



Why space matters to the United Kingdom

By Gabriel Elefteriu

The question of how to articulate the importance of space both to the taxpayer and to political decision makers has vexed British officials for a long time. It is a wicked problem for several reasons. First and foremost, space is ‘out of sight and out of mind’ – an intangible world of satellites and space stations which the public never gets to see in action with their own eyes or interact with directly. The closest to a ‘space experience’ one can have is witnessing a rocket launch. Space in general – exploration, science, and *science fiction* – may be an object of endless fascination for a great many people when their attention is turned in its direction, but broadly speaking it remains remote and abstract.

It is perhaps the case that citizens do not perceive ‘space’ as part of their daily life in the same way as they do transport infrastructure, utilities like energy, or the Internet, which are things that they *use* directly every day. Of course, all these aspects of modern society, and more, depend on background space-derived services to an increasing degree. Even navigating by Google Maps – space advocates’ classic example of the vital role of satellites in a person’s daily routine – is hard to ‘sell’ today as a space benefit rather than a function of the Internet or smartphone, which is how people practically encounter it.



The second major problem with respect to public opinion on this matter is that space in general is often seen as a discretionary activity. This is principally because *space exploration* – which does command some support but, as a scientific endeavour, remains a *niche* area of space policy – has always been the dominant space related theme in popular culture even before the Apollo missions.¹ It excites the imagination and, allied to science fiction stories, it is great fun to follow or consume as a media or cultural product. But, from a policy perspective, it is a dead-end as it makes for a feeble, limiting argument in seeking larger budgets. If space is mainly ‘just’ an expensive exploration and science endeavour to most people, it will inevitably be low on the list of *important* priorities when budgets are tight, and it will always be vulnerable to accusations of ‘waste’ – so much so that the government of Harold Wilson, then prime minister, closed down the United Kingdom’s (UK) successful rocket launch programme in the 1970s because it saw no important justification for it. In some ways, the starry-eyed space advocacy narratives drawing on the ‘fascination’ of this domain may work well with children, but from a broader perspective they are counterproductive.

The third key challenge is that space touches on so many other domains and is so multi-faceted, that it sits awkwardly at the intersection of several policy areas. Space combines science, business and national security; it is services and data, but also manufacturing and infrastructure. The fragmentation of space governance is a particularly debilitating problem in a British context. It is not clear which part of government space properly belongs to and it tends to be dealt with as a cross-departmental issue. But within each of the lead departments – today, the Department for Science, Innovation and Technology and the Ministry of Defence – space is at best a secondary issue, and it lacks a clear champion in government. So, by its very nature as a complex and widely-distributed policy area – without a clear, powerful champion in government, and without a simple, clear strategic narrative – space faces a structural, bureaucratic disadvantage in the competition for resources with other spending priorities.

Experts in the field, and indeed the Council on Geostrategy through its previous work, are clear about the *critical* importance of space and space power for Britain’s future.² But the gap in communicating this to non-specialist audiences has not yet been bridged. Finding ways to explain what is at stake to boost public and therefore political support for space – as the one drives the

¹ Will Dahlgreen, ‘Space exploration still seen as important’, *YouGov*, 08/11/2013, <https://yougov.co.uk/> (checked: 22/04/2024).

² See: Gabriel Elefteriu, ‘Space power and national strategy’, *Britain’s World*, 02/02/2023, <https://www.geostrategy.org.uk/> (checked: 22/04/2024); Ali Stickings, ‘Policy in a Vacuum: Why the UK Needs to Rethink How it Approaches Space’, *Royal United Services Institute*, 06/08/2020, <https://rusi.org/> (checked: 22/04/2024) and Phil Lester, ‘British Spacepower and the Integrated Review: The Search for Strategy – A Response’, *King’s College London*, 04/12/2020, <https://www.kcl.ac.uk/> (checked: 22/04/2024).

other – is not a pet project or an enthusiast’s work; it is becoming an urgent strategic requirement with real-world consequences for national security.

This Primer offers an alternative proposition for why space matters to the UK. Seeing space as increasingly central to geopolitical competition, it moves away from the conventional ‘retail list’ approach centred on space-based dependencies and opportunities. Instead, it argues that His Majesty’s (HM) Government should view space as central to national defence.

Justifying space investment: The conventional view

The arguments for the objective, measurable importance of space to the functioning of developed countries, such as the UK, are well rehearsed in public discourse and dedicated studies. Two of the most useful are Aerospace Corporation’s *The Value of Space* and the Department for Science, Innovation and Technology’s (DSTI) latest version of *The Case for Space*, as well as recent work from European Space Policy Institute.³ In all instances, the traditional approach in explaining why space matters rests on three components.

