British strategy and outer space: A missing link?

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Introduction

Since the dawn of the Space Age over 60 years ago, more than 70 states and a range of non-state actors have deployed over 1,400 satellites in Earth orbit (Union of Concerned Scientists 2017). However, the study of spacepower — the use of outer space’s military and economic advantages for strategic ends — remains a small subfield within strategic studies (Gray 1996; Dolman 2002; Klein 2006; Sheehan 2007; Lutes et al 2011, Harding 2013). Rarer still is that of the strategic aspects of British space activities (Sheldon 2010; Hill 2011; Quintana 2017). This article begins to address this gap by arguing that the discussion and study of British security strategy is missing the enabling link of spacepower. British freedom of action on Earth, and its critical infrastructure, is influenced by its dependencies on others in space. This article also presents a brief contextual analysis of the major space powers as assessing British spacepower is a relative and contextual task. Spacepower is one of the essential ‘elements, both military and non-military, for the preservation and enhancement of the nation’s (wartime and peacetime long term) interests,’ (Kennedy 1991: 5) regardless of the size of the state in question. Space technology and services, which are integral parts of modern defence industries and critical infrastructures, enable the full spectrum of British military capabilities and its high-technology economy.

This article proceeds by first categorising Britain as a secondary space power in the international context and identifying strengths and dependencies in British space capabilities. A ‘space power’ is an entity that uses outer space for its political objectives; whilst ‘spacepower’ is ‘the ability in peace, crisis, and war to exert prompt and sustained influence in or from space’ (Sheldon 2010: 28). Spacepower is more than missile defence systems or the exploitation of the information-based ‘Revolution in Military Affairs’ (Gray and Sheldon 1999: 24). Spacepower also assists in the development of a state’s security, economy, and infrastructure in a subtler yet more pervasive grand strategic sense. Space technology is used for precision agriculture as well as precision bombing. Satellites in orbit ensure a web of connectivity around the Earth and gather all manner of information about human and natural behaviour and systems on Earth. Second, it examines the increasing institutional recognition of space in Whitehall set against the context of austerity-led strategy-making.
Greater institutional recognition of the capability and importance of British spacepower is apparent in the release of space policies, industrial growth plans, and military doctrines since 2010. Third, it explores British spacepower in the context of the transatlantic divide between Europe and America, as well as considering space procurement options for Britain. Transatlantic security generates significant debate (Dobson and Marsh 2014; Dunne 2004; Epstein 2015; Freedman 1999; Blagden 2015) but its consequences for space policy and vice versa remain unexamined. Whilst it waxes and wanes, the institutionalised US-UK relationship is arguably extremely durable owing to its Lazarus-like quality (Marsh and Baylis 2005; Xu 2016). However, like the relationship as a whole, an overwhelming British dependency on the US in space may not always provide strategic returns for the UK (Dumbrell 2009: 77). British defence and security in space and on Earth also risk being fundamentally altered by Brexit (Uttley and Wilkinson 2016a/b; Oliver and Williams 2016; Pannier 2016; Dunn and Webber 2016), and in particular by the UK’s potential exclusion from the EU’s space industrial policy.

The context of rising powers in the international system adds to the difficult choices facing British grand strategy, yet Britain is often absent in the largely American but increasingly globalising spacepower scholarship. America, the EU, Russia, and Asian states draw the bulk of analysis in the field of spacepower (Sheehan 2007; Harding 2013; Wang 2013). Indeed, with the possible rise of a multipolar world order (Zala 2015: 12-13), its reflections are cast in space. The United States, Russia, China, India, and the EU are potential poles of such a world order as well as the actors that can independently access outer space (see Table 1). Britain’s story of relative and quantitative decline at sea, on land, and in the air, are familiar to most and has become an animating analytical concept (English and Kenny 2001: 259-283; Strachan 2011: 1282-1283). After Empire, Britain is arguably yet to find its role or identity between its stature as a former Great Power caught between Europe and America (Morris 2011; Gaskarth 2014; McCourt 2014; Childs 2016). Yet Britain’s recent successes as a secondary space power have gone unnoticed in the international relations (IR) and security studies communities.
Britain as a secondary space power

Space is not tainted by a past of British dominance and decline; yet its secondary status in space has not informed the independent or autonomous roles scholars have ascribed to the UK on Earth since space technology became essential to the battlefield in the 1990s. Gaskarth (2014: 566) outlined six possible roles for the UK: isolate, regional partner, influential rule of law state, thought leader, opportunist-interventionist, and great power. A missing link in discussions of Britain’s role is that the capability to fulfil any role will depend upon British spacepower and its degree of integration into the binary context of American and collective European spacepower. This omission of outer space is not surprising given how such thinking of roles relies upon identity and capabilities, and not so much on geographic realities (Gaskarth 2014: 561). Focusing on geography in strategy today highlights space as a common that must be commanded by the United States and its allies (Posen 2003: 7).

