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House of Commons Defence Committee Inquiry – Space Defence

Introduction

L3Harris Technologies is an agile global aerospace and defense technology innovator, delivering end-to-end solutions that meet government mission-critical needs. The company provides advanced defense and commercial technologies across air, land, sea, space and cyber domains. L3Harris has approximately $18 billion in annual revenue and 48,000 employees, with customers in more than 100 countries.

The Company is particularly proud of its role in supporting current space programmes and future developments in the space domain, from critical components on the Mars ROVER vehicle to deep space telescopes. From the outset of the US Government's Global Positioning System (GPS) programme, L3Harris has been at the very core of the technology and has delivered an equivalent of 800 failure-free years of operation across GPS constellations. In addition, the company continues to strengthen its relationship with the Department of Defence (DoD), US Space Force (USSF) and the Space Development Agency (SDA) on future Positioning, Navigation & Timing (PNT) solutions such as the Navigation Technology Satellite (NTS-3), which is an experimental, end-to-end demonstration of agile, resilient space-based PNT utilizing a software-driven system of system design concept; Command & Control (C2) work on the US National Space Operations Centre (NSpOC), space and ground based ISR solutions as well as work on future space architectures on data transfer layers and the Ballistic Missile Defence (BMD) programme.

L3Harris Technologies is currently delivering the exact capabilities the UK Ministry of Defence (MoD) has identified as critical capability areas for future UK defence space portfolio into the US Government.

In addition, in the UK L3Harris is the design authority, equipment supplier and maintainer for all 50,000 Bowman Tactical Radios in service with the British Army.

We believe we are well placed to support the UK government to understand better how to work more effectively with industrial partners and allies on delivering on present and future space defence programmes.

The answers to the questions are laid out in a bullet-point format for ease.

Q1 – How should the UK Government seek to further its strategic relationships and interoperability with allies?

- Publicise its ranking and weight the engagement order: US, 5 Eyes, NATO, friendly nations; then assign suitably skilled civil servants/industry contractors and appropriate number of personnel to engage that community.
- Engage in cross-party dialogue to fully understand the UK national defence space landscape: (1) map existing capabilities, (2) identify exact future capabilities required, (3) complete gap analysis.
- Map present and future capabilities from US, 5 Eyes, NATO, friendly nations and overlay UK gap analysis to determine interoperability and complementary capability plan for UK defence space.
- Rank EU as second highest weighted group and begin dialogue with EU regarding access to the Public Regulated Service (PRS) signal on Galileo.
- Ensure geo-return with ESA reflects work coming into UK.
- Extrapolate the European (including Russia) geopolitical map to 2030 and determine which of the capabilities identified in the gap analysis are required to ensure security and sustainability, i.e. ISR over polar and Baltic regions.

- Map gap analysis onto the individual finance sheets for programmes being pursued to identify where money is being lost. Reassign to capabilities that can be developed with international partners.
- Capabilities to collaborate on:
  - Space architectures across PNT, ISR/EO, Milsatcom, SSA, C2.
  - Space architectures including data transfer layers making novel use of orbit agnostic assets.
  - Ground architectures for space security and sustainability.
  - Better demonstration by UK government that industry views are being listened to and that government is taking active steps to engage full spectrum of domestic and international industry partners across all Tiers.

Q2 – Where can the UK most effectively develop and deploy its own sovereign defence capabilities, with particular regard to:

As stated above, an intelligent cross-party dialogue is required to understand what capabilities the UK requires as part of its defence space portfolio to ensure security, sustainability and prosperity for the UK and then in support of its allies and friendly nations. Development of key £multi-billion and million programmes must only be undertaken if the UK cannot source these capabilities from allied nations without service interruption. Where complementary products, capabilities and services can be procured, manufactured and delivered, this should be a preferred option.

Space Situational Awareness

- This is a key ENABLING capability in support of assets in any orbit (LEO, MEO and GEO) but requiring different responsive functionality per orbit and taking note of the fact that CONTESTED and CONGESTED have different meanings per orbit, i.e. assets in LEO are subject to greater terrestrial and space threats from both debris and adversaries than assets in GEO, which can manoeuvre against threats.
- The UK has historically provided support services to the US via RAF Fylingdales. With the news that the US Space Force is making plans to develop a network of sensors known as the Deep Space Advanced Radar Concept (DARC) comprising of 3 radar stations across the globe to track debris beyond the GEO orbit, the UK possesses the expertise via both the MoD and the private sector to invest in this work. Typically, software can easily be co-written or transferred and utilised on ground equipment that can interoperate and data transfer to US systems.

