



Size & Health of the UK Space Industry 2020

Summary Report for the  UK SPACE
AGENCY

know.space

May 2021



About us

know.space¹ is a specialist space economics consultancy, based in London and Dublin. Founded by the leading sector experts, Greg Sadlier and Will Lecky, it is motivated by a single mission: to be the source of **authoritative economic knowledge for the space sector**.

know. /nəʊ/v.

to understand clearly
and with certainty

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Acknowledgements

We would like to thank all the organisations who responded to our survey, and to those who helped promote it. We would also like to acknowledge the support of the UK Space Agency over the course of the project, and the bespoke analysis undertaken by the Office for National Statistics (ONS). Responsibility for the content of this report remains with **know.space**.

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¹ **know**.consulting ltd. (CRN: 12152408; VAT: 333424820), trading as **know.space**



Key findings

This edition of the 'Size & Health of the UK Space Industry' comes at a **uniquely challenging time**. The research was undertaken during the ongoing **COVID-19 pandemic**, and the period of analysis (2017/18-2018/19, with a forecasted estimate for 2019/20) provides insights into the industry's preparation for the **UK's exit from the European Union (EU)**.² Accordingly, this 2020 study was designed as a '**light touch**' update – a focus on core metrics and innovative exploitation of secondary data allowed a streamlined online survey to minimise industry burden whilst providing a new wave of historically consistent time series data.

In spite of the challenges, there are **a number of positive findings**, including modest growth, a large increase in industry population (fuelled by new incorporations, signifying a healthy ecosystem), plus strong optimism for the next 3 years. The importance of satellites to the wider economy continues to grow, with **over £360 billion of UK economic activity now supported**.

The findings are based on research of **1,218 UK-based organisations with space-related activities**, comprising 279 survey responses plus desk-based research of over 1,000 organisations.

A growing industry ...

All growth rates are real (inflation-adjusted) compound annual growth rates (CAGR) since 2016/17.

- Total **UK space industry income** grew to **£16.4 billion** in 2018/19, a growth rate of **2.8% per annum** since 2016/17. The forecasted estimate for 2019/20 is £16.6 billion (+0.8%).
- The industry numbers **1,218 organisations**, with **95 new incorporations** in the last 2 years.
- The **segments that experienced growth** were: Space Applications (+4%, +£852m; driving the vast majority of growth), followed by Space Manufacturing (+2%, +£73m) and Ancillary Services (+4%, +£38m). **One segment experienced decline**: Space Operations (-2%, -£75m).
- The **activities that saw the most significant growth** were: Location-based signal service providers (+115%, +£453m); Fixed satellite communication services (+52%, +£392m); Processors of satellite data (+34%, +£146m); Applications leveraging satellite data (+26%, +£219m); and Suppliers of materials and components (+25%, +£157m).
- The **activities that had notable declines** were Mobile satellite communication services (-24%, -£239m); Suppliers of user devices and equipment (-5%, -£190m); Proprietary satellite operation (-3%, -£104m); and Launch vehicles and subsystems (-14%, -£108m).
- With a (relatively) stable GBP/USD exchange rate, the UK industry growth rate matched that of the global industry, so the **UK's share of the global space economy remained unchanged at 5.1% in 2018/19**.

... and an important industry ...

- Direct **employment** grew to **45,100 jobs** in 2018/19 (from 41,900 in 2016/17), equivalent to **0.14%** of the total UK workforce, supporting a total of **126,300 jobs** across the supply chain.
- The industry directly contributed **£6.6 billion of Gross Value-Added** to UK economic output (**0.30%** of UK GDP, +5% per annum since 2016/17), and a total of **£15.8 billion** (including indirect and induced supply chain effects) in 2018/19.
- Labour productivity (GVA per employee) for the UK space industry was **£145,468** in 2018/19 (up from £142,011 in 2016/17), **2.6 times the UK average labour productivity** (£56,387).

² The Prime Minister formally triggered Article 50 on 29 March 2017, and the United Kingdom ultimately left the EU single market and customs union on 31 December 2020.



- The UK space industry workforce is **exceptionally highly-skilled**, with **3 in 4** (77%) employees holding at least a primary degree - **higher than any sector** in the ONS Census.³
- **Exports** remained unchanged in real terms at **£5.8 billion** in 2018/19, accounting for **35.5%** of total income- down from 37.4% in 2016/17 but still above the UK average (29.8%). The space export intensity increases to **60%** if Direct-To-Home (DTH) broadcasting is excluded.
- The most important export market for the UK space industry is the **Rest of Europe**, representing **19% of total income** and **53% of total exports**.
- With **R&D investment of £702 million**, up 8.6% per annum since 2016/17 and equivalent to 10.7% of GVA, the space industry is **5 times more R&D intensive than the UK average**.
- The UK space industry has a strong **commercial focus** - 81.3% of income is commercial, comprised of sales to consumers (including DTH) at 49.7% and sales to other businesses at 31.6%. That said, there is a strong role for public demand (18.7%) - Defence (8.6%), Civil Government (4.3%), Space Agencies (4.1%), and European Commission (1.6%).
- The dominance of **Direct-to-Home (DTH) Broadcasting** in industry income continues to be eroded. Though still the largest single activity, the share of income accounted for by DTH fell again to **46%** in 2018/19 (from 48% in 2016/17), as DTH income remained static whilst the wider industry income grew (particularly other space applications).
- The industry is **concentrated** and dominated by a few large organisations, with just **13** organisations accounting for **82%** of total space income, 119 for the next 13% and **1,086** for the remaining **5%**. Only 132 organisations generate space income in excess of £5m.
- All **UK regions** are home to headquarters of space organisations, though industrial sites (and employment) are **concentrated** in London, South East and East of England, and Scotland.
- **Services from satellites** (be they UK or non-UK and public or commercial satellites) **support wider industrial activities in the UK** non-financial business economy that contribute at least **£361 billion to UK GDP** (16.9%), broken down by type as follows (not mutually exclusive):
 - **GNSS (PNT)** satellite services support **£314 billion** of GDP (14.7%).
 - **Meteorological** satellite services support **£211 billion** of GDP (9.8%).
 - **Communications** satellite services support **£101 billion** of GDP (4.7%).
 - **Earth Observation** satellite services support **£100 billion** of GDP (4.7%).

... with strong future growth potential beyond current challenges

- According to survey responses on future outlook (next 3 years), **EU exit-related challenges** was the **most prevalent obstacle** to commercial success (55%), followed by **COVID-related challenges** (48%) and **economic uncertainty** (43%).
- Nearly half experienced a **negative impact** due to **UK's exit from the EU** on income (46%, of which 20% rated as significantly negative) and demand (45%), plus workforce impacts (36%).
- More than half of the survey respondents experienced a **negative impact** of **COVID-19** on their income (54%) and demand (51%). About 2 in 5 (37%-41%) companies were also negatively affected in terms of their workforce (37%), suppliers (41%), and investments (37%).
- **New** UK-headquartered space companies attracted **investment of £4.33bn** in total **over 240 investment deals** by **at least 251 unique individual investors**, making a total of **435 individual investment contributions** in at least **110 UK space companies**.
- Survey respondents indicated **optimism with respect to near-term growth**: 3 in 5 expect income to be higher in the coming three years (62%, of which 41% expect much higher); over half (54%) expect to employ more staff; and more than 2 in 5 expect higher investment (45%), increased R&D expenditure (44%) and increased exports (40%).
- In a validation of the Agency's work, 3 in 4 respondents (76%) cited **support and engagement with the UK Space Agency** as a **key enabler** for commercial success, followed by desires for a **UK National Space Programme** (61%) and **UK-EU partnership deal** (55%).

³ Note that here, as in other instances, *Size & Health* survey-based estimates are compared for context against national and regional 'official statistics' produced to rigorous standards defined in the [Code of Practice for Statistics](#).



Summary

Introduction

With responsibility for the UK civil space programme, the **UK Space Agency (UKSA)** aims to grow the UK space industry, build a strong national space capability and foster exploitation of (national and international) space capabilities for the maximum economic, scientific and policy benefit for the UK. To guide its work, UKSA needs a means to **monitor the health of the sector** and to **track the effectiveness of its activities and strategy**.

Undertaken every two years⁴ since 2010, the ***Size & Health of the UK Space Industry*** is a long-running study series that quantifies and tracks changes in the UK space industry. It measures if the sector is growing, and highlights the nature and source of the growth, including trends within sub-sectors, sources of income, and future expectations. It is **the definitive source of information on the UK space sector**, and a key resource for the Government's evidence-based strategy, policy design and decision-making – but also for the wider sector (e.g. strategy, business cases, investor decks, scientific impact).

UKSA commissioned **know.space** – the specialist space economics consultancy – to conduct the latest update. This edition of the 'Size & Health of the UK Space Industry' comes at a **uniquely challenging time**. The period of analysis (2017/18-2019/20) captures industry preparing for and experiencing early impacts of the UK's exit from the EU, whilst the study has been undertaken during the ongoing COVID-19 pandemic.

Accordingly, this 2020 study was designed as a **'light touch' update** – a focus on core metrics and innovative exploitation of secondary data allowed a streamlined online survey. This minimised the industry burden whilst providing a new wave of historically consistent time series data covering the time period **2017/18 and 2018/19**, and a *forecasted estimate for 2019/20*. This report summarises the findings of the 2020 edition.

Scope

The **'space industry'** is defined to include all organisations that are engaged in any space-related activity, comprising both:

- **Non-commercial organisations** (e.g. universities, research institutes) that secure income to contribute space-specific research and expertise throughout the industry supply chain, often in partnership with commercial organisations. Non-commercial income includes grant funding, core funding, research funding, tuition fees, departmental expenditures, and operating budgets.
- **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

⁴ The *Size and Health of the UK Space Industry 2018* report is available at: <https://www.gov.uk/government/publications/uk-space-industry-size-and-health-report-2018>



value-added applications. Such organisations may also secure non-commercial income (e.g. grants) to undertake specific research and development.

The term **‘income’** covers both commercial revenues and non-commercial funding.

‘Space-related activity’ is defined to include any of the following:⁵

- **Space Manufacturing**

Design and/or manufacture of space equipment and subsystems

including: launch vehicles and subsystems, satellites/payloads/spacecraft and subsystems, scientific instruments, ground segment systems and equipment (control centres and telemetry), suppliers of materials and components, scientific and engineering support, fundamental and applied research.

