

Science and Technology Committee

Oral evidence: UK Space Strategy and UK Satellite Infrastructure, HC 98

Wednesday 9 February 2022

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Members present: Greg Clark (Chair); Aaron Bell; Rebecca Long Bailey; Dehenna Davison; Katherine Fletcher; Graham Stringer.

Questions 375- 498

Witnesses

I: Dr Paul Bate, CEO, UK Space Agency; and Professor Mark Thomson, Executive Chair, Science and Technology Facilities Council.

II: Rt Hon Kwasi Kwarteng MP, Secretary of State for Business, Energy and Industrial Strategy; Rebecca Evernden, Director of Space, Department for Business, Energy and Industrial Strategy; and Hugo Robson, Chief Negotiator, Department for Business, Energy and Industrial Strategy.



Examination of witnesses

Witnesses: Dr Bate and Professor Thomson.

Q375 **Chair:** The Science and Technology Committee continues our inquiry into UK space strategy and the UK satellite infrastructure. We are very pleased to have two panels of witnesses this morning. Before we come to the Secretary of State for Business, Energy and Industrial Strategy a little later, I am delighted to welcome our first two witnesses, Dr Paul Bate, chief executive of the UK Space Agency, and Professor Mark Thomson, executive chair of the Science and Technology Facilities Council. Thank you very much, both.

Perhaps I may, in particular, thank Professor Thomson for hosting and inviting us to tour the facilities of the STFC at Harwell last week. It was a fascinating visit and Members learned a lot. It was very germane to the inquiry that we are conducting today, so we thank you and your colleagues for that.

Dr Bate, during our inquiry the UK's National Space Strategy has been published. Can you, from your position, give us an overview of what you consider to be the strengths and weaknesses of the strategy as published to date?

Dr Bate: Space has been quietly transforming ways of life on Earth for the better for some time, and it is only going to do more in the future as we go from financial markets being reliant upon position, navigation and timing, and sat-nav similarly with autonomous vehicles and climate change. That is why I think a National Space Strategy that brought together the civil aspects of space and the military aspects into one cross-government set of directions and ambitions was really important. That is the most important thing about the strategy that sets a level of ambition operating and being a modern spacefaring nation on a par with peer countries. Without that, it is hard for any organisation, including the space agency, to have that fixed point—a fixed star—to know which way we should be heading.

Given that the agency's substantive role is to deliver on the Government's ambitions, it is pretty positive that we know that clearly set out in the space strategy, and now with a Defence Space Strategy published very recently.

I do not think it is a weakness, but it leaves deliberately open the detailed "how". That is now being worked through across Government involving the agency, and it came before the comprehensive spending review, which meant that it did not put pound signs against each part of the ambition. That gives us flexibility as we go through the CSR to know, as we are now finding out, what the exact amounts of money are. We can start to prioritise which elements of the strategy to move on most quickly. All in all, it is very useful to have that direction.

Q376 **Chair:** You were appointed in September of last year, I think.



Dr Bate: That is right.

Q377 **Chair:** The strategy was published around the same time. Therefore, I assume that you inherited the strategy rather than being personally involved in shaping it. Is that right?

Dr Bate: That is absolutely right. The agency had a strong role.

Q378 **Chair:** Absolutely. Perhaps I may ask the same question to Professor Thomson. You have seen the strategy. You have long been a leading expert in this area. What is your evaluation of the strategy?

Professor Thomson: I think it is fantastic. It is bold, it is ambitious, and it sets a direction for the UK. The real value in having a strategy like this is that it provides a framework for all of us, including the agency and UKRI, to pin our activities behind a very clear strategy.

As Dr Bate said, the challenge is then in the implementation of that strategy, and that is the work that is ongoing at the moment.

It has also brought different bits of Government and arm's length bodies together to discuss how we work together to implement the strategy, so there is ongoing activity around the implementation of the space strategy. That involved the agency, UKRI, BEIS and MOD. That is a huge added value.

From the STFC perspective, one of the things we have also seen, in the preparation of the strategy, is much stronger engagement between our capabilities and the Ministry of Defence, bringing together the civil and defence aspects.

The strategy is very strong and very clear. The challenge is then implementing such an ambitious strategy. It sets very strong guide rails to what we do over the coming years. That is very positive.

Q379 **Rebecca Long Bailey:** Thank you both for coming to speak to us today. In the evidence that we have received in the inquiry so far, we have heard that the strategy contained a really good vision for the UK space sector but that it needed to be supported by a detailed implementation strategy. What work are you both doing towards creating this detailed implementation strategy?

Dr Bate: There is work in the agency and there is also work across Government that we take part in. There is now a national space board that is co-chaired by the MOD and BEIS. One of the key pieces of work it has is to carry out the implementation. Those are the metrics that we will use to judge the success of the strategy and the different elements of the 10-point plan that operationalise the strategy.

Within the agency, we have been asking industry and academia what it is that really makes a difference, or would make a difference, in the way the agency operated. We see it as licence to change now that we have the space strategy.



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I have been, since I joined in September, spending most of my time out on the road trying to listen and ask that question. Three things have come back and now form the mainstay of what the industry will do going forward. First, there is a job to be done truly to catalyse investment into the UK space sector because we know that we do not invest as much in civil space as other countries do—about a third, give or take, of the French, German and Japanese. We have to be clever about how we bring in private capital and contracts internationally as well as domestically. That is a big block of work for us.

We also need to strengthen our delivery capability. We already oversee 17 different science missions, working very closely with Professor Thomson and STFC, but alongside that we have the capabilities in space sustainability and UK launch. A big pillar of our work going forward will be about strengthening that ability to deliver—programme delivery.

The third bit that historically has been a little bit less spoken about is the ability to champion space. Agencies have a unique ability to be the champions, whether that is to the next generation, particularly to girls and children from disadvantaged backgrounds and making the STEM subjects accessible to them, or the future skills, but equally making the argument to the general public about the value of space for life here on Earth and to non-space sectors about the value of the data from space in improving their productivity. We are focusing on those three elements as an agency.

Professor Thomson: I will take that from two directions. First, in the work going on within Government developing this implementation plan, there are six work streams focusing on different areas of the National Space Strategy, and all the right players are in the room. We are very pleased that UKRI is represented on all these work streams. In fact, we are taking the lead in convening one of the activities around skills and clusters, which is obviously a particular interest to us.

That work is incredibly important. It is bringing all the partners together in a coherent manner to come up with an implementation plan, which is going to be challenging given the bold ambition of the strategy, which is a good thing.

There is another thing that is worth noting. Since the creation of UKRI, the different councils of UKRI are acting in a more co-ordinated way around space. It is not just STFC—we have the big facilities and the responsibility for space science and astronomy—but other research councils such as NERC, which is responsible for Earth observation; Innovate UK, our national innovation agency; and EPSRC, which develops a lot of technologies that are not always directly developed for space but have that connection. Through UKRI, we have brought all those activities together under a single co-ordination group.

That is one of the benefits of having a single organisation like UKRI. At the moment, we are developing our first UKRI strategy, and space will



appear in that strategy. There is lots of work below the surface. Cross-Department and cross-government organisational implementation plan development is a really key piece of work, and it is ongoing. All the right parties are involved in all the different areas.

Q380 Rebecca Long Bailey: Dr Bate, you mentioned the metrics you were using to measure success. As you will know, previously the Government committed to growing the UK space sector to 10% of the global space economy by 2030, but this aim was left out of the new strategy. What metrics are you now using, and how do you think success should be measured beyond metrics?

Dr Bate: Overall, that is being worked through. The commitment in the strategy was to work through a basket of metrics, recognising that it is a pretty complicated field—it is £16 billion across the UK alone—and a single metric really was not the way to go.

Within the agency, we will, of course, do the same: metrics that are about both our delivery on those three areas and our internal health as an organisation. If we know a metric within that basket that will help to guide us, what would that metric be? We look at the total investment into the UK space sector, whether that is capital investment or contractual values. It is not going to be easy to measure, but we think that is, in the light of the challenges of the amount of money that we are able to spend on behalf of the taxpayer, a really important metric. We sometimes call it our north star.

Beyond the metrics themselves, there is our ability to engage with industry, academia and Government and get the sense—I feel it quite clearly when I am out on the road—that I can measure whatever I like. Space is a very scientific discipline. It is much more about understanding whether we are really an agency that is working on behalf of the sector, that the sector feels it is added value. We have that in part, but we get quite clear feedback—and I think the Committee has had feedback as well—that there is a lot more that we need to do. Those conversations on the qualitative side are just as important.

Q381 Rebecca Long Bailey: Thank you. Professor Thomson, is there anything you would like to add?

Professor Thomson: I do not think specifically. Dr Bate gave a good answer. We are very delivery focused in what STFC is doing. We pin our objectives to our strategy, which then links up to UKRI strategy, which follows all the national strategies. Things like delivering the National Satellite Test Facility on time and largely on budget is one of our key aims. It tends to be delivery focused, so less on the broader policy side.

Q382 Rebecca Long Bailey: Thank you. Professor Thomson, you mentioned the importance of an across-Government implementation plan earlier. In its written evidence to this inquiry, UKRI mentioned it would like to see greater co-ordination across ESA, UKSA, MOD and UKRI funding



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mechanisms. What is happening to ensure that the priorities of these organisations are aligned?

Professor Thomson: Interestingly enough, that input was given before the ongoing activities now around the implementation plan. That co-ordination that perhaps has been lacking in the past is now there. I see that as a really positive step forward.

From my perspective, the only weakness in co-ordination—and this is a personal view—is that we are co-ordinating very well across Government and arm’s length bodies, and that is absolutely fantastic, but, to deliver the National Space Strategy, industry is absolutely key; it is not purely public sector. We also need to find mechanisms to co-ordinate with industry more widely through trade bodies and other such organisations. There is still some work to do with that broader co-ordination because we are not going to deliver this strategy through public investment alone.

Q383 **Rebecca Long Bailey:** That is great. Thank you very much. Do you want to add anything, Dr Bate?

Dr Bate: I only want to add that there is quite a strong relationship between the space agency and Professor Thomson’s organisation in particular. We have a dual key approach because, on the one hand, the agency is funding the space systems and the immediate data infrastructure to process that data, but Professor Thomson’s organisation then funds the ongoing ability to derive science from all that data, so that goes right back to the start of the agency.

We are aware that, even though there is that strength of relationship and perhaps a bit more clarity, there is a whole series of funding councils that have been mentioned, and it is not always clear how we interact with them. Part of the work, now that we have the strategy, is to work through and help industry and scientific communities understand the best ways to apply for the money.