Britain’s current and potential spacepower supports conceptions of Britain’s role as a regional power and a contributor for rules and norm-building in the international system. However, it contrasts with other conceptions of Britain’s role as an independent great power (Morris 2011: 331-336; McCourt 2014: 160-168). As seen in Table 1, Britain lacks in military space capabilities when compared with the United States, Russia, China, and India yet it does produce significant commercial outputs relative to its European peers. Whilst Britain has returned to its maritime roots following the 2015 defence review (Childs 2016: 141), without a greater number and spread of sovereign space assets – particularly surveillance or Earth observation (EO) satellites – British air and naval power projection will increase its traditional reliance on a ‘principal ally’ (Freedman 1999: 29). The headline combat capabilities that the UK has invested in reaffirm a desire by London to project maritime and air combat capabilities through two new Queen Elizabeth-class carriers, the F-35B Lightning II, the creation of two extra Typhoon squadrons (HMG 2015c). Future developments in unmanned aircraft and expeditionary warfare increase dependencies on space communications, and also the ‘first look’ capability that space-based reconnaissance and EO satellites allow. Without spacepower, deployed
forces will struggle to speak, listen, see, and fight. Missiles could go astray and ships could quite literally be lost at sea.

Although used to analyse developing states, Harding’s triple-tiered vision of spacepower has merits as a frame of reference for all space powers and provides a reasonable framework to show the relative material position of the UK in space (2013: 78-79). It is a useful contextual starting point because it distinguishes a distribution of capabilities. Primary – Tier 1 – space powers have independent and comprehensive launch, manufacturing, design, development, and operations. They also possess sovereign space technology production capability, extant or almost operational launch capability for both low-Earth orbit (LEO) and geosynchronous orbit (GEO) launches, whose space programmes have evolved from ballistic missile and nuclear programmes, and have breadth and depth in deployed satellites. In addition, primary space powers must be able to command space to varying degrees through controlling the environment and denying it to adversaries with destructive weapons (Bowen 2017: 9-13). The United States, Russia, and China easily fit this description and form the primary or Tier 1 space powers (Weeden 2014; Pollpeter 2016). Secondary – Tier 2 – space powers have a mix of these capabilities and may have high degrees of autonomous or commercial capability within particular niches, but general space capabilities are reduced in number or spread compared to Tier 1 space powers. Secondary spacepowers have developed a mix of launch capabilities, satellites, and services according to sovereign needs, such as France and the EU by extension, Israel, Japan, and India. However, the depth of sovereign military and economic infrastructure prevents a subjective categorisation of them as primary space powers on a par with Russia, China, and the United States. Secondary space powers produce some of their own space technology, have basic launch capacities, have national space agencies, and frequently but not always collaborate with other advanced states in the production of space technology. These capabilities and deployments, however, are more significant than the Tier 3 client image of an actor’s space capabilities. Tertiary space powers purchase space technology, products, or services from third parties and always collaborate with other more developed space actors.
A final say on how all spacepowers could and should be taxonomized is not the intent of this article. However, this tiering of space powers serves an illustrative purpose, particularly given the niche character of spacepower scholarship. If this subjective illustration and relative judgment generates further debate it will have achieved its pedagogical objective of communicating the presence of spacepower within International Relations. One cannot attach purely objective or neutral indicators of an actor’s power – even when limited to a particular geostrategic environment – as material realities do not reflect unquantifiable aspects of power such as trust between allies, the quality of decision-making and strategies, political stability, credibility, prestige, and soft power (Vital 1971: 16). It is not the aim here to generalise about the behaviour of secondary space powers or provide a universal model, as each actor will appear unique under more detailed idiographic – as opposed to nomothetic – study. Yet, a broad context-setting exercise and in-depth examination of one space power requires a working image of the general international material distribution of spacepower as a point of departure for more detailed analysis.

Britain is a secondary space power that outsources much of its top-end military and intelligence capabilities that its diplomatic and power projection efforts rely upon. But it retains niche commercial and industrial space capabilities that keeps it above the tertiary class of spacepower and firmly within the secondary tier. The UK’s only indigenous and sovereign space-based capability – the Skynet communications satellites – were launched aboard American rockets. These seven satellites provide dedicated communications for UK military and allied users. This enables the UK to provide extra capacity for allied communications, and purchases some influence in multilateral operations which quickly consume readily available bandwidth. Britain also operates two terrestrial stations that augments its military space capacities – Royal Air Force (RAF) Fylingdales and RAF High Wycombe. Although RAF Fylingdales is ostensibly a missile detection radar, it is also used to detect, track, and identify objects in Earth orbit. This radar can track satellites as well as debris, which is an increasing security concern (Bowen 2014: 58-65). This data is passed on to the United States, and in turn the UK receives information from the United States’ Space Surveillance Network and collates a British space situational awareness picture (SSA) at its own Space Operations Centre at RAF High
Wycombe (HMG 2014a: 17). British SSA capabilities are singled out in the NSP for further
development as a contribution to international partners in space (HMG 2015b: 12). Together, the US,
UK, Canada, and Australia take part in the Schriever space warfare games; and the 2015 NSS refers to
Other than integrating space services into direct MoD services and platforms as a client of third party
services such as the Global Positioning System (GPS), cooperating with space warfare and
surveillance training and missions with the United States, and research outlets such as the Defence
Science and Technology Laboratory, this is in effect the totality of the UK’s military space enterprise.

