

## **Written Evidence Submitted by Spire Global UK (SPA0092)**

### About Spire Global

Founded in 2012, Spire has maintained a site in Glasgow since 2015. Here we design and manufacture our satellites, and in October of 2021 moved from our 11,000 sq ft unit to a 29,500 sq ft purpose-built facility at Skypark. Currently, the site employs a workforce of c. 100 personnel, highly skilled in engineering, software development and data science.

We also have sites in Singapore, Luxembourg, and in the United States at Boulder, San Francisco, and Washington, DC.

We believe insights and information from space can help us build a better world by placing previously unavailable knowledge into the hands of decision-makers. With this information, they can lead, act, and plan with confidence. Spire uses data about every point on Earth to solve global problems and unlock human potential.

Information about the earth and its environment has usually been collected from ground networks and satellite imagery. Spire does something different: we create a vast network of affordable nanosatellites that orbit just above Earth's atmosphere. These collect rich, granular data from the ultimate vantage point.

We want the information we collect and analyse to help make our world a safer, cleaner, more prosperous and more equitable place. Whether we are providing accurate weather forecasts to minimise the impact of natural disasters or location data to protect assets, optimise efficiency, and mitigate risk, we empower our customers to address our planet's toughest challenges with deliberate speed.

We welcome this inquiry and hope our contribution will help the committee in its task of effective recommendations for the continued growth of the UK space and satellite sector.

We have provided answers to the questions as detailed in the call for evidence, and are very happy to contribute or offer more information as the committee requires.

## **What are the prospects for the UK's global position as a space nation, individually and through international partnerships?**

We support the UK Government's ambition for the UK to capture 10% of the global space market by 2030. We believe the work we are undertaking can play a role in achieving this ambition.

The UK satellite sector has many strengths and is advancing. For example, at Spire we are using small satellites to monitor global weather systems and environmental phenomena. Along with partners, we are employing small satellite technology to track and control forest fires.

Given the UK's existing capabilities, **we would encourage the UK Government to ensure a focus on support for small satellite manufacturing**. It is the UK space sector's most significant speciality and differentiator, and therefore a real asset in making international impact. By concentrating support in this field, the UK Government can help the country's satellite sector develop its expertise and reputation, while growing our international market share. As a global company, Spire works with international partners to provide data solutions to global challenges, including those addressing the climate emergency, through the use of an expansive constellation of nanosatellites. The underpinning small satellite manufacturing capability is a recognised asset of the UK space sector and specifically within the Scottish space ecosystem.

## **What are the strengths and weaknesses of the current UK space sector and research and innovation base?**

The UK space sector's greatest strength is its ability to innovate and the speed at which it can do so. We do, however, believe the sector's strength in innovation is not being used to its full potential. More co-ordination and support through initiatives with government backing would strengthen the sector. The UK has a very agile space environment, and the capacity to tackle fundamental global challenges. With a coherent plan of national priorities, that are supported by long term government initiatives, the UK space community can be quickly mobilised to provide innovative solutions.

As an example, a large amount of environmental data is gathered by small satellites. Small satellites have an advantage of increased frequency and latency when compared to the more traditional large satellite missions. Yet the environmental data gathered by these small satellites is not being co-ordinated, analysed, or used in any coherent or regular fashion. If, however, the space sector were supported to focus on key areas of expertise such as the environment, with the added incentive of this being a national priority, the benefits for the sector and the world could be more impactful.

The UK space sector has the opportunity to lead the world in co-ordinating this work. We can boost our current strength of innovation while showing globally the strength of the UK's small satellite sector. To build on innovation and co-ordination and use existing information from small satellites, **the UK space sector needs a clearer regulatory framework**. To expand innovation, the space sector **needs a commercial strategy to generate growth and revenue in the sector**. This strategy should identify key areas of satellite specialism and seek to support them.

## **What lessons can be learned from the successes and failures of previous space strategies for the UK and the space strategies of other countries**

We are grateful for existing government support for the space sector. However, this support has tended to arrive in the form of small contracts and short-term opportunities. We believe a more harmonised approach to the support measures issued by the various Government programmes would have a greater strategic impact and create more longer-term opportunities for the UK space sector. In some instances, multiple opportunities are issued with very similar underlying solutions, however the administrative burden on submitting multiple applications is a major blocker for many growing organisations. A more streamlined and holistic approach would allow for greater participation from SMEs and better illustrate the breadth of capabilities and partnerships in response to opportunities.

