HOUSE OF COMMONS LIBRARY

BRIEFING PAPER

Number CBP 2021-9202, 22 April 2021

The UK Space Industry

By Claire Housley
Elizabeth Rough

Contents:

Contents

Summary

The UK space industry is a fast-growing sector and its income is estimated to have trebled in size since 2000. It generates an estimated income of £14.8 billion per year and supports around 42,000 jobs across all regions of the UK. The UK space industry supports a range of public services – particularly through satellite data and imagery – such as disaster relief, telecommunications, global positioning system (GPS), and weather forecasting. The growing global reliance on satellites and their data, and the reducing cost of launching small satellites into space has driven the growth of the space sector.

Government Policy is to grow the sector

Over the past decade, the UK Government has aimed to develop the sector within the global space industry. In December 2015, the Government welcomed the space industry's ambition to capture 10% of the global space market by 2030 and published its first National Space Policy, setting out the Government's main aims and policies

- That space is of strategic importance to the UK;
- A commitment to the safety and security of the space operating environment, free from interference;
- It wishes to support the growth of the commercial space sector, underpinned by excellent academic research; and
- A commitment to international cooperation on legal frameworks and collaboration when beneficial to the UK sector.

Four years later, the Government set out its plans to establish a new National Space Council and launch a UK Space Strategy in the December 2019 Queen's Speech.

The National Space Strategy is still yet to be published, but the Government's Integrated Review of Security, Defence, Development and Foreign Policy (published March 2021), indicated that the Strategy would integrate military and civil space policy.

How the sector is developing

A range of developments are taking place within the UK space sector, including:

- LaunchUK aims to put the UK at the forefront of small satellite launch and sub-orbital flight and is helping develop spaceports in the UK;
- The UK Space Agency funds a variety of programmes that help to deliver resilient space capabilities;
- The UK Government invested in satellite technology firm OneWeb;
- Several international agreements related to space have been made, such as the UK-Australia 'Space Bridge' and the US-UK Technology Safeguard agreement.

A specific regulatory framework

The Space Industry Act 2018 was introduced to create a regulatory framework for the expansion of commercial space activities (involving both launch to orbit and sub-orbital spaceflight) and the development of spaceports in the UK. The Act created the high-level legal framework to enable commercial spaceflight in the UK but the introduction of secondary legislation, to provide a more detailed regulatory framework, has yet to take place. During 2020, the Government held several consultations seeking views on the draft regulations, though, at the time of writing, secondary legislation had yet to be formally laid.

1. Overview of UK Space Industry

The Size and Health of the UK Space Industry was surveyed in 2018 by London Economics (LE) on behalf of the UK Space Agency. LE found that the "UK space industry income grew to £14.8 billion in 2016-17, a growth rate of 3.3% per annum". This was estimated to be equivalent to 5.1% of the global space economy.[1] The survey found that there were almost 950 organisations engaging with the space industry (as defined in Box 1), supporting 41,900 jobs.[2]

London Economics estimated that the space industry contributed £5.7 billion to the UK economy in 2016/17, equivalent to 0.29% of total UK economy output.[3] Including wider supply chain impacts it was estimated the sector contributed £13.0 billion in 2016/17. In addition, satellite services support a range of activities in other sectors of the economy.[4]

The latest data available relates to 2016-17. An updated 'Size and Health of the UK space industry' survey for the year 2020 is currently being carried out by know.space on behalf of the UK Space Agency.[5]

Box 1: Definition of the space industry[6]

The LE report defines the space industry as all 'organisations that are engaged in any space-related activity to some degree,' including:

- **Commercial organisations** (i.e. businesses, companies, firms) that earn revenue from the manufacture, launch and operation of satellites/spacecraft, and from utilisation of the signals and data supplied by satellites/spacecraft to develop value-added applications
- **Non-commercial organisations** (e.g. universities, research institutes) that secure funding to contribute space-specific research and expertise throughout the industry supply chain, often in partnership with commercial organisations.

1.1 Range of space industry activities

The industry is dominated by 'downstream' activities, with an income of £12.4 billion generated by space applications such as direct to home broadcasting. 'Upstream' activities, including space manufacturing (launch vehicles, satellites, payloads, scientific instruments, for example) have grown by 7.8% since the 1999/2000 financial year, generating an income of £2.4 billion in 2016-17.[7] The income of the UK space industry can be broken down further into the following capabilities:

1 London Economics, Size & Health of the UK Space Industry 2018, A Report to the UK Space Agency, Summary Report, January 2019, p1
2 Ibid, p1
3 Ibid, p9. Direct economic output in current prices in terms of gross value added.
4 Ibid, p23.
5 UK Space Agency, UK space sector survey – Size and Health 2020, 14 October 2020
6 London Economics, Size & Health of the UK Space Industry 2018, A Report to the UK Space Agency, Summary Report, January 2019, p3
7 Ibid, p5

UK space industry income by capability

£ millions, 2016/17

Broadcasting	7,584
Communications	2,741
Positioning, navigation, timing	1,819
Defence/military	1,228
Other	523
Earth observation	407
Science or exploration	315
Transportation (including launch)	97
Meteorology	78
Total	**14,792**

Source: London Economics, Size & Health of the UK Space Industry 2018

The space industry is commercially focused; 82% of income is generated by sales to consumers and businesses, and 18% by the public sector (4% for Space Agencies and 14% Government).[8]

1.2 Location of UK space organisations

All 13 UK regions are home to headquarters of space organisations, with a higher concentration of industrial sites (and employment) in London, South East, East of England, and Scotland.[9] It is estimated that organisations based in London generate the majority (£9.5 billion, 64%) of the total UK space industry income, whilst the South East generates (£2.4 billion, 16%) and contains the largest number of organisations (269 organisations, to London's 172).[10]

The capabilities of these organisations have recently been mapped by the Knowledge Transfer Network (KTN) and UK Space Agency.[11] An interactive tool has been created that outlines the universities, companies, funding bodies and networks that make up the UK space sector. Andy Bennett, Knowledge Transfer Manager for Space at the KTN, explained how the map could benefit the UK space sector:

> This UK Space Sector Landscape Map showcases our knowledge and aims to support those both inside and outside the sector to build new collaborations. We hope that it supports our ambitious UK space sector to continue to grow and succeed.[12]

8 London Economics, Size & Health of the UK Space Industry 2018, A Report to the UK Space Agency, Summary Report, January 2019, p7
9 Ibid, p1
10 Ibid, p21
11 UK Space Agency, KTN and UK Space Agency launch UK Space Sector Landscape Map, 21 January 2021
12 Ibid

1.3 Employment in the UK space industry

It is estimated that the space industry supported 42,000 jobs in the UK in 2016/17, meaning that just over 0.1% of the UK's total workforce are employed in space organisations.[13] Employment in the UK space industry is distributed more evenly across the UK than space industry income, as some of the large space organisations have locations in multiple regions. London and the South East account for 51% of all employees, followed by Scotland (18%) and East of England (10%).[14] Scotland's share of space industry employees is much higher than its share of income (0.9%) and 0.29% of Scotland's total workforce are employed by space organisations – higher than the UK average.[15] Below is a full break down of employment and income by region:

UK space industry organisations, employment and income
2016/17

	Count of space organisations	Employment	Income (£ million)
London	218	12,286	9,484
South East	368	9,023	2,364
Scotland	132	7,555	2,088
East of England	146	4,379	184
North West	75	2,360	140
South West	173	1,333	127
Yorks and the Humber	44	1,302	102
West Midlands	74	1,170	77
North East	34	907	75
East Midlands	83	868	67
Wales	47	517	40
Northern Ireland	26	145	33
Total	1,424	41,929	14,792

Source: London Economics, Size & Health of the UK Space Industry 2018, p21-22. Some data (including from Crown Dependencies) has been redacted for confidentiality purposes.