Q384 **Chair:** Thank you, Rebecca. I have some follow-up questions and some more on funding and financing. There was previously a target for the UK to have 10% of the global market in space. Dr Bate, you talked about the UK being a spacefaring nation, and we know this is an expanding sector. Is there any reason why that 10% ambition should not be one that we continue with?

Dr Bate: I do not want to prejudge that. There are a couple of reasons I am cautious about that single—

Q385 **Chair:** You say “prejudge” it. Does that imply that there will be a review of it?

Dr Bate: No, I mean there is an implementation plan as part of the National Space Strategy, and one of those elements is looking at what the series of metric would be. Clearly, the metrics we have had in the



past need to be in the pot that we are looking at for the right set going forward.

In the UK space sector, quite a lot of the growth historically and the size of the sector has been determined by direct-to-home broadcasting. That is a much more mature sector than what we might talk about as being the new space or the space of tomorrow. If we are looking at that block of money—half of the £16 billion, give or take—and seeing it as unlikely to grow on the trends that we see at the moment, it is likely to skew the understanding of whether we are really succeeding in space or not. That is always the challenge with having a single metric.

The other side of it is that I would rather have a series of metrics that, if the space sector in the UK is being successful and doing the things it said it would do, directly impacts the metrics. But with every other country also driving its space sector, it becomes a much more relative scale if we have a percentage of the total global space economy. I am always interested in the metrics and say, not least within my agency, that if we do this we can be confident that these numbers will move in the right direction.

Q386 Chair: You mentioned that direct-to-home satellite broadcasting is likely to drop out, and it is not going to be as prominent in the future as it has been in the past. That surely is taken into account by the fact that it is the total global market. That is not going to be true only for us but for other leading space nations. Would the Committee be right if it were concerned that there was a scaling back of ambition, or do you think that we can do better than 10% of the global space market in the years ahead to 2030?

Dr Bate: I definitely do not think there needs to be a concern about the level of ambition, particularly given the way in which the space strategy articulates that across quite a few different goals. This is what I meant about the direct-to-home broadcasting element. We have £16 billion currently in the UK space sector—5% or thereabouts of the global sector. Because such a large component of that is currently in direct-to-home broadcasting, and that, as you say, will not increase, anything that we do that is driving the ambition forward in the rest of the space sector, including a substantial growth in in-orbit servicing and launch of small satellites, could easily be negated by a completely different industry trend.

The bit that matters for me, and for space overall, is that when we drive forward the new space sector in the way the space strategy says we should we have to be able to measure that and not have it offset by some other part, particularly one that is not really one where we are investing in the same way as we are in the new space economy.

Q387 Chair: That sounds to me as if you are preparing us for not achieving the 10%, perhaps with the justification that that had embedded in it satellite broadcasting. If we were to continue to measure our share of the global



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market, is the implication of what you said that you expect us to fall below that by 2030?

Dr Bate: No, I am not trying to prepare anybody for that. What I am looking at is that there has been a static 5% or so of the total global space economy within the UK. The main reason the growth in the space sector in the UK has been where it is is that, on the one hand, we have direct-to-home broadcasting with relatively little growth, and the rest of the space sector, the growing area, growing much more quickly.

In total, will we reach 10%? That is hard to believe, certainly soon, but most of all it depends on a lot of other countries. I would much rather we were measuring a set of things that are the consequences of being successful in delivering the space strategy as it is set out.

Q388 Chair: In other parts of the Government's purview, the levelling-up White Paper was published just last week. It is very clear that it has a number of missions with a clear, single metric against which progress will be judged, presumably with the intention of galvanising and impelling progress towards it. What has been done in the space strategy so far—we have made it clear that you were not the author of it—is to go in the other direction, to drop what had been a very clear target and what you have been implying as a broader range of different targets. Is that not going in literally the opposite direction to what the top note in Government in the levelling-up White Paper is striking?

Dr Bate: Space is a pretty big field. I spent most of my career in healthcare, and the same question was often put: should there be a single health target? Having only one target always would have meant that large elements of the NHS were not involved in the target. The A&E target is hugely important, as is the elective waiting times target and MRSA, when I was involved in it. It is my view that if you only have one target for something that is inherently as large—and the space sector is enormous, from upstream satellite design, manufacture, all the way through data and applications; it is just too big to have a single metric—it risks skewing people's incentives, and I just do not want to do that.

Q389 Chair: It was a mistake to have it in the first place.

Dr Bate: No, I am not saying that. I am saying that as the space sector has grown and the interest in the sector has grown it now makes sense to have a wider basket of metrics.

Q390 Chair: I see. The National Space Council was established in June 2020. Are you a member of it, ex officio, as head of the agency?

Dr Bate: The National Space Council is for politicians only.

Q391 Chair: Do you attend in an unofficial capacity? There are officials there, I assume.



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Dr Bate: There has not been a space council since I have been in post. I attend the space council officials' meetings when they happen. On invite, I would attend the space council.

Q392 **Chair:** You have been in post since September last year. Are you surprised that the National Space Council has not met since then when it was trumpeted as being a very significant development to drive the pace of our ambition in space?

Dr Bate: No. I can see, because it is part of the agency's role on briefing and engaging with all other parts of Government, including the Cabinet Office and No. 10, just how important space is all the way through Government, including the Prime Minister. I do not have any concern that the fact that the space council has not met somehow implies that space is not a top priority. I look forward to the next space council, whenever that is.

Q393 **Chair:** Do you know when it is?

Dr Bate: No.

Q394 **Chair:** There is not one scheduled, as far as you know.

Dr Bate: I do not know the date of the next meeting.

Q395 **Chair:** There is not one. You would know if you were preparing for one.

Dr Bate: I do not know the precise date. I am not sure about—forgive me for being relatively new in post—how much information it is okay to share on all sorts of different committee meetings. All I say is I do not know the firm date of the next space council meeting.

Q396 **Chair:** Professor Thomson, you said that moves are afoot to try better to co-ordinate some of the funding structures in UKRI. Can you say a bit about that, and when you expect such an agreement to be reached?

Professor Thomson: Across UKRI, there are a number of areas where funding flows. For example, for STFC, we fund our large-scale facilities—the big national capabilities—through the RAL Space National Satellite Test Facility.

We fund the “looking up” bit of space science—the astronomy and astrophysics side—and NERC funds the exploitation of data through Earth observation. As I said previously, the technology side is funded across UKRI. The crucial bit for me is to bring the research-focused activities together with the innovation activities.

We have recently been having some very constructive engagements with Innovate UK about how we can link those activities into the wider innovation system, and that is of particular interest to my part of the organisation where we do a lot of innovation and a lot of innovative activities—for example, at the Harwell Space Cluster. That connectivity between the research and scientific exploitation-focused activities and Innovate UK's activities is key. This space co-ordination group was set up



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about 18 months ago. It may have been pre-pandemic. It is a good way of dating things. That was to ensure good communication through the different bits of the organisation.

Previously, STFC and NERC have worked closely—the upward looking bit of space and the downward looking bit of space. Bringing those activities and linking them with Innovate UK is part of an ongoing process. It is a maturing activity. We are not quite where we want to be at the moment. The fact that we are now sitting in a room speaking the same language with common goals is a major step forward. I do not think it would have happened before UKRI was formed.

Q397 **Chair:** You have been in post for some time. Were you involved in the drafting of the space strategy?

Professor Thomson: UKRI was involved in the review process. There was an overall landscape review process. We internally produced a deep dive into our UKRI-wide capabilities that fed into the discussions of the National Space Strategy. UKRI was not directly involved in drafting the National Space Strategy, but we fed into it. We had sight of various drafts and were able to provide comments.

Q398 **Chair:** You say, Professor Thomson, that this co-ordination could not have happened before UKRI was created, but that is now several years' standing. Was it not possible to have concluded these discussions so that the strategy that some people have criticised for being a bit too high level could have had this concordat between the funding agencies within it rather than the discussions continuing?

Professor Thomson: In fact, one of the roles of the co-ordination group was to co-ordinate UKRI's input to the discussions around the National Space Strategy, so it did have that role.

The area where we need to push now in a more co-ordinated effort is how UKRI contributes to implementing the National Space Strategy as a whole rather than as nine separate parts. That is where getting people in the same room and speaking the same language with a common goal is so crucial. This could have happened before UKRI, but the fact that we are now one organisation has lowered the barriers to that kind of discussion and that collaboration.

Q399 **Chair:** My concern is that even with the creation of UKRI it is still taking quite a long time to decide these things. This might be a reflection on how UKRI is organised and run. Clearly, space par excellence is a sector that is growing, developing and innovating very rapidly, and there is a risk, is there not, that if we are not as agile and responsive in our administrative arrangements we can miss opportunities? Do you think that the pace needs to quicken in concluding this funding agreement?

Professor Thomson: The work through the space co-ordination group—certainly, the input to the National Space Strategy—was ramped up rather quickly. The challenges we face now are not just the National



Space Strategy that is out there, but the Innovation Strategy, the levelling-up White Paper and the National AI strategy. All these areas—certainly, AI and innovation—are focused on science and technology. There is a lot of work within UKRI on technologies and artificial intelligence. It is how to link all these different activities, which are not necessarily purely space activities, with the space activities.

Dr Bate pointed out the new space model with lots of data being produced. How do we use these wider technologies—I will use AI as an example—to exploit the maximum value from the data that we are producing? It is complex, and it is complex across UKRI.

I am very encouraged by the pace of the discussions that we are having internally at the moment, particularly in the context of UKRI developing its first overall UKRI strategy. We are, certainly at the scientific and strategic level, moving at reasonable pace at the moment.

Q400 **Chair:** Thank you. Dr Bate, I have a question on ESA and our contribution to ESA. Some of the written evidence that the Committee has had suggests that we should, given whatever the pot of funds is—it is always going to be limited—direct it more to national priorities and supporting our national strategy rather than to ESA priorities. Clearly, it is good to do both, but in any world there will be a fixed pot. What is your view on whether we have the balance of those contributions right?

Dr Bate: ESA has its own missions, particularly its basic science missions, but it also has a strong mandate to support each of its 22 member states. ESA recognises that it is really important that that role is at the forefront of all the conversations with the UK because they know that we are looking to build our national capabilities, and that is quite right. I want us to build the national capabilities up more, but what I do not think is a binary choice is that we do that by not investing in ESA and only going our own way. A lot of countries use ESA capabilities and technical expertise to build up their own industries. The Italians have just done that in quite a big way. What matters most is to say, “What do we really want to do as a country?”, hence the space strategy, and then we look at all the levers at our disposal, whether it is ESA, national programmes or bilateral or multilateral relationships with the Five Eyes community or out in the Asia Pacific. ESA is a way of delivering our national capabilities.