[insert Table 1 here]

This table shows a selective snapshot of the material distribution of spacepower, according to
launch capability and satellites deployed by and registered within those actors, which includes Tier 1
and some Tier 2 space powers. This article does not examine the quality of specific satellite platforms,
launch vehicles, and economic performance in any depth here, and a brief explanation of the
categories is required. Military/government/civil communications refer to publicly owned or operated
secure communications for the state’s use, and the exception is for surplus bandwidth to be sold on
them to the market, and not the rule. Such satellites, based in the geosynchronous belt at 35,786km
altitude above the equator, enable military forces to communicate securely with or without a fixed
terrestrial communications infrastructure, even in a nuclear war. Examples are the British Skynet and
the American Wideband Global SATCOM. Commercial communications satellites are those owned
and operated by private companies that sell bandwidth on the open market. Examples are Iridium and
Inmarsat companies. These communications systems patch together a truly global, wireless, and
mobile information infrastructure. Position, Navigation, and Timing refers to satellite navigation, like
the now-ubiquitous American GPS, the Chinese Beidou/Compass, the European Galileo, and the
Russian Globalnaya Navigazionnaya Sputnikovaya Sistema (GLONASS). These services allow
bombs to be guided anywhere on Earth with extreme accuracy, provide banks with accurate time data
that authorise financial transactions, and guide autonomous vehicles such as robotic precision
agriculture, guiding ships to port, and allowing trains to stop at exactly the correct place on the
platform.

EO, or remote sensing satellites provide images of Earth according to many spectrums of light
and other sensory techniques. Such satellites can track troop movements and identify airstrips,
monitor crops, and analyse air pollution. These have a multitude of dual-use (civilian and military)
applications. For example, the detection of disturbed surface water is not only useful for monitoring
hydrological systems but can also reveal the recent movements of heavy armour. Examples of such
systems include the EU’s Copernicus programme and Sentinel satellites, the American Keyhole and
Landsat, and the Chinese Yaogan. Increasingly sophisticated imagery is now available in the
commercial sector, with companies such as Digital Globe and Surrey Satellite Technologies (SSTL)
building and selling platforms and images on the market. Space observation refers to an emergent
capability of observing outer space from space itself. Satellites dedicated to monitoring space
activities have so far been led by Canada under partnership with the United States for the North
American Aerospace Defense Command (NORAD) system. Science and technology satellites are
included to indicate future potential, as space is dominated by scientific and technical advancements.

Universities and government departments are significant actors here, and is a very tentative indicator
of the quality of space platforms in use. For example, Russia’s relatively small amount of
experimental or research satellites may be an indicator of a declining high-technology base compared
to China and the United States. The European states and Japan demonstrate a high proportion of
research/experimental satellites relative to deployed satellites, and may indicate healthier research
base and space industries.

The United States leads in the total number of deployed satellites, in particular commercial
communications and EO. China and Russia are ‘runners up’ in the Tier 1 category, thanks to their
spread of launch and satellite deployment capacities. India and Japan, whilst capable of varied launch
options, remain Tier 2 space powers due to their relative lack of depth and mass in deployed assets
compared to Tier 1 space powers. The EU and ESA (European Space Agency) are difficult actors to
categorise, as they are not states, but through integration they represent a potential European Tier 1
space power. The individual European states listed can be considered Tier 2 space powers like Canada, Australia, and Israel because of specific indigenous capabilities placed in a deeper web of partnerships and alliances in space. But these individual states cannot aspire to be Tier 1 space powers due to their size and the demands of resource-intensive demands space power. Tier 2 space powers such as India, Japan, and the EU/ESA have a larger potential resource and skills base to draw upon if the political will is there to invest in a more vigorous space effort thanks to their existing breadth of space capabilities and operations that could one day generate depth in spacepower and elevate them to a Tier 1 status. Until then, their reduced breadth and depth in space relative to the USA, China, and Russia keeps them in the Tier 2 category.

The total number of deployed satellites per actor may be misleading when comparing the smaller states shown because Tier 2 space powers choose where to invest scarce resources, and where to rely on allies and the market. In addition, a registered company in a small state may inflate the given satellite totals – such as Canada’s 21 and Britain’s 26 commercial satellites. However, this may give these states potential influence in international space industry and regulations discussions – such as environmental debris-mitigation protocols – as well as some control of components and integration with the needs of the host government. A large commercial base may enable softer power for Tier 2 states by winning support from the large companies that enable government-subsidised launch capabilities to break even or create some return on their investments in rocket technologies. Taken together, the members of the EU featured in the table highlight a comprehensive spread of capabilities – Britain (whilst still in the EU and potentially contributing to EU security missions after Brexit) can provide secure communications via Skynet (7 satellites) and additional capacity through leveraging influence upon commercial space communications companies registered there (26 satellites). France, Spain, Germany, and Italy meanwhile, provide 76 government or military operated EO satellites (such as optical imaging, radar satellites, and signals intelligence) that Britain lacks. For its part, ESA directly operates, and the EU funds, the emergent Galileo navigation system – which is manufactured in the UK. Therefore, when comparing Britain and other European space powers, their different kinds of capabilities and their strengths cannot be directly compared as their integration under ESA and the
EU and bilateral defence cooperation enables European states to pool resources. Only collectively under the banner of the EU and ESA does Europe emerge as a potential Tier 1 space power by sharing costs and directing resources among its members. As explored below, the UK’s departure from the EU may complicate its future participation in EU-funded space programmes and its ability to keep ESA independent of the EU.

Like many European states, Japan’s alliance with the United States did not prevent a desire to develop a sovereign EO capability. India, for its part, shows its position as a relatively lonely military power through its sovereign military communications, EO, and navigation capabilities. India has augmented American GPS signals in South Asia through its GAGAN system and its investment and partnership with Russia in GLONASS, which secures Indian navigation and precision warfare capabilities (Sputnik 2016). It is clear that, relative to Britain, India has a greater breadth and depth of military communications and EO capabilities. But the UK possesses more than Japan in military communications satellites. In turn, Japan is far more capable – numerically – in terms of sovereign EO which has significant military potential.