BMG Research has recently published a report based on its Space Sector Skills Survey 2020, which it prepared for the UK Space Agency. The report highlights the growing demand for highly skilled and qualified workers required by the industry, and issues that might be leading to a shortfall in suitable candidates.[16]

The UK Space Agency has begun to address space skills issues by working with the Space Engineering Trailblazer group to develop a level 4 Space Engineering Technician Apprenticeship and will be creating a level 6 apprenticeship is Space Systems Engineering.[17] Trailblazer groups

[13] London Economics, Size & Health of the UK Space Industry 2018, A Report to the UK Space Agency, Summary Report, January 2019, p23
[14] Ibid, p22
[15] Ibid, p23
[16] BMG Research, Space Sector Skills Survey 2020, February 2020, p2-3
[17] PQ 115796, 24 November 2020

are groups of employers that develop and maintain new apprenticeship standards. The Space Engineering Trailblazer group is headed by Airbus.

In 2020, the Space Skills Alliance ran a Space Census in order to understand better the demographic of people working in the UK Space Industry. The Space Growth Partnership plan to use the information gathered to "improve equality, diversity and inclusion in the UK space sector".[18]

1.4 Imports and Exports

In their report, LE estimated that in 2016/17 the UK space industry generated £5.5 billion of its income from abroad, which amounts to 37% of the income of the industry.[19] Almost 85% of total exports go to the rest of Europe, including European Space Agency (ESA), European Commission, and European governments, businesses and consumers, with France and ESA having a combined share of 69%.[20]

Based on 85 respondents (compared to 275 for the rest of the survey) London Economics found that 58% of the space industry's inputs are imported from overseas, with 69% coming from Europe and 27% from North America.[21]

18 UK Space Agency, First space census launches today, 7 October 2020
19 London Economics, Size & Health of the UK Space Industry 2018, A Report to the UK Space Agency, Summary Report, January 2019, p8
20 Ibid, p8
21 Ibid, p9

2. Strategy and Policy

2.1 National Space Policy

In 2014, the UK Government welcomed the space industry's ambitions to capture 10% of the global space market by 2030. To support the sector the Government published its first ever National Space Policy in December 2015, setting out that the Government:

1. Recognises that space is of strategic importance to the UK because of the value that space programmes deliver back to public services, national security, science and innovation and the economy.
2. Commits to preserving and promoting the safety and security of the unique space operating environment, free from interference.
3. Supports the growth of a robust and competitive commercial space sector, underpinned by excellent academic research.
4. Commits to cooperating internationally to create the legal frameworks for the responsible use of space and to collaborating with other nations to deliver maximum benefit from UK investment in space.[22]

Box 2: Key UK space organisations

UK Space Agency – an executive agency, sponsored by the Department for Business, Energy & Industrial Strategy. They are responsible for providing technical advice on the government's space strategy and delivering programmes that implement this strategy.

Nation Space Council – a Government Cabinet Committee (see below).

UK Space – a trade association of the British space industry. They represent and promote space to key stakeholders, including the government, on a national and international level.

Space Growth Partnership - brings together companies, institutions, academics and entrepreneurs from the Space community to work with the Government to secure the future growth of the UK Space sector.

Satellite Applications Catapult - independent technology and innovation company that aims to boost UK productivity by helping organisations make use of and benefit from satellite technologies.

Harwell Space Cluster - a co-location of over 100 industry, academia and public sector organisations at related to the space sector. Its aim is to facilitate collaboration and knowledge sharing to drive multidisciplinary innovation,

European Space Agency – shapes the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world. Is not an EU organisation and the UK remains a member.

[22] HM Government, National Space Policy, 2015, p8

2.2 National Space Strategy and National Space Council

During the Queen's Speech on 19 December 2019 the Government set out plans to establish a new National Space Council and launch a UK Space Strategy:

> Space capabilities are increasingly central to our day-to-day life - underpinning a range of technologies from smartphones to navigation systems. A new National Space Council and UK Space Strategy will help the UK lead the way in this fast-growing, high-technology sector, creating thousands of jobs across the country and generating opportunities to strengthen the UK's global influence while keeping people safe.
>
> The Cabinet-level National Space Council will help put space at the heart of Government policy and help us deliver a UK Space Strategy. The Space Strategy will boost future funding and lead to a dedicated innovation programme to support future space exploration and exploitation of technology developments by funding cutting-edge British innovation in AI, robotics and satellites.[23]

In June 2020, the National Space Council was established. Its terms of reference can be found in the list of 'Cabinet Committees':

> To consider issues concerning prosperity, diplomacy and national security in, through and from space, as part of coordinating overall Government policy.[24]

The National Space Strategy is yet to be published and there have been several Parliamentary Questions asking about its progress. In response to a Parliamentary Question in January 2021 on when the strategy can be expected, the Government stated, "The UK's first comprehensive national space strategy is being developed under the direction of the National Space Council".[25]

The subject of the new National Space Strategy was also raised on several occasions during debate in the Commons on "The Future of the UK Space Industry" on 4 February 2021. Owen Thompson (SNP) commented:

> A space strategy has often been promised, but we are still waiting to see it delivered. I am sure those watching today's debate will be as keen as I am to hear what the Minister has to say on that front.[26]

Richard Graham (Con) added:

> My instinct is that for the UK to continue to be at the leading edge of space technology, with skills, jobs and growth benefits, we need the National Space Council to work closely with the Department for Business, Energy and Industrial Strategy on the strategy promised but not yet seen.[27]

---

23 Prime Minister's Office, Queen's Speech December 2019: background briefing notes, 19 December 2019, p108
24 Cabinet Office, List of Cabinet Committees, 19 November 2020
25 PQ 133283 [on Space Technology], 15 January 2021
26 HC Deb, 4 February 2021, c1155-1156
27 Ibid, c1160-1161

In response, the Parliamentary Under-Secretary of State for Business, Energy and Industrial Strategy, Amanda Solloway, said:

> We have established a new National Space Council to co-ordinate space policy. We will grow our space economy across the Union, bolster our capabilities to protect the UK and our allies, foster innovation, and make the UK a world-class destination for global talent and investment. The UK's priority for space will be set out in the first comprehensive space strategy, which will be delivered in the next six months. I could not agree more that we need that.[28]

Most recently, the National Space Strategy has been referenced in the Government's Integrated Review of Security, Defence, Development and Foreign Policy (published March 2021). This indicated, for the first time, that the UK's national space strategy would "establish an integrated approach across military and civil space policy".[29] The review also listed the following ambitions for UK space policy:

- Establish a new Space Command by summer 2021, ensuring that the armed forces have cutting-edge capabilities to advance UK interests on Earth and in space – enhancing our cooperation with allies and ensuring we can compete with our adversaries.
- Develop a commercial launch capability from the UK – launching British satellites from Scotland by 2022 as part of the UK Space Agency's programme to enable a UK-wide market for spaceflight services. This will give us greater strategic autonomy and flexibility in terms of what the UK puts into space, and when.
- Develop other critical space capabilities for military and civil use, including Space Domain Awareness, which uses integrated in-space and ground sensing to track space debris, investigate incidents in space, and detect, anticipate and attribute hostile activity.
- Support the UK space sector to realise the economic benefits from this new and dynamic market and extend the UK's influence in the space domain. As part of building the UK's strategic advantage through S&T, the Government will build the enabling environment for a thriving UK space industry developing space- and ground-based technologies. We will promote a 'whole-of-life' offer from R&D through finance to satellite operations, launch capability data applications and end-of-life services. Defence will carry out more space-related science activity, R&D and operational concept demonstrators.
- Prevent the proliferation of technologies that pose a threat in space, such as ballistic missile technologies, through robust export controls
- Increase the UK's international collaboration across our space-related objectives. We intend to continue our participation in the EU's Copernicus Earth observation programme, and will deepen our cooperation with NATO and through the Combined Space Operations (CSpO)

---

28 HC Deb, 4 February 2021, c1176-1177

29 HM Government, Global Britain in a competitive age. The Integrated Review of Security, Defence, Development and Foreign Policy, March 2021, CP 403, p58

> initiative. We will also develop our work with bodies including NASA and the European, Canadian, Australian and Japanese space agencies.[30]

The National Space Strategy was also mentioned on 17 March 2021 by the Secretary of State for Business, Energy and Industrial Strategy, Kwasi Kwarteng, when he gave oral evidence to the House of Commons Science and Technology Committee for their inquiry into A new UK research funding agency:

> […]
>
> I also said explicitly that we would own the space strategy. If you look at space and the policy around space, that was sitting in lots of different buckets. Obviously, No. 10 had a clear interest in it, as did the UK Space Agency, the MoD and other Departments. I have said that BEIS will take the lead on this. We are holding the pen on the space strategy. We are very keen and excited about delivering that in the next few months.[31]

2.3 Satellite Infrastructure

In its 2018 report, London Economics estimated that over £300 billion of the UK's non-financial business economy GDP is supported by satellite services.[32] Satellites provide a vast number of functions, including services such as telecommunications, global navigation satellite system (GNSS) and earth observation.[33] Satellite data also provides benefits to wider industries such as agriculture, aviation, maritime, urban development and energy.[34] For further information about the UK's use of satellites see:

- POSTnote 514, UK Commercial Space Activities, 15 December 2015, p2-3

Over the past few years there has been a significant reduction in the cost of producing and launching satellites,[35] and an increase in popularity for the development of small satellite mega-constellations (See Box 2 and Box 3).[36] This shift in cost is predicted to allow a wider range of companies and organisations to launch satellites.[35]

---

30 HM Government, Global Britain in a competitive age. The Integrated Review of Security, Defence, Development and Foreign Policy, March 2021, CP 403, p58
31 Science and Technology Committee, Oral evidence: A new UK research funding agency, HC 778 2019-21, Q263
32 London Economics, Size & Health of the UK Space Industry 2018, A Report to the UK Space Agency, Summary Report, January 2019, p24
33 POSTnote 514, UK Commercial Space Activities, 15 December 2015
34 HM Government, National Space Policy, 2015, p10
35 Deloitte Perspectives, The decline of commercial space launch costs, accessed 9 March 2021
36 CNBC, Why in the next decade companies will launch thousands more satellites than in all of history, 15 December 2019

Box 3: Satellite mega-constellations

- Satellite mega-constellations are networks of many (hundreds or thousands) small satellites in low earth orbit (LEO, altitude of less than 1000 km).[37]
- In comparison to conventional satellites that have geostationary orbits (orbiting 36,000 km above the equator and at the same rate as earth), LEO satellites don't have to follow a particular path around Earth, resulting in there being more routes available for LEO satellites.[37]
- These networks can provide internet coverage to the whole planet, including remote or inaccessible parts of the world, with reduced latency.[38]

Box 4: Planned satellite launches

- Space-X's Starlink - plans to create a mega-constellation of up to 42,000 small satellites to deliver the world's largest LEO broadband constellation.[39]
- OneWeb – plans to launch 650 small satellites to provide high speed broadband coverage to 95% of the Earth's surface.[40]
- Amazon's Project Kuiper – plans to launch a constellation of 3,236 LEO satellites to provide affordable broadband, to "make a difference for unserved and underserved communities".[41]
- Telesat's Lightspeed – have partnered with Thales Alenia Space to form a fleet of 298 satellites.[42]

The Government's National Space Policy set out a number of aims relating to satellites, including:

- To bridge the digital divide by using satellite technology to provide broadband for the last 5-10% of the population.[43]
- To use satellites to strengthen the nation's security.[44]
- To protect space systems from non-malicious (space debris and space weather) and malicious threats.[44]
- To assist UK employers to compete in the global market for space-related products, including satellite technologies.[45]
- To establish a spaceport and in due course launch small satellites from the UK.[46]

---

37 The European Space Agency, Types of Orbit, 30 March 2020
38 OneWeb, Technology: Our Solutions, accessed 17 March 2021
39 Space News, SpaceX submits paperwork for 30,000 more Starlink satellites, 15 October 2019
40 OneWeb, Technology, accessed 22 March 2021
41 Amazon, Amazon marks breakthrough in Project Kuiper development, 16 December 2020
42 Telesat, Press release: Telesat to Redefine Global Broadband Connectivity with Telesat Lightspeed, the World's Most Advanced Low Earth Orbit (LEO) Satellite Network, 9 February 2021
43 HM Government, National Space Policy, 2015, p8
44 Ibid, p9
45 Ibid, 13
46 Ibid, p14

The Government has made steps to meet these aims by funding and establishing a number of satellite-related projects and deals, detailed below.

UK Spaceflight Programme

The Government Response to the UK Space Innovation and Growth Strategy 2014-2030, and the Government's National Space Policy, set out ambitions to establish a UK spaceport to facilitate commercial spaceflight and small satellite launches from the UK.[47] In addition, the Integrated Review of Security, Defence, Development and Foreign Policy, reported that the UK currently relies heavily on its allies for critical space capabilities, including satellite launch.[48]

A report from the Space Growth Partnership also identified that developing low-cost space launch sites in the UK should be one of four key priorities for the UK space sector, in order "to promote even lower cost access to space".[49]

Satellites are relied upon for many civilian services such as access to broadband, GPS and weather forecasting.[50] They are also used in military communication services. [51] In its recent Integrated Review of Defence, the Government stressed that developing a domestic commercial launch capability would allow greater "autonomy and flexibility" in terms of what the UK puts into space, allowing for critical civilian and military services to be delivered.[52] The Government has previously stated that commercial launch demand is potentially worth £3.8 billion to the UK economy over the next decade.[53]

Another advantage of 'homegrown' spaceflight is that international satellite customers need to use different launch trajectories so their payloads can access different low earth orbits. For examples, Virgin Orbit are in partnership with Spaceport Cornwall so that they can access northerly and southerly polar low earth orbits.[54]

To support these ambitions, the UK Space Agency has launched a UK Spaceflight Programme. Investments have been made in several spaceports; a vertical launch site at the Sutherland Space Hub in Scotland and a horizontal launch site from Spaceport Cornwall in Newquay (see Section 4.1 for details on LaunchUK activities).

The regulatory framework to enable commercial spaceflight activities from UK spaceports was created under the Space Industry Act 2018. The detailed licensing still needs to be set out in secondary legislation.