We recognise that an ongoing challenge for the successful implementation of any government strategy is staff turnaround. This can never be completely mitigated, however we do believe **that a clearer designation of which body is responsible** for the driving and delivery of a strategy will go some way to help.

We would also like to see **any body designated with the task of shaping and implementing the strategy including leadership from the UK space sector**, working alongside the appropriate government officials. We believe that this can help the relevant body on track and also help facilitate a more agile, less fragmented environment, where the strategy can evolve and adapt more easily, to keep pace with industry development. A clear example of this approach can be seen in the MoD's Defence Space Strategy. This has been very industry-focussed and supported by a detailed and practical plan.

In terms of international examples, we should look to the US, which employs a continuous strategy that transcends the change of government. We believe such security has helped US companies drive growth and revenue. This US strategy exists as an ongoing programme because successive federal governments have recognised that a strong, robust satellite sector is very much in the national interest.

Government support – delivered through policy change or direct funding – will always be crucial for the satellite sector. Successive UK Governments – like their US counterparts – will need to see the **UK's satellite sector as a national asset** and support it accordingly. By giving the satellite sector clear, consistent support through funding, strategy, and policy development, the UK Government can signal clearly to the sector and the world that the satellite industry is a priority for the nation.

#### **What should be the aims and focus of a new UK Space Strategy, including considerations of:**

- **technology**
- **skills and diversity**
- **research funding, investment and economic growth**
- **industry**
- **civil and defence applications**
- **international considerations and partnerships**
- **place**
- **current regulatory and legislative frameworks and impact on UK launch potential**
- **impacts of low Earth orbit satellites on research activities**

We are pleased that, between the UK Government, the Scottish Government and its agencies, there is existing support in some areas. These areas include small satellites, ecosystems of supply-chain, data provision and delivery, launch sites, the innovation centre, AI machine learning, and real-world applications. End-to-end tech and application is not, however, supported across the UK in the same way.

In our recent inputs for the National Space Strategy, we noted that there was a *“distinct lack of detail on data and application areas in EO, technology development to support data collection, and products and services that are critical to the growth of the sector”*. We also made clear our request to ensure that the Strategy had *“a focus on EO data and the use of this for climate and ongoing environmental monitoring”*. With the current suite of traditional EO data collecting satellites moving towards the end of life, there is a pressing need to consider alternative low cost space systems that will allow for the continuous collection of vital EO data.

As part of these inputs, we identified six key areas of focus for the Strategy:

##### *a. Government involvement as an anchor customer*

Supportive public private partnerships incentivise industry to mobilise on delivering nationally focussed priorities, such as EO and climate data to better understand the impact of the changing environment. Governments are key customers to the space industry, providing a pathway to marketable products, as well as bridging the gap for commercial traction. As such, positioning government to become an anchor customer will accelerate growth and

enable the space sector in the UK to focus attention on developing transformative services within the national interest.

*b. More appropriate regulation framework to support the UK space sector and UK Launch programme*

A definite and robust regulatory framework is needed to accommodate the growing small satellite industry in the UK that recognises both the agility in development and launch frequency required to provide low-cost access to space. The level of Third Party Liability (TPL) insurance should reflect the needs of industry players in this sphere, with lower costs and an international competitive model, making the UK an attractive option for foreign entities looking to establish space sector capabilities. A review of the regulations in this way will further enhance the UK launch programme, by drawing a wide range of satellite operators to use the UK as a base for licensing and launch opportunities. Without a significant change in regulation, there is a risk the UK launch programme will be unable to secure the required operators to support the sites.

*c. Importance of the nanosatellite space cluster in Scotland*

Scotland is a recognised hub for the nanosatellite industry, providing end-to-end development of technology subsystems, satellite hardware, at scale manufacturing, as well as exploiting these assets through data services using ML/AI techniques and product development. It is critically important that the nanosatellite cluster is both protected and supported to ensure further growth and long-term development continues. This unique cluster is further strengthened by the Data Driven Innovation initiative at Edinburgh drawing in adjoining sectors that can benefit from space data and applications. Resources accessed through business engagement from the local enterprise agencies and government backing have also been critical in establishing this nanosatellite cluster in Scotland. Furthermore, the agility of the cluster to explore and access skills from other sectors, such as Oil & Gas, to draw in electronics and innovative ideas has seen a diversification and transferability of resources ensuring the significant skills and expertise are not lost.