The first is about the high level of **dependence of modern societies and militaries** on space-based services. As also discussed in previous work by the Council on Geostrategy, space underpins large chunks of the modern economy and is a vital component of Critical National Infrastructure.⁴ The financial sector, for example, is enabled by precise time-stamping of financial transactions, with global time data distributed by Global Navigation Satellite Systems (GNSS) such as the American Global Positioning System (GPS). Without a timing signal, ATMs would malfunction and the banking system would freeze up.

In the area of transport, things are similar: space supports all its major modes, from aviation to maritime navigation, not to mention upcoming ‘smart mobility’ solutions which depend on precise positioning data and other space services. Telecoms use precise timing for bandwidth management; satellite backhaul for data transfer; and now, satellite broadband and soon phone to

³ See: Robert S. Wilson, Michael P. Gleason, Samira Patel, and Luc H. Riesbeck, ‘The Value of Space’, Aerospace, 11/05/2020, <https://csps.aerospace.org/> (checked: 22/04/2024) and ‘The Case for Space: Investing to realise its potential for UK benefit’, Department for Science, Innovation and Technology (UK), 12/07/2023, <https://assets.publishing.service.gov.uk/> (checked: 22/04/2024). Previous iterations of this study were published in 2015 and 2009, see: Greg Sadlier, Rasmus Flytkjaer, Mike Halterbeck, Viktoriya Peycheva and Laura Koch, ‘The Case for Space 2015’, London Economics, 07/07/2015, <https://www.ukspace.org/> (checked: 22/04/2024) and ‘The Case for Space: The Impact of Space Derived Services and Data’, Oxford Economics, 16/07/2009, <https://www.ukspace.org/> (checked: 22/04/2024).

⁴ Gabriel Elefteriu, ‘The role of space power in geopolitical competition’, Council on Geostrategy, 30/01/2024, <https://www.geostrategy.org.uk/> (checked: 22/04/2024).



satellite ('direct-to-device') connectivity. In short, mobile telecommunications worldwide depend on space. The list goes on and the vulnerabilities compound with the growing integration of terrestrial services and the wider digital economy with space-based systems. There are approximately 9,400 satellites in orbit in 2024.⁵ A 2020 study predicts this number to reach anywhere between 60,000 to 100,000 by 2030.⁶ Any disruption in space services would have a cascading effect.

In the military field, the dependency of the armed forces of leading free and open countries on space cannot be overstated. In 2017, Gen. Sir Chris Deverrell, then Commander of UK Joint Forces Command (now Strategic Command), stated publicly that '90% of the platforms and systems that constitute the UK military equipment programme are dependent on space to some degree.'⁷ Advanced armed forces, such as those of North Atlantic Treaty Organisation (NATO) countries, would find it extremely difficult to conduct major combat operations without access to space-based capabilities; they would be rendered deaf, blind and disoriented, with almost everything which gives them the 'technological edge' over their presumptive adversaries being lost at a stroke.

The second conventional argument for space relates to the **societal benefits and applications** of space technology. Space science and research and development, for example, can have a catalysing effect on a country's innovation and technological ecosystem, with various spin-off technologies. Then there are the variety of efficiencies that space-related services bring in people's daily lives, from sports-technology GPS-linked fitness apps to Internet connectivity in remote locations. The fight against climate change is also strongly tied to data collected from space – indeed, it is not possible to get to 'Net Zero' without space – as is accurate weather forecasting. Simply put, satellites support many of the technologies behind modern-day conveniences.

Finally, the third key point in the standard case for space is the sheer value of the space economy itself, and, relatedly, the growing proportion of the overall global economy that space supports. The UK space sector is worth over £17.5 billion in income and space activities are growing globally, with the world space economy now worth around US\$0.5 trillion dollars and projected to reach US\$1 trillion in 2030 even on current trends.⁸ But technological innovation in a number

⁵ 'How Many Satellites are in Space?', *nano avionics*, 04/05/2023, <https://nanoavionics.com/> (checked: 22/04/2024).

⁶ Aparna Venkatesan, James Lowenthal, Parvathy Prem and Monica Vidaurri, 'The impact of satellite constellations on space as an ancestral global commons', *Nature Astronomy*, 4:1043–1048 (2020).