- **Space Operations**

Launch and/or operation of satellites and/or spacecraft

including: launch services, launch brokerage services, proprietary satellite operation (incl. sale/lease of capacity), third-party ground segment operation, ground station networks, in-orbit servicing, debris removal, Space Surveillance & Tracking (SST), space tourism, in-space manufacturing.

- **Space Applications**

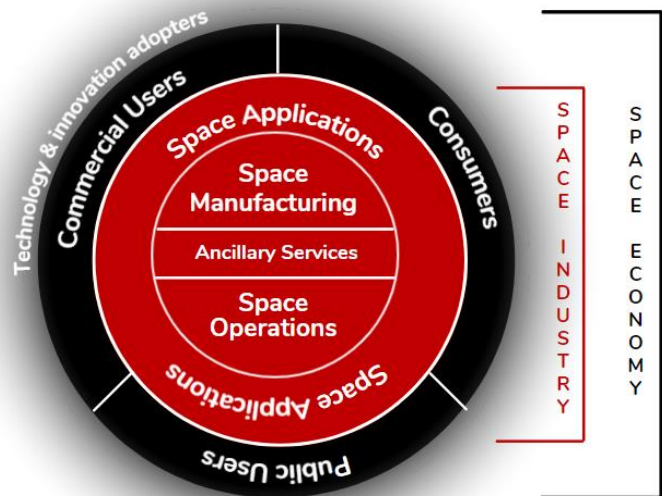
Applications of satellite signals and data

including: Direct-To-Home (DTH) broadcasting, fixed and mobile satellite communications services (including very-small-aperture terminals (VSATs)), location-based signal and connectivity service providers, supply of user devices and equipment, processors of satellite data, applications leveraging satellite signals (e.g. GPS devices and location based services) and/or data (e.g. meteorology, geographic information system (GIS) software and geospatial products), other (e.g. Quantum Key Distribution).

- **Ancillary Services**

Specialised support services

including: launch and satellite insurance (incl. brokerage) services, financial and legal services, software and IT services, market research and consultancy services, business incubation and development, policymaking, regulation and oversight.



The outputs of the UK space industry are used to considerable benefit by a large and increasingly wide range of **public, commercial and consumer users**. Commercial users are defined as businesses in an industrial sector other than space that utilise satellite applications *operationally* to improve delivery of their core proposition. The value of commercial use is captured in the value of *‘Wider UK GDP supported by satellite services’*.

⁵ This 2020 edition fully adopts the modernised value chain segmentation introduced in the 2016 edition. For reference, Space Manufacturing and Space Operations combined can (roughly) be considered as ‘upstream’, and Space Applications as ‘downstream’. Ancillary Services provide specialised support to all other value chain segments.



Approach

This edition maintains the methodology of the 2018 edition to **preserve consistency and comparability with time series** and to identify patterns of growth and emerging trends, with some tweaks (listed below).

The research was undertaken employing **a combination of primary research** (279 responses to an [online survey](#)) and **secondary research** (desk-based research of more than 1,000 organisations) employed to deliver comprehensive coverage of the UK space industry. Secondary data sources used include Companies House records and statutory financial reports, subscription-based databases and information sources, own proprietary knowledge and databases, the ONS Annual Business Survey and supporting economy-wide data from the ONS and Bank of England. In keeping with the **'light touch'** objective, this 2020 edition has maximised secondary research to lighten the burden on industry for the online questionnaire.

A small number of changes were adopted for the 2020 approach:

- Reflecting the **'light touch'** objective, the survey questionnaire was streamlined to reduce the data requested (e.g. 2017/18 was optional, and income by domain was dropped) and online routing used to simplify the survey response journey.
- The **modernised segmentation** of the 2016 and 2018 studies was maintained, but **expanded** to include new activities (e.g. Spaceports, Debris Removal, Space Surveillance and Tracking, In-Orbit Servicing);
- **Expanded identification** of space-related organisations in the UK based on updated UK space-relevant conference lists - the 2020 findings are based on **1,218 UK-based space organisations**;
- **Micro-level secondary research** of **over 1,800 organisations** using a wide range of public/free and private/paid information sources to determine UK and space relevance;
- New for 2020, this edition includes **research and analysis of investments into UK space companies**;
- An **analysis** about the **impact of COVID-19** and **EU-exit** on UK space industry's income, workforce, demand, suppliers, and investments.
- An **update** of the assessment of the **use of space and satellite services** across the UK economy as presented in the 2016 and 2018 editions.

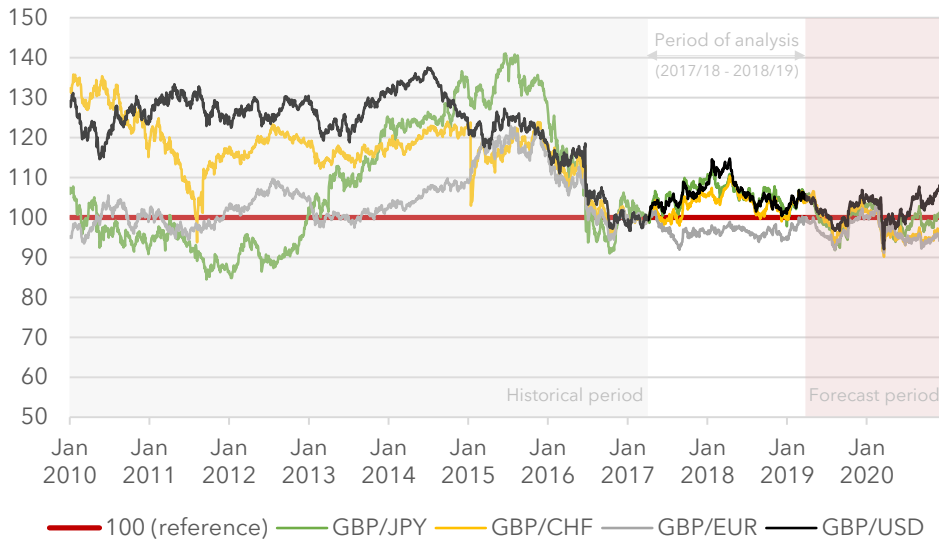
Caveats

Though the research has been conducted by independent analysts with specialist knowledge of the space sector, using best practice and best judgement to calculate robust and fair estimates, the following caveats apply:

- **Measurement error uncertainty of estimation:** The analysis employs estimation and approximation techniques - the true coverage of the analysis and the measurement error associated with survey respondent data cannot be estimated.
- **Unidentified omissions:** It is probable that some UK-based organisations with space-related activities have been missed, but any omissions should be small and have a negligible impact on estimates.
- **Financial years:** Each company may choose the start and end dates of its financial year, so these vary across companies. Our estimates of space-related income and employment therefore reflect the specific financial years of companies.



- Exchange rate fluctuations:** The reference currency for this analysis is GBP, and any input (e.g. company accounts stated in EUR) or comparators (e.g. the size of the global space economy in USD) values must be converted to GBP using the prevailing exchange rate. Though there has been a long-term depreciation in the value of GBP against the USD, the exchange rates maintained general stability over the period of analysis.



Source: know.space analysis of Bank of England exchange rates

Note: Each series is an index with the exchange rate pair value on 01/04/2017 = 100

Note: Unless otherwise noted: all figures are in 2018/19 prices, all growth rates are real (inflation-adjusted) and are calculated as compound annual growth rates (CAGR).

Size of the UK space industry (2018/19)

Population

The industrial population numbered **1,218 organisations with confirmed space-related activities** in the UK in this edition.

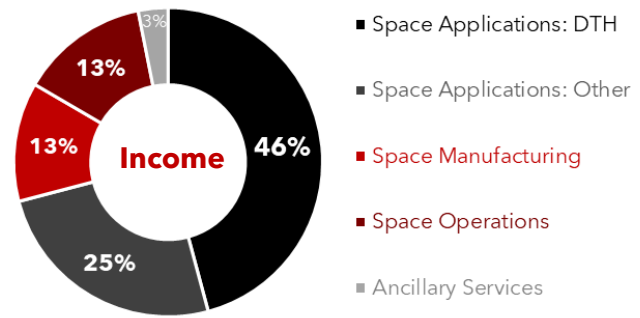
Income

Total UK space industry income grew to **£16.4 billion** in 2018/19 (up from £15.6 billion in 2016/17). By far the largest segment is **Space Applications** with **71%** of total income, and dominated by Direct-To-Home broadcasting (DTH) - although the DTH share of total industry income slips further to **46%** (down from 48% in 2016/17 and 52% in 2014/15). Without DTH, the overall space industry income would fall to £8.9 billion, but with Other (non-DTH) applications at £4.1 billion Space Applications would still be the largest segment of UK space activity. **Space Operations (13.5%)** is the second largest segment, followed by **Space Manufacturing (12.5%)**, and **Ancillary Services (3.1%)**.

