others. Because of the way SpaceX has revolutionised launch, it has a lower cost; its price is lower, but we do not know whether that will remain the case and for how long. If it is a matter of getting something into orbit or not, then maybe it is worth making the investment because perhaps it has strategic reasons for it or it supports an industry that needs it.

Will Lecky: Again, of course, autonomy and non-reliance on others are reasons.

Q41 **Baroness Stowell of Beeston:** I want to talk about the European Space Agency and the returns that we get on our investment, or I was going to say lack thereof because the NAO was recently reporting that we are not getting the full benefit of the money that we are investing. I heard you say earlier that we are fourth behind other countries, but I gather that new data has come out in the last few days showing that things are improving in terms of return on investment. What is your assessment of us relying so heavily on the European Space Agency in terms of the prospects for the UK space industry? Do you think it is a good thing or a bad thing? Do we have options that we are not taking up? Are there alternatives?

Rasmus Flytkjaer: I should declare that we are doing quite a lot of work for ESA. Generally, it is a good thing. ESA offers things—activity, services and technical skills—that are hard to create otherwise. What could the UK do? It could set up a national programme like France and Germany have, for example, but it would probably take a while to get there. The German space agency employs about 10,000 people, most of whom are researchers. The running of the civil space that Germany does, which is similar to what the UK Space Agency does, is roughly equivalent. The UK has set up to rely on ESA, and a lot of the technical expertise that is required to run these programmes is with ESA. There is not as much domestically, but obviously that could be brought back if desired.

“geostationary”.

² Mr Lecky has clarified in writing that this covers launches in both New Zealand and the US.



HOUSE OF LORDS

ESA has some advantages: it is generally a three-year funding cycle, which means that companies know where the UK has decided to invest and, because of the geo-return, where they can expect to get money back. That means that they can make strategic decisions that, generally speaking, with UK financial years, are not as reliable. When we ask people what it is like to work for ESA, they always say, "The technical support is very strong". We even have people who say, "We don't really need the funding; the funding is necessary to unlock the technical support that we can get from ESA". ESA also allows a mode of international collaboration that it encourages by organising events and industry days. I have been to two industry days in the UK in the last six months where you can meet potential collaborators.

Obviously, there are some limitations as well. ESA is the agent that delivers for the EU. The UK does not have access to all those activities, and there are awkward firewalls between what is happening in the civil non-EU space and in the EU space, but that is the way it is. Because of its statute, ESA does not allow wholly defence-related space activities, which is a bit of a weakness. The UK MoD has a programme, but perhaps there is a gap there.

Will Lecky: We conducted an evaluation on this topic as part of a consortium led by the Technopolis Group. One of the headline findings was there is considerable value added from working with the European Space Agency. Rasmus has talked extensively about the in-house technical expertise, so I will not labour that point, but the access to the big missions, such as the James Webb Space Telescope, Gaia, or whatever other mission you want to choose, is difficult to do on your own or through bilaterals.

Also, access to European markets is an important aspect. It is very difficult to quantify the benefits you get from these kinds of investments because it is a tangled web of spaghetti that leads to the ultimate impacts, but to the extent that can be done, a finding of that report was that for each pound invested, the UK gets £10 returned over the longer term. Yes, we could rejig it. If my stats are correct, we spend around £400 million to £450 million a year on ESA and £150 million to £200 million on the national programme. You could change that balance by putting more into the new programmes, such as the International Bilateral Fund or the Space Science and Exploration Bilateral Programme.

Is there evidence it would actually improve outcomes? I am not sure. My honest view is that we underfund both. We are fourth in ESA. The higher up you are, the more say you get in the direction, and that improves your return. Obviously, you want to use the money wisely. It is too early to say that the bilaterals are fantastic value for money or whatever else, but there are some very exciting opportunities being funded, which could lead to great things in the future.

Also, the UK was a founder member of ESA, which is celebrating its 50th anniversary this year. A lot of the capabilities and shared working can



HOUSE OF LORDS

take decades to develop and can be lost very quickly if the support is not there, so we need to think carefully before making radical changes.

- Q42 **Viscount Stansgate:** How important to the UK's commercial space operations is the potential to help our security and resilience? I mention this partly because, in our papers, we have been given an example of a study four years ago that said that if we lost access to positional navigation and time just for one week, it might cost us nearly £8 billion. Mr Lecky, you used the phrase earlier, "new security reality" and we all know what that may mean, so we cannot necessarily guarantee to have access. In your own words, how is it important to the UK's security and resilience?