⁷ Chris Deverrell, Speech: 'Global MilSatCom conference 2017', Ministry of Defence (UK), 08/11/2017, <https://www.gov.uk/> (checked: 22/04/2024).

⁸ See: 'Space Foundation Releases the Space Report 2023 Q2', Space Foundation, 25/05/2023, <https://www.spacefoundation.org/> (checked: 22/04/2024); 'A giant leap for the space industry', McKinsey and Co, 19/01/2023, <https://www.mckinsey.com/> (checked: 22/04/2024); and 'The New Space Era: Expansion of the Space Economy', Bank of America Institute, 26/01/2023, <https://newspaceeconomy.ca/> (checked: 22/04/2024).



of key areas such as in-space manufacturing, on-orbit servicing and space based solar power – supported by falling launch costs – is set to unlock completely new markets in space, and therefore significant extra wealth. Being in a technological and commercial position to tap into these opportunities and capture an important share of this future space economy will ultimately translate into significant strategic advantage that no country with global interests, such as the UK, can afford to ignore.

These three arguments are undoubtedly powerful and true. Space is certainly about *national resilience* (whole industries and critical services are dependent on satellite systems); about a whole range of *societal benefits* which ultimately translate into various forms of competitive advantage, including in technology and addressing global issues like climate change; and about the sheer *economic opportunity*, which will be transformative for national prosperity in the future.

But this ‘portfolio’-way of explaining why space matters, which tries to persuade by quantity (i.e., a list of disparate reasons which *together* amount to an argument) rather than quality (a single compelling idea) sows confusion. In all fairness, it is also too similar to the case that can be made *to some extent* for other important technologies or capabilities, such as Artificial Intelligence or green/clean technologies. It is therefore ineffective for the strategic task identified at the outset: persuading the public and decision-makers of the *special* and urgent need to invest in UK space power. A different approach is required.

The defence-centric argument

The rapid deterioration of the international environment, with Chinese ambitions pressing on the South China Sea and Taiwan, Iranian power ascendant in the Middle East, and an unrelenting Russian invasion pressing against Ukrainian defences on European soil – defined as ‘intensifying geopolitical competition’ or ‘systemic competition’ in the Integrated Review and its refresh⁹ – creates a fundamentally different background for a national conversation about space today than it has been the case throughout the decades of benign ‘NewSpace’ growth after the Cold War.

⁹ See: ‘Global Britain in a Competitive Age: the Integrated Review of Security, Defence, Development and Foreign Policy’, Cabinet Office, 07/03/2021, <https://www.gov.uk/> (checked: 22/04/2024) and ‘Integrated Review Refresh 2023: Responding to a more contested and volatile world’, Cabinet Office, 13/03/2023, <https://www.gov.uk/> (checked: 22/04/2024).



The other factor disrupting the continuity of the conventional thinking on the place of space in national policy is the qualitative step-change in worldwide space capabilities over the past decade, particularly seen in the rise of mega-constellations, such as Starlink. Today's space environment, with numbers over 9,400 active satellites, is unrecognisable from that of even five years ago when only some 2,200 satellites were functioning in orbit.¹⁰ It is not just a question of numbers, either; the technical capabilities and the strategic capability which the latest space systems and sensors provide are having an increasingly deep impact on security and therefore international politics – as seen particularly in Ukraine, both with Starlink and with the intelligence, surveillance and reconnaissance (ISR) spacecraft supporting Kyiv's fight.

In these circumstances, the *defence* argument for the importance of space – and space power – has now arguably gained more potency than all the others, and is likely to have the most cut-through with the public and decision-makers for the foreseeable future. From this perspective, space matters to the UK because **to defend itself on Earth, Britain needs to be able to defend itself in space**. HM Government has to be able to ensure space access and operations, for the UK and its allies, and be able to impair or deny space access and operations to adversaries. It therefore needs to give more attention to space security.¹¹

The medium and long-term threat cannot be understated. The latest version of the United States (US) Intelligence Community's most authoritative assessment states that 'by 2030, [the People's Republic of] China [PRC] probably will achieve world-class status in all but a few space technology areas' and warns of growing Chinese and Russian capabilities in the area of ground-based and space-based counterspace weapons.¹² Secondly, it is now a matter of evidence that strategic competition in the space domain between the leading nations of the world, from the US and the PRC to India, Japan and even European countries, such as France, is accelerating. This is reflected in growing space budgets and expanding national space capabilities, together with high-level strategic focus and programmatic attention now focused on this issue.