UK space industry income by segment, 2018/19

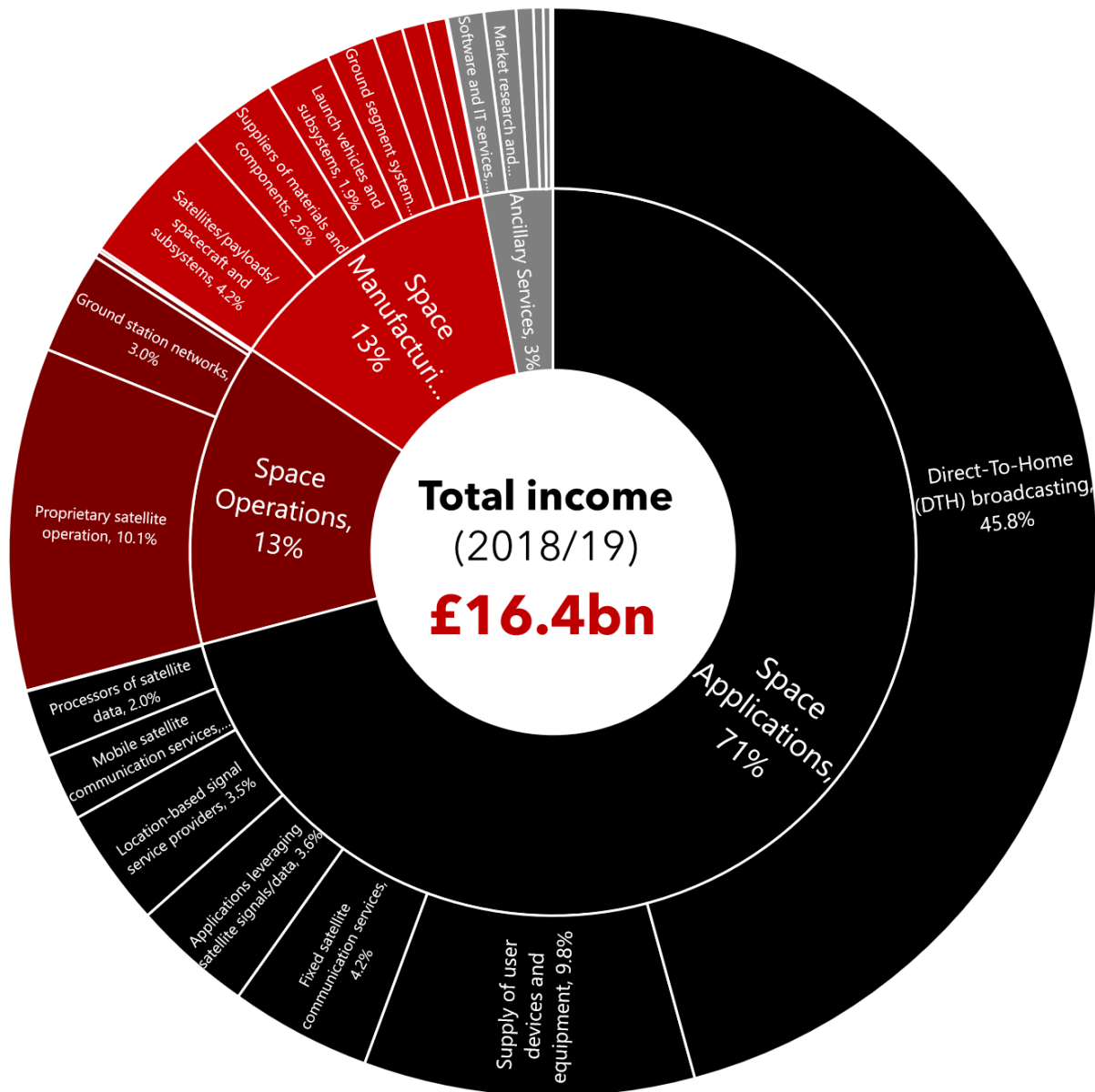
Segment	2018/19 £m
Space Applications	11,659
- DTH broadcasting	7,533
- Other applications	4,126
Space Operations	2,216
Space Manufacturing	2,052
Ancillary Services	514
Total	16,440

Source: know.space analysis



Delving a level deeper, the sunburst chart below shows the breakdown of **income by activity** (information is provided in tabular form later).

UK space industry income by segment and activity, 2018/19



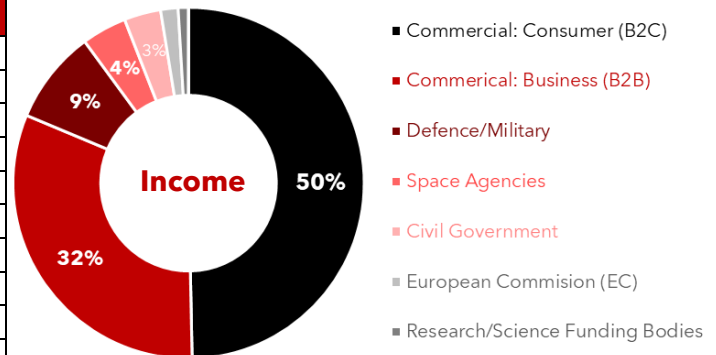
Source: know.space analysis

Analysis by customer type reveals the **commercial focus** of the UK space industry – **81.3%** of total income is commercial, comprised of sales to **consumers** (including DTH) at **49.7%** and sales to other **businesses** at **31.6%**. That said, there is a strong role for **public demand (18.7%)** – Defence (8.6%), Space Agencies (4.1%), Civil Government including Research/Science (4.3%), and European Commission (1.6%).

UK space industry income by customer type, 2018/19

Customer type		2018/19 £m
Commercial	Consumer (B2C)	8,167
	Business (B2B)	5,200
Defence/Military		1,418
Other Civil Government		555
European Space Agency (ESA)		521
European Commission (EC)		264
Research/Science Funding Body		157
UK Space Agency		92
Other Space Agency		66
Total		16,440

Source: know.space analysis

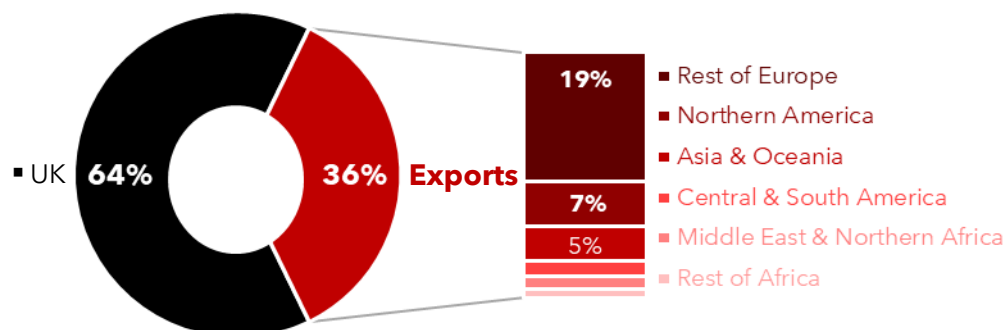


Exports

The UK space industry maintains its success in **exports by generating more than 36% (£5.8 billion)** of income from abroad (slightly down from 37% in 2016/17)⁶. At **36%**, the UK space industry's export share is **higher** than the export share of the UK economy as a whole (**29.8%**⁷). The picture improves further if DTH broadcasting – which has a strong domestic market focus – is filtered out. Indeed, **the export share of the UK space industry excluding DTH stands at 60% in 2018/19**.

The most important export market for the UK space industry is the **Rest of Europe**,⁸ representing **19% of total income** and **53% of total exports** (down from 20% and 54% in 2016/17, respectively). The second and third most important markets are North America and Asia & Oceania (7% and 5% of total income, and 18% and 14% of total exports, respectively).

UK space industry income by customer region, 2018/19



Source: know.space analysis

⁶ By definition, goods and services sold to ESA are an export as the ownership of goods or intellectual property changes hands from a UK entity to an entity that is based in a foreign country and which is not majority-controlled by UK interests.

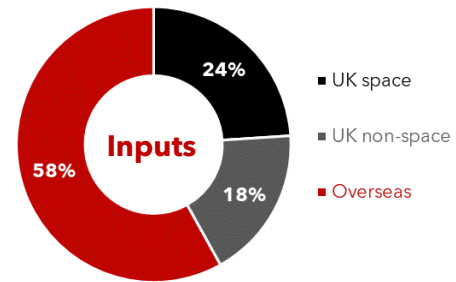
⁷ Department for International Trade (2019). *UK Trade in Numbers*, February 2019.

⁸ Includes European Space Agency, European Commission, and European governments, businesses and consumers.

Imports

Based on a limited sample (118 respondents), more than half (**58%**) of the **industry's inputs** are imported from suppliers overseas. Inputs from UK suppliers are split somewhat evenly between space and non-space sectors.

UK space inputs by supplier type, 2018/19



Source: know.space analysis

Note: Based on a limited sample of respondents (n=118)

Gross Value-Added (GVA)

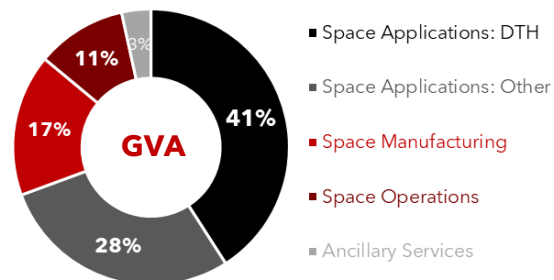
In 2018/19, the UK space industry is estimated to have directly contributed **£6.6 billion** (up from £6.0 billion in 2016/17) of Gross Value-Added (GVA) to UK economic output, equivalent to **40%** of space industry income and **0.3%** of total UK Gross Domestic Product (GDP) – both up from 38% and 0.29% in 2016/17, respectively, suggesting the space industry continues to outperform the wider economy in terms of productivity.

The majority of UK space GVA is generated in the **Space Applications** segment with **69%**, slightly less than the **71%** of income accounted for by the segment. As with income, this segment is led by Direct-To-Home broadcasting (contributing **41%**). At **17%**, Space Manufacturing accounts for a higher share of GVA than income (**12.5%**). At **11%** Space Operations accounts for a smaller share of GVA than income (**13.5%**). Ancillary Services contributes almost the same to both space industry GVA (**3.4%**) and income (**3.1%**).

UK space industry Gross Value-Added (GVA), 2018/19

Segment	2018/19 £m
Space Applications	4,554
- DTH broadcasting	2,679
- Other applications	1,864
Space Manufacturing	1,090
Space Operations	690
Ancillary Services	225
Total	6,559

Source: know.space analysis



Employment

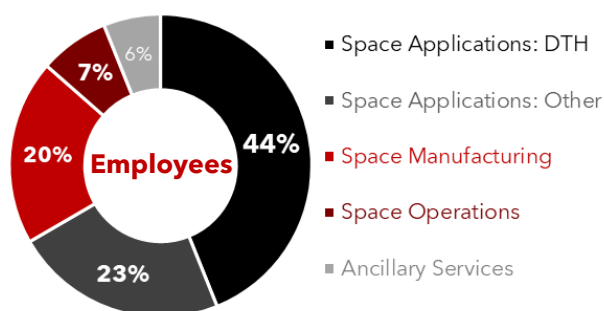
Total employment (headcount) in the UK space industry was **45,100 employees** in 2018/19 (41,900 employees in 2016/17) – equivalent to **0.14% of the total UK workforce**.