Q401 **Chair:** There is an ESA ministerial meeting in November. It is biennial, is it not? What are we looking for from that ministerial meeting? Are there particular projects or programmes? You bid for particular activities, do you not? What is our current intention?

Dr Bate: It is too early to say. That is because we do not have our fund settlement. As I am learning myself, we will go in with a negotiating position. It will be very important that we know what we want, but we also need to know how much money we have for the bids against all the other countries.



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Q402 **Chair:** Your funding settlement is the CSR allocation broken down to your agency.

Dr Bate: Yes, that is exactly it.

Q403 **Chair:** When do you expect that to be finalised?

Dr Bate: I hope to have that by the end of February.

Q404 **Chair:** By the end of February. Will that be a multiyear settlement? Will it be for the three years of the CSR?

Dr Bate: It will be for the three years.

Q405 **Chair:** I see. Give the Committee the advantages of that.

Dr Bate: The single biggest challenge when I have been out and about in the space sector is that you are a grant-funding body predominantly in the agency and for the last two years it has been single-year grants. Even if the call for the grant goes out on 1 April, which it does not always do, and there is a fast process of the applications, which there is not always, that leaves less than a year for all that money to be spent. The money cannot be spent by the receiving organisation after the end of the year. That is too short term for space in particular. Having a three-year settlement means that we can put multiyear grants out to the sector academically and industrially. That is the single biggest challenge that I have heard.

Q406 **Chair:** You are confident that is going to be in place by the end of this month.

Dr Bate: That is what I have been told, so, yes.

Q407 **Chair:** Professor Thomson, you want to come in.

Professor Thomson: I just want to add to the importance of having a three-year settlement. Over the past years, we have been working on, effectively, one-year settlements. With everything we do—in STFC more broadly, but certainly around space—these are long-term investments. You put the money in, whether it is through academic communities or projects. They span not just three years but maybe a decade or more. Having some longer-term understanding of finances really will enable us to plan more strategically. At the moment, we plan, but we have to make lots of assumptions and then flex those assumptions as we get the year-by-year budget. It is incredibly welcome that we will have that longer-term settlement in a matter of weeks.

Q408 **Chair:** You are hearing the same as Dr Bate, that this is about to be—

Professor Thomson: My understanding is that there is another layer. There is the BEIS to UKRI settlement, and then there is the UKRI allocations process across the councils. It may take another few weeks, but it is still relatively short term.

Q409 **Graham Stringer:** We are out of Galileo. Copernicus is in the balance, as



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I understand it. Apart from the cash invested in Galileo by this country, what have we lost scientifically by not being part of the Galileo programme? What will we gain by being part of Copernicus?

Dr Bate: On Galileo, since we are not part of it any more, there have been two main parts from the agency: the initial review of so-called GNSS and, more recently, the space-based position, navigation and timing options appraisal. That is the agency's contribution to solving the problem. This is a very substantial problem—about £1 billion a day lost if we were to lose the PNT signal. We have been asked as part of an overall Government approach to understand the best way of securing PNT services for the UK. We can only do that from the space part. I cannot give you a full answer on what we lost or how we are making it up, but I can say that we have now reported back to Government on the full options appraisal on the best ways to take forward the space-based part of PNT now that we are not in Galileo.

Copernicus is a huge part of Earth observation globally. It is scientifically leading. As you say, it is in the balance. We will have to see. We are doing what I think is the right thing; we are preparing for both scenarios and making sure that whatever happens we are building up and continuing to build up the national capability in Earth observation. It is something we are historically very strong on, and we have been growing more quickly than a number of peer nations in Europe.

Q410 **Graham Stringer:** What I am really interested in about the Copernicus programme—I will come back to PNT in a second—is that, if we were to withdraw from it, the project would continue. It would have to be funded by other people. Presumably, the information about the state of the world would continue, and, in that sense, scientific knowledge would go on. What would our science base in the UK lose by not being part of it, or would it lose anything?

Dr Bate: It is a really serious concern across Europe if the UK does not associate. We have been very clear that €750 million is available and we want to be part of the Copernicus programme. If that money is not there and it leaves that shortfall, hopefully, from the scientific point of view, that money gets found elsewhere. It is not a given, and the European Union and European Space Agency recognise that. I would hope that all those expansion missions that are part of Copernicus will go ahead because of the science and the impact to knowledge on climate change that they will have.

In terms of what that would mean for the UK, if we did not associate we would have that money available for national Earth observation capability. That is an opportunity.

Q411 **Graham Stringer:** In budget terms, it would replace some of the loss from Galileo.



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Dr Bate: That would be Earth observation money going to ensure that there was not a shortfall to industry and academia on the Earth observation side.

Q412 **Graham Stringer:** Right. You have allocated £2 million to the six companies, have you not, to ensure that we have a PNT facility? How is that work progressing? Will the OneWeb project help with PNT?

Dr Bate: A total of more than you said has gone into the space-based PNT work since Galileo. With a lot of support from industry and consultancy, we have been evaluating all the different ways we could see for the space-based component to be taken forward for the UK. That came up with a multi-criterion analysis to work out against 10 options which were the best value for money, which were the highest quality and so forth. That work concluded around November of last year and reported back into Government. That work now sits as part of the future PNT strategy. The wider PNT strategy does not sit with the Space Agency, so I cannot really comment on it.

Q413 **Graham Stringer:** Can you explain a bit more about your role in the PNT strategy? It seems to be partial.

Dr Bate: It is.

Q414 **Graham Stringer:** I did not quite understand that.

Dr Bate: My apologies. Because position, navigation and timing has a space-based component from the satellites and the atomic clocks, and so forth, that are in space and a ground-based component, the likely solution, or credible solution, would be a combination of things terrestrially and things in space. The space agency has been asked to develop the options only on the space-based parts. That is why I gave a deliberately partial answer. We have given our answer back on what the right set of options, or what the lead option should be, but that has to be balanced against all the non-space elements and taken forward across Government. It really is a cross-government-owned thing; it is not owned by the space agency.

Professor Thomson: Can I add something to Dr Bate's answer? UKRI is funding a number of initiatives on the distribution of PNT signals—research and development into ground-based PNT signals. You can distribute very precise timing through optical fibres, and there is a programme funded through UKRI's Strategic Priorities Fund working between UKRI and the National Physical Laboratory looking at how you can distribute precise timing across ground-based cables.

The potential advantage of that—it is not the only answer—is that it could give us a very resilient national timing signal because the UK is not such a vast area. If you can reliably and accurately distribute timing signals through various centres in the UK using new technologies, there are opportunities there. One of our sister councils, the EPSRC, is funding various technologies and initiatives around distribution of timing signals.



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The correct answer for the UK will be some combination of space-based timing and potentially very resilient ground-based timing distribution.

Q415 **Graham Stringer:** When Galileo was first mooted, 12 or 13 years ago, and before it had a defence component, it was controversial because the improvement in positioning was seen to be relatively small compared to what was there before. Is there now a cost-benefit analysis of that improvement?

Secondly, in five years' time, will we have the PNT facilities? Will we be able to access positioning as well as other people in the European Union?

Dr Bate: Because we are not in Galileo, no, we will not be able to access all the services that Galileo would provide to contributing members.

Q416 **Graham Stringer:** I was asking something more specific than that. Will we, either by OneWeb or some other facility or dealing with Galileo, be able to get very precise positioning information? I suppose people will get it in the European Union.

Dr Bate: The point of that options analysis on the space-based side was to look exactly at how we make sure we have a signal at least as good, if not better. Whether it will be within five years depends on how quickly you make the decision on what the right system—or system of systems, as Professor Thomson said—we go forward with is, how quickly we get the money for that, and how quickly it can be built. It is a multiyear project, so I do not think we can say that within five years it will definitely be there.

Q417 **Graham Stringer:** Do you have a time in your mind?

Dr Bate: No, because I do not know the decision on the overall system of systems, and it cannot start until then.

Q418 **Graham Stringer:** Professor Thomson?

Professor Thomson: It is slightly distant from where I exactly sit within UKRI. I can try to follow up for the Committee with a written answer to make sure we get the details right on exactly how the activities we are pursuing within UKRI link into the broader discussion. That is not something I can, reliably at least, answer now.

Q419 **Graham Stringer:** Thanks. How will my constituents benefit from the considerable investment in OneWeb?

Dr Bate: The future of space—and certainly on the telecommunications side—is in multi-satellite megaconstellations. Very practically, OneWeb Start is one of the biggest constellations, with over 350 satellites already up. This year, it is starting its service. It is starting it small and above 50 degrees latitude. It provides broadband services in areas of the world and the country that do not have access to them terrestrially. Globally, more than 10% of the world is not going to have fast broadband access from anything other than satellites. In the UK, around 9% or 10% of people currently do not have access to high-speed broadband. I believe it is



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about that amount. Services like OneWeb are essential for filling in the gaps and getting people high-speed internet access.

Q420 **Chair:** Last week, we had George Freeman, the science and technology Minister, in front of us, and we talked about all the issues we have been discussing today. We had a discussion on launch, and it is a very prominent ambition for the Government to have a satellite launch from the UK this year. Minister Freeman said that he expected a horizontal launch from Cornwall to take place this summer. Dr Bate, is that your expectation?

Dr Bate: Yes, absolutely.

Q421 **Chair:** Thank you. He was less sure about vertical launch. There are two leading sites in Scotland. Brief the Committee on what your expectations are there.

Dr Bate: The two leading most advanced spaceports in Scotland are SaxaVord on the Shetland islands on Unst and the Sutherland spaceport at the top of the mainland in Scotland. The aim is to have that vertical launch from the Shetland Islands in 2022. That is a combination of the operator of the spaceport, SaxaVord, and Lockheed Martin and ABL.

We do the programme delivery. We have funded Lockheed. That is a challenging timescale. It is not helped by the fact that ABL, the rocket launcher company, had a test failure two or three weeks ago in which the upper stage was destroyed. First things first, they have to understand why that took place. Fortunately, there was no loss of life. There was no injury. They have to go through the process of understanding what caused that, for all the obvious safety reasons. We do not know exactly how long that will delay, but, seeing as they need to do their US launch before they come to the UK, that clearly makes the timescale more challenging. That is the extent of the situation that we know at the moment.

We fund both those endeavours, and we work very closely and productively with both of the vertical launch providers in Scotland. They are ambitious timescales. Launch is difficult. Launch is not routine. The secret of good programme delivery and management is to understand what the challenges are that the industry is going through and work through with them.