There is also an increasing global interest – sometimes couched in terms of a *race* – in returning to the Moon and developing a cislunar economy.¹³ These plans are being backed by growing public and private investment in Moon

¹⁰ 'How Many Satellites are in Space?', *nano avionics*, 04/05/2023, <https://nanoavionics.com/> (checked: 22/04/2024).

¹¹ Space Security capabilities include measures taken within a system to improve mission assurance ('space Resilience'), operations to ensure freedom of action in space ('Space Control'), Space Domain Awareness, and Space Command and Control.

¹² 'Annual Threat Assessment of the US Intelligence Community', Office of the Director of National Intelligence (US), 05/02/2024, <https://www.dni.gov/> (checked: 22/04/2024).

¹³ The term denotes the space between Earth's outer orbits and the Moon, including the latter's own orbital regime.



missions and the development of space technologies which will support cislunar operations, including the exploitation of the Moon itself. This future is no longer a fantasy of science fiction; rather, it is inevitable and will open up extraordinary opportunities – as well as threats. It therefore becomes clear that a country with global strategic interests, such as the UK, cannot afford *not* to be at the forefront of this new wave of cislunar expansion. **Britain should be able to secure its position in this new age of ‘off-world’ exploration and resource acquisition – because all key rivals and partners already are involved.** Already, space power – with defence space capability at its centre – is a vital component of UK strategic advantage, whether acknowledged as such or not (see: Box 1).

Box 1: Space and strategic advantage

To use the theoretical framing developed by the Council on Geostrategy, space power effectively integrates at least two ‘catalytic’ functions.¹⁴ As a *multiplier* of national power it provides the platform and means to align new actors to Britain’s vision of space, and to create new space-related alliances – such as a potential European Space Agency (ESA)-like Intercontinental Space Alliance for the Indo-Pacific region, as previously suggested in the Council’s research.¹⁵ Secondly, space power acts as an *extender* for Britain’s strategic reach in the ever-expanding space domain, whether in terms of near-Earth orbital operations or, in the future, in relation to the future lunar economy. Overlooking the critical need to build the UK’s strategic advantage in space would be a major failure of policy.

The interaction between space power and a country’s ability to pursue its geopolitical interests on Earth – whether defensive or offensive – is increasingly tight and consequential, particularly in a national security context.¹⁶ The alleged Russian intention to place an anti-satellite nuclear weapon in orbit, which captured global headlines, has also served as a powerful demonstration of this strengthening link between the space domain and ‘terrestrial affairs’.¹⁷ It is likely

¹⁴ The Council on Geostrategy sees strategic advantage as situated between the ‘means’ and ‘ways’ of strategy development. Governments can generate catalysts – to amplify, multiply, accelerate and extend their means – to generate more effective strategy. See: Gabriel Elefteriu, William Freer and James Rogers, ‘What is strategic advantage?’, Council on Geostrategy, 23/11/2023, <https://www.geostrategy.org.uk/> (checked: 22/04/2024).

¹⁵ Gabriel Elefteriu, ‘The role of space power in geopolitical competition’, Council on Geostrategy, 30/01/2024, <https://www.geostrategy.org.uk/> (checked: 22/04/2024).

¹⁶ Defined as ‘the ability in peace, crisis or war to exert prompt and sustained influence in and from space’, in Colin Gray and John Sheldon, ‘Space Power and the Revolution in Military Affairs: A Glass Half Full?’, *Airpower Journal*, 1999, p. 36.

¹⁷ See: Gabriel Elefteriu, ‘Russian space nukes would be a sword of Damocles over our heads’, *Britain’s World*, 19/02/2024, <https://www.geostrategy.org.uk/> (checked: 22/04/2024).



to prove a tipping point in terms of the public's awareness *and concern* in relation to the **defence implications** of space.

These are in fact, objectively, the reasons why many nations are accelerating their space capabilities – both in technology development and industrial capacity expansion. They all recognise that space power will be an element of geopolitical influence, as shown by the rise of the term 'astropolitics' in the high level strategic debates across the world.

Developing a spacepower mindset

In this context, for the UK, the adoption of a national 'space-power mindset' (and the means to bring it into effect) would be a prudent response to the disruptive challenges of the coming decades – and indeed this is what all of Britain's peers are doing. One important conceptual step in this direction at a time when war is forcing strategic reappraisals across the board is to decide whether space is *marginal* or *central* to the UK's national interest. Now, this is a foundational question.