It is in the commerce and industry of space that Britain appears as a more significant actor, rather than as a military space power. Economic space power could provide more opportunities for Britain’s views to be considered in global governance and industry regulation activities. Since 1999, the UK space industry’s income has trebled, growing at an average rate of 8.1 per cent per annum, whilst employment in the space industry has grown annually at 6.7 per cent. The UK Space Agency (UKSA) estimates that wider UK industrial activities worth £250bn, or 13.8 per cent of gross domestic product in the non-financial business economy, is supported by satellite services. Currently, British space exports are evenly split between the European market and the global market (UKSA 2016: 1, 10, 12). The UK’s success with the commercial Disaster Monitoring Constellation (DMC) programme demonstrates a demand at home and outside Europe for small satellite-based imaging and observation data and services (Sheldon 2010: 33). SSTL has successfully exported DMC satellites to Nigeria, China, and India, and is a potential model for export for a multitude of other states and customers. Furthermore, if the British government’s optimism on the economics of small air-launched
satellites is realised, the United Kingdom could have the first spaceport in Europe capable of tapping into this novel market. Britain could further develop its own sovereign imagery and EO system based on the DMC and a government investment of £21m in developing synthetic aperture radar satellites (3-dimensional radar imaging used for surveillance) at SSTL (HMG 2014b).

This helps develop British expertise in spacepower through surveillance satellites and analytical tradecraft that can be developed as sovereign systems for the UK to assist and enable its flagship defence capabilities on Earth, and can be tailored to its needs in ways that contracted commercial or foreign services cannot. This is not necessarily too expensive. The sale of DMC satellites to the smaller economy of Nigeria demonstrates that it is not too costly for Britain to develop sovereign space-based intelligence capabilities (Surrey Satellites Technology 2011). Israel, with its smaller economy, has developed a self-reliance in niche small-scale space launch, reconnaissance, surveillance, communications, and early warning technologies (Paikowsky, Levi and Israel 2013: 322). A more muscular Governmental strategy towards military and commercial space could take the UK one step closer to strategic parity with the other permanent members of the UN Security Council, all of which possess a space industry for their own strategic purposes as part of continuous hedging for the perpetually uncertain years ahead. A capability that may be too expensive for a sovereign system would be a satellite navigation network, such as Galileo, which will have cost €10bn by 2020 (BBC 2016). By comparison, surveillance and reconnaissance from space are relatively affordable, as demonstrated by exports to developing countries and the ability of individual European states to unilaterally invest in such capabilities as well.

Britain’s dependencies on others in space for navigation, communications bandwidth, and EO should create caution in the expectations of more autonomous British military power or greater diplomatic leverage in crises or wars where British interests diverge from those of its allies. Britain does have high-quality satellite communications capability, a successful space economy, and a potential to develop high-end EO satellites that have as much military and security applications as they do for civilian needs. This increases Britain’s ability to offer assistance to allies as a regional power and an interventionist, and a capability for Britain to shape the global governance of space. But
the absence of British EO capabilities directly influences Britain’s military autonomy. Key to secondary space powers is the degree to which it depends on others for services, and this crucial aspect of British strategy remains marginalised in debate and policy, despite Whitehall’s increasing activity in space.

**Leviathan wakes? Whitehall in space**

The absence of a discussion of spacepower is notable even within the general vacuum of political thought regarding British ‘grand’ strategy and national security (Porter 2010: 6). The British state has published a series of documents which recognises spacepower as a source of national power and international influence. This official recognition is welcome, as space must be taken seriously as a strategic environment and not treated merely as a flight of fancy or an opportunity for questionable puns and science fiction references (Kelso 2016: 44). 2010 saw the formation of the UKSA and the publication of the *UK Military Space Primer* (UK Ministry of Defence 2010). 2014 witnessed the publication UK’s first ‘National Space Security Policy’ (NSSP), and the first National Space Policy (NSP) arrived in 2015 (Her Majesty’s Government [HMG] 2014a; 2015b). In addition, the UK has developed civil space strategies and commercial growth plans (UKSA 2012; 2014).

Space infrastructure is viewed as part of British critical infrastructure in the 2015 NSP (HMG 2015b: 5-6) and by the Centre for the Protection of National Infrastructure. This is welcome as the 2015 NSS only mentions British space security in very generic terms (HMG 2015a: 19, 29-30, 46). The NSP states that ‘Government will treat space threats in the same way as we would approach any other threat to our strategic national interests’ (HMG 2015a: 11). This attitude is prudent as it challenges prevailing notions in the field of space security that ‘space deterrence’ can be considered as a matter separate from and different to deterring war in general. Rather, conventional and nuclear deterrence already subsume satellites as stabilising assets (Sheldon 2009: 35). The recognition of Britain’s reliance on international partners and allies is distributed throughout the NSP and NSSP; yet it is scarcely recognised that Britain as a secondary spacepower like smaller naval powers, is ‘likely to have only limited independence of strategic decision when up against’ much larger powers with incongruent national interests (Till 2014: 23). The 2015 NSS declares that Britain should be able to
'undertake war-fighting independently or as a lead nation in a coalition’ (HMG 2015a, 51). This is unsustainable given Britain’s high degree of dependency on other states or commercial providers for its EO and additional communications bandwidth.