*d. Advantage of a low cost satellite constellation to measure critical climate variables*

The accurate and global measurement of climate variables is of vital importance to further our understanding of the impact of climate change, and has so far relied heavily on a small number of dispersed satellites. Whilst this data is significant, it lacks the temporal resolution and global coverage required to continuously monitor the changing climate conditions that are needed to drive towards net zero targets. By leveraging the low cost collection of climate variables from space, the UK can become a global leader in developing a more detailed understanding of the impact of climate change, and be pivotal to areas of research by combining this global space data with modelling information to allow for more robust decisions to tackle the climate issue. For example, accurate measurement of the Earth's irradiance is a critical element into climate models, however to date this value is not well understood. Through a low cost constellation collecting relevant global data, this value can be easily determined, improving our understanding of the global climate condition.

*e. Net Zero target - Climate change and global weather variability*

The UK has an opportunity to become a world leader in weather monitoring by investing in new and innovative satellite data variables that would have a global impact on weather forecasting models, without the reliance on ageing European satellites. By taking advantage of the nascent space industry in the UK, a unique set of satellite derived weather variables can be measured, improving the weather forecast models and giving a more detailed picture of the changing global weather patterns. The UK would be positioned as a world leader in providing these data on a global stage.

*f. Importance of GNSS technology to improve aspects of life*

The importance and criticality of GNSS technology on modern society is well understood, and so the development of a resilient system that can serve as backup for critical elements of this is a high priority. The system would serve to amplify signals, allowing more reliable and robust GNSS signalling to support smart city development for better monitoring and surveillance to enable the reliable use of autonomous vehicles as the UK moves towards connected cities. Signal amplification through this resilient system could be used to give more detailed information inside buildings for example, providing critical data in areas that are so far only serviced by

localised and costly systems. Through the deployment of a resilient system to act as both a backup to the current GNSS network and amplify signals for greater applications, the UK would be at the cutting edge of this technology and have a reliable framework in place.

**What needs to be done to ensure the UK has appropriate, resilient and future-proofed space and satellite infrastructure for applications including:**

- **navigation systems**
- **weather forecasting**
- **earth observation including climate change**
- **communication (including broadband)**

There needs to be a more resilient programme to ensure delivery of all the above.

As we have highlighted, the UK has a strong small satellite sector. Much of the technological development in this area is focussed on launching satellites, with investment into spaceports and the overall launch programme. After this, however, there is little co-ordination about gathering and using the information these satellites collect to deliver on solutions or develop the suite of applications needed for decision making. This issue can be addressed if consistent government support recognises and focuses on the UK satellite sector's areas of existing specialism and potential growth. These include the recognition that the small satellite industry has a critical and impactful contribution to make in weather forecasting, earth observation, navigation system and communication. Partnership programme between national agencies and small satellite data provider can be used to demonstrate the valuable contribution these data can have on future proofing space based tools. An example of this is the partnership between the MET Office and Spire where a data validation project produced an independent impact study highlighting the significant improvement to weather forecasting models through the inclusion of Spire radio occultation data. This demonstrated both the accuracy and reliability of small satellite data for inclusion into existing weather forecasting, and that the amount of data collected improved the accuracy of the forecast substantially.

Navigation system is another key area of critical national importance, which can be supported and future-proofed by leveraging the expertise from the small satellite industry. Investment into a robust and resilient system that can serve as a backup to current GNSS networks would pave the way for the UK to lead on this technology and have this resource on hand to mitigate the risk of GNSS blackout.

The UK Government could also benefit from prioritising the integration of these capabilities nationally and promoting them internationally. We would like to see a clarification of UK Government structures, so its priorities and also its decision-making process is clearer for all to see. We believe this would boost the sector's confidence at home, while also showcasing its specialism and cutting-edge capabilities across the globe.

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