Space Applications also dominated employment, accounting for **67%** of the industry's total, of which DTH broadcasting is **44%** of the total. Space Manufacturing employs a greater number of staff than Space Operations (**20%** and **7%**, respectively), with Ancillary Services making up a small but important workforce (**6%**).

UK space industry employment by segment, 2018/19

Segment	2018/19 employees
Space Applications	30,050
- DTH broadcasting	19,796
- Other applications	10,256
Space Manufacturing	8,924
Space Operations	3,360
Ancillary Services	2,752
Total	45,086

Source: know.space analysis



Employment by gender

The majority (**63.5%**) of employees in the UK space industry are male, based on the limited sample of responses. Just **36.5%** of space industry employees are female.

Gender	2018/19
Male	63.5%
Female	36.5%
Other preferred	<0.1%

Source: know.space analysis

Productivity & Skills

The labour productivity (GVA per employee) for the UK space industry in 2018/19 is estimated at **£145,468** (slightly up from £142,011 in 2016/17) – equivalent to **2.6 times the UK's average labour productivity (£56,387)**.⁹

This high level of labour productivity reflects the **exceptionally skilled workforce** of the UK space industry. Survey respondents indicate that most employees have undertaken university education, with **77%** of employees possessing at least a bachelor's degree. In terms of the 'share of employees holding a higher degree, first degree or HNC/HND and equivalent qualifications', the **average qualification level of space industry employees is higher than any sector covered by ONS Census data for England and Wales**.¹⁰ This applies for the whole space industry and all four of the value chain segments.

Research and Development (R&D)

An estimated **£702m** was spent on space-related **R&D** (equivalent to **4.3%** of total industry income) in 2018/19 – an increase of **8.6%** per annum since 2016/17. This R&D investment was funded almost equally from **internal** (48%) and **external** (52%) sources. Investment in R&D can have a long and broad economic effect if it generates new knowledge, technologies, capabilities and derived products and services. This is particularly true in the space industry whereby **capabilities developed in the R&D-intensive manufacturing and operations segments are commercialised in the applications segment and by commercial users**.

⁹ Estimated UK GVA per filled job in 2018. Source: ONS (2020) *Subregional Productivity: Labour Productivity (GVA per hours worked and GVA per filled job) indices by UK NUTS2 and NUTS3 regions*. Available from: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/datasets/subregionalproductivity/labourproductivitygvaperhourworkedandgvaperfilledjobindicesbyuknuts2andnuts3subregions>

¹⁰ Note that here, as in other instances, *Size & Health* survey-based estimates are compared for context against national and regional 'official statistics' produced to rigorous standards defined in the *Code of Practice for Statistics*.



With the equivalent of **10.7%** of direct industry GVA invested in R&D, space industry R&D is **5 times higher than the UK average of 1.71%**¹¹.

Industry composition

The UK space industry covers the **full spectrum of organisation size** (in terms of space-related income and not total organisation income), from start-ups with low space-related income to multinational conglomerates turning over tens of millions in space-related income. However, the space industry is **concentrated** and dominated by a few large organisations, with just **13** organisations accounting for **82%** of total space-related income, **119** for the next **13%** and **1,086** for the remaining **5%**. **Only 132 organisations generate space income in excess of £5m.**

Regional distribution of the UK space industry (2018/19)

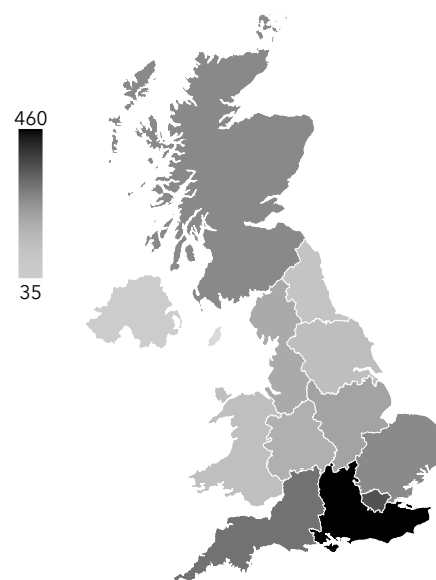
Population by region

Based on postcode data from survey responses and gathered through desk-based research, it is possible to analyse the **regional composition** of the UK space industry **workforce** across the **twelve 'NUTS1'¹² regions of the UK** - the nine regions of England and the three country-level regions of Scotland, Wales and Northern Ireland - and the British Crown Dependencies.

As in 2016/17, space-related activity **sites** are **concentrated in the South and East** of England - comprised of **South-East** (460 sites), **London** (289 sites), **South-West** (222 sites) and **East of England** (172 sites) regions - tied with **Scotland** (173 sites). **Wales** is home to 61 space-related organisation sites, and **Northern Ireland** has 35 sites. All NUTS1 regions have a count of space-related organisation sites in the double-digits, whilst there were 3 such sites in the British Crown Dependencies.

UK space organisation population by region, 2018/19

Region	Space organisations
South East	460
London	289
South West	222
East of England	172
Scotland	173
East Midlands	120
North West	104
West Midlands	92
Yorkshire and the Humber	63
Wales	61
North East	51
Northern Ireland	35
Crown Dependencies	3
Other / Undefined	106
Total	1,951



Source: know.space analysis

Note: Total of regional populations exceeds the UK total due to some organisations being present in multiple regions

¹¹ ONS. (2020). *Gross domestic expenditure on research and development, UK: 2018*. 'Total R&D expenditure in the UK in 2018 represented 1.71% of gross domestic product (GDP)'.

¹² Eurostat's Nomenclature of Territorial Units for Statistics (NUTS).



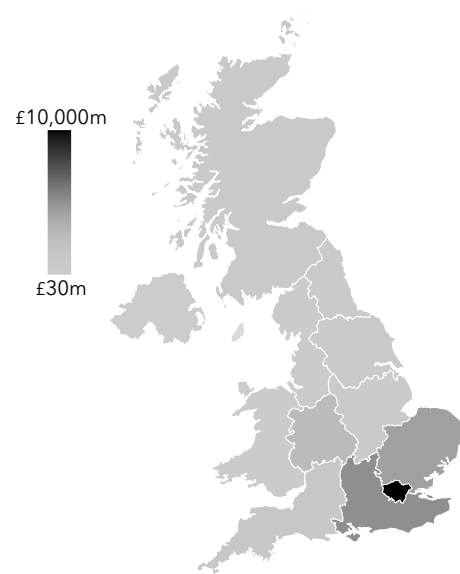
Income by region

The geography of income is defined with respect to the location of the **organisation's headquarters**. Though each of the 13 regions/nations is home to many headquartered organisations, the distribution of total income varies greatly across regions.

London accounted for the **majority** (£9.7bn, 59%) of total UK space industry income in 2018/19, followed by the **South East** (£2.9bn, 18%), **East of England** (£2.1bn, 13%) and **West Midlands** (£0.8bn, 5%). Together, the 4 regions account for **94%** of total UK space income. Both the South East and East of England showed an income share increase from 16% and 14%, respectively, when compared to the last edition, with a consequent decline for London's income share from 64% in 2016/17.

UK space industry income by region, 2018/19

Region	Space organisation HQs	Income 2018/19, £m
London	227	9,700
South East	325	2,899
East of England	117	2,114
West Midlands	51	809
South West	125	231
Scotland	96	137
Yorkshire and the Humber	31	128
North East	28	88
East Midlands	74	83
Wales	31	73
North West	52	44
Northern Ireland	17	32
Crown Dependencies	3	0
Other / Undefined	41	103
Total	1,218	16,440



Source: know.space analysis

Note: Income distribution reflects the location of the headquarters (HQ) rather than the distribution of value creation

Employment by region

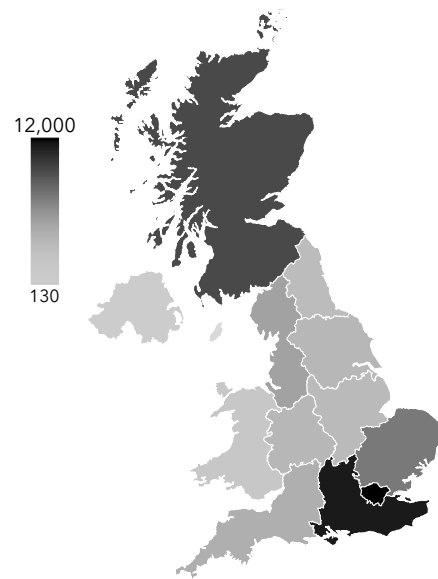
Space employment is much more evenly **distributed across regions** than income, revealing that **large UK space organisations** (especially those headquartered in London and the South-East/East regions) **have locations in multiple regions**.

London (27%, down from 29% in 2016/17) and the **South East** (23%) employ the most staff and account for **half** of all employees combined. **Scotland** and the **East of England** follow, with shares of **17%** and **11%**, respectively.

UK space industry employment by region, 2018/19

Region	Space organisations	Employees 2018/19
South East	460	10,475
London	289	11,999
Scotland	173	7,703
East of England	172	4,933
South West	222	1,799
North West	104	2,543
East Midlands	120	1,179
West Midlands	92	1,318
Yorkshire and the Humber	63	1,314
North East	51	1,014
Wales	61	415
Northern Ireland	35	133
Crown Dependencies	3	2
Other / Undefined	106	255
Total	1,951	45,086

Source: know.space analysis

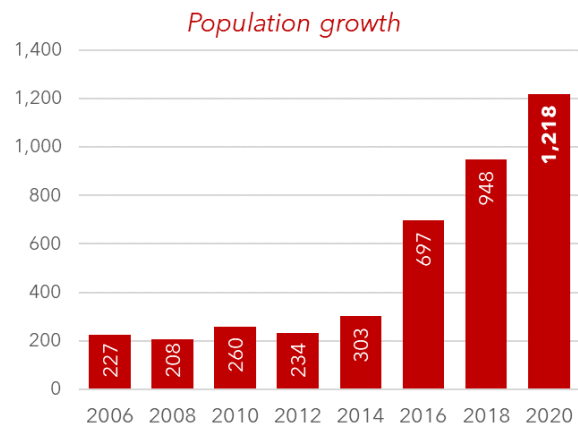


Growth of the UK space industry

Population growth

The industrial population grew once again to **1,218 organisations with confirmed space-related activities** in the UK - continuing a strong growth trend since 2012 (CAGR 23%, see right). This growth demonstrates the dynamism of the sector - with new entrants such as start-ups and spin-outs, and a growing list of inward investments offsetting attrition from the industry.