The Ministry of Defence (MoD) has become somewhat cognizant of the smaller military space status of Britain as expressed in its military doctrine (MoD 2013: 6-4, 7-7 – 7-10, 8-3). However, its doctrine falls victim to the dilemmas facing those of smaller military powers. Smaller armed forces sometimes emulate the doctrine of larger one or admit to relative unilateral sovereign impotence and disguise it through multilateralism (Germond 2014: 49). This unwillingness to admit to the small size of sovereign British military spacepower compared to the United States and its European allies raises questions for Britain’s ability to conduct independent operations that cannot do without guaranteed and appropriate space services. British space doctrine imitates the concepts of the United States and massages cultural sensitivities which may refuse to portray Britain as a military power highly dependent on others – primarily Europe and the United States – for basic military space support for its operations. British doctrinal talk of ‘offensive counterspace’ and ‘space control’ belie the reality that the UK has no dedicated soft-kill methods of space warfare, equivalent to the USAF 4th Space Control Squadron, which operates a Counter Satellite Communications System (MoD 2013: 7-10 – 7-14). Soft-kill methods include radio jamming, false signal/data production (or spoofing), and cyber infiltration methods which are usually reversible. Hard-kill refers to the physical destruction of satellites or their components, such as kinetic, nuclear, or explosive interceptors, lasers, radiofrequency weapons, and particle beam weapons. Although British capabilities are present in UK spacepower doctrine, it can produce a misleading ‘big picture’ of capabilities and dependencies in space for British personnel and general audiences. It is misleading because it emulates full-spectrum American Tier 1 spacepower doctrinal concepts rather than accepting Britain as a secondary spacepower that cannot support its terrestrial ambitions with an independent space infrastructure. Rather than focus doctrine and education on what UK spacepower can contribute towards a ‘joint’ and coalition fight, British military officers are taught to think along concepts and roles that only American spacepower and space warfare officers can truly autonomously perform.
The NSSP declares that the UK will meet its space requirements by its own means ‘when a purely domestic responsibility or specific sovereign interest makes this necessary’ (HMG 2014a: 5). This is wishful thinking without a clear statement of intent about which space capabilities to develop and the appropriation of funds to do it, and beckons a more deliberate strategic approach such as ‘smart muddling through’ in order to secure the most potent force achievable with restrictive resources (Cornish and Dorman 2012: 222). This is explored further below according to the principles of Open Procurement and Technology Advantage. Whilst the NSSP is right to highlight Britain’s integration and track record in relying on the United States and cooperating with the EU and the European Space Agency (ESA) to ‘augment’ its spacepower, the illusion of a sovereign military space capability remains. This mismatch between resources, commitment, and ambitions may be typical of an intellectual vacuum in British strategy-making (Porter 2010: 6), and creates a problematic missing link between British strategy on Earth and the support from space services it needs to carry out its roles.

Increasing UK commercial space activities could raise the profile of spacepower in the eyes of policymakers (Sheldon 2010: 28), and that may be borne out given institutional publications since 2010. The NSP declares that strong leadership is required in commercial space from HMG (2015b: 4). Unfortunately, the May government’s Industrial Strategy makes only scant and vague reference to the commercial space sector despite the ambitious plans laid out in space policy and space industrial documents and the UK Space Bill (HMG 2017: 15, 31). Moreover, the NSP does not go far enough in detailing how the benefits of a larger space economy can contribute towards increased unilateral strategic capabilities for decision-makers – particularly in the fields of EO and surveillance satellites. This section and the one above it create the assessment of Britain as a terrestrially significant economic and military power that may be hamstrung by the lack of dedicated sovereign military space systems. However, British economic spacepower can help develop Britain’s military space capabilities and provides a source of indirect influence through institutional, structural, and productive power in the global governance of space (Barnett and Duvall 2005: 3). If Britain is to have a grand strategy that requires flexible, balanced capabilities, it cannot neglect the commons of space. Britain’s
current position within this common is dominated by binary forces – America and Europe – which can pose risks to British ambitions on Earth.

**A binary system? Between America and Europe**

Boosting Britain’s terrestrial power, London has historically integrated itself into Washington’s space infrastructure, due in no small part to its traditionally close relationship with its nuclear sector and intelligence communities which are enmeshed with space technology. The UK has enjoyed a relatively privileged position within the orbit of American military spacepower, even when the United States refused to launch military and commercial satellites for other European states (Wang 2013: 8). Desiring more sovereign space systems is not a confirmation of decline in the special relationship – rather, it is to hedge against a superpower that may not always provide what is in the best interests of Britain, particularly as the US has significant concerns in the Asia-Pacific that may draw resources away from Europe (Sheldon 2010: 29-32). This could be particularly true of redirected American space intelligence assets that Britain relies upon. As expansive as the US intelligence and military machine is, it is not without its gaps that Britain could seek to fill. Most states that possess nuclear weapons have also developed an independent ability to launch spy or EO satellites – but not Britain, which has ‘outsourced’ it to the United States within the highly institutionalised intelligence and nuclear special relationship (Xu 2016: 1212-1222). The UK’s operationally independent nuclear deterrent relies upon American satellites to provide targeting data (Norris 2008: 158). The UK, like all NATO forces, has also become dependent upon and fully integrated with GPS for precision strike and navigation capabilities.