Q422 **Chair:** That setback relates to the Shetland site. Is that right?

Dr Bate: Yes, that is right.

Q423 **Chair:** What about the Sutherland one? What is the situation there?

Dr Bate: It is also very ambitious. It is doing really well. It is a combination of Highlands and Islands Enterprise and Orbex, the launch company, based in Scotland. They are targeting a quarter one 2023 launch timescale. Things have gone very well for them. Orbex has made some really impressive announcements in recent weeks showing that the



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delivery of the spaceport and of the rockets is going according to plans. They have won recent judicial reviews that would have otherwise slowed down the timescale. It is certainly not easy and it is certainly not routine, but the programme is doing well.

Q424 **Chair:** That is helpful to know. Is there anything that the agency needs to do, or is doing, to facilitate and to unblock anything that might impede the progress?

Dr Bate: Yes, we do a lot on that. Let us take one example. Would you like to start with horizontal launch?

Chair: Yes.

Dr Bate: That is the first launch we are likely to see in the UK. My teams in the agency, alongside the CAA, were out in the US with Virgin Orbit. The most important thing dictating the timescale for launch now is their licence application—their being able to demonstrate to the CAA that all the different components of the application are appropriate.

We could sit back and say, “There is the grant that we have prepared. It is now on you, Virgin Orbit, to demonstrate,” but we do not do that at all. We are working very closely with Virgin Orbit, we are working with Spaceport Cornwall, and we are working with the CAA to understand whether there are any blocks, whether there are things that are going to make it more difficult, whether there are things that we can directly unblock, whether it is a financial thing—a conversation about funding—or whether it is things around Government that can be done differently.

Q425 **Chair:** And the same with the vertical launch.

Dr Bate: Absolutely.

Q426 **Graham Stringer:** There has always been money in rubbish and clearing rubbish. Are we going to maintain our capabilities for dealing with space debris? Do we have a view on how responsibility for space debris should be apportioned and how it should be regulated? Professor Thomson, you look eager to answer that.

Professor Thomson: Not really. It is interesting because I was in Switzerland at the beginning of the week at EPFL, and saw a presentation from one of the companies, ClearSpace, which is part-based at the Harwell Space Cluster. There is an opportunity here for the UK to take a lead in this. This is delivered not through the public sector but through industry. At the Harwell Space Cluster, I think there are three companies looking at space debris. There is the practical side, and we are working with all the other companies on site. There is an opportunity to grow that activity, I believe.

The other thing that the UK historically has been very strong at is regulatory work. It would be for the space agency to take a lead in the regulatory aspects of space debris. I am sure Dr Bate can follow up on that.



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It is a very timely question. This was the grabber in space. It is quite exciting stuff. This is happening in companies that are based in the UK. There is an opportunity to really build on that initial work.

Dr Bate: I strongly agree with that. It is a real area of strength. Already, ClearSpace, Astroscale, D-Orbit and many other companies are in the UK delivering these services. There are over 300 million pieces of debris, according to European Space Agency estimates, and it is just not sustainable. It is not sustainable to continue to use the space environment and simply to grow the amount of debris.

It is an existential problem. It is great that we already have industry working on this. The agency has a particular focus in two or three different ways. First, we provide some services to the country's satellite operators letting them know if there is a likelihood of a conjunction event or whether they need to manoeuvre out of the way by giving them the risks. We do that in conjunction with the military. We also fund the technologies.

Mark mentioned ClearSpace, which is one that we funded. There is Astroscale as well. We recently announced over £1 million of funding.

There is the regulatory aspect, which Professor Thomson mentioned, and diplomacy—the United Nations angle. Part of your question was about where responsibility lies. It lies globally and it lies with Governments and with satellite operators and launch operators. We are trying to take quite a leading role. Because we have the Space Industry Act and because, therefore, our licensing requires that high standard and avoiding debris, we have to build satellites and launchers in a way that we feel confident that they are not adding to the debris problem.

We have an ability to project that on the world stage. There was a G20 meeting of space agency leads at the back end of last year, and the UK was being called out by the United Nations representative as leading the way and helping on these so-called sustainability guidelines.

Q427 **Graham Stringer:** Which body in the UN would you envisage having regulatory responsibility?

Dr Bate: It is called UNOOSA. The Committee on the Peaceful Uses of Outer Space and the United Nations Outer Space Treaty. I will get you the full title beyond the acronym.

Q428 **Graham Stringer:** Thank you. This country is also at the cutting edge of science and technology with in-orbit manufacturing. Are we going to maintain that position, and, if so, how?

Dr Bate: Yes, that was identified in the space strategy—in-orbit servicing and manufacturing—as a real growth area. Companies like Space Forge in Cardiff are really leading the way in what we know is going to be a market for the 2030s and 2040s. There are some things that cannot be



manufactured sensibly, safely or economically on Earth in the same way as they can in space because of the microgravity and vacuum.

What we are doing goes right back to what I said at the beginning about catalysing investment. It is always asking the question: "If we are able to put in this many pounds, what will the consequence be in contracts and private investment that will come in?" Some of the most exciting companies like Space Forge are the ones operating in in-orbit manufacture.

Q429 Dehenna Davison: Hearing the ambition from you lot today is a really positive thing, but, clearly, in order to achieve the ambitions we need to make sure we have the right skilled workforce. One of the things we were discussing on our Committee visit to Harwell was some of the skills shortages issues that some of these start-ups are facing. It is really reassuring to hear that UKSA is planning to create apprenticeships, particularly as this week is National Apprenticeship Week, so it seems very apt to ask about it. Can you give us a bit more detail about that, and about other steps that UKSA is taking to try to improve the skills gaps?

Dr Bate: It is a real problem, partly because of the scale of growth. There just are not that many people who have that heritage—the years and years of experience in space—because it has grown so quickly. It is something that the agency takes a role in, but it is ultimately for the sector as well to think about its own requirements and to build them up.

You are absolutely right: we support apprenticeships. We also support intern programmes such as the SPIN programme. The key part of the role for us is to convene all of industry and academia in recognising the scale of the problem, including the skills survey, and that linkage of diversity and inclusion within the sector.

We know that, of the skills that we have, we are over-represented in people coming from wealthier backgrounds. We are under-represented in people from ethnic minority backgrounds. We are very under-represented in women in space.

There is quite a range of activities that we are trying to corral, measure and demonstrate what the opportunities are. That goes as far as for small and medium enterprises for developing skills and a diversity strategy so that they can take that themselves rather than having to work everything out from scratch.

Q430 Dehenna Davison: One of the things we heard about was a lack of programming skills, which was proving difficult, particularly in comparison to some of our European neighbours. We will not go into the recruitment challenges of the current immigration system. Is work being done by UKSA specifically on this to feed into other Government Departments that are looking at setting curriculums and setting standards in programming to encourage younger people to get into it?



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Dr Bate: For the last five years I worked in digital healthcare, and it is just as much a problem there. These are some of the skillsets that are in huge demand. People can get paid a lot at Facebook or at Google. It is not something that is by any means restricted to space, but we really recognise it in space. So much of the money comes from the downstream applications that need the software as well as programming satellites.

We do quite a lot of work, as I mentioned, on the skills side. That includes software as well as hardware skills. We also think it starts a stage back because we can solve the problem for today but we want to keep growing the industry. The way in which you work with primary schoolchildren and secondary schoolchildren is equally important.

We funded the National Space Academy based in Leicester for many years with their programme. At the moment, it is reaching 10,000 children each year, supporting them in interventions that increase their likelihood of going to STEM and then doing masterclasses. It is training even more teachers. Hundreds of teachers are trained because that then spreads it out.

I would not want to point to one thing. It is more that the agency recognises the scale of that challenge and is trying to support industry and academia with it.

Q431 **Dehenna Davison:** Professor Thomson, we understand that the STFC is putting together a proposal for a skills factory. Can you very briefly give us a little bit of detail about that?

Professor Thomson: Across all our facilities—we do not just fund science but we run big scientific facilities, some of which are connected to space but not all—these are really exciting projects. They are very attractive, very exciting and high-tech. Currently, we have 166 apprentices, and we have probably a comparable number in our graduate schemes. Our apprentice scheme is nationally recognised as being very high quality.

At the moment, we have these schemes, effectively, because we need those skills internally. It is important to recognise that space is one sector, but the skills gap is common across multiple sectors. It is mechanical engineering, electrical engineering and computational skills. Any training you do in other areas is applicable to space.

We would like to scale up our apprentice and graduate intake substantially, and, rather than targeting it on filling our own skills gap, effectively, overtraining significantly so that the people we train—the apprentices and graduates—go out into industry.

At Harwell, we are ideally located for space because we have 105 space companies in the Harwell Space Cluster. I should say it is not just about mechanical engineering, other engineering and computing. We also have



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apprenticeships in project management, which are key skills for the space sector.

The ambition is to grow that activity significantly. A part of the unique offering is that there would be a public engagement commitment. Anybody who came through this scheme would be committed to undertake two weeks a year of public engagement activities, going out into the community really encouraging people and opening up the possibilities of what you can do within engineering.

The final thing that is worth flagging is that the levelling-up agenda is key to Government. Apprentice schemes are very local. Apprentices are not the most mobile group of people. They are fairly young, particularly if they are straight out of school. These activities are place based. We have a big cluster at Harwell, but we also have a big laboratory close to Warrington in the north-west. This scheme would extend across all our sites. There is an opportunity to expand this programme.

It is an exciting opportunity. The challenge, as always, is money. The apprentice levy is great—that provides some of the training costs—but apprentices and graduates in training schemes require salaries. As soon as you do that and you scale it up, the numbers start to become quite big. It is a really exciting opportunity.

My vision for this is that it becomes part of our mission as a scientific and technology delivery organisation. It is not just to do the science and the technology, but it is to train for UK industry. If this works, which we think it will because we have been doing these activities for a while now, there is a possibility to expand this type of concept across other PSREs. That is another way you could get that national footprint.

Q432 **Chair:** Public sector research establishments.

Professor Thomson: Sorry, yes, public sector research establishments, all of whom have unique facilities. It is the hands-on training aspect on the big science and technical facilities where we can give people a unique experience and make them highly marketable. It is an exciting topic for me, as you can probably tell.

Dehenna Davison: With a passion.