---

47 Ibid, p14
48 HM Government, Global Britain in a competitive age. The Integrated Review of Security, Defence, Development and Foreign Policy, March 2021, CP 403, p58
49 Space Growth Partnership, Prosperity from Space: A Partnership Strategy for the UK, 11 May 2018, p7
50 POSTnote, UK Commercial Space Activities, 15 December 2015
51 Ministry of Defence, SKYNET Enduring Capability programme, 6 November 2020
52 HM Government, Global Britain in a competitive age. The Integrated Review of Security, Defence, Development and Foreign Policy, March 2021, CP 403, p58
53 Press release: Britain competes for the launch of an estimated 2,000 satellites by 2030, UK Space Agency and Department for Business, Energy & Industrial Strategy, 9 August 2018
54 Spaceport Cornwall: Frequently Asked Questions, November 2019

For more details about the Act and the licensing that is required, see Section 3.

OneWeb

In July 2020, the Government led a successful bid to acquire the satellite technology firm OneWeb alongside Bharti Global Ltd, with each partner contributing $500 million. The Government set out their rationale for the purchase in a press release:

> The deal will enable the company to complete construction of a global satellite constellation that will provide enhanced broadband and other services to countries around the world.
>
> […]
>
> With a sovereign global satellite system, the UK will further develop its advanced manufacturing base, making the most of its highly skilled workforce as the hardware is further developed and equipment and services are deployed to make the most of this unique capability.
>
> OneWeb will also contribute to the government's plan to join the first rank of space nations, along with our commitment to making the UK a world leader in science, research, and development.[55]

Prior to the Government announcement, the BEIS Acting Permanent Secretary and Accounting Officer, Sam Beckett, wrote to the Secretary of State for Business, Alok Sharma, seeking a Ministerial Direction for the purchase, noting the time available to review the purchase, value for money and potential non-monetary benefits.[56]

In September 2020, Industry experts were questioned by the Business, Energy and Industrial Strategy Committee on the OneWeb deal. The experts thought that the deal had potential in allowing the UK to enhance its internet connectivity through OneWeb producing and launching satellites. However, they suggested that the Government needed a more coherent strategy for the UK's overall satellite infrastructure, especially with regards to GNSS (Global Navigation Satellite System) capabilities.[57]

Since the Government announcement of the deal, there has been regular questions in Parliament about how the UK will benefit from the acquisition of OneWeb. For example, on 8 February 2021 Nick Smith (Lab) asked:

> … if his Department will publish the primary objectives of OneWeb with reference to its provision of (a) internet communications, (b) surveillance and (c) GPS.

The Government responded:

> The Government and other shareholders are supporting OneWeb in the development of their long-term strategic plan.

---

55 Press release: UK government to acquire cutting-edge satellite network, Department for Business, Energy & Industrial Strategy, 3 July 2020

56 Letter to the Secretary of State from the Acting Permanent Secretary and Accounting Officer, BEIS, 26 June 2020

57 Business, Energy and Industrial Strategy Committee, Oral Evidence: OneWeb, HC 806, 17 September 2020, Q26

> OneWeb's global Low Earth Orbit (LEO) constellation will provide high speed, low-latency global internet coverage.
>
> OneWeb's current generation of satellites does not offer any surveillance applications. However, moving forward, OneWeb's capabilities in potential future-generation satellites, alongside those of the wider sector, will be reviewed in the context of the UK's evolving Space requirements.[58]

A further question asked if there was any 'potential for OneWeb to support the UK's national security interests', to which the Government indicated it continued to rely on the SKYNET programme:

> The UK will continue to rely on the SKYNET programme for its defence and security global communications requirements.[59]

SKYNET is a family of military communications satellites that provide communication services to the UK Armed Forces and allies.[60] Airbus provides the service for the Ministry of Defence (MOD).

Since June 2020, OneWeb has launched 36 satellites. The company plans to launch a commercial broadband service to the UK (and other regions) in 2021 and have a global service running by 2022.[61] The acquisition was completed on 20 November 2020.[62]

Harwell Space Custer

The Harwell Space Cluster is the "co-location of industry, academia and public sector organisation at Harwell related to the space sector." Over 100 organisations are involved with the cluster, facilitating collaboration and knowledge sharing to drive multidisciplinary innovation.[63] The Space Cluster also provides a wide range of national facilities and infrastructure, with the National Satellite Test Facility due to be opened in summer 2022. The facility received £99 million from the Industrial Strategy Challenge Fund and will host the following activities:

- Large satellite preparation and solar array deployment
- Centre of gravity and moments of inertia
- Vibration and pyro-shock
- Acoustic testing
- Large space test chamber
- Electromagnetic compatibility and antenna test.[64]

Satellite Applications Catapult

The Satellite Application Catapult (SAC) was launched in 2013 as part of the joint government and industry Space Innovation and Growth Strategy that was first developed in 2010. The SAC is an independent technology and innovation company that aims to boost UK productivity

58 PQ 150743, 8 February 2021
59 PQ 152467, 10 February 2021
60 Ministry of Defence, SKYNET Enduring Capability programme, 6 November 2020
61 One Web, OneWeb's Successful Launch, Paves the Way for Commercial Services, 18 December 2020
62 Department for Business, Energy & Industrial Strategy, UK government secures satellite network OneWeb, 20 November 2020
63 Harwell Space Cluster, Space Cluster Brochure, September 2019, p4
64 UKRI, National Satellite Test Facility, updated 11 January 2021

by helping organisations make use of and benefit from satellite technologies. It is based in Harwell, Didcot and was one the first companies to join the Harwell Space Cluster.

2.4 Recent funding announcements

Space Sector Support Plan

In February 2021, A Space Sector Support Plan was announced by the Department for International Trade. The measures announced include:

- Setting up a Space Sector Export Academy to educated space businesses on international trade and investment skills
- Continued support for the Leicester Space Park as a High Potential Opportunity for foreign investors
- Creation of new promotional material for the UK space sector to attract investment
- Working across government departments to support creation of international partnerships.[65]

Business support scheme for space-related enterprise

In partnership with Entrepreneurial Spark and The University of Strathclyde, the UK Space Agency is delivering a Business Accelerator programme that offers free virtual sessions to support companies that are interested in the space sector.[66] Eight one-off Business Horizon events are being run, as well as a 10-week programme to help companies develop a targeted space strategy.

Funding for new 'space hubs'

In November 2020, the Government announced that it would provide funding for new 'space hubs' to be created across England. 'Space hubs' will bring together Local Enterprise Partnerships (LEPs), combined authorities, academic institutions, research groups and businesses, with an aim to creating a strong space strategy in each area.

The funding is being provided to seven locations, including the North West, West Midlands, and West Yorkshire, with Wales, Scotland and Northern Ireland also provided with funding to analyse their local space sectors.[67]

National Timing Centre

UK Research and Innovation (UKRI) has invested £36 million in a world-first National Timing Centre. Researchers across the UK will develop a network of atomic clocks, so that the UK economy and public services are less reliant on satellites technology for precision timing.[68]

---

65 Department for International Trade, UK's leading space sector to benefit from new government support, 25 February 2021

66 UK Space Agency, Business support scheme to boost UK space industry has lift off, 19 February 2021

67 UK Space Agency, New support for UK space hubs unveiled, 18 November 2020

68 Department for Business, Energy & Industrial Strategy, World's first timing centre to protect UK from risk of satellite failure, 19 February 2020

In 2018, The Blackett Review reported on the UK's vulnerabilities due to over-reliance on Global Navigation Satellite System (GNSS) and a report from LE estimated that the economic impact of a GPS failure would be £1 billion a day. The creation of the National Timing Centre aims to increase the UK's resilience to the risk of satellite failure.