The British state, as it attempts to depart the EU, risks becoming ever-more a satellite of the United States. It is not certain that British scientific, economic, military, and diplomatic interests will be best served by integrating further, particularly as Congress can upend long term space exploration and science programmes unilaterally. ‘Muddling through,’ rather than making hard strategic choices (Rathmel 2011: 31-32), risks diminishing British spacepower, with direct strategic consequences for Britain’s relative autonomy on Earth. Spacepower is essential for a ‘smart muddling through’ approach for British grand strategy and a role in the world that relies on rules, norms, information,
nuclear deterrence and expeditionary warfare, which ‘translates into a requirement for the most highly
capable, balanced and agile force posture achievable’ (Cornish and Dorman 2012: 222). Space
communications and EO technology are ubiquitously essential for modern military forces. Who
provides the essential services that underpin a British strategy of ‘smart muddling through,’ and
whether Britain should increase its own sovereign systems, remain undebated issues. The problem of
balancing European economic interests with strategic atlanticism in British grand strategy is not
unique to outer space, though in space we see the caricatures of Britain as an ‘awkward partner’ to
Europe and a feared American Trojan horse (George 1998: 41) expressed acutely.

A close relationship to American spacepower is not a risk-free future for Britain if the history
of transatlantic space relations is to be considered. European cooperation with the United States has
not always been assured. The United States has at times frustrated European attempts to develop
autonomous launch and navigation capabilities, and the occasionally antagonistic behaviour of the
United States and European states in astropolitics have been at odds with what is expected of a
transatlantic security community (Wang 2013: 10-16). Furthermore, the British electorate is not
always receptive to being so closely aligned or subservient to the foreign and defence policies of the
United States (Oliver and Williams 2016: 554). A looser relationship with the EU will signal a weaker
claim to stand apart from the United States and continue to be a ‘great power’, as exemplified through
Britain’s ‘special relationship’ with US military spacepower. British thinking should take a practical
view of the changing global power distribution and the place of the special relationship within it (Zala
2015:13-14). Britain must account for not only the rise of Asian spacepowers (Harvey, Henk and
Pirard 2008: 1-253, 439-541), but also the fact that it cannot avoid the competitive aspects of
transatlantic astropolitics. On the one hand, the special relationship has integrated Britain into
American spacepower. On the other hand, space is one area where the EU has been very active and
has drawn in Britain, and not solely relied on its ‘magnetism’ or attraction by ‘being’ (Clarke 2011:
11). A utilitarian British approach to outer space (Sheldon 2010: 33) has resulted in its integration into
European and EU space policy, particularly in the development of navigation systems, EO, and
weather satellites. Europe can provide an alternative source of space infrastructure than can make up
for Britain’s dependence on America’s Achilles’ Heel in space which is being actively targeted in

Developing cooperation and integration beyond the United States may reflect some pervasive
wariness in British identity and its roles on over-reliance upon the United States. Although British
efforts to steer a different course from the United States have never challenged the closeness between
them in military areas (Oliver and Williams 2016: 554-555), the UK has supported multilateral space
capabilities. The UK has made moves in recent years to influence the ‘security’ and hard power
aspects of EU and French space policy (HMG 2014a: 13-15). Efforts to involve Britain in the security
aspects of EU space programmes – such as Galileo and Copernicus – may now unravel due to Brexit
and being outside the EU’s space industrial policy, discussed below. Despite the UK’s interest in
ensuring the continuity of space cooperation under the Entente Frugale, the extent to which French
military space interests can compensate for the loss of influence in the overarching EU military and
security space programmes remains to be seen (HMG 2014a: 16). Bilateral Franco-British military
spacepower cooperation involves the Unmanned Combat Air System programme and the sharing of
modern naval aviation and maritime assets, which are intensely data-hungry and space-
communications dependent systems. These platforms would require a European, or Franco-British,
space communications backbone if such bilateral capabilities are to be less susceptible to American
influence. However, such Franco-British bilateral cooperation would have to compete with existing
French bilateral cooperation in space with Germany and Italy. Despite a 2010 agreement to work
more closely on defence research and technology projects, Britain may wish to become more useful
and active in space for French cooperation, but Brexit may push Paris closer towards Berlin and
Brussels in space, as it may do in defence generally (Pannier 2016: 487-488; MoD 2012: 31).

France enjoys a close relationship with Italy and Germany in space surveillance and EO data
sharing, where Paris provides the latter with imagery intelligence, whilst it in turn receives synthetic
aperture radar services from Berlin and Rome (Norris 2008: 162). This is also the basis of the EU’s
MUSIS (Multinational Space-based Imaging System for Surveillance, Reconnaissance, and
Observation) programme which would combine the complementary distribution of European satellite
capabilities as seen in Table 1. A further risk for Britain will be that the EU could be strengthened in space at the expense of NATO. Formal EU-NATO relationship structures would enable NATO to tap into the considerable and growing EU space infrastructure. Britain’s exit from the EU will ensure that its spacepower has been denied an institutional foothold in one half of that relationship (Dunn and Webber 2016: 474-475), whilst the other space powers of Europe will have a presence in both institutions to further their space policies.

The spacepower element of grand strategy illustrates Britain’s difficult position in attempting to bridge the gap between American and ‘European’ strategic interests. Brexit in space, as well as defence more generally, means the British may be warier of the Europeanization of its defence capabilities, whilst the French will seek to check any atlanticization of its own defence dependencies (Durand 2011: 110). With British access to allied spacepower perhaps resting upon what Britain can offer in space on a quid-pro-quo basis, rather than offering alternative intelligence or special forces capabilities on the ground (Sheldon 2010: 29), Brexit raises the pressure for Britain to become more unilaterally useful for the United States and NATO in space if it is to make up for Brexit’s impact on British spacepower. British grand strategy must consider what exactly it must be able to do in space by itself, as American resources and commitments may not enable Washington to provide London with timely access to all the space support it requires or requests (Sheldon 2010: 32). As Brexit unfolds, it may be that London will no longer be able to ensure its interests are taken into account in Brussels either.