PNT (Position, Navigation, Timing) services, in the context of the UK's exit from the EU's Galileo and EGNOS programmes

- Refer to bullet point 4 in Q1. With the UK exiting the EU and losing access to Galileo's PRS signal, the UK should renegotiate its access.
- Reach back to its closest ally, US, to understand the work underway on the NTS-3 programme for future use, interoperability and augmentation on a potential sovereign system perhaps only requiring new waveform development and/or complementary ground-based solutions.

Intelligence, Surveillance and Reconnaissance

- UK ISR is hugely reliant on Open Source Intelligence with allies, especially the US. Therefore, development of more efficient data analysis and distribution can be developed.
- UK should contextualise/encompass any space-based ISR solution within the wider MDI concept whereby space ISR is able to interact with other domains. In fact, all space capability needs to be designed within an MDI construct.

Communications

- The UK government has relaxed its definition of "sovereign" within the Milsatcom/SKYNET programme whilst adopting a structure that will still allow the assets to be defended and protected whilst ensuring service delivery anywhere and at any time to the commander.
- This is the only area where the UK retains any space capability that can be described as sovereign. Presently the space supply chain remains broadly unchallenged by international industrial partners who can contribute

novel and exquisite products and systems under new commercial frameworks that can enhance the overall system. New ways of working with new partners should be a priority for the UK government.
- None of the capabilities listed above can be developed in isolation from international partners to a degree.
- That said, all the above capabilities can be sovereign, taking note that space is international and collaborative by design; and pathways exist to allow international partners to add to the supply chain without compromising on sovereignty.
- Invest in upgrading existing ground terminals in support of complementing existing Skynet constellation, and procure new ground infrastructure to complement future space-based assets.

Q3 – 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)?

- Vulnerabilities and threat profiles differ from LEO, MEO to GEO – language and tone of government ministers should reflect that understanding. Attacks are wider and easier from the ground, therefore greater thought and investment should be made there.
- Russia and China are leading efforts in threats in the grey zone. Therefore, the UK should understand the cyber interaction with space more and design software and interception tools appropriately.
- Wars have started and finished with words: our language and tone with our adversaries is often confrontational with no follow-through. This only weakens the UK position and rhetoric.

Q4 – How can defence industrial policy ensure that investment and innovation in in the private space sector is harnessed to align with the UK's defence requirements?

- Rationalise the current technology priority list, publish and work with appropriate sectors of industry through a set of transparent and open frameworks that allows fair competition.
- Recognise that not all technology development can be open to all sectors of industry, such as the SME community and that for certain capabilities and programmes a more focussed approach with industry will be more cost-effective and efficient.
- Engage with the European Defence Agency (EDA) and European Space Agency (ESA) to capitalise on the return on investment with these agencies.

Q5 – 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?

- Need to see actual signs from government that industry voice is being listened to.
- What is the national strategy?
- Vision for space seems all encompassing and financially limitless. Then UK really does not need everything.

Q6 – 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?

- Space Command, over time, may deliver C2 across defence space platforms, which means telemetry and telecommand, monitoring and responding to anomalous space and ground conditions. This requires experienced SQEP and a buildout of capability first.
- Policy and ownership of defence space programmes such as existing Skynet and future ISR, PNT and SMT are the financial and strategic responsibility of Strategic Command or are they? This division of roles and responsibilities needs to be clarified and cemented. In other words, a Mission Operations Centre (MOC) manages and operates assets and constellations. Decision to repurpose and reallocate assets lies elsewhere.
- Whilst the US space command provides a good template for how the UK version should be, the UK really should not mimic the US – simply don't have the budget, resources or the requirements/need for it.
- With the declaration of a future Space Academy residing within Space Command and the Space Commander being the authority, the role of the Air & Space Warfare Centre at RAF Waddington needs clarification. Training and how commanders use space derived data needs structure, focus and delivery by experienced

personnel and the Commercial Integration Cell (CIC) remit can be widened to incorporate a larger resource pool from industry to support the initial SQEP build-out within Space Command.

Q7 – How can the Ministry of Defence ensure that it attracts, develops and retains high calibre space specialists in both policy and operational roles?

- Design a career pathway for advancement: in industry graduates nominally spend first 2 years working within their chosen top 3-4 departments to gain full visibility of organisation – rotate policy, operational, delivery and between military branches.
- Write job specifications that are accurate and reflect the skills and human attributes required of the job.
- Make space attractive and transferrable with appropriate salary, recognition and ability to gain advancement and promotion within the military structure like the Royal Navy, Army and Royal Air Force.
- More industry/MOD talent transfers and secondments.
- Better transparency of roles on offer: Space Directorate has a mix of civil servants and armed forces personnel with advice being sought from select industry partners. Where was this advertised?

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