3. Space Industry Act 2018 and Regulation

In 1967, the UN Outer Space Treaty was introduced to place obligation on Governments to:

- Maintain a register of objects sent into space.
- Ensure safety of operations for such space activities.
- Bear ultimate liability for costs arising from accidental damage to 3rd parties from UK space activities.

In response, the UK Government introduced The Outer Space Act 1986 (OSA) which provides the legal basis for the regulation of activities in outer space carried out by persons connected with the United Kingdom, thereby implementing the UK's obligations under the UN Space Treaties.

In 2017, the Government considered that neither international aviation nor space law were suitable to regulate the risks to safety and security posed by commercial spaceflight activities in the UK. On 9 February 2017, the then Secretary of State for Transport (Chris Grayling) announced forthcoming legislation on spaceflight:

> We intend to publish a draft spaceflight Bill later this month, dedicated to commercial spaceflight in the UK. This legislation will be fundamental to enabling small satellite launches and sub-orbital flights from the UK, ensuring the UK is well placed to take advantage of a growing global market. The Government's intention is to introduce this Bill formally early in the next Session, following a period of scrutiny and engagement with industry and other interest groups.
>
> The space sector is vital to the future of the UK economy, with a strong record of creating high-value jobs and generating wealth across the country. To help the creation of the space launch market in the UK, the UK Space Agency is inviting commercial space consortia to apply for grant funding to take the action that will make our ambitions a reality.
>
> Together, the proposed legislation and grant funding announced today will have the potential to enable commercial spaceflight from a UK spaceport by 2020

The Bill was introduced into the House of Lords on 27 June 2017 and received Royal Assent on 15 March 2018. The Outer Space Act 1986 now only applies to space activities carried out by UK entities overseas.[69]

3.1 Space Industry Act 2018

The Space Industry Act 2018 (SIA) provided for the creation of a regulatory framework to enable commercial spaceflight activities (involving both launch to orbit and sub-orbital spaceflight) to be carried out from spaceports in the United Kingdom. The aims of the Act were to:

---

[69] UK Space Agency, Department for Transport and Civil Aviation Authority, Brochure Spaceflight Programme, 15 July 2018

- Create a framework for the regulation of spaceflight activities in the UK in line with the UK's international obligations.
- Establish a system of licencing for UK space activities.
- Create powers for the Secretary of State to appoint a regulator(s). The regulator's primary objective is to ensure public safety.
- Create a framework for establishing safety, training and informed consent requirements for individuals participating spaceflight activities.
- Create a framework to establish a launch site in the UK, including creating powers for the Secretary of State to make orders over land.
- Create a framework for liability, indemnities and insurance for UK space activities.
- Create new offences and applies existing UK criminal law to space activities.[70]

Further information about the Act and its progress through Parliament can be found in the Commons Library Briefing, The Space Industry Bill 2017-2019, 2 February 2018.

Overall, the Bill was welcomed by both Houses and industry stakeholders. The main issue, repeatedly raised, was the lack of detail on the face of the Bill and a reliance on developing more detailed rules for commercial spaceflight through secondary, rather than primary, legislation.[71] [72] The Commons Science and Technology Committee's 2017 inquiry into The Draft Spaceflight Bill reported that:

> The lack of detail on the face of the Bill has made detailed scrutiny difficult at this stage. There are still many 'unknowns' where commercial spaceflight is concerned, and the Government's approach has been to issue a "skeletal bill" with powers placed in the hands of regulators, and the Secretary of State, to plot a course through the unknown. Consequently, the draft Bill contains a large number of delegated powers—103 provisions in a Bill with 67 clauses—to bring forward secondary legislation in the future, of which only six are afforded the 'affirmative resolution' procedure. Some of these, including clauses 29 and 63, are particularly wide-ranging, while others, such as clauses 21 and 51, are potentially inappropriate delegations of legislative power.[73]

During the House of Lords stages these broad delegated powers were discussed, as well as environmental issues, powers over land and liability, indemnity, and insurance provisions.[74] More information about the amendments made can be found in the Library Briefing paper.

---

70 The Space Industry Bill 2017-2019, Commons Library Briefing Paper CBP-8197, 2 February 2018, p8
71 Ibid, p3, 21-22
72 Explanatory Notes, 29 November 2017, para 8.
73 House of Commons Science and Technology Committee, Draft Spaceflight Bill, HC1070, 29 April 2017, Summary.
74 The Space Industry Bill 2017-2019, Commons Library Briefing Paper CBP-8197, 2 February 2018, p20

The lack of detail contained within the Bill was scrutinised throughout its passage through Parliament.[75] There have been continued concerns over the need to pass the secondary legislation so that the framework for commercial spaceflight is in place, allowing the UK space industry to grow.[76]

3.2 Licencing framework

The Space Industry Act 2018 (SIA) created the high-level legal framework to enable commercial spaceflight in the UK. Secondary legislation, to provide a more detailed regulatory framework, has yet to be made. Throughout 2020, several consultations have been published by the Government, seeking views on draft regulations that have been proposed under the SIA.

In July 2020 a consultation was published by the Department of Transport asking for views on the draft regulations and guidance documents that are required to:

- operate a spaceport
- carry out spaceflight activities
- provide range control service.[77]

A second consultation was published by the Department of Transport in October 2020, covering the draft insurance, liabilities and charging requirements to implement the SIA.[78] The results of the two consultations were published together on 5 March 2021. In a statement, the Parliamentary Under Secretary of State for Transport, Rachel Maclean, said:

> We are pleased to report that our modern regulatory framework was supported by the vast majority of respondents with many applauding the flexibility of our proposed approach, which fosters adaptability through an outcomes-based focus.
>
> The response I am sharing today sets out the ways we have adjusted the draft Space Industry Regulations and associated guidance material to reflect, and where possible accommodate, the suggestions and recommendations made through the consultation process. We believe that this collaborative approach will not only strengthen the licensing regime we are implementing, but also demonstrates the Government's on-going commitment to growing this exciting sector.
>
> My Department has worked closely with the Department for Business, Energy and Industrial Strategy, the UK Space Agency and Civil Aviation Authority to legislate for a wide range of new commercial spaceflight technologies, including traditional vertically launched vehicles, air-launched vehicles and sub-orbital

---

75 The Space Industry Bill 2017-2019, Commons Library Briefing Paper CBP-8197, 2 February 2018, p3

76 HC Deb, 4 February 2021, c1155-1157, c1169-1170, c1171-1173

77 Department for Transport and UK Space Agency, Spaceport and spaceflight activities: regulations and guidance, 29 July 2020, p12

78 Department for Transport and UK Space Agency, Commercial spaceflight: insurance and liabilities requirements, 13 October 2020

> spaceplanes and balloons. It is our intention to bring this legislation before the House later this year.[79]

Space Industry Regulations Consultations contains a summary of views collected and the Government Response. Overall, respondents were supportive of the regulatory approach proposed. Some of the key concerns and the Government's response to these are shown below.[80]

Space Industry Regualtions: concerns and Government response

Concern raised	Details	Government Response
The alignment between the OSA and SIA is unclear	OSA has a traffic light system to provide early guidance about their application, majority view is that the SIA should contain this system.	Government will introduce an optional traffic light system.
	Prospective orbital operator licence applicants need to understand how the OSA and SIA relate to one another.	The Government will arrange a plenary session to address how the SIA relates to the OSA.
Alignment between spaceport and launch operator licences	Respondents felt that there should be alignment between the two licenses.	The government will not mandate the sharing of information between the licenses.
Launch from a ship	Respondents queried whether the Regulations accounted for launch a space object from a ship.	The SIA does not recognise a ship as a spaceport but would regulate launch activity from a ship. The regulator will consider licence applicants for launch from a ship on a case by case basis, taking into consideration the SIA and OSA.
Payloads	Respondents highlighted that the payload might not be known at time of application, or there might be no payload involved in the launch.	Regulations wills be adjusted so that detailed information about the payload is only required if this information is known.
Training requirements	Respondents proposed that the training requirements be expanded.	The regulations will now include all individuals who participate in licensed activities, even if they do not have a specified role. Training will now include "human factors."
One-off charges for orbital licensing	Queries about how this applies to constellations of satellites.	Government will maintain approach of one-off charge of £6,500 but look at ways to reduce fees of constellation operators.
Modelled Insurance Requirements (MIR)	Support for MIR – setting insurance requirements for launch and licence conditions. Queries in relation to liabilities	Wider review to be carried by Government in 2021.