The *marginal* view of space is a strategic dead-end. It essentially represents the status quo, the continuation of the traditional British model of space policy which sees HM Government's role, by and large, as a convener and facilitator for industry rather than its driving force. This paradigm has been in operation since the 1970s when Britain's original – and successful – space launch programme was terminated on account of insufficient 'value for money'. Even today the essential purpose of the UK's space policy is to 'add value' – in military space, this refers to adding value to other allies' space capabilities, particularly the US – and 'benefit the economy'.¹⁸

This model is unsustainable in military and industrial terms given the UK has entered an age of high-powered space competition. As Box 2 explains, if Britain is to operate as a fully sovereign actor in the international system, it ought to be a leading space nation standing on its own feet. It cannot remain a subordinate actor dependent on others when it comes to such a critical dimension of national power such as space. Space is central to Britain's national interests.

¹⁸ See: 'National Space Strategy', Department for Business, Energy and Industrial Strategy (UK), 05/11/2021, <https://assets.publishing.service.gov.uk/> (checked: 22/04/2024). Almost all official (and industry) messaging on the importance of space for the UK leads with the economic argument.



Box 2: Britain as a 'space nation'

Turning Britain into a leading space nation of the 21st century ultimately requires a higher vision: it is about adding a new dimension – a further identity element – to the country's self-image. To be sustainable – and space is now a never-ending proposition – this must be more than just another 'growth' or 'innovation' project aiming to simply augment UK power in the name of prosperity and security. In this sense, it should be a historic initiative.

Becoming a leading space nation implies a sense of national endeavour. Curiously for a country with such a distinguished history of exploring and mapping the Earth, the ambition for human exploration of outer space passed Britain by.¹⁹ This is likely a result of circumstance (and perhaps of a misplaced 'declinist' mindset at elite level which manifested just as space exploration became technically possible) rather than a genuine popular disinterest. On the contrary, space exploration, as a theme that fuses exciting science with the thrill of discovery, is hugely popular with the public as demonstrated by the widespread enthusiasm generated by Tim Peake's *Principia* mission to the International Space Station in 2015. Therefore, if properly couched in a broader message about a new 'space chapter' for the UK, an ambitious space vision can galvanise public imagination and become a self-fulfilling prophecy.

Conclusion: A different conversation

Space continues to matter to the UK for all the *conventional* reasons that have long been part of the space policy conversation for many years. But the context has changed significantly in recent years, and space advocacy should now be more closely synchronised and coordinated with the imperative of national defence – responding, as well, to the concerns and demands of the public in this era of renewed global tensions – and with the essential challenge of UK's position in the next chapter of global space development, particularly in relation to the cislunar economy. The UK ought to secure its share of the future advantages and prosperity that space can offer, but in an increasingly insecure world this objective must be approached from a defence perspective *first*.

Space is no longer a discretionary activity, but a vital part of defence and, increasingly, a requirement for the country's grand strategy, including its ability

¹⁹ Britain closed its rocket programme in the 1970s, and to date only two UK astronauts even visited a space station – both times via non-national space programmes. World-class UK-made instruments regularly feature on some of the most advanced space probes built by humans, but there are no UK-only missions; even countries like India and Israel are sending their own spacecraft to Mars and the Moon.



to generate strategic advantage and influence.²⁰ Britain should become a fully-fledged space nation. It ought to stand ready to take part in space development, one which is at least commensurate with its position in geopolitical competition on Earth. This is now an urgent matter, as the UK's competitors and adversaries are accelerating their own programmes and potentially gaining an insurmountable advantage. HM Government should ensure Britain maintains freedom of action in the space domain, through proper resourcing of Space Security capabilities.

Space now matters more than ever for this country's defence posture, and for its destiny in the great competition for the control of cislunar space. For, in the words of Everett Dolman, the doyen of space realism and author of the classic work, *Astropolitik*:

Who controls low-Earth orbit controls near-Earth space. Who controls near-Earth space dominates Terra. Who dominates Terra determines the destiny of humankind.²¹

*This Explainer is part of the Council on Geostrategy's **Strategic Advantage Cell**.*

²⁰ Of the five permanent members of the UN Security Council, the UK is the only one without assured/sovereign access to space-based PNT (Position, Navigation and Timing) and robust remote sensing, and medium/heavy space launch capabilities. Space power is another barometer of strategic influence.

²¹ Everett Dolman, *Astropolitik: Classical Geopolitics in the Space Age* (London: Routledge, 2001), p. 8.



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