There were **95 new incorporations** in the period, continuing a recent trend of 53 incorporations per year since 2012, having averaged 28 per year between 2000 and 2012.



Source: know.space analysis

Income growth

UK space industry income continued to grow, although the rate of growth slowed slightly to **2.8%** per annum between 2016/17 and 2018/19 - from an average of 7.8% per annum between 1999/00 and 2016/17, and more recently 3.3% between 2014/15 and 2016/17. While this represents slower growth than the historical trend, it still **outpaced growth in the general UK economy** which also exhibited a slowdown over the same period (1.3%)¹³. Note that to reflect current challenges and uncertainty, **2019/20 has been conservatively forecasted** as a two-year historical average.

¹³ ONS (2020). *Gross Domestic Product: chained volume measures: Seasonally adjusted £m. 2017Q2 to 2019Q2.*

UK space industry income, 2009/10 - 2019/20^e

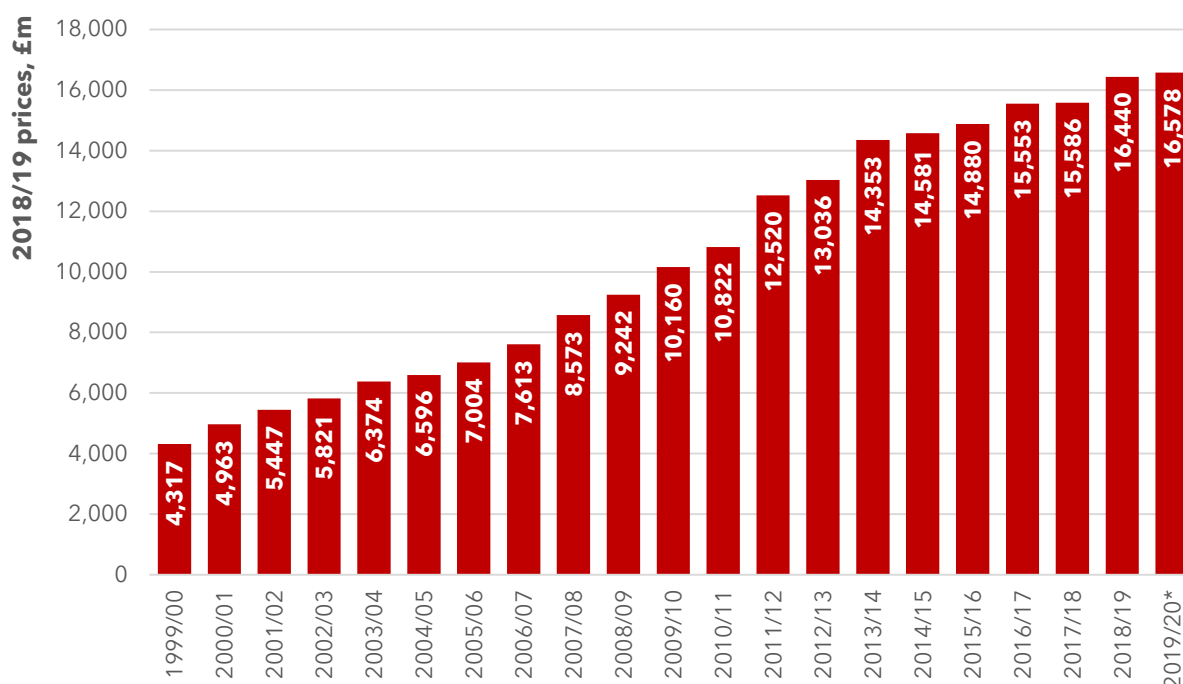
Year	Current prices £m	2018/19 prices £m	Growth y-o-y%
2009/10	8,334	10,160	8.0%
2010/11	9,188	10,822	6.5%
2011/12	11,087	12,520	15.7%
2012/13	11,848	13,036	4.1%
2013/14	13,347	14,353	10.1%
2014/15	13,702	14,581	1.6%
2015/16	13,998	14,880	2.1%
2016/17	14,792	15,553	4.5%
2017/18	15,242	15,586	0.2%
2018/19	16,440	16,440	5.5%
2019/20*	16,865	16,578	0.8%

Source: know.space analysis

Note: * 2019/20 is a forecasted estimate. Reflecting the considerable prevailing uncertainty, 2019/20 has been estimated for non-respondents using a two-year average rather than an historical growth rate (as used in previous editions).

A longer-term perspective reveals the true success story of the UK space industry: industry income has **almost quadrupled** (x3.8) in real terms since the turn of the millennium (a CAGR of **5.5%** since 1999/00), and **increased by 62% in real terms since 2009/10**.

Long-term UK space industry income, 1999/00 - 2019/20^e



Source: know.space analysis

The aggregate-level growth rate conceals variation in performance by activities:

- ↑ The **segments** that experienced **growth** were **Space Applications** (+4%, +£852m; with non-DTH applications driving the vast majority of growth), **Space Manufacturing** (+2%, +£73m), and **Ancillary Services** (+4%, +£38m).
- ↑ The **activities** that saw the **most significant growth** were: **Location-based signal service providers** (+115%, +£453m); **Fixed satellite communication services**

(+52%, +£392m); **Processors of satellite data** (+34%, +£146m); **Applications leveraging satellite data** (+26%, +£219m); and **Suppliers of materials and components** (+25%, +£157m).

UK space industry income growth by activity, 2016/17 - 2018/19

Segment, Activity		2016/17	2018/19	CAGR
		2018/19 prices, £m		%
Space Manufacturing	Launch vehicles and subsystems	425	317	-14%
	Satellites/payloads/spacecraft and subsystems	692	697	0%
	Scientific instruments	55	101	36%
	Ground segment systems and equipment	295	243	-9%
	Suppliers of materials and components	275	433	25%
	Scientific and engineering support	109	140	13%
	Fundamental and applied research	126	114	-5%
	Space test facilities	-	7	-
	Segment total	1,979	2,052	2%
Space Operations	Launch services	2	4	36%
	Launch brokerage services	4	1	-49%
	Proprietary satellite operation (incl. sale/lease)	1,773	1,669	-3%
	Third-party ground segment operation	37	33	-6%
	Ground station networks	475	501	3%
	In-Orbit Servicing	-	5	-
	Debris Removal	-	1	-
	Space Surveillance & Tracking (SST)	-	2	-
	Space Tourism	-	~0	-
	In-space manufacturing	-	~0	-
	Spaceports	-	2	-
		Segment total	2,291	2,216
Space Applications	Direct-To-Home (DTH) broadcasting	7,466	7,533	0%
	Fixed satellite communication services	298	689	52%
	Mobile satellite communication services	568	329	-24%
	Location-based signal service providers	125	578	115%
	Supply of user devices and equipment	1,802	1,612	-5%
	Processors of satellite data	182	328	34%
	Applications leveraging satellite signals/data	366	585	26%
	Other	-	4	-
	<i>Non-DTH Space Applications segment subtotal</i>	<i>3,341</i>	<i>4,126</i>	<i>11%</i>
		Segment total	10,807	11,659
Ancillary Services	Launch and satellite insurance (incl. brokerage) services	93	82	-6%
	Legal and financial services	13	14	4%
	Software and IT services	141	178	12%
	Market research and consultancy services	147	157	3%
	Business incubation and development	52	50	-2%
	Polymaking, regulation and oversight	33	34	2%
	Segment total	476	514	4%
Total UK space industry income		15,553	16,440	3%

Source: know.space analysis

- The dominance of **Direct-to-Home (DTH) Broadcasting** in industry income (69% in 2010/11) continues to be eroded. Though still the largest single activity by some distance, the share of income accounted for by DTH fell again to 47% in 2018/19, as DTH income remained static whilst the wider industry income grew (particularly other space applications).



- ↓ The one **segment** that experienced **decline** was **Space Operations** (-2%, -£75m).
- ↓ The **activities** that had **notable declines** were **Mobile satellite communication services** (-24%, -£239m); **Suppliers of user devices and equipment** (-5%, -£190m); **Proprietary satellite operation** (-3%, -£104m); and **Launch vehicles and subsystems** (-14%, -£108m, with a decline in defence contracts).

Employment growth

UK space industry employment, 2009/10 - 2019/20e

Year	Employees	Growth y-o-y%
2009/10	28,995	16.5%
2010/11	28,942	-0.2%
2011/12	32,024	10.6%
2012/13	33,882	5.8%
2013/14	37,391	10.4%
2014/15	38,522	3.0%
2015/16	41,690	8.2%
2016/17	41,929	0.6%
2017/18	44,052	5.1%
2018/19	45,086	2.3%
2019/20*	46,135	2.3%