Source: DfT and UK Space Agency, Space industry regulations consultations: summary of views received and government's response, 5 March 2021, p5-6.

The Government is now in the process of amending the draft regulations and guidance documents and will carry out a review of the

79 HCWS827, 8 March 2021
80 Department for Transport and UK Space Agency, Space industry regulations consultations: summary of views received and government's response, 5 March 2021

proposed approach to insurance. It is expected that these will be published alongside the secondary legislation, although a specific time frame has not been given for this.[81] Section 68(5) of the SIA states that regulations made under the Act must be made under the negative resolution procedure except in the case of an instrument listed in subsection (6), where the affirmative procedure is required.[82]

The delay in publishing the Government Response to the consultations, and formally establishing regulations, was highlighted as an issue several times during the Commons debate on The Future of the UK Space Industry on 4 February 2021. Owen Thompson (SNP), commented:

> Yet getting the regulations in place is at times more like moving through treacle than rocketing away into a new space future. We need to get the regulations to permit rocket launches, to give clarity about how the system will work and to get it right. The framework was set up in the Space Industry Act 2018, but it is still not in place, and we still await the outcome of the consultation process. When we hear the results, I certainly hope that the Government will have listened carefully to industry voices and taken their concerns on board. So far there has been a lot of dither and interdepartmental confusion, and unfortunately a lack of determined leadership from the Government on these regulatory issues
>
> […]
>
> The concern is that the licence application process for launch will take far too long to process, resulting in the industry being uncompetitive. I hope the Minister can assure the House in her response today that there is a development strategy in place that embraces all parts of the space industry and has a clear imperative around which the Government, regulators and industry can coalesce to ensure the full potential of space ambition.[83]

Steve Double (Con) talked about the need for flexibility in the regulations:

> The thing we need now is for the regulations to be put in place. We need them in place urgently in order to be able to obtain the necessary licences. There is concern, however, that the regulations are looking to take a one-size-fits-all approach for both vertical and horizontal launch. Those two means of launch are very different. Horizontal launch, which is basically little different from a large passenger jet taking off, until it reaches altitude for rocket launch, should not be bogged down by unnecessary regulations that are required only to cover vertical launch. Will the Minister therefore look carefully at the regulations to ensure that they differentiate between launch mechanisms and are fit for horizontal launch? [84]

---

81 Department for Transport and UK Space Agency, Space industry regulations consultations: summary of views received and government's response, 5 March 2021, p7 para 2.6

82 The Space Industry Act 2018, Section 68(5), 68(6)

83 HC Deb, 4 February 2021, c1155-1157

84 HC Deb, 4 February 2021, c1169-1170

Carol Monaghan (SNP) expressed concerns that the complex regulations and costs of administration and insurance would adversely affect the UK's space industry:

> So where does that leave the UK? Well, there are a number of issues that we need to address. The licensing requirements under the Space Industry Act 2018 include complex regulation that must be simplified to avoid large administrative costs for licence applicants. The third-party liability insurance costs are a major challenge for small satellite operators. These costs are excessively high and, as my hon. Friend the Member for Central Ayrshire (Dr Whitford) has already explained, disproportionate to the low risks associated with this class of satellite.
>
> Currently, one company is leaving the UK every month to launch elsewhere, and many more are electing not to come to the UK in the first place. This threatens the future of the UK's small satellite sector and its wider supply chain, which needs focused Government support. A new insurance model is required for UK companies to remain competitive in the global market, and for the Government to leverage its space sector investments, including in launch sites and manufacturing facilities. The UK has a well-established earth observation capability, but there is growing competition. Other companies have significant national programmes and clear earth observation data and security policies, which enable greater investment certainty. Data exporters from the UK are disadvantaged because of the lack of such a policy, so that needs to be looked at urgently.[85]

Concerns were also raised about the third-party damage liability cap, a topic that was frequently debated during the progress of the Bill. Dr Philippa Whitford (SNP) said during the debate:

> The UK space industry is currently held back by the lack of a domestic launch site, but the licensing and regulation system of the Space Industry Act 2018 is still not finalised. The industry is concerned about the technology safeguarding agreement with the US, which could exclude foreign-launched customers from UK spaceports. It would be a failure if they just ended up as long strips of tarmac awaiting the occasional visit of a US vehicle.
>
> The biggest unresolved issue is that companies must accept unlimited liability to indemnify the Government against third-party damage. This is disproportionate, as small satellites would largely burn up on re-entry. Without a cap on liability, though, it is impossible to get insurance, and this is already driving some micro-satellite companies out of the UK. There is also concern at the lack of consultation on moving regulation from the UK Space Agency to the Civil Aviation Authority, especially as the latter has its hands full with taking on aviation safety after Brexit.[86]

In response to these comments the Parliamentary Under-Secretary of State for Business, Energy and Industrial Strategy, Amanda Solloway outlined the Government's support for the space industry, and on regulation concluded:

> […]
>
> We have kickstarted work to build the first UK spaceports, including in Scotland, supported by grants worth £40 million. We

85 HC Deb, 4 February 2021, c1171-1173
86 HC Deb, 4 February 2021, c1163-1164

> expect the first launches from 2022, creating hundreds of secure, highly skilled jobs. To ensure that the UK's launch offer is competitive and encourages new market entrants, the UK Government are putting in place a world-leading regulatory framework, with the Civil Aviation Authority assuming responsibility for the regulatory functions of the Space Industry Act, in addition to regulating orbital activities under the Outer Space Act 1986.[87]

More recently, the Department for Transport opened a consultation on the environment objectives and guidance for the spaceflight regulator, with responses required by the 24 March 2021. In a written statement on 10 February 2021, the Parliamentary Under Secretary of State at the Department for Transport, Rachel Maclean, said:

> We've worked with environmental agencies, public bodies and government departments to ensure coherence with our national and international policies and obligations. Our intention is to have these objectives in place by the time the secondary legislation and guidance (on which we consulted on 29 July 2020) comes into force this summer and the regulator begins receiving and assessing applications.[88]

87 HC Deb, 4 February 2021, c1177
88 HCWS776, 10 February 2021

4. UK Space Agency Programmes and Missions

4.1 Key UK Space Agency Programmes

Detailed, up to date information on the UK Space Agency's missions and programmes can be found on a UK Space Agency webpage on UK space missions: case studies and programmes (last updated 10 February 2021). Four key programmes and their aims are detailed below. These programmes were highlighted as "Priority Programmes" in the UK Space Agency's Corporate Plan for 2020-21.