Will Lecky: It is incredibly important. We need only consider what is going on in Ukraine to see the importance of space. Rasmus referenced the rocketing of the Eutelsat OneWeb share price as it is touted as a potential replacement for Starlink. For example, if we look at SKYNET, commercial companies are behind developing the military-hardened communications that can survive an event, whether that is something like space weather or human-caused. But to me, the commercial actors cannot provide everything. Governments will continue to have a strong role in the operation of assets and the sense of information, which, as we look at this new security reality, means leveraging both commercial and government assets. I have increasingly heard a change in terminology away from dual use towards space for security, and that is only going to increase over time.

Rasmus Flytkjaer: It is also important to mention that the opposite effect of defence funding benefiting commercial companies is definitely relevant. We know that the United States Space Force spends approximately \$30 billion a year, and around \$20 billion of that, if I am right, was spent on research, development, testing and evaluation. Clearly, there will be spillovers from the Space Force R&D on space defence into the civil domain. Maxar is a good example of an EO company that provides a lot of intelligence but then also sells its data to others, but otherwise I agree with Will.

Viscount Stansgate: So, in a nutshell, you both agree that we could leverage dual-use capacities in space to boost our national security and defence.

Will Lecky: Yes.

- Q43 **Lord Lansley:** I apologise, as I could not be here for the earlier part of your questions and evidence. Being very quick, what would you say was the impact of the *National Space Strategy*, so far? What has it meant in practice?

Will Lecky: I suppose the National Audit Office's deep dive would go further than I could from an outside perspective. It has value as a road map. The original *National Space Strategy* published before the spending review did not have any funding attached. While strategic direction is



always welcomed by industry, the same people would also say talk is just that, so back it up with actions. That said, good things have happened since the *National Space Strategy* was published: positive ministerials and continued growth in the sector, the *National Space Strategy in Action* document set out some more concrete steps and we have seen some new UKSA programmes which are broadly welcomed within the community.

So it is helpful as a starting point, but there are some questions. As the NAO pointed out, if funding is scarce, which may well be quite likely, which actions will be prioritised? There are very high ambitions, but I wonder if the funding matches the ambition sometimes.

Lord Lansley: Perhaps you would be kind enough to add any thoughts you might have about what in practice the Cummings spending review means in terms of the space strategy. Does it mean a rewrite, does it add to the thrust of the programme or will it push it into orbit?

Rasmus Flytkjaer: I do not know a lot about the impact of the space strategy. I have not studied it. The link between the civil space strategy and defence that was made in the space strategy is very welcomed. If the UK is going to be spending that much more on defence—as was announced last week, I believe—it would be very advantageous to let some be space and more than it currently says.

Q44 **The Chair:** Finally, very succinctly, if you could make one recommendation on space policy in the UK, what would it be and why?

Rasmus Flytkjaer: I would look at the Space Acts Agreements that the Americans have used and figure out to what extent the UK could do something similar. The UK Government need to be able to articulate clearly what is needed and ensure it is something that industry can work towards. Space Acts Agreements were used with SpaceX to create the resupply missions to the ISS and, in essence, it involved a contingent contract on SpaceX being able to deliver what the Government needed it to deliver, which was NASA needing resupply to ISS. If successful, they would get a big prize at the end. In that case, it was \$1.6 billion. That meant that the Government acted as an anchor customer for SpaceX's development and, even though it had launched nothing when this contract was created, it managed to develop the technology with support from another Space Act Agreement contract and actually succeed in meeting the milestones to be able to unlock that big contract at the end.

If you look at the valuation of SpaceX, especially between 2010 and 2012 when it met both objectives, it grew by a factor of five to \$4.5 billion. So, if Government need something—we talked about defence earlier—and can articulate what they need and then step away and let the industry develop it, there is a good chance that this anchor customer relationship could really make development happen in the companies and potentially make them—maybe not shooting for multiples of unicorns—that sort of size.



HOUSE OF LORDS

Will Lecky: If I could return to the funding points: if you have high return on low investments, you still see low absolute returns. We are a second-tier space nation. That is the reality. Finances are under pressure, but space is critical for UK growth and UK security. I mentioned the risk of talking outweighing the ability to deliver, which is real. I do not want to be negative—it is right to celebrate the many strengths that there are in the UK space ecosystem—but it is equally important to see the untapped potential, whether that is through greater embedding of space services in the wider economy to support productivity and growth, or cost saving through cheaper delivery of public services. There is a big prize on offer that we are not necessarily fully grasping.

The Chair: Thank you both very much for a very informative session.