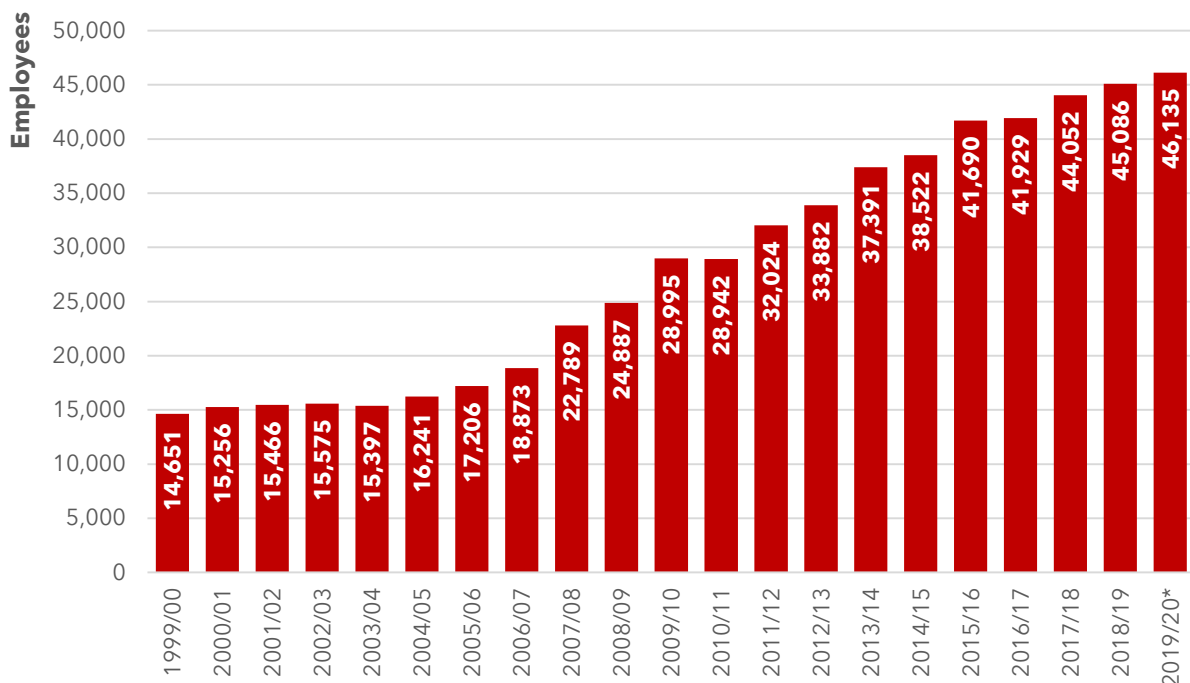
Source: know.space analysis

Direct employment in the UK space industry was around **45,100 jobs** in 2018/19 following strong growth of **2.3%** since 2017/18 - **double** the growth rate of the **total employed UK workforce (1.1%)**¹⁴.

DTH broadcasting accounts for **44%** of total space industry employment. **Space Manufacturing** is the second largest employer (after Space Applications) with **8,924 employees**.

Employment in the UK space industry has **grown strongly (CAGR 5.8%) since 1999/00**.

Long-term UK space industry employment, 1999/00 - 2019/20e



Source: know.space analysis

¹⁴ Office for National Statistics (2020). A01: Summary of labour market statistics, December 2020. <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/datasets/summaryoflabourmarketstatistics>



Gross Value-Added (GVA) growth

Space GVA increased by 5.0% p.a. between 2016/17 and 2018/19 to **£6.6 billion**.

UK space industry Gross Value-Added, 2009/10 - 2019/20e

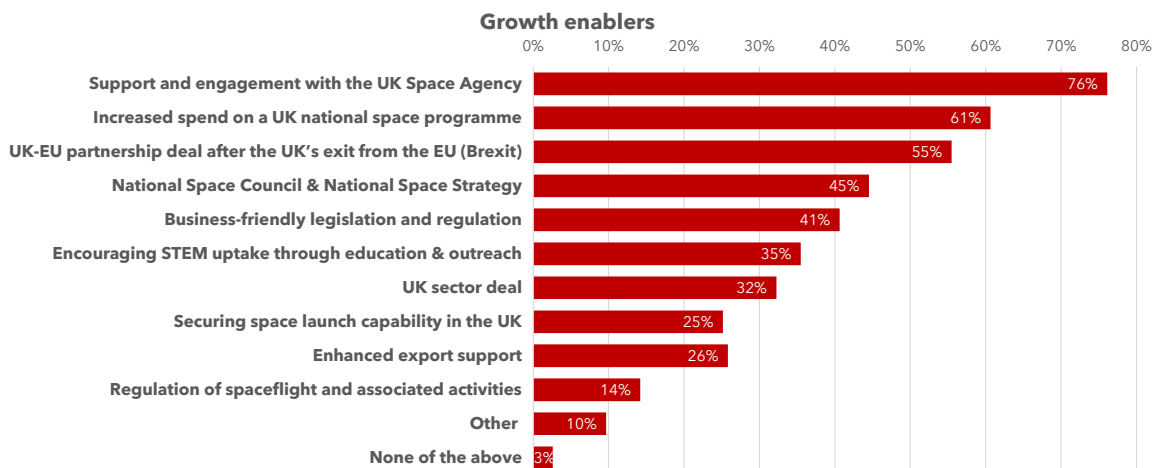
Year	Current prices £m	2018/19 prices £m	Growth y-o-y%
2009/10	3,789	4,619	0.50%
2010/11	4,130	4,865	5.3%
2011/12	4,597	5,191	6.7%
2012/13	5,044	5,550	6.9%
2013/14	5,020	5,398	-2.7%
2014/15	5,132	5,461	1.2%
2015/16	5,257	5,588	2.3%
2016/17	5,663	5,954	6.6%
2017/18	6,438	6,583	10.6%
2018/19	6,559	6,559	-0.4%
2019/20*	6,703	6,589	0.5%

Source: know.space analysis

Note: * 2019/20 is a forecasted estimate. Reflecting the considerable prevailing uncertainty, 2019/20 has been estimated for non-respondents using a two-year average rather than an historical growth rate (as used in previous editions).

Enablers of growth

In a validation of the Agency's work, **3 in 4 respondents (76%)** cited **support and engagement with the UK Space Agency** as a **key enabler** for ongoing commercial success, followed by a desire for increased spend on a **UK National Space Programme** (61%) and **UK-EU partnership deal for the UK's exit from the EU** (55%).

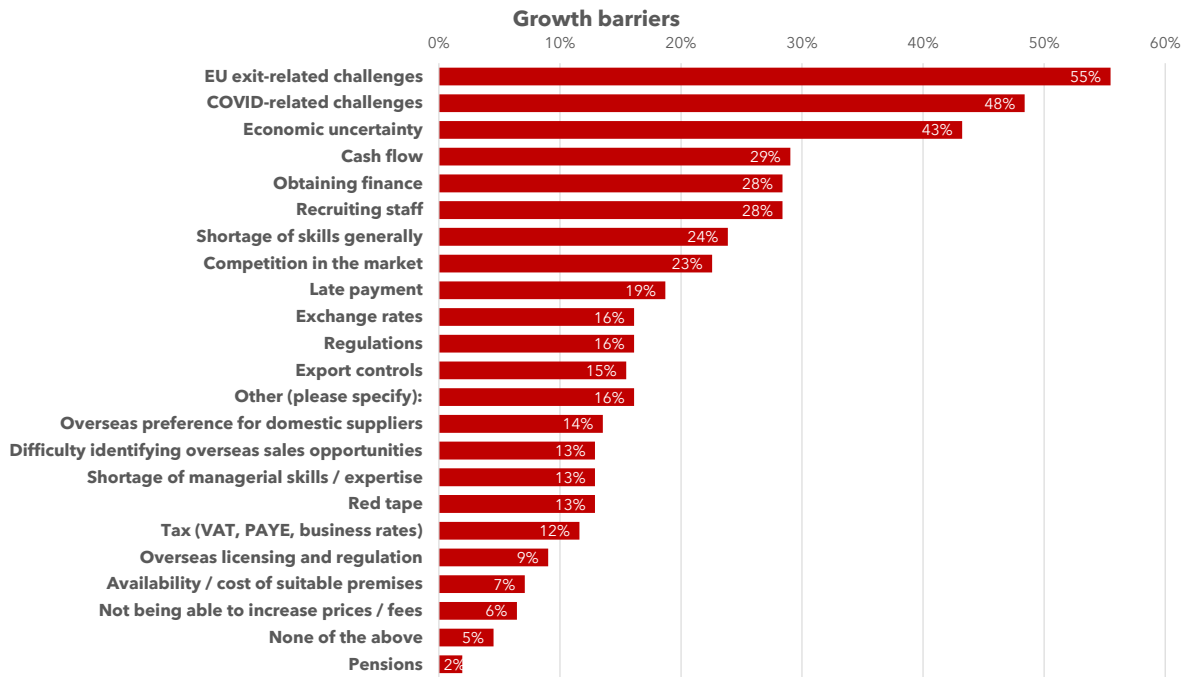


Source: know.space analysis of survey responses

Note: Based on a limited sample of respondents (n=155)

Obstacles to growth

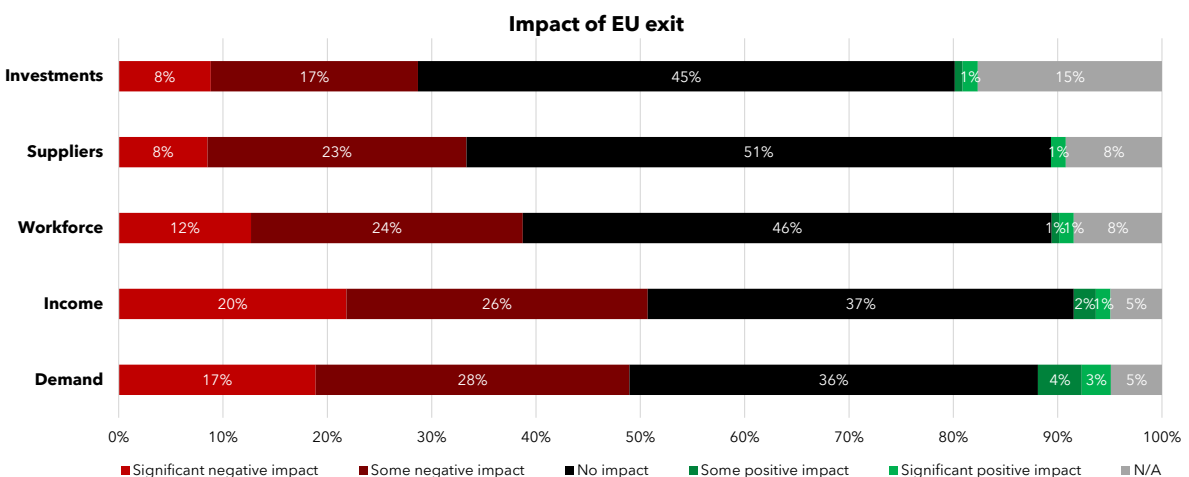
EU exit-related challenges was the **most prevalent obstacle** to ongoing commercial success, cited by **more than half (55%)** of respondents, followed closely by **COVID-related challenges** (48%) and **economic uncertainty** (43%). A wide range of diverse barriers were also indicated by respondents.