LaunchUK

LaunchUK is the UK Space Agency's Spaceflight Programme; it aims to establish commercial vertical and horizontal small satellite launch from UK spaceports.[89] The details of the UK Spaceflight Programme were published in July 2018 by the UK Space Agency, Department for Transport and Civil Aviation Authority. The programme builds on the UK's world leading small satellite industry and aims for UK to be the first country in Europe to achieve small satellite launch.[90] It highlights seven possible spaceport locations across the UK.

Investments have been made in several spaceports, such as £17.3 million to establish a vertical launch site at the Sutherland Space Hub in Scotland and £7.85 million to support horizontal launch from Spaceport Cornwall in Newquay. More information on these spaceports can be found in the Commons Library Insight, When will UK spaceports be ready for lift-off?, and is summarised in Box 4.

Box 5: UK Spaceports

The UK Space Agency, Department for Transport and Civil Aviation Authority, have recently published a guide to the UK's commercial spaceports. Key information about these spaceports is summarised below.

Sutherland Space Hub[91]

- A vertical launch site based at A' Mhòine peninsula, Sutherland, Scotland, operational from 2022.
- Secured planning permission in August 2020.
- Expected to host a maximum of 12 launches a year.
- £17.3 million total funding - £2.5 million from the UK Space Agency, £9.8 million from Highlands and Islands Enterprise (HIE) and £5 million being sought from the Nuclear Decommissioning Authority.
- Construction is expected to start during 2021, lasting 15 months.

89 UK Space Agency, How we are promoting and regulating spaceflight from the UK, 1 October 2020
90 Department for Transport and UK Space Agency, Spaceport and spaceflight activities: regulations and guidance, 29 July 2020, p7
91 Highlands and Islands Enterprise, Space Hub Sutherland, accessed 18 March 2021

- HIE's is partnered with Orbex, a UK-based launch vehicle company. Orbex has received £5.5 million from the Government to build a rocket for launch in Sutherland.
- Lockheed Martin also received £23.5 million from the Government to establish vertical launch operations in Sutherland.

Spaceport Cornwall[92]

- A horizontal launch site based at Cornwall Airport Newquay, operational from 2022.
- Project between Cornwall Council, Cornwall and Isles of Scilly Local Enterprise Partnership (LEP), Virgin Orbit and Goonhilly Earth Station.
- £12 million funding from Cornwall Council, £8 million form the Government, and £2.5 million from Virgin Orbit.
- Virgin Orbit will use a small-satellite launch system where a modified Boeing 747 (Cosmic Girl) carries a rocket (Launcher One).
- No runway extension is required to operate the Virgin Orbit systems.

Prestwick Spaceport[93]

- A horizontal launch site based at Glasgow Prestwick Airport (GPA), fully operational from 2023.
- Aims to provide a arrange of services including micro gravity flights, launch of satellites up to a mass of 800kg, human space flight and hypersonic flights services by 2035.
- The project is supported by the Ayrshire Growth Deal with the Ayrshire's Aerospace and Space Programme receiving £80 million: £32 million from the UK Government, £30 million from the Scottish Government, and £18 million from South Ayrshire Council.

Shetland Space Centre[94, 95]

- A vertical launch site based at Lamba Ness, Unst, Shetland, operational from 2022.
- Aims to provide a launch site for small rockets for transporting satellites and a ground station to act as a datalink to satellites.
- Lockheed Martin & ABL Space Systems are planning launches.

Spaceport Snowdonia[94]

- A horizontal launch site based in Llanbedr, Gwynedd, Wales, operational from 2022.
- Site already has experience in testing emerging flight technology.
- Partnered with B2Space.

Spaceport Machrihanish[94]

- Combined horizontal and vertical launch site based in Campbeltown, Argyll, Scotland, fully operational from 2027.

Spaceport 1[94]

- Vertical launch site based in North Uist, Outer Hebrides, Scotland, fully operation by 2023.

92 Spaceport Cornwall: Frequently Asked Questions, November 2019
93 Prestwick Aerospace, Prestwick Spaceport: Intro, accessed 19 March 2021
94 UK Space Agency, A guide to the UK's commercial spaceports, 23 March 2021
95 Shetland Space Centre, accessed 23 March 2021

National Space Technology Programme (NSTP)

Originally launched in 2011, the National Space Technology Programme (NSTP) funds industry, academia and other (not for profit) government institutions in their development of technology for the UK space sector. Funding is available for projects that cover: access to space; sensing; position, navigation and timing; robotics and exploration; and telecommunications.[96]

Since 2011, NSTP has supported 300 projects, with the most recent set of funding announced on 12 March 2021. A total of £300,000 will be given to projects spanning propulsion systems for nano to small satellites and far infra-red sensors for studying climate change and star formation.

Space Based Positioning, Navigation and Timing Programme (SBPP)

The Space Based Positioning, Navigation and Timing Programme (SBPP) is a major new UK Government programme launched by the UK Space Agency in October 2020. It aims to explore innovative ways of delivering vital satellite navigation and timing services to the UK from space. [97] These services are vital for transport systems, energy networks, mobile communications and national security and defence.[98]

National Space Innovation Programme (NSIP)

Launched in July 2020, the National Space Innovation Programme (NSIP) "will provide grant funding to UK project teams to support the development of their innovation ideas". [99] The programme has already awarded 21 UK organisations with a share of over £7 million funding. For example:

> Surrey-based Global Satellite Vu will build a new compact, high-resolution infrared camera for satellites to measure thermal emissions from our homes, schools and places of work, supporting the government's green economic recovery plan.[100]

Most recently, the NSIP provided five new international projects with a share of over £1 million government funding. UK organisations will work with partners such as NASA, and space agencies from Canada, Japan and Italy to work on projects relating to space sustainability, flood forecasting and mapping ice on Mars.[101]

International Partnership Programme (IPP)

The aim of the International Partnership Programme (IPP) is to use the UK space sector capabilities to "deliver a sustainable, economic or societal benefit to undeveloped nations and developing economies." The projects within IPP are reported to span a range of themes including

---

96 UK Space Agency, National Space Technology Programme, September 2019, p4
97 UK Space Agency, Space Based PNT Programme, 10 February 2021
98 Press release: Government to explore new ways of delivering 'sat nav' for the UK, Department for Business, Energy & Industrial Strategy, 24 September 2020
99 UK Space Agency, National Space Innovation Programme, 22 July 2020
100 Press release: Government funds UK companies at the forefront of space innovation, UK Space Agency, 7 December 2020
101 UK Space Agency, UK space sector gets £1 million government boost to support international innovation, 22 March 2021

"reducing deforestation, disaster response, land-use monitoring, reducing maritime problems and deploying renewable energy".[102] It is a 5 year programme, with £152 million funding from the BEIS Global Challenges Research Fund.[103]

4.2 Other UK Space Agency funded schemes

The UK Space Agency also provides funding to programmes run with space sector, academic, education and community partners. Some recent programmes are described below:

Columbus Ka-band Terminal fitted to International Space Station

The UK Space Agency funded a new terminal that has been fitted to the International Space Station and will allow research results to returned to Earth at broadband speeds. Previously, the results were returned on a hard drive, taking months to receive.[104]

Joint Venture with Rolls Royce to Explore Nuclear Power and Technologies

The UK Space Agency and Rolls-Royce have joined together to research the use of nuclear power as a source of energy for space exploration.[105]

Space Research and Innovation Network for Technology (SPRINT)

The UK Space Agency has also recently provided funding for 5 projects through the Space Research and Innovation Network for Technology (SPRINT). The new space projects bring together industry expertise and scientists from the following UK universities:[106]

- University of Leicester – aim to tackle climate change by using satellite analytics to track emissions of shipping fleets
- University of Edinburgh – aim to support Malawian farmers to plan large-scale agriculture
- University of Southampton – will use artificial intelligence to detect buried archaeological remains to aid construction companies.

