

# **Written Evidence Submitted by Space Forge Ltd (DIV0097)**

## **1. About Space Forge**

1.1 Space Forge is a Cardiff based company developing in-space manufacturing through the creation of a returnable satellite platform that leverages the benefits of space to make new materials that are not possible on Earth.

1.2 Our revolutionary return technology reduces the cost of return from space, which means less space debris in the orbital environment, and enables satellites to be refurbished on Earth for the first time ever.

1.3 Space Forge is working on a number of technologies simultaneously focused on improving the energy efficiency of critical systems, reducing the carbon footprint of the innovation. Space Forge plans to expand the Space-to-Earth and Space-to-Space industry by optimizing all aspects of a mission; from payload development to post-mission recovery and transportation systems, resulting in a comprehensive end-to-end service for in-orbit building and return.

1.6 The platform we are developing can support a wide range of missions. Space Forge has been developing use cases across several key profiles which has generated user interest. These profiles are:

1. In-space manufacturing in Low Earth Orbit for return to Earth
2. Dedicated microgravity research operating beyond ISS capabilities
3. Tactical return, providing rapid in-space capability that can offer 'plug and play' payload hosting for short duration missions with low turnaround time between return and relaunch.
4. Future support to in situ resource utilisation and deep space exploration

1.7 Space Forge enables the UK to be one of only five countries with an operational return from space capability, and one of only three able to do so to our own territories. The UK will be the only country in Europe able to facilitate return from space.

## **2. What benefits are there in in-space manufacturing?**

2.1 Payload technology under development by Space Forge can create materials in the space environment which are impossible to produce on Earth. These materials, when returned to our planet, enable significant capability advancements across our aerospace, defence, telecommunications and energy sectors.

2.2 Space manufacturing will deliver the next generation of products that are critical to a modern, clean society. These materials will impact our lives by reducing energy loss, make vehicles lighter, among other benefits, with the ultimate aim of reducing carbon dioxide emissions by a factor of three or more.

2.3 The permanent microgravity only found in space enables billions of new alloys to be made that were previously out of reach for humanity. By bringing them back to Earth these alloys could revolutionise renewable energy, transport and computing industries.

2.5 As well as the direct benefits outlined above, the development of the technology needed to successfully operate our returnable satellite platform will also have many other applications for the space sector in both a civil and defence capacity. For example the ability to predict with a high degree of accuracy the landing site of our returning platform.

### **3. Current regulatory and legislative frameworks and impact on UK launch potential.**

3.1 Space Forge's returnable satellite platform is the first of its kind and as such there is no regulatory model that adequately addresses our need. Through engagement with the Civil Aviation Authority (CAA), and other government bodies, we have begun to address this. Notably, Fabrication and Repatriation missions are now included on the list of potential missions recognised by the CAA.

3.2 Due to the novel returnable capability of our satellite platform, controlled re-entry is a critical part of the mission. Addressing the regulatory aspects of this return capability correctly is key to the safety and success of the mission.

3.3 Currently, the licensing framework established by the Space Industry Act 2018 does not offer a license which accurately suits our needs. Establishing a licensing framework that acknowledges the kind of platform Space Forge will be launching would ease our ability to make multiple launches in the future from the UK.

### **4. What should be the aims and focus of a new UK Space Strategy?**

4.1 The UK Space Strategy was a welcome publication as it allowed for a framework through which to engage with the Government and clarified how, when and which regulators Space Forge need to engage with.

4.2 However, although in-space manufacturing was mentioned in the strategy, it was not addressed in any detail. With a more comprehensive understanding of and long

term planning from the government within this sector, we would be able to grow and develop our technology and business at a fast rate, adding to the value and capability of UK launches. Space Forge would be happy to help develop government understanding of this emerging market.

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

5.1 With its ESA membership and well established industrial base, the UK is well positioned to develop innovative and commercially viable space capabilities. The UK Launch programme, expertise in small satellite manufacturing and application ecosystem are evidence of the UK's engineering capacity combined with an entrepreneurial environment.

5.2 However, the UK is behind many major space nations both in Europe and globally with its government support for the sector and its appreciation with the public.

5.3 On a prospect basis, there are strong opportunities to carve our world-leading and niche capabilities in the space domain that offer significant export potential, drive net-zero ambitions, and can support our allies.

5.4 International partnerships with new space agencies should be a key focus to improve trade opportunities and technological advantages. An illustration of this would be how UAE's Space Agency is only 10 years old and has already landed a mission on Mars.

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

6.1 Space Forge is building a significant strength in both in-space manufacturing and satellite re-entry. While both emerging technologies, the US and Asia have multiple actors already in pursuit of these markets. Space Forge remains the only actor in Europe developing these technologies and is developing a significant national capability.

6.2 Space Forge has expertise in the development of novel materials for advanced in-space manufacturing, satellite design and build, operation of spacecraft, satellite re-entry and recovery, and satellite software development. Coupled with the launch UK programme the UK will be one of only three countries able to both launch and recover a space platform within its own territory.

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