Source: know.space analysis of survey responses
 Note: Based on a limited sample of respondents (n=155)

Impact of EU exit

Reflecting the identification of **EU exit-related challenges** as a key obstacle to commercial success, a **little under half** of survey respondents indicated a negative impact on **income** (46%, of which 20% rated the impact as significantly negative) and **demand** (45%). About **1 in 3** reported **some negative impact** in their **workforce** (36%), **suppliers** (31%) and **investments** (25%). These views correspond with the widely identified **barrier** of UK's exit from the EU. Very few respondents (1%-6%) indicated a positive effect of EU exit.



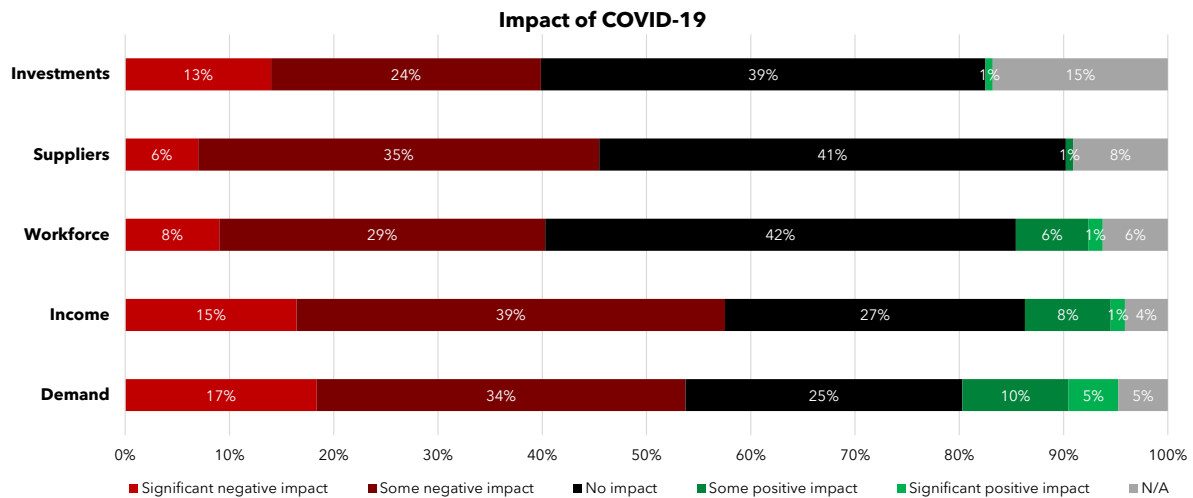
Source: know.space analysis of survey responses
 Note: Based on a limited sample of respondents (n=155)

Impact of COVID-19

Similarly, negative sentiments were indicated with respect to the impact of **COVID-19**. **More than half** of the survey responses indicated a **negative effect** of COVID-19 on their **income** (54%) and **demand** (51%). About **2 in 5** (37%-41%) companies were also



negatively affected in terms of their **workforce** (37%), **suppliers** (41%), and **investments** (37%). On the other hand, a small number of respondents experienced positive effects on **demand** (15%), **income** (9%) and **workforce** (7%).



Source: know.space analysis of survey responses
 Note: Based on a limited sample of respondents (n=155)

Investment monitor

New for 2020, this inaugural analysis portrays a **vibrant sector** attracting increasingly valuable and frequent investments from an increasingly diverse range of private investors.

Research of investments¹⁵ into **UK-headquartered space companies**¹⁶ between 2013 and 2020 using [Crunchbase](#) found that:

- **Over £4.33bn was invested** in total, in **over 240 investment deals**¹⁷ by **at least 251 unique individual investors**¹⁸ making a total of **435 individual investment contributions** in at least **110 UK space companies**, of which:
 - at least **101** received **private** investment;
 - at least **36** received **public or other** investment;
 - at least **27** received funding of **unknown** source.
- **Three £1bn+ investments** in large companies (two in OneWeb, one in Inmarsat), overshadow more numerous but lower-value investments. Filtering out such deals shows **a clear and continuous increasing trend** in the **total value invested** (with the exception of 2020, which may have been constrained by the COVID-19 pandemic).
- There is a **strong upward trend** in *both* **number of investments** (from 3 in 2013 to 39 in 2020) and the **population of investors** (from 4 in 2013 to 69 in 2020), driven by **private investors** - revealing that investing in space is no longer limited to governments, high net-worth individuals and niche specialists.
- Unsurprisingly, the **most common** investment type was a **grant** (50 grants).

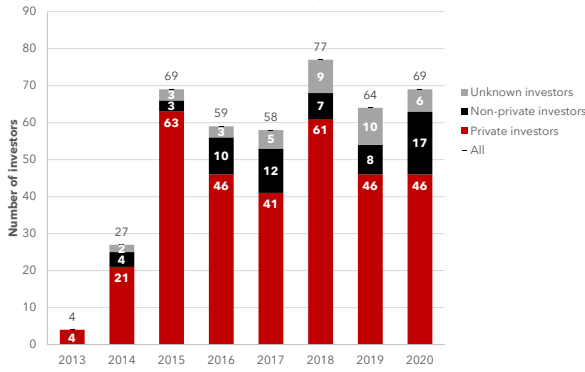
¹⁵ Investment types covered by Crunchbase are: Funding Round, Equity Crowdfunding, Product Crowdfunding, Angel, Pre-Seed, Seed, Series A, Series B, Series C, Series Unknown, Convertible Note, Grant, Non-Equity Assistance, Post-IPO Equity, Debt Financing, Post-IPO Debt.

¹⁶ Of the total 1,218 space organisations, approximately 500 appear on Crunchbase, of which c.290 list a UK headquarters.

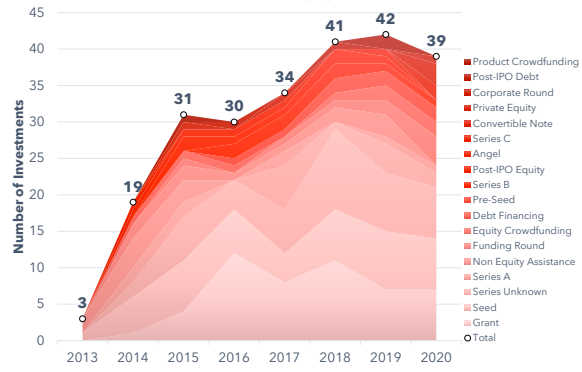
¹⁷ Note: Lower bound estimate - Investment value for 70 of the 240 deals was 'undisclosed', so treated conservatively as £0.

¹⁸ Note: Lower bound estimate - The identity of 39 investors was 'unknown', which is treated together.

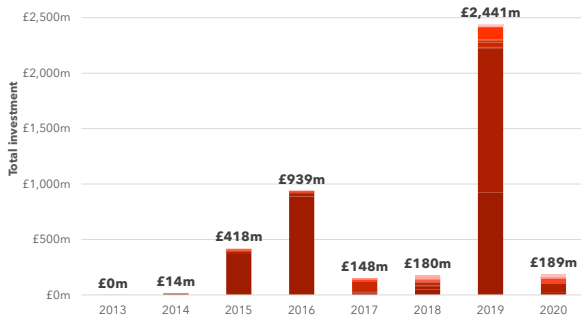
Population of investors, by year



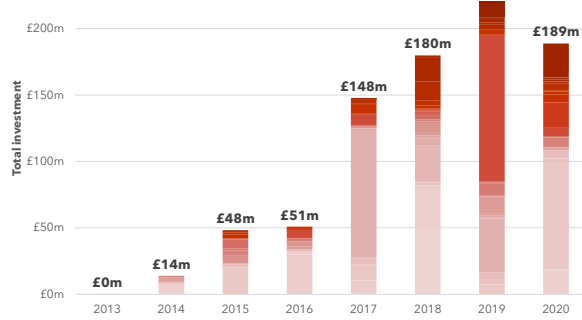
Number of investments, by year



Total invested (all deals), by year



Total invested (deals <£100m only), by year



Source: know.space analysis of Crunchbase data

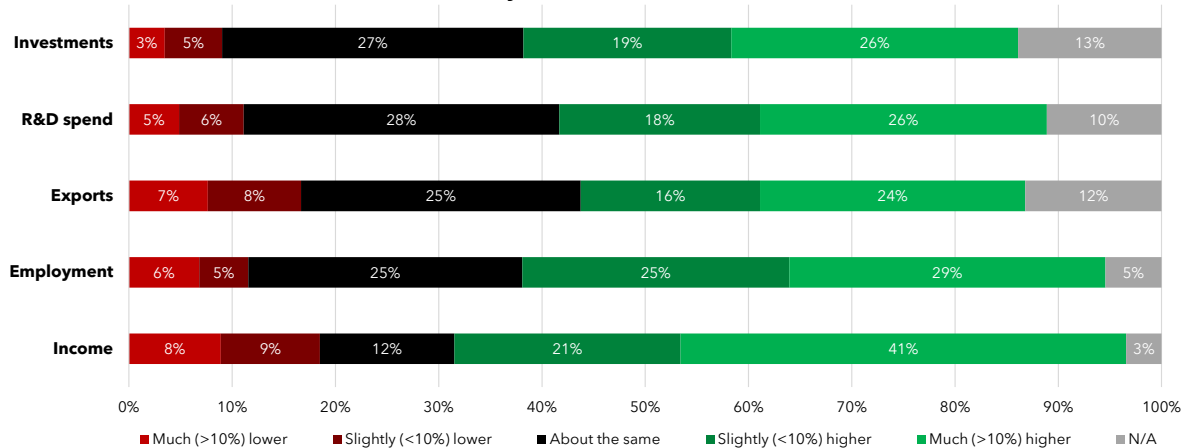
3-year outlook

Survey respondents indicated **optimism** with respect to **near-term growth**.

- **3 in 5** (62%) expect **income to be higher** in the coming three years, of which **2 in 5** (41%) expect income to be much higher.
- **Over half** (54%) of respondents expecting to **employ more staff**.
- **More than 2 in 5** respondents expect **higher investment** (44%) and **increased R&D expenditure** (43%).
- **2 in 5** (40%) respondents foresee **increased exports**.

The picture is **not all positive**, however, as almost **1 in 5** (17%) respondents expect income to be lower, and 15% expect reduced exports.