SPRINT is also delivered by the University of Surrey and the Open University.

---

102 UK Space Agency, International Partnership Programme, Last updated 10 April 2019
103 Ibid
104 UK Space Agency, Spacewalk to fit ground-breaking British kit to International Space Station, 27 January 2021
105 UK Space Agency, Rolls-Royce and UK Space Agency launch study into nuclear-powered space exploration, 12 January 2021
106 UK Space Agency, New funding for innovative space tech to help solve problems on earth, 6 January 2021

5. International Outlook

5.1 The Integrated Review 2021

The Government's Integrated Review of Security, Defence, Development and Foreign Policy (published March 2021) referred to the importance of the UK's commercial and military use of space:

> Space will be a domain of increasing opportunity, as the application of new technologies in space enables new possibilities – from commercial opportunities to international development and climate action. But increasing commercial and military use of space will make it an important sphere of competition; there will be considerable risks to strategic stability if this is not managed and regulated effectively.[107]

The Review indicated, for the first time, that the UK's national space strategy would "establish an integrated approach across military and civil space policy".[108] This will include the establishment of a new Space Command, funded by the Ministry of Defence,[109] with the aim of "ensuring that the armed forces have cutting-edge capabilities to advance UK interests on Earth and in space – enhancing our cooperation with allies and ensuring we can compete with our adversaries".[108]

For a summary of the key points of the Integrated Review, see:

- Commons Library Briefing, Integrated Review 2021: Summary, 16 March 2021

5.2 Brexit and the UK Space Industry

The UK's membership of the European Space Agency (ESA) is not affected by leaving the EU as the ESA is not an EU organisation. However, the UK's participation in some EU space programmes is affected.

The EU Space Programme includes the following components:

- European satellite navigation programmes, Galileo (the global navigation satellite system (GNSS)) and European Geostationary Navigation Overlay Service (EGNOS)
- Copernicus Earth Observation programme
- EU Space Surveillance and Tracking (EUSST) programme
- Governmental Satellite Communications (GovSatCom) programme (a new EU programme).[110]

The UK no longer participates in Galileo or EGNOS but an agreement has been made in principle for the UK to participate in Copernicus as a

---

107 HM Government, Global Britain in a competitive age. The Integrated Review of Security, Defence, Development and Foreign Policy, March 2021, CP 403, p29
108 HM Government, Global Britain in a competitive age. The Integrated Review of Security, Defence, Development and Foreign Policy, March 2021, CP 403, p58
109 HM Government, Spending Review 2020, 12 December 2020
110 Department for Business, Energy & Industrial Strategy, Guidance: UK involvement in the EU Space Programme, 31 December 2020

third country for 2021-2027. More information on these programmes and our continuing participation in them can be found at the following links:

- POST, Key EU space programmes, June 2020
- Department for Business, Energy & Industrial Strategy, Guidance: UK involvement in the EU Space Programme, 31 December 2020
- Joint Declaration on Participation in Union Programmes and Access to Programme Services, December 2020

5.3 International Collaborations

UK-Australia 'Space Bridge'

The UK and Australia have signed an agreement in space policy that aims to "unlock improved access to trade, investment and academic research opportunities, better advice to businesses and innovative bilateral collaborations." The UK Space Agency, UK Department for International Trade, Australian Trade & Investment Commission, and the Australian Space Agency will cooperate with an aim for the UK and Australian governments and companies to work together on space related activities.

The Space Bridge Framework Arrangement was signed on the 23 February 2021 and in a press release Minister for Exports, Graham Stuart MP said:

> Space exports hit £5.5 billion in 2017 and it is this international demand for our space goods and services which is driving the development of the UK's vibrant and innovative space industry.
>
> Like the UK, Australia recognises the enormous potential of space science and recognises that closer partnership and alignment between our two sectors can boost progress and jobs in both countries. I believe that UK exports to Australia could grow by £900 million as a result of a Free-Trade Agreement and the Space Bridge programme can play a critical role in space contributing to this growth, and further strengthening our UK-Australia relationship.[111]

UKspace and Space Industry Association of Australia have also welcomed the agreement.

UN-UK space sustainability agreement

The UK is providing £85,000 worth of funding to the UN Office for Outer Space Affairs (UNOOSA) to promote space sustainability on an international level and address matters such as space debris and the risk of collisions.[112] The project also aims to encourage global implementation of the Long-Term Sustainability of Outer Space

[111] UK Space Agency and Department for International Trade, 'Space Bridge' across the world will help UK and Australia get ahead in global space race, 23 February 2021

[112] UK Space Agency, UN and UK sign agreement to promote space sustainability, 26 January 2021

Activities (LTS guidelines) that were adopted by United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) in 2019.[113]

US-UK Technology Safeguards Agreement

In June 2020 the US and UK signed an agreement which will allow US companies to participate in space launches from the UK.[114] The treaty was presented to Parliament in October 2020. A PQ asked about Parliamentary scrutiny of the agreement and the Government stated:

> The Technology Safeguards Agreement (TSA) is a legally binding bilateral treaty with the United States of America and is subject to 21 sitting days scrutiny under section 20 of the Constitutional Reform and Governance Act 2010 (CRaG).
>
> The Command Paper along with the Exchange of Notes for the TSA and Explanatory Memorandum was published and E-laid before Parliament on 16 October 2020.
>
> The TSA will not enter into force until the enabling legislation (the Space Industry Regulations, published for public consultation on 29 June 2020) is in force, the CRaG scrutiny procedure has completed and following an exchange of notifications between the Parties confirming that all domestic procedures and requirements necessary for the Agreement's entry into force have been fulfilled. [115]

Several Members raised concerns during The Future of the UK Industry debate held on 4 February 2021, with Carol Monaghan (SNP) commenting:

> The technology safeguard agreement between the US and the UK was entered into last June without consultation or scrutiny. That could be unreasonably restrictive to members of the UK industry, for example, if a company were to obtain a component from a country outside the missile technology control regime. It may also prevent companies from other countries coming to the UK to use launch facilities.

---

113 United Nations, Report of the Committee on the Peaceful Uses of Outer Space Sixty-second session (12–21 June 2019), 3 July 2019, p22

114 UK Space Agency, New US-UK agreement boosts UK's spaceport plans, 17 June 2020

115 PQ 107056, 21 October 2020

BRIEFING PAPER
Number CBP 2021-9202
22 April 2021

About the Library

The House of Commons Library research service provides MPs and their staff with the impartial briefing and evidence base they need to do their work in scrutinising Government, proposing legislation, and supporting constituents.

As well as providing MPs with a confidential service we publish open briefing papers, which are available on the Parliament website.

Every effort is made to ensure that the information contained in these publicly available research briefings is correct at the time of publication. Readers should be aware however that briefings are not necessarily updated or otherwise amended to reflect subsequent changes.

If you have any comments on our briefings please email papers@parliament.uk. Authors are available to discuss the content of this briefing only with Members and their staff.

If you have any general questions about the work of the House of Commons you can email hcenquiries@parliament.uk.

Disclaimer