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INPUT TO PARLIAMENTARY REVIEW ON DEFENCE SPACE

By Neil Fraser – personal input but based on 26 years military experience, including as the MOD lead for Skynet 5, and my role at NSSLGlobal as Director Defence and Space Programmes. The notes are in bullets for ease and laid out by question area.

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

- *Space is international and global by nature, and fundamentally strength, resilience and consensus are key to maintaining safety in space for wider benefit – including defence and security (far wider than purely the military elements of space)*
- *BUT we have to recognise that competition in space – economic and military – can escalate and do so rapidly and so we must be better prepared nationally and internationally with capability and intent to deal with escalations and threats to behaviours and norms*
- *Being "International by design" is key – to allow effective ability to lean on allies and also achieve influence – whilst also retaining "appropriate independence"*
- *Key areas of development*
    - *Architectures across PNT, EO/ISR, Satcom, Space Domain Awareness (SDA), Space Traffic Management (STM) etc – where allies can interoperate*
    - *Priority assumed to be US, 5-eyes, NATO, wider*
    - *Don't treat space "in its own right" too much – but as a key enabling domain to the user domains (air, land, maritime) and fundamental to Multi-Domain Integration and similar initiatives in allied nations (and notably the US)*
    - *Consider how space contributes to combined and joint forces – including US-UK, the Combined Joint Expeditionary Force (CJEF), wider NATO and see areas where operational coherence can be improved – eg dynamic bandwidth reallocation etc.*

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

- *see comments about Allies above – plus "sovereign" is a word that can be tricky to define. Do we mean the supply chain (and to what level?), or simply freedom of operation. Sovereignty or National capability can be over-played in some areas – we don't have sovereign supply chain in many (if any) defence areas. The MOD assured capability (AC) approach provides some useful angles to decompose this more intelligently. Also, we cannot afford everything so need to understand from Allies where burden sharing can be most effective!*
- **Space Situational Awareness**
    - *UK already plays a part here, and has obligations, STM paper in train from UKSpace*
    - *Clearly all needs linked to Allies, and to commercial providers of SSA and commercial operators who would benefit from improved SSA*

- *Enabling UNDERSTAND function which is key to OPERATE and PROTECT*
- *Can make rapid progress here in tools and software, and with allies and industry – probably fairly cost effectively*

- **PNT (Position, Navigation, Timing) services, in the context of the UK's exit from the EU's Galileo and EGNOS programmes**
  - *So many other options – utilise wider GNSS systems, including Galileo, and aggregate for resilience, leverage comms systems with multi-band antennas, link into ground-based systems*
  - *Next generation US GPS programme underway*
  - *Need to really understand return on investment here – it's a vital capability but can be done in many ways that may not need a space-based UK capability at all…*

- **Intelligence, Surveillance and Reconnaissance**
  - *Fundamentally today ISR relies hugely on OSINT (Open Source Intelligence) and Allies (especially the US)*
  - *So, gathering data is perhaps better approached from bringing reliable OSINT space services (perhaps from UK or other companies) together with Allies space gathered intel and other intel – with the key sovereign element being how that data is analysed?*
  - *No doubt the UK could create new capability in EO/ISR from space – plays to smallsat and UK launch from a general perspective, builds on work at Harwell and this may be an area we can offer UK capability to allies and do some burden sharing*
  - *ISR from space needs seen in wider defence context (HUMINT, ELINT air and ground and maritime gathered) and so however delivered, the space capability must be seen as part of the wider defence, national and international ISR mix – not some "space stovepipe"*
  - *And maybe it's more about camera and processing technology …*

- **Communications**
  - *This is the traditional area where UK has invested in "independent capability" (albeit delivered and managed by industry) and can and should retain core capability BUT*
  - *Could be better leveraged across government, making best use of taxpayers money*
  - *Sustains the building jobs (potentially both GEO scale and MEO/LEO scale satellites)*
  - *An area of expertise we can build on – but also consider bringing more choice, better and more flexible commercial frameworks, wider supply chain to the delivery of satcom*
  - *See satcom as a continuum between commercial / private sector COMSAT and military MILSAT (even if contractor delivered) rather than separate*
  - *Consider convergence more between satcom and terrestrial*
  - *Invest in terminal technology – to best leverage various space-based assets*
  - *Satcom is key to all enabling defence to deliver Multi-Domain Integration (MDI) and ensure resilient connectivity across defence, into wider government and to the tactical edge to support the demand to sense, understand and orchestrate effects from the senior decision maker to the front-line unit and in some cases the individual*

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)?

- *Increasingly vulnerable and clearly there is an increasing intent to undermine/attack allied space-based capabilities. Potentially more likely though is an unintended incident causing damage….*
- *Work with allies to create operational, technical, commercial and (inter) national resilience (ie a national system maybe easier to target than one supporting allies and / or enterprise or consumer traffic).*
- *Consider whole of systems – it's the ground segment that is easier to intercept/disrupt – especially widely dispersed and harder to protect LEO ground segment.*

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?

- *Match ESA with national funding*
- *Determine priorities and focus on them*
- *Regionalise and group where appropriate*

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?

- *Seems to be progress in "messaging" but need tangible signs*
- *Get the strategy out – and a plan*
- *A Vision without resources is a hallucination…*

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?

- *To UNDERSTAND, ENABLE, PROTECT the domain – across all space capabilities (BUT in concert with others noting the attack vectors from ground segment). This must be the priority, building around the capability the UK has and growing linkages with allies and wider UK Defence*
- *It must be and must be seen as a joint command – and understand the user community and hence how operating the battlespace / domain enables them*
- *Communications and ISR are fundamentally capabilities space contributes to (the "digital backbone") but a fledgling space command (and even a fully mature one) should not lead these functions. Strategic Command and enabling organisations need to set the demand on space, and integrate these capabilities for wider defence purposes. Space Command could in time deliver and operate the space elements for an on behalf of Stratcom and enable the Front-Line Commands*
- *Space Command will naturally grow in skills and scale – and act perhaps as a more operationally aware and integrated organisation to enable wider defence and space operations eg space launch, SSA/SDA/STM.*
- *The provision of commercial satcom, and commercial EO/ISR must be integrated with Stratcom, Defence Digital, Defence Intelligence and others and also the satellite operations element via the Commercial Integration Cell (CIC) in the Space Operations Centre (SpOC).*

- *UK Space Command cannot be the same as the US – scale and budget reality – so needs to act as a focus, and not attempt to do it all. The balance between Stratcom C4ISR and Space and Space Command will be key, and interesting to watch.*
- *Space is fundamentally an enabling domain….*

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

- *Consider carefully managed Industry placements – the right companies, the right roles, and with return of service*
- *Consider placements in DSTL for military staff for Space and also in UK Space Agency (UKSA) in addition to the extant exchange posts (assumed largely in the US)*
- *Make it a career stream to the joint community (OPERATE and DEFEND space) including technical acquisition*
- *But also encourage people to move into and out of space (providing user focus, acquisition experience etc) to prevent it becoming just a battlespace / spacecraft controller dominated world – ie a route to promotion for more generalists – which will ultimately mean space is better understood and considered.*

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