Dependency and sovereignty are problems for the UK, and is highlighted in the tension between Open Procurement and Technology Advantage principles in the MoD’s procurement policy (MoD 2012). Open Procurement refers to acquiring defence capabilities from domestic and global commercial providers, either through off-the-shelf purchases or open competition for contracts. However, this approach is tempered by the principle of Technology Advantage which seeks to ensure that London has a secure supply base and assured capability in the most critical areas within ‘value for money’, such as nuclear warheads, cryptography, and electronic warfare (MoD 2012: 19, 25, 27). Sovereignty, as opposed to dependency, means an ability to ensure an operational advantage (i.e.
better capabilities) and freedom of action for the MoD (2012: 26). Above, it was shown why EO and imagery satellites may be feasible capabilities for the UK to develop. The question therefore for the UK’s spacepower is whether a dependency on others for multispectral image intelligence from outer space undermines the operational advantage and freedom of action derived from Britain’s high-end combat capabilities.

Should the MoD decide to procure EO and surveillance satellites, or more communications systems, it has a few options that fall at various points between the ‘open procurement’ and ‘technology advantage’ positions. It could decide to invest in the full process from design to operations to analysis of an EO system. This would ensure British freedom of action and technological advantage, but at greater cost. Or, Britain could simply buy satellites ‘off the shelf’ from providers but operate them within the MoD to develop an operational end-user military space intelligence capability. This could boost British space industry if bought ‘at home’, and may cut costs by relying on existing British space business models. If more sovereign British satellites are deemed too costly, more analysts of imagery intelligence from space alone could still be staffed to increase a British capacity to process the images it procures from allies and the private sector. Britain can choose to deploy more Skynet communications satellites for exclusively military purposes, or develop a ‘Civil Reserve Space Fleet’ to enhance sovereign communications bandwidth during crisis or war and subsidise greater bandwidth and network redundancy by providing more points of failure in space. This concept was adopted by The United States in the 1991 Gulf War as dedicated military communications satellites became saturated with users, and the Pentagon pressed commercial bandwidth to serve its needs. However, closer civil-military space integration requires firmer military controls and access into commercial systems which may inhibit the attraction and access of commercial systems to third party clients, whilst an open commercial system may be more vulnerable to hostile parties and therefore less reliable (Billman, 1999: 512, 552).

If Britain is to purchase new space capabilities and go beyond staffing more space imagery analysts, there are three general considerations in terms of procurement policy. The first is that ‘buying British’ could support small and medium space enterprise within the UK, as procurement
policy encourages (MoD 2012: 59). Brexit may enable the UK to champion its space industry which is currently blocked in UK procurement law (Uttley and Wilkinson 2016b: 499). Indeed, if the British space industrial growth plan to capture 10 per cent of the global space economy by 2030 (UKSA 2014: 4) is to be realised, defence investment and procurement can help Britain’s space sector increase competitiveness, capability, and proportionate status among the second tier of space powers. Furthermore, supporting industry at home where possible is a key objective of the MoD’s procurement policy (MoD 2012: 12). The MoD could be a customer of small and polar satellite launches from a UK spaceport, the legislation (but not public funding) for which is being ratified through Parliament at the time of writing.

Second is to purchase from the United States. Although the US-UK Defence Trade Cooperation Treaty allows Britain to trade more freely with sensitive American space technology, it risks making sensitive British space technologies harder to export outside of the United States. The International Traffic in Arms Regulations (ITAR) export control regime hampers the free and commercial flow of space technology due to US security concerns over technological diffusion (Kasku-Jackson and Waldrop 2009: 85-88). Britain would have to decide how its space economy would function in relation to both French and American technology export controls, as well as the potential of global space markets (Sadeh and Vallance 2009: 140-141; De Selding 2011; 2016; 2017b). A third option is to purchase and integrate with European allies in space, and buy into the MUSIS programme. However, Brexit produces a great deal of uncertainty as to Britain’s position in European space programmes that are increasingly influenced by the European Union, and its commerce and autonomy-driven space strategy (European Commission 2016: 8). These last two options, however, would make it harder for the UK to reach its space industrial objectives and of supporting small to medium sized enterprises in contributing to defence capabilities.

Both ‘soft’ and ‘hard’ Brexits risk Britain’s ability to influence the direction of EU spacepower. Despite the immediate politics of Brexit, Britain’s position between America and Europe will not change overnight (Cornish and Dorman 2015: 369-370). If Britain decides that it will not secure the interests of its space economy, and will not invest in sovereign space systems for the most
essential strategic tasks, then the UK risks only preaching, and not practicing, at ‘the top table’ in New York and cast doubt on its position in the UN Security Council (Rathmel 2011: 22; Oliver and Williams 2016: 555). The other four permanent members of the UN Security Council possess either comprehensive spacepower capabilities or the strategic essentials that guarantee an independent ability to launch and target nuclear weapons, and integrate spacepower into their conventional military forces.