Q433 **Chair:** Thank you. We must not keep the Secretary of State waiting, but I have one final question to Dr Bate. When we were in Harwell talking to people who were working in space, one of the things that was said is that there is a bit of a Catch-22 for people coming in. People want to recruit people with space experience, but it is quite difficult to get space experience if you have no space experience. Dr Bate, you are a physicist by background. You have spent quite a lot of your career in medical sciences, but you have come into space, indicating that some of the skills are transferable. Do you have any reflections on people from different specialisms coming into space and whether the agency can promote and



make that easier?

Dr Bate: The great thing about space being such a big sector for us now is that there is such a wide variety of skills, roles and expertise that are needed. That is part of what we are doing from a really early age with kids, explaining that everyone is excited about being an astronaut, but you do not have to be an astronaut to work in space, brilliant though our astronaut programme is.

Having come from a different sector but having some level of scientific background beforehand, I can see really significant similarities between the sectors that I was in, healthcare—safety critical, very much in the public eye, inspirational, written, matters to daily life. Those programme delivery disciplines really matter. The software skills that were raised earlier really matter. There are so many transferable skills. I say this as somebody who had a fantastic career in healthcare. I would encourage anybody to look at space and see what they can bring. That is why we have the apprenticeships to support people in that. At any stage of their career, it is a wonderful opportunity. It is just a mind-blowingly wonderful sector to be in.

Chair: That is a very good note on which to finish this panel of evidence. Dr Bate and Professor Thomson, thank you very much indeed for your evidence.

Examination of witnesses

Witnesses: Kwasi Kwarteng, Rebecca Evernden and Hugo Robson.

Q434 **Chair:** I am delighted to welcome the Secretary of State for Business, Energy and Industrial Strategy, Kwasi Kwarteng, who has brought two of his senior officials, Rebecca Evernden, director of space in the Department, and Hugo Robson, the chief negotiator in the Department. Thank you very much indeed for appearing with us today.

The Committee is coming to the end of its inquiry into what is a very exciting area for the UK in almost every respect—technology, jobs, global influence—which is space and satellites. Secretary of State, the Government published a space strategy in September of last year. It was widely welcomed. If it has attracted some criticism, it is that it is perhaps lacking in some specifics in an implementation plan. What is your response to that?

Kwasi Kwarteng: As in all these things, one has to place this in context. I became Secretary of State in January last year, and it was clear to me that responsibility for space strategy sat across a number of different Departments—the Department for Transport, the Ministry of Defence, the UKSA, No. 10, BEIS. All these organisations had equity in it. As a consequence of my conversation with the Prime Minister, I very much pushed for BEIS to own civil space. It was the first time that the British Government had ever come up with a space strategy. As you mentioned in your question, it has been widely welcomed because it is directional in



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the scale of the ambition and the kinds of sectors that we want to participate in.

You will understand that it is much harder to have granular specifics that need to be costed in terms of the timing ahead of the October comprehensive spending review. As a consequence of the spending review we have a very good R&D allocation. Once we make specific allocations within the R&D budget, we can have more granularity in driving the space strategy. That sequence was the main reason why we have not perhaps been as granular as we could have been.

Q435 **Chair:** Post CSR, you expect to be able to inject further granularity.

Kwasi Kwarteng: I think there will be a bit more specifics. As you will remember, these strategies need financial heft behind them. It would have been premature to outline very specifically the ambitions and targets ahead of the CSR process.

Q436 **Chair:** The strategy was published in September, but—perhaps this may be attributable to your leadership in the Department—a decision was announced in June to create a National Space Council, a kind of Cabinet sub-committee that recognises the fact that there are interests across Government. We heard in our earlier session that it has not met since September. It was formed in June. You are a member of that, I assume.

Kwasi Kwarteng: That is right.

Q437 **Chair:** How many times did it meet?

Kwasi Kwarteng: It met once. The next meeting will be fairly imminent. I cannot tell you exactly when it will be, but I imagine in the next few weeks. Rebecca, do you want to come in on that?

Rebecca Evernden: The space council has not met for a while, but it has considered the space strategy, and it considered that by correspondence, so it was engaged in the consideration and the sign-off of the Government policy on space. As the Secretary of State said, due to the number of high-priority things that need to be delivered this year, the council is likely to meet again quite soon, but it is for the Cabinet Office to decide whether to call the council.

Q438 **Chair:** Obviously, the Government have had various other things to contend with in the last couple of years. We recognise that. Is it your aspiration that the Committee meet relatively frequently, or that it meet once a year to review progress rather than being a Committee that is in the driving stage?

Kwasi Kwarteng: You will remember this from your days in Cabinet, Mr Clark, that there is a whole range of sub-committees that one sits on. Some of them meet infrequently, once or twice a year. Some of them, particularly in the XO/XS pre-Brexit days, were meeting every day. I would suggest that the council probably meet three or four times a year. That would be roughly, I imagine, the frequency with which the council



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meets. It is not in my gift to determine that. We would have to speak to colleagues in the Cabinet Office as well to establish a rhythm.

Q439 **Chair:** It is chaired by the Prime Minister, I think.

Kwasi Kwarteng: Yes, it is.

Q440 **Chair:** Thank you. Previous commitments going back some years included an ambition to have 10% of the global space market for the UK, based on the fact that we are, as has been described, a spacefaring nation and we ought to have more than our proportional share of the global population in this. That was not in the strategy. Tell us where your thinking is on what contribution we expect to make to the global market.

Kwasi Kwarteng: In terms of the numbers that we are looking at, the number in the space strategy, if I remember, was £490 billion in the global market by 2030. Today, our market share is about £16 billion. Just doing quick arithmetic, you can see that if we can double from £16 billion to £32 billion, we are not quite at the 10%, but it is more like 7.5% or 8%. That, I think, is a more realistic trajectory than taking 10% of a market that is growing very quickly indeed. We feel that we should be more targeted in our approach in terms of where we can add best value as opposed to going for a generic proportion of a global market that is growing extremely quickly.

Q441 **Chair:** Now that we have the CSR that has been settled for three years and, as you say, you are in a position, which you were not before, to be more granular, would you look to set some targets, whether it is an overall one or for particular parts of the space industry, in the way the levelling-up White Paper had some very specific missions with metrics attached to them?

Kwasi Kwarteng: We can look to do that. Going back to your earlier question about the 10%, different parts of the space industry require different levels of capital deployment. Just having a 10% thing for the whole industry does not really reflect the variety of different technologies and different bits of the industry. That is why we did not go for the 10%. Clearly, if we allocate the money that we have been given through the CSR, we can have more granular targets.

Katherine Fletcher: Thank you for your time. I appreciate it.

Kwasi Kwarteng: Thank you.

Q442 **Katherine Fletcher:** As you have highlighted in your opening remarks, this is an emerging area. Lots of people have been playing in it. Talk to the funding picture for that at the moment. We have heard previously in this inquiry about the European Space Agency programmes that the UK is engaged in. I would be interested in your take on how you are balancing the relative demands of our own UK-led space programme versus the contributions to the ESA, and how you are deciding what we should focus on nationally.



Kwasi Kwarteng: What we have to be very mindful of is the fact that our national strategy, the space strategy, fits into other strategies. We are going to have a Defence Space Strategy that is looking purely at defence. There is the Integrated Review, which also relates to a lot of what we are seeing in space. There is the Innovation Strategy.

In terms of where we are co-operating with European colleagues, we are very focused on the national strategy. In certain things like Copernicus, the Earth observation, we have said openly that we want to participate with European colleagues. In other areas, we want to develop, and we feel we can develop, national capability. It is a mix between those two.

Q443 **Katherine Fletcher:** What is the mechanism for making those calls? Is it to set up the overall mission? You said in your opening remarks that calls need funding left behind them. I noted that £1.4 billion has gone into the Defence Space Strategy. That is another moving part. How are you making those calls?

Kwasi Kwarteng: A lot of it is through the Committee that Mr Clark referred to in terms of the National Space Council. A lot of it was bilateral conversations that I have with the Secretary of State for Defence. The good thing about all these strategies is that if we take them all together there is a very clear sense of what our national objectives are, and that comes first. If we can realise those objectives through co-operation, we are prepared to do that, but, clearly, the starting point is our own national policy, as outlined in the various strategies I mentioned.

Q444 **Katherine Fletcher:** Fair enough. Do you anticipate having further conversations with the Treasury on that? Obviously, the IR and the Defence Space Strategy have figures attached to them. Is that something that you are doing to try to put that left behind the overall strategy?

Kwasi Kwarteng: Those are conversations we are having. If you look at the space strategy, we talk very much about the decade—we talk about 2030. The CSR is three years. Obviously, we are going to be having those continual conversations and setting targets through the decade.

Q445 **Katherine Fletcher:** What would you like to see coming out of it? Is there anything within the space strategy that is the winner that you would really like to pick?

Kwasi Kwarteng: I will refer to officials, if I may, on this. On that, there are specific targets. For example, we are talking to Virgin Orbit about the launch. That is a very tangible target. We have aspirations in terms of how many jobs we think we can create. There are 45,000 jobs in the space sector today, and the UK supports about 126,000 indirectly. We are refining targets on how we can grow the sector. As you say, that requires some investment, and we are in the process of allocating the R&D budget.

Q446 **Katherine Fletcher:** We are off to see some of those jobs and businesses this afternoon in Glasgow, which is very exciting. You have



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alluded to it. Long-term R&D, especially in emerging areas, requires multiyear settlements. We have heard some evidence that not having that clarity because the mechanisms of Government are on three-year cycles is perhaps slowing some of the technological developments and potentially giving systems that do not have that approach an advantage. Do you have any actions in place to try to restore that balance or protect the longer term?

Kwasi Kwarteng: You are obviously familiar with the process, but, from my own experience, it was a devil of a job landing a three-year CSR. In fact, the last time we had a three-year CSR was 2015, and every year since 2017 we have been promising a CSR. Brilliantly, the Treasury announced a three-year plan last year. I am not in a position unilaterally to say that we can have longer multiyear settlements. That is for the Treasury. We did a very good job landing the three-year settlement that we did in October.

Q447 **Katherine Fletcher:** Fair enough. Thank you, Chair. Do any of the officials want to come in on any of the points I made?

Rebecca Evernden: You asked about prioritisation around how we are going to fund what is in the strategy and asked about some of our thinking. Let me expand a little bit.

The 10-point plan that is attached to the strategy will be the main mechanism for identifying priorities for funding. The Secretary of State has mentioned the launch ambition. I can see that continuing to be a priority. Funding innovation will also be at the heart of it. Developing the clusters-type approach to how we foster the sector in the UK will be a priority going forward. We will be looking to continue to support some of the more forward-looking, nascent technologies that we have set out in the strategy, whether that is around how we manage space debris or in-orbit servicing.

