

## Written evidence submitted by AWE

### AWE response to House of Commons Defence Select Committee call for evidence to inquiry on Space Defence

AWE plays a crucial role in nuclear defence, providing the warheads for the UK's nuclear deterrent. We also use our knowledge and technical expertise to provide innovative solutions that support the UK's counter-terrorism and nuclear threat reduction activities. AWE is a 'non-departmental public body' owned by the MOD, it is not part of the MOD (and does not speak for the MOD).

We do not claim to represent defence space through our submission to this inquiry, but a number of our capabilities are of direct relevance to the questions asked and to both defence and civil space – especially with regard to resilience. The shared technologies and vulnerabilities of all spacecraft irrespective of the purpose of their design means that expertise is applicable in satellites, and in both defence and civil contexts

#### **How should the UK Government seek to further develop its strategic relationships and interoperability with allies?**

No comment.

#### **Where can the UK most effectively develop and deploy its own sovereign defence capabilities, with particular regard to:**

- **Space Situational Awareness**
- **PNT (Position, Navigation, Timing) services, in the context of the UK's exit from the EU's Galileo and EGNOS programmes**
- **Intelligence, Surveillance and Reconnaissance**
- **Communications**

No comment

#### **How vulnerable are our space assets to deliberate attack, both physical and otherwise, and what steps can be taken to improve their resilience (with regard both to defence capabilities and other critical national infrastructure)?**

Objects in space are inherently at risk from deliberate and natural sources of radiation and building resilience in the face of this should be a key consideration of any plan to develop space assets.

AWE has capabilities which could support satellite builders in both defence and civil space. The product AWE builds is launched on a rocket from under the sea and travels at speeds of up to 15,000mph while being heated to thousands of degrees. Further to this, it is exposed to intense pressure as it reaches and passes through the exo-atmosphere, where it is then exposed to the vacuum of space, before returning to a precise location on earth. Many of the 'insults' (pressures, g-forces, rapid multi-axis rotation, radiation) we ensure the UK's warheads are capable of withstanding are the same as those experienced by satellites.

AWE possess know-how, data and experimental facilities to strengthen against and test for the extreme conditions spacecraft make face. Subject to the consent of our parent Department, we are able to support other defence customers with resilience to these threats.

#### **How can defence industrial policy ensure that investment and innovation in the private space sector is harnessed to align with the UK's defence requirements?**

From AWE's experience, the private sector is able to invest in skills and drive innovation when it has a clear pipeline of demand and confidence that this is backed by a requisite long-term budget. This holds true in benefiting everything from niche scientific skills, to supply chains and construction.

**Have recent machinery of government changes ensured a joined-up and coherent approach to defence space policy both across Whitehall and within the MoD? What further improvements could be made?**

No comment.

**What should be the priorities of the new Space Command, and how will its structures facilitate integration across all military domains and co-operation with commercial space operations?**

No comment.

**How can the Ministry of Defence ensure that it attracts, develops and retains high calibre space specialists in both policy and operational roles?**

From AWE's experience, space as a sector does have inherent advantages in attracting people; not least being a fascinating topic and a desirable area in which to work which helps to draw those with STEM skills to it. This is particularly true regarding graduates, where some sub-specialisms in the space industry can have 100's of graduates applying for a single place. However, retaining these graduates is more of a challenge, with the difference between expectation and reality in the space sector sometimes being significant.

While the subject matter is fascinating, the pace of work can be slower than anticipated. While this is part of developing complex technologies, a greater tolerance of risk and failure can help lead to new innovations and the retention of skilled graduates and other workers.

In terms of other levers that can be pulled to help retain the best employees in this competitive field, from AWE's experience, experiencing the benefit of a long-term financial commitment from Government greatly helps to maintain niche technological capabilities. In addition to its pure monetary effect, a long-term financial commitment also helps to provide the confidence needed to get the buy-in of stakeholders from industry, to academia and SMEs, who all play a part in sustaining the interest of the specialists the department will need.

*5 July 2021*