3-year future outlook



Source: know.space analysis of survey responses

Note: Based on a limited sample of respondents (n=155)



Supply chain effects

In order to capture the full economic impact of the UK space industry, it is necessary to consider not only its direct impact, but also indirect (secondary demand to UK suppliers) and induced impacts (derived demand from employee expenditure) across the economy.

This is achieved by estimating and applying a series of economic **multipliers** using Input-Output analysis and analytical tables published by the Office for National Statistics (ONS) and space-related GVA share of more than 100 different sectors (5-digit SIC codes).

Gross Value-Added (GVA)

The *Type II* multiplier measures direct, indirect and induced effects. It is estimated at **2.4** (up from 2.3 in 2018 edition), implying that **each £1 of space industry GVA generates £1.40 worth of GVA in the supply chain and supporting sectors.**

The **contribution of the UK space industry** including indirect and induced effects is therefore estimated at **£15.8 billion** in 2018/19. This implies that the sector's direct GVA of **£6.6 billion** generates an additional GDP contribution of **£9.2 billion** in the UK economy through indirect impacts and induced impacts.

Employment

The *Type II* employment multiplier measures direct, indirect and induced effects. It is estimated at **2.8** (unchanged from the 2018 edition), suggesting that **the activity of 100 employees in the space industry supports 180 additional employees among suppliers and in other economic sectors** (such as retail and services). Using this multiplier, we estimate that the **total UK-based employment supported** by the activities of the UK space industry in 2018/19 is **126,300 employees**. Direct employment in the space industry (**45,100**) thus supports **81,200** additional UK jobs through indirect and induced effects.

Wider UK GDP supported by satellite services

As flagged in the approach, the impact of space extends far beyond the space industry to a wide range of public, commercial and consumer users. Beyond the direct effects of the space industry itself, an assessment was made of which **(non-space) UK industries employ satellite services** in their commercial operations in order to derive an estimate of the **proportion of UK GDP that is supported by satellite services.**

The estimates are **not a valuation of the economic value contributed by satellite services**, and the estimates are **not specific to UK-owned/operated satellites**. Rather, the estimates indicate the total value of output of those industries that are supported by satellite services from UK and non-UK satellites.

Caveat: *The analysis does not cover the full UK economy. Instead, it reflects the coverage of the ONS's Annual Business Survey (ABS) and is limited to the **UK Non-Financial Business Economy** which accounts for approximately two thirds of the UK economy in terms of Gross Value Added. In other words, it excludes: financial and insurance, public administration and defence, public provision of education, public provision of health and all medical and dental practice activities. Furthermore, the ABS is a sample-based snapshot rather than a time-series data source and changes in the sample can affect the approximated Gross Value Added (aGVA) results.*



Value of industrial activity supported

On the basis of the latest granular industry data (*Annual Business Survey 2018*) it has been estimated that satellite services (be they from UK or non-UK and public or commercial satellites) support wider industrial activities across the UK (non-financial business) economy that contribute at least **£361 billion to UK GDP**,¹⁹ equivalent to 16.9% of UK GDP²⁰ (up from £302 billion and 15.3% in 2016/17).

Delving deeper reveals the importance of all satellite services, but highlights the particularly high adoption of GNSS (Global Navigation Satellite Systems, or more commonly: 'satnav'), which enables a wide range of positioning, navigation and timing (PNT) applications:²¹

- **GNSS** satellite services support an estimated **£314 billion** of GDP (14.7%).
- **Meteorological** satellite services support an estimated **£211 billion** of GDP (9.8%).
- **Communications** satellite services support an estimated **£101 billion** of GDP (4.7%).
- **Earth Observation** satellite services support an estimated **£100 billion** of GDP (4.7%).

Progress towards 2030 ambitions

As the definitive measure of UK space income, employment and exports, below presents a **progress report** on the UK government's strategic ambitions for the industry by 2030.

Income share

Ambition: 10% of the world's space economy by 2030.

Status: 5.1% of the global space economy in 2018/19.

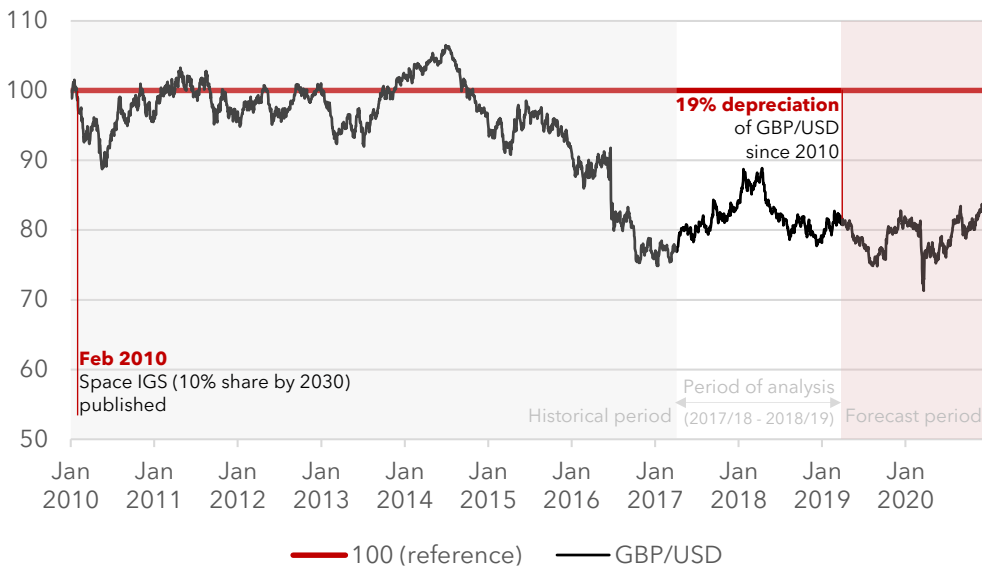
The UK's global space share is strongly influenced by the Sterling (GBP) / US Dollar (USD) exchange rate - used to compare UK income (in GBP) with global income (in USD in *The Space Report*). Despite a 19% depreciation in Sterling since Space IGS ambitions were set (see below), the rate was unchanged at the end of the two-year period of analysis.

¹⁹ This estimate has been calculated with the support of the Office for National Statistics (ONS).

²⁰ ONS (2020). *Gross Domestic Product at market prices: Current price: Seasonally adjusted £m*, <https://www.ons.gov.uk/economy/grossdomesticproductgdp/timeseries/ybha/ukea>.

²¹ Usage of satellite services are not mutually exclusive so the sum across satellite types exceeds the total value supported.

Evolution of GBP/USD exchange rate, 2010 - 2020

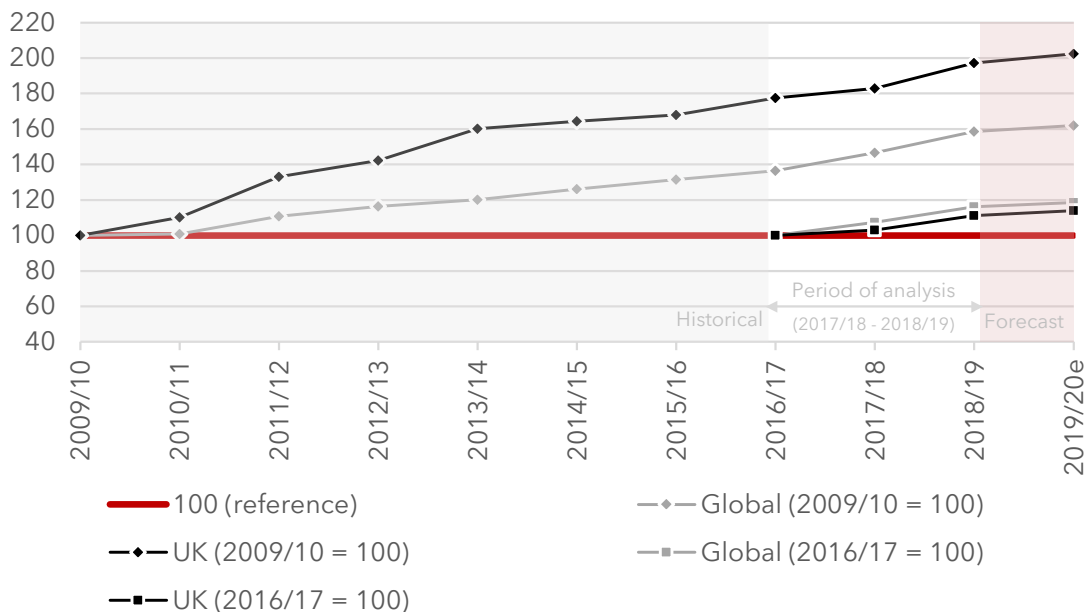


Source: know.space analysis of Bank of England exchange rates

Note: The series is an index with the GBP/USD exchange rate value on 04/01/2010 = 100

With a (relatively) stable GBP/USD exchange rate, the UK's share of the global space economy remained unchanged at 5.1% in 2018/19. This trend is better understood by considering indices of UK and global industry size estimates (below). The UK industry has grown more than the global industry since 2009/10, boosted by fast growth in the early years, though UK growth has slowed to match the global growth rate in recent years. In fact, in 2017/18 the global industry growth outpaced the UK growth rate.

Evolution of UK and global space industry size, 2009/10 - 2019/20e



Source: know.space analysis of Size & Health estimates and Space Foundation 'The Space Report' 2010-2020

Note: The series is an index of values in current prices



Export intensity

Ambitions: Export share of 60%.
Status: Export share of 35.5%.

The Space IGS targets an export share of 60% by 2030 from a starting point of 22% in 2010. The 2018 report showed an export share of 37.4% in 2016/17, but the export share of income fell slightly to 35.5% in 2018/19.

Considering the non-DTH activities of the space industry (where export is more likely), export intensity is estimated at 59.5% in 2018/19 (also down slightly from 65.4% in 2016/17).

Employment

Ambitions: 100,000 jobs created by 2030, equivalent to a total space industry workforce of 119,100.
Status: 45,100 space industry jobs (direct) in 2018/19.

The Space IGS targets the creation of a further 100,000 space industry jobs from a starting point of 19,100 in 2007. Nine years later, in 2018/19, the space industry supported an estimated 45,100 direct jobs, also up from 41,900 jobs supported in 2016/17.

... now you **know.**