Q448 **Katherine Fletcher:** I am particularly interested to make sure that there can be the spin-offs in the civil world from what is within defence. Without getting into areas that we cannot discuss, is that what you are alluding to?

Rebecca Evernden: Absolutely. BEIS and MOD are working ever more closely together. We have a joint approach to implementing the space strategy. We formed a joint implementation with the MOD, and I was at the launch of the Defence Space Strategy alongside my counterpart Air Vice Marshal Harvey Smyth at the event last week. One of the things that we talked about was how we continue to embed our thinking about not only how we have ideas about space but how we fund space and how we use procurement, potentially, to go down the dual-use route in the future. That is absolutely at the heart of our thinking.

Katherine Fletcher: Brilliant.

Q449 **Graham Stringer:** Welcome, Secretary of State.



Kwasi Kwarteng: Hello.

Q450 **Graham Stringer:** We have been excluded from the Galileo programme. It was expensive. It changed its nature. It started off not being a defence project, just a communications project. It included both. I have two questions. What is the Government's political response to that exclusion, if any? Secondly, what are the consequences for science and communications of not being part of Galileo?

Kwasi Kwarteng: My view—and I know that people have different views on this—is that positioning, navigation and timing capability, which Galileo is all about, is something that we could do ourselves. Some people said we cannot do this, there is no way that we could deliver PNT outside Galileo. I do not happen to agree. Our strategic stake in OneWeb, which we may talk about, gives us a possibility for future capability in PNT. Given our commitments in space, when people look at our space strategy, we are seen as a credible medium-sized player. That is why I do not think that participation in Galileo was really the be-all and end-all. In fact, looking at it, we felt that we were not getting our bang for our buck in what our companies and supply chain were getting from it. That is my view on this.

Q451 **Graham Stringer:** We are getting nothing for our very big buck, are we? It is £1.2 billion, from memory. I do not have it written down. What is the political response to that?

Kwasi Kwarteng: I am not quite sure what you mean by that question.

Q452 **Graham Stringer:** Let me explain, if I can.

Kwasi Kwarteng: Yes, please.

Q453 **Graham Stringer:** It is quite a nasty, severe decision of the EU to say, "You cannot be part of a project because it has a defence element," when it did not start off with a defence element. Is there a quid pro quo? Is there a response to say, "You are doing that, so we will do this," or do we just take it passively?

Kwasi Kwarteng: With our relations with the EU, there are a whole lot of other conversations. At the moment, the funding of Horizon, the science innovation programme, is being discussed. We are talking about Copernicus as well. We have been very clear about what we want to do with Copernicus. The conversation about Galileo, in terms of our response, is part of a wider conversation.

All I would say is—it is a very simple point—that building our own capability gives us a much better position in responding politically, as you put it, or responding to the EU's actions than simply not having the capability. That is what I am focused on in delivering the space strategy, working with the MOD, driving response in what we can do with OneWeb and our ownership. That puts us in a much better position, frankly, than we were two or three years ago.



Q454 **Graham Stringer:** I think Aaron wants to ask questions about OneWeb, but on Copernicus, which is in the balance at the moment, it is clearly a good thing knowing what is happening around the planet. I have no doubt about that. It is an EU project supported by the European Space Agency and individual countries. If we are not part of Copernicus, what are the consequences for this country's science?

Kwasi Kwarteng: We are in a position of strength. We have world-leading expertise in the whole value chain of Earth observation. Earth observation has been recognised in the strategy as something that is really important. I am confident that we can deliver the right capabilities outside Copernicus if that is indeed where we end up.

Q455 **Graham Stringer:** Would it make sense for this country to carry on doing Earth observation on our own when Copernicus, in one form or another, is a major project supported by most of the countries in the European Union? They still provide excellent knowledge about the Earth. Would we not be better looking at how that £700 million a year could be spent elsewhere?

Kwasi Kwarteng: It is important that we build up our own capability. One of the big things that we speak about in the space strategy is skills. In order to have skills, you need to have your own capability. In terms of Earth observation, as I pointed out, we have a credible, world-beating offer, and we should be doubling down on that. Rebecca, do you want to come in on that?

Rebecca Evernden: Copernicus is a one-of-a-kind system. It is a global system. That is why our plan A is to continue to participate in Copernicus. However, whether or not that happens is subject to the wider negotiation. As the Secretary of State has said, we have other options domestically if that negotiation does not result in association to Copernicus. We would want to look at some of those options through opportunities for collaboration on Earth observation. It offers a potential for dual use, joint working with the MOD, thinking about the potential for dual use opportunities when we are thinking about what we need from Earth observation.

Q456 **Graham Stringer:** Can you explain what you mean by dual use?

Rebecca Evernden: It can be used for defence purposes and civil purposes. Those collaborations could be international. They could be with commercial offerings. There are lots of different ways that we could approach that. We have quite a menu of options to explore as we are thinking about what might happen if we do not get that association agreement.

Kwasi Kwarteng: On that, specifically—maybe you will refer to this—we have national Earth observation programmes.

Rebecca Evernden: Yes.



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Kwasi Kwarteng: They may not be as developed, but we have the elements of having Earth observation capability here—the National Centre for Earth Observation.

Rebecca Evernden: Yes. Much of the data from Copernicus would still be able to be accessed even if you were not a full member of the Copernicus programme.

A menu of different approaches to how we think about this is probably the right way forward rather than necessarily having a single solution.

Q457 **Chair:** We talked about Copernicus and Galileo. The other European programme in discussion about association is Horizon. There is a plan B being developed on those negotiations. What is your view, Secretary of State, of the balance of advantage between plan A and plan B? Are they finely balanced?

Kwasi Kwarteng: This was discussed in 2020 ahead of the final Brexit, and it was a finely balanced argument. The BEIS view was that we should sign up to Horizon. Different Departments had different views. Frankly, over the year, looking at what we get out of Horizon, the costs, we can operate plan B successfully. As you put, it is a finely balanced situation. It is not clear to me that one world is so much better than the other.

We have great science. We demonstrated that in the vaccine roll-out. There are huge amounts of investment. When I travel around the world, people are really keen to invest in UK innovation. I just got a letter from a Minister from Kenya. She said that our innovation strategy is being pored over. We have a great story. I think that plan B, should we end up in plan B, can work very well.

Q458 **Chair:** How long will we let it run before making a decision on it?

Kwasi Kwarteng: You will appreciate that I am not at the spear's point of the negotiations. There are other people in Government who are much more sighted on the flow and the timing of what might happen. We are working full steam ahead on plan B.

Q459 **Chair:** If that balance were to tilt—it is finely balanced—the implication was that as time goes by there are consequences to not being in the programme. It is a dynamic there, and it is going in the direction away from association. You as the Secretary of State for BEIS could say to the negotiators, "Actually, we think we have passed the point in which we would like to proceed voluntarily with plan A."

Kwasi Kwarteng: There is no way I am going to say to you even if I had a date. That would not make any sense at all, Mr Clark.

Chair: Fair enough.

Q460 **Aaron Bell:** It is good to see you, Secretary of State. Coming back to OneWeb, which you have already mentioned, I appreciate the investment predates your time as Secretary of State, but what is your understanding



of the motivation of the Government's decision to invest?

Kwasi Kwarteng: I thought you might ask me about that. I am not going to read it aloud, but I have a very clear letter from my predecessor. He refers to OneWeb representing an opportunity for UK interests globally. It has an ability to connect millions of people around the world through broadband. It would mean that we had a space platform. There were lots of compelling economic, financial reasons as well as strategic and defence reasons, which I am not privy to go into here, that made the purchase a sensible one.

Q461 **Aaron Bell:** Obviously, the space strategy was not published at the time, but did the investment fundamentally change our space strategy, which was in preparation at the time?

Kwasi Kwarteng: As I remember, the sign-off was in June 2020. That was when our investment was made. We only really got possession of the space strategy in January 2021. There was not a sense in which the acquisition of the stake in OneWeb led to the space strategy. They were quite different processes. Clearly, it has given us more capability in this space than if we had not made the acquisition.

Q462 **Aaron Bell:** It was obviously an abrupt decision because of the circumstances of the bankruptcy. We were at Harwell Space Cluster last week. A number of firms expressed a certain disquiet within the sector at this sudden decision, which was a very big divergence from what we were doing. They were a little discombobulated. They were not saying it was necessarily a bad idea. Have you heard that feedback, and how have you reassured the rest of the space and satellite sector that they are still being listened to?

Kwasi Kwarteng: We have to be very clear about what the nature of our investment means. There was a suspicion among the sector that somehow we would prioritise OneWeb, or we would be biased in favour of OneWeb, and we have been very strict about that. We very clearly want to have a competitive, diverse sector. We do not want the Government's stake in OneWeb to prejudice competition or tilt the playing field in a highly competitive market.

Q463 **Aaron Bell:** We have a fairly large investment. I think we are down to about 20%.

Kwasi Kwarteng: It will be diluted to about 17.5%.

Q464 **Aaron Bell:** What say do we have in how it is run and its priorities? Are we actively seeking to influence that, or, further to what you just said, are we taking a hands-off role and allowing them to compete?

Kwasi Kwarteng: Rebecca, do you want to come in on that?

Rebecca Evernden: I will come in and then perhaps hand over to Hugo to talk about the company. To add to what the Secretary of State has said, the OneWeb investment decision also signalled the Government's



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ambition at that stage to be a big player on the global stage. It is having a strategic asset that says we want to operate globally. It gives us strategic advantage; it should stimulate further opportunities and growth into the sector in the UK. While, as the Secretary of State has said, there is not a cause and effect around OneWeb leading to the space strategy, there is a line that you can follow that represents an increase of ambition in this country around what we want to achieve in space. I will hand over to Hugo, if that is okay.

Hugo Robson: You mentioned we are down to 19%. That is as a result of dilution. The initial investment was for \$500 million. That, based on the latest fundraising round in the sale of Hanwha, is worth an extra 20% in terms of the value.

In terms of the dilution, we have in essence the same rights as when we went into the project jointly with the Bharti group. Our rights are essentially the same. We still have three directors on the board. We have, importantly, the special share, the B share, which enshrines the rights within the business, and they are enshrined in the articles of association.

Some of the rights that we have will remain in place, ensuring that certain things like if there was a decision to move the headquarters out of the UK—it has been very much a move to being a UK business—would need approval from the Government. Yes, there has been dilution.

Q465 **Aaron Bell:** We still have those three board members.

Chair: You are one of those board members.

Hugo Robson: Yes, I should declare that I am.

