Written Evidence Submitted by Micross Components

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Micross is a specialty one-source microelectronics solutions provider focusing on servicing the high reliability electronics market by designing, manufacturing and supplying ruggedised components for harsh environments and applications. The main markets served are Space, Aerospace & Defence.

Micross is an active contributor to the upstream worldwide Space supply chain having qualified a number of microelectronics components for many satellite applications that include communications, earth observation, scientific instrumentation, military and navigation. As a European Space Agency (ESA) Assembly and Test House Process Capability approved organisation in accordance with ESA European Space Components Coordination (ESCC) Basic Specification No. 2567000 Issue 1, Micross has a long history and wealth of experience in manufacturing and qualifying components for Space applications.

The prospects for the UK's global position as a space nation is very encouraging given that over the past years it has focused on developing the infrastructure required to have an ecosystem conducive to meeting the end-to-end needs of the space supply chain from sub-system level design and manufacturing to a native launch capability. Historically, in the development of this capability, there has existed an over emphasis on specifically focusing on data applications. This has led to a very strong satellite applications ecosystem for data driven solutions. Unfortunately, this over emphasis on the data-only applications has meant that weaknesses in the supply chain in the upstream domain need focusing in order to improve the capabilities of the UK native supply chain and as such enhance the prospect of the nation's global position.

A strength of the UK Space sector is certainly its infrastructure around the developments promoted by the Satellite Applications Catapult as this domain is supported and has developed into being world class. A perceived weakness of the UK space sector is its dependency on foreign support at the upstream part of the supply chain given that the nation has not had the same level of focus and support in this domain. The realisation of all of the downstream applications are due to improvements and technological advancements in semiconductor technology that make the acquisition and processing of data possible. Without the evolution of microelectronics technology, the data driven applications would not be possible. Micross and the electronic component suppliers play a critical role in the end-to-end supply chain as a key enabler for the future national space programme ambitions. In an age in which there is a worldwide semiconductor shortage the non-dependency on a native supply of microelectronics/ semiconductor ecosystem is more important than ever given that Space electronics represent less than 1% of the worldwide semiconductor market by revenue. This non-commanding position of the Space industry relating to semiconductor availability means that it is very vulnerable and exposed to supply chain shortages having a negative effect on the industry's ability to develop future projects. Given this weakness of the UK Space sector, the recommendation would be to place some focus and emphasis on supporting the upstream sector of the supply chain in the way that the downstream applications sector has. A case study as a successful space strategy in this domain can be that of France and the impact of the National Centre for Space Studies (CNES[1]) and influence it has in coordinating, supporting and developing the native French upstream supply chain. CNES plays a pivotal role in defining technical requirements and supports the growth and development of technology and how it is specified and deployed into national and international space programmes. By operating under this dynamic,

[1] Centre National D'Études Spatiales

France has developed a very credible and capable native supply chain and workforce centred in the Toulouse Space cluster providing self-sufficient technological solutions to Space programmes worldwide. As part of this strategy, the French approach (and that of CNES) has been to encourage and maintain control of design authorities for the two key main prime manufacturers (Airbus and Thales Alenia Space) within the country (specifically in the Toulouse region). This has enabled France to spearhead the design and manufacturing of payload and service module requirements for many national, European Space Agency (ESA) and International consortia space projects.

The aim and focus of a new UK Space strategy should be to balance the strength and weaknesses of the native supply chain taking into consideration the disparity in capabilities that exist when comparing the infrastructure downstream to that of the upstream sector at the component supply level. As previously mentioned, future Space programmes will be dependent in technological advancements heavily supported by upcoming semiconductor technologies. In both of these domains, component upstream supply and semiconductors for space applications, the UK has a skills and technological shortage as the country is not developing enough engineering capabilities to support the industry. Funding focused on developing semiconductor and electronics engineering skills should be a priority for the country's future space ambitions. The Compound Semiconductor Applications (CSA) Catapult is a springboard for supporting this industry requirement. The Catapults current focus on the automotive industry and compound semiconductor technology means that there are limitations on the support it can provide the space industry. Of the leading compound semiconductor technologies, Gallium Nitride (GaN) at low voltage levels (sub 1kV) is utilised for space applications but Silicon Carbide (SiC) is susceptible to heavy ion radiation and as such unsuitable for wide Space applications in its current manufactured topology.

In the view of Micross, the UK Space strategy should emulate that of CNES in truly bringing together the national capabilities by coordinating and orchestrating via the UK Space Agency the organisations that can develop the technological requirements of the future. An example on an impact that this can have would be on the access to Low Earth Orbit (LEO) constellations for proof of concept and prototype validation of new technologies without space heritage. LEO satellites are well placed to provide a platform for technology demonstrators. In Orbit Demonstrator (IOD) activities managed by the Satellite Applications Catapult are difficult for upstream applications to participate in.

Microelectronics and semiconductor technologies have a significant touchpoint in the ability for the UK to develop an appropriate, resilient and future-proof space infrastructure in all of the satellite application domains: communications, earth observation, scientific instrumentation, military and navigation. Without a national strategy supporting these upstream component development activities, there will always exist a heavy reliance and dependency on foreign input that will limit the capability of the UK's global position as a space nation.

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