A crucial piece of the future of British spacepower now rests in the future independence of ESA from the EU. In recent decades the independence of the inter-governmental ESA from the EU, and the militarisation of European space institutions have become the subject of considerable debate (Hoerber 2009: 206-208; Oikonomou 2012: 105). Furthermore, 86 per cent of ESA’s revenue, €1.7bn, derives from the EU, on top of direct contributions from member states which total €3.7bn in 2017. Britain remains the fourth largest direct contributor to ESA at €300m in 2017, after Germany (€858m), France (€856m), and Italy (€550m), although British contributions have been increasing in recent years (ESA 2017). Ceasing to be a member of the EU, if managed poorly, risks undermining British economic and scientific spacepower. The EU’s space industrial policy threatens the UK’s future ability to win contracts to manufacture components and receive access to data in ESA programmes that are funded by the EU (European Community and ESA: Article V). An EU-funded project undertaken at ESA does not need to provide industrial returns for members of ESA which are outside of the EU. In conjunction, the EU’s industrial space policy is concerned with developing a European market for EU member states’ space industries (European Commission 2013: 10-11). Britain’s ability to remain the chief manufacturer of the Galileo satellites – one of the EU’s flagship space projects – may be far less likely. However, Prime Minister May did decide to increase Britain’s contributions to EDA and ESA after the Brexit referendum, which can help ensure a British input into European defence capabilities and large-scale ESA-only space projects (Pannier 2016: 487; De Selding 2017). There are also concerns about tearing up the current contract for the UK’s role as manufacturer in the Galileo project because of Brexit, as well as fears of business flight from the UK (Hollinger 2017; Uttley and Wilkinson 2016b: 500; Herz 2016). Even in the event of a ‘soft’ Brexit,
where the UK maintains full ‘access’ to the SEM, its political voice in the strategic direction of Europe, and consequently European spacepower, will be diminished as a price of leaving the EU (Uttley and Wilkinson 2016b: 496-497). As Britain is leaving the EU, the EU’s space industrial policy may become a direct challenge rather than an asset for British spacepower.

The EU has traditionally suffered blocking actions in military integration by Britain, yet it also cannot do without Britain as a significant terrestrial military power in Europe (Biscop 2012: 1297-1298). There may be greater potential to dovetail EU space integration in support of CSDP objectives now that Britain may not be able to block further integration from within the EU. The EU’s 2016 space strategy has cited its space programme’s applications in security and defence as a priority area, and the strategy is clear that space is a key enabler for the EU’s defence and security policy objectives on Earth (European Commission 2016: 2, 5, 8, 10). Indeed, as the EU and its members are on the cusp of reducing their strategic dependence on American GPS through Galileo, Britain is heading for the door. Britain, then, is caught between Europe and America, and its particular relationships in space with them will influence the degree of freedom of action Britain has. America and France (via the EU) are militarily significant powers with their own spectra of space services to support whatever roles they choose for themselves. Britain is still a terrestrially significant power in a coalition that adds significant military capability, but is a potentially client military space power with a commercial space sector now competing against the EU’s space industrial policy.

Conclusion

Britain has developed niche capabilities in secure military communications, commercial communications, and the small satellite industry, and the greater institutional recognition it has been awarded is to be welcomed. British spacepower benefits from military and intelligence cooperation with the United States and France, yet this strains British principles of freedom of action and technology advantage whilst Brexit could make the EU’s space industrial policy a threat to the British space sector. As Britain continues to invest in its significant ability to project power overseas, Britain should consider whether it needs a more sovereign EO capability and a greater depth in communications satellites to support its expeditionary warfare capabilities and its booming domestic
space industry. Whilst this article has definitively answered the question of whether investment in outer space is worth the opportunity costs of other possible defence investments, it provided an analysis of the context of spacepower on the international and domestic environments for such discussion in future. Dependency on foreign space support reduces the autonomy of British terrestrial forces, and the multitude of civilian uses for satellites also raises the question of sovereignty over critical infrastructure at home. A more capable space infrastructure provides a ‘strategic latency’ that can help ensure Britain can continue its ‘smart muddling through’ on Earth because it enables small, light, agile, and balanced forces that allow for an indecisive or open-ended security strategy and roles in the world that allows for hard power projection, shaping rules in global governance, and providing global utilities. If Britain requires a ‘good enough’ degree of autonomy or ‘technological advantage’ in terrestrial power projection, it must question whether it is comfortable with the fundamental pillars of the intelligence, surveillance, and reconnaissance capabilities needed to support such precision-warfare and networked forces remaining outside of sovereign British space infrastructure.

Space is a geography and common with places of advantage, where useful machines fly, and different states and actors competitively exploit it as a medium in its own right; spacepower is merely the continuation of Terran politics by other means (Bowen 2017: 9). Whatever role Britain chooses for itself, it must accept its secondary status in space with niche capabilities and associated potential, its degrees of integration on both sides of the Atlantic, and how specific investments in sovereign British space technologies and skills training can enhance the degrees of independence in its grand strategy. In space, Britain has little historical baggage compared to the haunted past of empire and discussions of decline, yet it must also be wary of delusions of grandeur by the wholesale imitation of American spacepower concepts. Britain is not a fully autonomous power on Earth, but the extent to which it relies on America in space for critical enablers of military power, and Europe for commercial and scientific success in space, demonstrates a missing link in British grand strategy. Concordantly, this raises similar strategic questions for all the states on Earth which rely on others for their access to outer space, and how this dependency on a handful of countries and their rockets and spacecraft shapes perceptions of the distribution of sovereign power in the international system.
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Table 1: Select satellite types by state/agency

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*All 3 listed as both commercial and government.

Source data: Union of Concerned Scientists 2017
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