Q466 **Aaron Bell:** Do you and other members take direction from the Department on how you act on the board, or do you use our own judgment?

Hugo Robson: It is a mix. There are certain requirements whereby we are acting effectively as directors, and we look at those as you would as a normal director, but there are certain shareholder director rights which are the normal rights you would have through a shareholder agreement whereby we effectively take the position from the Government and we therefore seek ministerial approval for those decisions.

Q467 **Aaron Bell:** To return to the Secretary of State for my final question, it seems like we are in the money at the moment—that's a long game. What do you say the UK has gained compared with other countries that have not invested in OneWeb?

Kwasi Kwarteng: The potential is huge. In phase 1 essentially we are looking at broadband distribution and satellites, and in phase 2 we can think about PNT, which was referred to. The OneWeb ownership gives us



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a potential. It does not mean it is going to happen, but if we did not have that stake we would be much more restricted in our ability to plan ahead.

Q468 **Aaron Bell:** It is about flexibility.

Kwasi Kwarteng: Exactly. It gives us a lot more flexibility. From a personal point of view, this was one of the biggest issues when I became Secretary of State in January. I think the equity raised at that point was £1.4 billion. We had to reach £2.4 billion in order that the company would not run out of money.

That was a big issue. I would not say it was a headache and I had sleepless nights over it, but it was in the balance. We managed to raise £1.5 billion on top of the £1.3 billion approximately. That was not obvious in January 2021. I think it is a huge success that we managed to get other investors on side. In the last tranche, the Korean company is paying a premium on the amount we paid, which is a good thing.

Q469 **Aaron Bell:** The UK Government took an active role in persuading other investors to come in to get to the full £2.4 billion, or whatever the amount was.

Kwasi Kwarteng: I would not say that I was an equity salesman, but I had conversations.

Q470 **Aaron Bell:** It was not just the company; it had the backing of BEIS.

Kwasi Kwarteng: Yes. Frankly, many of the people I had conversations with were very eager investors. That was demonstrated by the fact that we managed to double the equity raise in a fairly short time.

Q471 **Chair:** That investment decision was quite controversial at the time. I think it required your predecessor to make a ministerial direction on the grounds that it was novel and contentious. Is that right?

Kwasi Kwarteng: Yes.

Q472 **Chair:** What we know so far, as Aaron Bell says, is that it seems to be in the money, and the evidence you have given is that strategically it is contributing to our strengths. Is this a model that you think commends itself in other areas?

Kwasi Kwarteng: It is not something that I think is usual, and I would not want it to be a usual, day-to-day occurrence that governments take equity stakes—ultimately, taxpayers' money—in businesses that were bankrupt. Let's face it: it was in chapter 11. It is not something I want to see frequently.

At the time, I think people felt it was a unique opportunity to take a stake in an industry which is about to explode and grow very fast. You were kind enough to say that so far the investment has proven successful. If it had not, I am sure you would have hauled me in front of your Committee and I would have been asked to answer very difficult questions about the



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process and why we did this, but, in the event, it has worked reasonably well.

Q473 **Chair:** There is no work in the Department to learn the lessons of this to see whether it might be a way of thinking in other sectors where similar opportunities or risks apply, if there is a risk of bankruptcy.

Kwasi Kwarteng: I do not think there is any mileage in trying to create a system by which essentially we invest in companies that have gone bankrupt. I do not think that would be good or credible.

Q474 **Chair:** We should regard it as exceptional.

Kwasi Kwarteng: I think it is an exceptional deal.

Q475 **Graham Stringer:** You referenced a letter. Is that public? Can you make it available to the Committee?

Kwasi Kwarteng: I understand it is public; it is a one-side letter.

Q476 **Graham Stringer:** It would be very useful to have that.

Kwasi Kwarteng: That dates from 26 June. It was my predecessor writing to the acting permanent secretary essentially about the ministerial direction to which the Chair referred. As I look back, everything in the letter has proven true.

Q477 **Graham Stringer:** If the satellite project is successful, both financially and technically, are there any inhibitions, prohibitions or barriers to selling the Government's share?

Kwasi Kwarteng: It is not our intention to do so, but obviously if we have a share we are not prevented from selling it. We have no intention of doing that.

Q478 **Graham Stringer:** I understand that, but I am asking whether there are any barriers or regulations that would stop you doing that.

Kwasi Kwarteng: My understanding is not, but I would refer to the director.

Hugo Robson: No. As you would expect, in a shareholders agreement there are certain arrangements for the process of selling. There are restrictions. We cannot just sell our stake tomorrow. We would need to discuss it with our fellow shareholders, but there are normal shareholder arrangements in the process of selling.

Q479 **Graham Stringer:** If I may ask Aaron's question in a slightly different way, how would you explain to your constituents, or my constituents, the benefits of this investment to them?

Kwasi Kwarteng: I think it gives us a range of optionality in the space industry. We have talked about Earth observation capability and particularly about positioning, navigation and timing, which is a kind of GPS-type technology.



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All these things can be achieved—I'm not saying they will be—through OneWeb in the future. It does not just give us civil positioning abilities; it has a knock-on effect on our defence capability. Imagining a world in which we did not have access to this, particularly in relation to the fact we have been excluded from Galileo and we are negotiating on Copernicus, we would be in a much weaker strategic position.

As far as I am concerned, this has already delivered value for money. That is proven by the fact that the Korean company has paid a 20% premium on the price we paid.

Q480 Graham Stringer: When would you expect businesses and people in this country to have at least as good a service in PNT and communications as people in EU countries who have access to Galileo?

Kwasi Kwarteng: I cannot give a timeframe for that, but I would want to see it in the next two or three years, probably sooner.

Rebecca Evernden: The open service on Galileo is freely available to citizens of the UK, as it is to citizens of the EU and globally, so there is no direct impact on citizens from the free service provided by Galileo.

One other point on the benefits of OneWeb is that one of its aims is to offer satellite broadband for rural communities and people who find connectivity quite difficult. That is an important benefit we should be supporting and lauding.

Kwasi Kwarteng: The service is a global one. One of the things we have not mentioned about OneWeb is the range of investors. There are Korean, French and Indian investors. That gives us a distribution capability that is unique in this space. It is hugely significant and shows we are looking at our national strategic objectives and demonstrates that we are working with partners across the world to deliver world-affecting capability.

Q481 Chair: Mr Robson, my understanding of ministerial directions—this is not to criticise the direction—is that they are necessary if the advice of the officials of the Department is against that course of action. Have I understood that correctly?

Hugo Robson: Not so much against the course of action. I think the issue here was that it was a transaction being done very quickly indeed. It was in chapter 11 and there was a date by which bids had to be put into the process. Therefore, there was not enough time to run through the normal process you would expect in government—going through a business case, analysing the options and determining whether this was the right option. There was also not enough time to do the normal due diligence you would have hoped to go through, again because of the timing.

I would describe it more as a process issue rather than us saying that commercially this was the wrong thing to do. It was a process issue in



terms of the ability to do a proper value-for-money assessment, but we were lining up with the Bharti group, which is a very sophisticated investor. Therefore, from a commercial point of view we could feel comfortable that there was value.

The other issue from the point of view of value is that at that time a very significant amount of investment had been made into the business: some \$3.5 billion had been invested. We knew there was a significant additional investment to be made and that was one of the risks the Secretary of State alluded to in raising additional money, but in terms of the value of the business and the bid we put in we were comfortable that that was an appropriate bid on a commercial basis.

Q482 **Chair:** Sometimes there will be fast-moving situations in which it is necessary to make a decision without the time to be able to do all the analysis or have all the information. My question is really for the Department's administration. Why in those circumstances could the Department not make a recommendation that allowed the decision to be made without essentially passing it over to the Minister, saying, "It is over to you"? Why did the Department feel obliged to do that?

Hugo Robson: That was an assessment made at the time. A number of people had input into that decision, including the acting permanent secretary. The view taken was that, although it could be justified from a commercial point of view, we were unable to demonstrate at that point value for money against the alternative options that might have been available at the time. As I say, the main reason for the direction was a process issue.

Q483 **Chair:** Had it gone wrong, as the Secretary of State implied, his predecessor may well have attracted a lot of criticism and opprobrium for making it. If that was the considered view of the Department, is it not rather unfair not to crystallise that into advice that we should proceed with this but it is risky and put it all on the shoulders of the then Secretary of State?

Kwasi Kwarteng: Perhaps I might answer that question. This goes to the heart of government, as you appreciate. The phrase is, "Ministers decide." That is why we have this parliamentary system and I come in front of this Committee. Ultimately, the Minister in the form of the Secretary of State bears responsibility.

The officials were very clear about the process. As Mr Robson has described, the issue was not that they felt it was not value for money, but that they did not have enough time for the process. You will appreciate that in these fast-moving commercial situations people have to make decisions very quickly. We have seen this in the pandemic, where Ministers acted at red-hot speed and had to deploy capital and make things happen very quickly.



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You are quite right to say that ultimately my predecessor and I would have been responsible. I am happy to suggest that in this instance it did work reasonably well. You are quite right to say that if it had not worked we would bear the responsibility for that.

Q484 **Dehenna Davison:** Probably one of the sexiest things in space is actual launch.

Kwasi Kwarteng: If you say so.

Q485 **Dehenna Davison:** I think launch is the really sexy thing. Not only does it have huge economic benefits if we can improve our launch capability in the UK, but it inspires particularly young people to take an interest in space in the first place.

We spoke to Minister Freeman last week, who informed us that we can expect a horizontal launch from Cornwall this summer. It is incredibly exciting. Secretary of State, can you give us any further clarity on when we can expect the first vertical launch?

Kwasi Kwarteng: That is a very good question. We are focused on horizontal launch and the spaceport. For me, Spaceport Cornwall, if that is where it is—that is probably likely—is what we have to do. Going forward, it is not just Cornwall; we have Shetland, Snowdonia and a number of other places where we can launch satellites, but my immediate focus is on this summer.

Rebecca Evernden: The Secretary of State has said that we are very clearly focused on getting that first launch this summer, but we are working very closely with Lockheed Martin, ABL and the spaceports in Scotland to make sure that a launch in Scotland follows not long after. We are looking at a timeline of several months, but not much more than that, in order to get the first launch from Scotland.

Kwasi Kwarteng: That will be a vertical launch.

Rebecca Evernden: Yes.

Kwasi Kwarteng: We are focused on the horizontal launch and are very hopeful that a few months afterwards maybe we could get the vertical launch in Shetland.

