

SUBMISSION FROM THE COUNCIL ON GEOSTRATEGY

DEFENCE COMMITTEE'S INQUIRY ON SPACE DEFENCE

1. The Council on Geostrategy is an independent non-profit organisation situated in the heart of Westminster. We focus on an international environment increasingly defined by geopolitical competition and environmental crisis. Our vision is a united, strong and green Britain, which works with other free and open nations to compete geopolitically and lead the world in overcoming the environmental crisis – for a more secure and prosperous future. The security of the United Kingdom (UK) and its assets, whether they be on earth or in space, is of vital concern to the Council on Geostrategy; as technology develops the security of space assets will become vital to the wider security of Britain and its allies and partners.
2. Since the first man made satellite was launched in 1957 the potential and importance of orbital satellites has increased exponentially. Not only is British civil society dependent on satellites, but they are key to existing UK national defence systems, and wider military operations. The British military communications network is dependent on Skynet, a satellite based communications network which covers almost all of the world.
3. Innovation in space drives wider innovation that can be deployed to improve the everyday lives of citizens around the world. Whether that is the development of the Oneweb, which will soon be able to provide high speed internet to people all over the world, or simply in getting from A to B by using the global positioning systems.
4. The UK needs the ability to launch within 48 hours, this also needs to be independent, as with the nuclear deterrent. This capability is necessary for us to be able to match the launch abilities of nations such as the USA and China. The ability to launch replacement for damaged or sabotaged satellites within 48 hours will give the UK resilience, as well as providing our NATO Allies with similar resilience. As the [Integrated Review](#) points out (p. 58), the UK is heavily reliant on its allies to launch satellites into space. Creating a commercial UK based satellite launch industry will ensure the country's strategic security, enabling the UK to deliver satellites into orbit without allied assistance, making the UK a sovereign space power.
5. The creation of the Cornwall spaceport means that the UK will have its first vertical satellite launch, from 2022, from European territory. Similarly the Space Hub Sutherland ([SHS](#)), will provide the UK with a second space launch site in the Highlands of Scotland. This is in line with the intentions of the [Integrated Review](#) (p.60), which seeks to have commercial launch capability by 2022. The building of two launch sites increases the resilience of the UK's space launch capabilities. As the UK is a long way from the equator, launches will not benefit from reduced delta-V requirements, but shorter supply chains from factory to launch site bring their own cost-saving benefits.
6. In tandem with this the UK should seek to develop and invest in small lift vehicle manufacturers. Due to technological advancements and off-the-shelf satellite technology, the size and cost of satellites has drastically reduced. In [2011](#) only 39 satellites launched weighed less than 600kg, in 2020 it was more than 1,200. Companies such as RocketLab with their reusable small Electron Engine provide opportunities for cheaper launches of small satellites. The reusable RocketLab launch engines are currently launching out of New Zealand; the UK should be seeking to attract such companies, as they provide the innovation needed to ensure the future of the UK's Space Program and defence.

7. Research and development to reduce the cost of launching satellites, which is currently the most expensive aspect of satellite launches. This can be achieved by maximising use of off-the-shelf technology and leveraging UK companies that specialise in this field.
8. Due to the UK's withdrawal from the European Union (EU), the UK no longer has access to the secure connection to the Galileo global navigation satellite system (GNSS) programme. This means the UK no longer has access to its own secure space-based Positioning, Navigation, and Timing programme (PNT). According to HM Government around [£253 billion](#) (13.4%) of the economy is reliant on PNT; it is therefore a crucial part of the British economy. Currently the UK relies heavily upon allied infrastructure, most noticeably the United States' Global Positioning System (GPS). An ideal system for the UK to adopt would be a [system of systems](#), with no individual links, making it resilient to accidental or deliberate disruption and damage. The future of an independent British PNT satellite system is not yet certain, but it is likely that cost will be the most significant obstruction to a fully integrated and secure PNT network. For the time being the only viable solution to a PNT system is space based, but the UK has the potential to develop a [Quantum 'compass'](#) – a highly advanced form of accelerometer which does not require satellite uplink.
9. Government investment is vital, although the UK has a robust small satellite industry, investment is needed to keep hold of the market share Britain currently has. Surrey Satellite Technology Ltd are one of the world's leading manufacturers of small satellites, with [40%](#) of all small satellites in orbit having been manufactured by UK companies.
10. Skynet 6 is vital for maintaining Beyond Line of Sight Communication and has been [approved](#) by an Accounting Officer Assessment (AOA) by Sir Stephen Lovegrove, the National Security Advisor. Although Skynet 5 is an excellent system that functions well and provides communications to all of the 'Five Eyes' allies, it is an ageing system, whose technical specifications have been far surpassed by modern developments. The current Skynet 5 contract is due to expire in 2022; continued investment in Beyond Line of Sight Communications will be vital to British military operations and ability to project and protect power across the globe.
11. The weaponisation of space should be avoided at all costs; it would increase the likelihood of '[Kessler Syndrome](#)', and make the chances of collision in low earth orbit high enough as to render it unusable. Kessler Syndrome is a theory proposed, in 1978, by NASA Scientist Donald J. Kessler. Kessler suggests that past a critical mass, the likelihood of collisions in space would increase, creating a collisional cascade, rendering Low Earth Orbit unsustainable for satellites.
12. However, at present the greatest risk to UK space assets is through cyber warfare. As the nature of most satellites is to communicate with Earth, they maintain links to and from the planet's surface, making them vulnerable to cyber attack. The UK has among the best cyber defences in the world, but this does not make British satellites invulnerable. It is almost certain that the UK is able to electronically break into foreign satellites and it is likely other nations will have, or will be developing, similar capabilities.
13. The nature of space makes all space assets vulnerable to attack. Resilience is likely to be best achieved countering attacks prior to launch – requiring investment into sophisticated intelligence gathering capabilities – or, more significantly, by the ability to rapidly replace individual satellites or broader elements of orbital infrastructure.
14. The importance of space should not be understated; the Integrated Review highlights the fact we are in an age of geopolitical competition, which increasingly incorporates space. Although the UK has long been commercially competitive in terms of space technology, it lacks the

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comprehensive and integrated capabilities of a major sovereign space power (befitting its global weight and interests). This should be remedied by greater investment in UK launch capabilities and measures to keep up with foreign attempts to gain military and strategic superiority in space. It may also require HM Government support for high risk but potentially high reward research and development as well as activities in space that may have a national as opposed to an exclusively commercial utility.

*Prepared by John Dobson, Events and Policy Coordinator, Council on Geostrategy
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