Q486 **Dehenna Davison:** That is good to hear. One piece of feedback we have had from some of the companies working on launch, be it at launch sites or otherwise, is concern about the length of time it takes for licences to be granted, not just licences to operate but licences to launch. Is there sufficient human resource capacity within the Civil Aviation Authority to deal with the situation as it stands, but also looking ahead to future increasing numbers of applications?

Kwasi Kwarteng: That is an excellent question. I spoke to the Secretary of State for Transport about this very issue yesterday. As Rebecca suggested, I am very focused on this summer's launch. Clearly, we had



to expedite regulatory processes. Grant Shapps, Secretary of State for Transport, is responsible for the CAA. He has been very clear that, without any impediment to safety or impairment of the integrity of the process, we want to expedite this.

There is a wider issue with the CAA's capability. Clearly, historically the CAA has not been focused on space launches simply because we have not had them, but if this is going to happen I am sure that the CAA will reflect this growing market in its personnel, recruitment and staffing.

Q487 Dehenna Davison: What steps are being taken by BEIS to expedite and streamline the licensing process?

Kwasi Kwarteng: As I have said, the CAA is the arm's length body that deals with this. The CAA, as a function of our structure of government, reports to Transport, but I am always conversing with Transport colleagues about how we expedite regulation in this space.

Q488 Dehenna Davison: How much interaction has gone on with industry on this matter in terms of feedback on the application process and the length of time it takes?

Kwasi Kwarteng: Specifically in terms of the Cornwall launch, I have spoken about this to Virgin Orbit and Richard Branson himself. There is a lot of engagement in this specific project. More broadly, we are trying to do more engagement with companies, are we not?

Rebecca Evernden: We are working closely with Virgin Orbit, the CAA and the UK Space Agency that lead this programme. Virgin Orbit is working as a trilateral to try to get this delivered in the summer, so it is very much a combined effort with a shared sense of what is sought to be achieved. I think we are doing that quite well.

Kwasi Kwarteng: Going forward, clearly we need to do more of that if we are to have more launches.

Q489 Aaron Bell: Talking about developing new capabilities in space, let me give a little whistle-stop tour of a few topics. Following what Katherine Fletcher asked about earlier, what are you doing to ensure that MOD investments in our space domain awareness capabilities benefit the UKSA's space surveillance and tracking programme?

Kwasi Kwarteng: That is a question best directed to the MOD and the Secretary of State for Defence. All I can say is that we speak all the time. As Rebecca has pointed out, there is a dual capability. There is a civil capability, for which we are responsible, and a defence capability. We are trying to integrate the two and work out how we can synergise both approaches. We speak to the MOD all the time.

On a personal note, before I was Secretary of State I think I had gone to the MOD once. As a consequence of my promotion, I have been there



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probably half a dozen times, all of which have involved extensive conversations about space.

Q490 **Aaron Bell:** We saw some excellent demonstrations last week at Harwell Space Cluster by companies working on space debris. How can we work with other nations to create global regulations to control the amount of debris in space?

Rebecca Evernden: This was set out in our strategy as a priority area. The way to do this is to work through the United Nations because you need a global solution to a global problem. There are two different elements to this. One element is about dealing with space security—the threats—and coming up with a set of global norms and rules with other like-minded countries. There is a working group under the United Nations process to do that, which we are leading with the FCDO playing a strong role in that piece of work.

There is a bigger conversation about the space environment more generally that is trying to take forward the G7 summit statement on what we want to achieve in the space environment, which is dealt with through the Committee on the Peaceful Uses of Outer Space.

There is a twin-track approach and the UK is very active in both channels. We have made it a top priority for one of the things we want to take forward as part of the space strategy implementation.

Q491 **Aaron Bell:** What is the prognosis for those United Nations talks? There are members of the Security Council who do not really share our views on these sorts of things. Is it realistic that we will get the same sorts of treaties that we have for places like Antarctica? We have had previous treaties on the moon and so on. Will we get something on space debris that looks a little bit like that? How likely do you think that is?

Rebecca Evernden: The key is to work closely with like-minded states in order to create a critical mass to influence the wider debate. That is our starting point. We are working up a regulatory road map internally that will set out the steps we wish to take to get to that point of a consensus.

Kwasi Kwarteng: It is important to refer to the G7 last year, which ironically was held in Cornwall, where we want to launch a satellite. There was a commitment at that time for G7 to work together. I know that is not the UN, but these are some of the most influential countries in the UN and there is broad good will. How we get over the finishing line in the UN is another question, but we are certainly not the only people who are concerned about this.

Q492 **Aaron Bell:** We highlighted in-orbit manufacturing in the space strategy as an area where we can establish global leadership as the sector grows. What are we doing to support in-orbit manufacturing companies and the development of that sector?



Rebecca Evernden: It is one of the nascent technology areas that we have highlighted. The UK Space Agency has been running a national space innovation programme. We would expect to build on the experience of that going forward, subject to decisions being made around the allocation of funding in the next spending review period, but it is certainly an area where we work closely with our colleagues in UKRI and the Space Agency to look for those opportunities to fund and support technologies that have the potential to scale up and become big quite quickly.

Kwasi Kwarteng: The key is the manufacturing component. We have just come out with the levelling-up White Paper. We are very committed to building supply chains across various net-zero technologies. Similarly, in space we think the supply chain is important, so we need manufacturing capability as well as great design, R&D, innovation and blue-sky thinking.

It is an integrated approach, but we think there is economic opportunity in manufacturing and industrial capability.

Q493 **Katherine Fletcher:** If you zoom out a bit on our pale blue dot, you see that the biggest nuclear reactor in the neighbourhood is the sun. Obviously, there is a lot of talk about nuclear's contribution to net zero, which is incredibly welcome, but recently I have seen within the departmental brief some stuff about space energy. For the uninitiated, it is effectively putting a very sophisticated set of modular solar panels in orbit and beaming the energy back to the UK. I was surprised at how far down from a "Star Trek" script this stuff is. It has an enormous opportunity at the very least to be in the pot for consideration in our net-zero commitments because there is no carbon dioxide in space. I just wonder where you are with that because obviously it is really energy policy as opposed to space policy.

Rebecca Evernden: There has been early consideration of space-based solar power within the Department. It is something on which we have not yet concluded and is one of the technologies we are exploring as a possible solution for net zero. It is also a very innovative area in which potentially we could excel in the UK, but that is the stage the consideration is at in this point in time.

Q494 **Katherine Fletcher:** Would you be so kind as to keep the Committee updated as that emerging consideration occurs. I mention it—it seems a bit wacky—but a single installation is potentially 2 GW with a 2% transmission loss. For the uninitiated, that is a large nuclear reactor.

Kwasi Kwarteng: Two gigawatts is a huge amount. If you look at Hinkley Point C, that is 3.2 GW, but those are two reactors. You are quite right to say that potentially it is a huge installation, but you have to look at cost. I have not seen a breakdown of the cost. Before Ministers committed to that we would need a much clearer sense of what the bang for the buck would be in sticking something in space.



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Q495 **Katherine Fletcher:** Of course, but the 8-year-old in me who watched “Star Trek” was intrigued.

Kwasi Kwarteng: We all did that.

Chair: Ms Evernden, we would be grateful if you wrote to us in time for us to reflect this in our report. Obviously, it is not a central feature of it, but it would be nice to have that because it is very interesting.

Q496 **Dehenna Davison:** We know the importance of building the sector not just economically and in terms of the supply chain but in human capital. One of the issues the industry faces at the moment is skill shortages. It is double-pronged. One is the lack of skills base in the UK and the other is the difficulty at the moment in recruiting from overseas given our decision to leave the EU. I am focused more on the domestic side of it.

We have heard that the industry itself is doing an awful lot by way of encouraging people to come in at different levels; there are apprenticeships and graduate programmes. One of the areas where they say we are really lacking is programming skills. What work is going on in BEIS to try to encourage greater take-up of programming training and putting some resource into the industry to try to improve things?

Kwasi Kwarteng: The skill shortage you have described is relevant to lots of different sectors. In particular, as we are bouncing back from Covid there is a huge amount of demand. I think we are in the somewhat enviable position where we have more jobs than there are people to fill them. You contrast that with the opposite where you have too many people. I am old enough to remember when unemployment was 3 million and we had too few jobs for too many people. The situation we are in is a feature of expanding the economy. The strategy is very committed to upscaling skills and human capital, but we have to do more to do that and it is not obvious to me how we can remedy that very quickly, because it is about the education system, encouraging more STEM graduates, as we are doing, and commercialising those graduates so they can understand the economic opportunities in space; it is about digital skills and AI skills. It is something we are aware of. We are also working with the Department for Education. I would be very happy to update the Committee on what progress we are making in that.

Dehenna Davison: I think we would all appreciate that.

Q497 **Chair:** I have one final question that arose from our visit to Harwell last Thursday. We spoke to companies as well as some of the scientific institutions there. One of the companies said that it relied on Copernicus data to carry out its data analysis, which it then sold on to its customers. What are the implications for them of not associating with Copernicus? Is there anything the Secretary of State or Rebecca can say about that?

Kwasi Kwarteng: We did address this earlier in the hearing. My own view, having looked at different opportunities, is that we can reproduce



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quite a bit of what Copernicus offers. We have NovaSAR and other Earth observation programmes. Maybe Rebecca can fill you in on that.

Rebecca Evernden: One of the things we are looking at is the availability of data as we consider the options around Copernicus. Much of the data from Copernicus would still be available if we were not part of the programme, which is important.

There is a real opportunity for the UK to do more around data analytics. There are very many sources of space data, not just Copernicus. One of the things we are looking at is how we maximise all those sources of data so that companies can develop innovative applications and come up with commercially savvy ways of using the data.

It is a combination of the essential data—what Copernicus can provide around that and what we need to supplement potentially with domestic alternatives—and how we use data from other source, which is already being gathered. It is a bit like what the Geospatial Commission did; it opened up a whole market of new applications, so it is about learning lessons from that to create commercial opportunities.

Q498 **Chair:** Are you or can you be in touch with businesses like this to understand their needs and perhaps provide some reassurance during this period of uncertainty in which negotiations are taking place?

Rebecca Evernden: I am sure we can. The UK Space Agency is doing that all the time. There was a Space to Connect event last week specifically about the applications sector. A lot of businesses talked to Minister Freeman and colleagues from the Space Agency about exactly what data availability is and what the opportunities are. The Space Agency is continuing to do that, but it is an important point.

Chair: Ms Evernden, Mr Robson and Secretary of State, thank you very much indeed for your evidence. Secretary of State, you have a fascinating portfolio, of which space is a particular point of interest. Thank you very much for a very interesting session.