



The Scottish Space Cluster

Progress now and in the future

EXECUTIVE SUMMARY



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Scottish Enterprise

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Executive Summary

Introduction

Scotland maintains a reputation as an innovative, science-focused, and technologically advanced country. Scotland's space industry is a key part of this story, where its space manufacturing and applications capabilities are both UK and European leading. Scottish space organisations are also active in other parts of the value-chain, a strength underpinned by leading universities and research institutions in areas as diverse as advanced forming, Earth Observation and digital technologies.

These strengths were first highlighted in London Economics' 2016 *Development of the Scottish Space Industry report* for Scottish Enterprise. The present study expands on this work by identifying the size, capabilities, strengths, opportunities, potential growth and trends of the Scottish Space industry.

Study objectives

The objectives of this report are to answer three groups of questions:

- What is the current status of the Scottish space cluster?
- What are the strengths, weaknesses, opportunities and threats of the cluster?
- What is the maximum projected growth trajectory of Scotland in medium-term (2025) and long-term (2030) based on current capabilities and if identified gaps are addressed?

This evidence will inform actions by Scottish Enterprise and other stakeholders to develop a competitive and market-leading cluster, particularly in the context of NewSpace. These developments are encouraging a more commercial and entrepreneurial industry with new entrants. By identifying the needs of these actors, this study will help Scotland realise its potential as one of Europe's foremost space clusters.

Key findings

What is the current status of the Scottish space industry?

The '**space industry**' defines a varied collection of commercial and non-commercial organisations engaged in both the development and launch of space assets (upstream organisations) and those engaged in the exploitation of these assets for terrestrial use (downstream organisations). Within this broad classification, there are several subcategories with their own distinct value-chain (e.g. Earth Observation, GNSS, satellite communications) and sets of activities (e.g. space manufacturing, operations, applications and ancillary services).

The **133** space organisations active in Scotland in 2017/18 can be considered members of a common '**space cluster**' given their relative geographic proximity; their membership and contact with similar network organisations and infrastructure, and their contribution to the same value-chain. **66** of these organisations (50%) are active in space manufacturing and **57** (43%) are active in space applications, highlighting these segments as areas of relative Scottish strength.

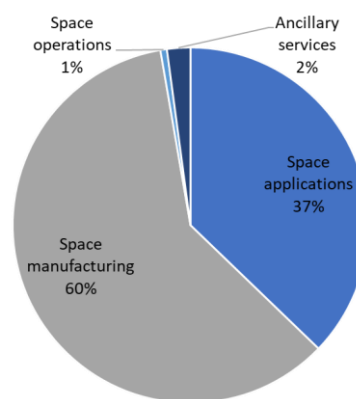
Contribution to the economy (Gross Value Added)

The contribution of the all space-relevant organisations to national economic activity is measured in terms of Gross Value Added (GVA). This is equivalent to income less the costs of intermediate inputs and capital stock. GVA for the Scottish space cluster is estimated at **£880m** or **14%** of the UK’s total space industry contribution.

Reflecting the concentration of Scottish organisation, space manufacturing and space applications dominate GVA with shares of **60%** and **37%** respectively, followed by ancillary services (**2%**) and space operations (**1%**), as show in Table 1 below.

Table 1 Scottish space industry GVA by segment, 2017/18

Segment	2017/18	Share of UK
	£m	total %
Space Manufacturing	529	32%
Space Operations	5	1%
Space Applications	328	9%
- DTH broadcasting	278	11%
- Other applications	50	4%
Ancillary Services	19	9%
Total	880	14%



Note: The pie chart shows the total Scottish GVA by segment.

Source: London Economics analysis

These results also highlight the significance of Scotland for the UK space industry as a whole. For example, **Scotland’s large manufacturing segment generates almost third of the UK’s total GVA (32%)** in this segment – more than double Scotland’s contribution to the UK space industry more broadly (14%).

Space industry employment

This economic activity supports a total workforce (headcount) of **8,019** employees or **19%** of total employment in the UK space industry. The majority of this workforce is accounted for Direct-to-Home broadcasting (DTH) activities (**78%**).

Without DTH broadcasting, the Scottish space industry’s workforce is **1,734** employees or **8%** of the UK’s non-DTH total workforce. Of this, space manufacturing accounts for more than half of employment (**51%**). This is followed by other (non-DTH) applications (**31%**), ancillary services (**13%**) and space operations (**6%**).

Space industry income and growth

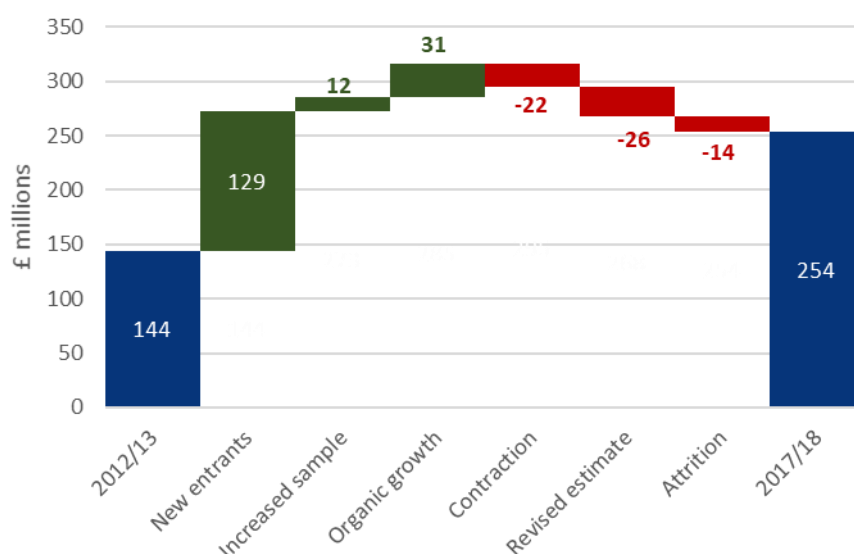
Total Scottish space industry income is estimated at **£254m** in 2017/18. This represents compound annual growth of **12%** per annum in real terms since 2012/13 when the Scottish space industry income was estimated at £144m.

This estimate of industry income includes non-commercial income (e.g. grant funding, core funding, research funding, departmental expenditures and operating budgets) as well as commercial income. Unlike GVA, the estimate of Scottish industry income only counts the incomes of organisations that are headquartered in Scotland. Incomes of companies with Scottish that are headquartered

elsewhere in the UK are excluded from this estimate since these companies do not report UK income split by countries or regions of the UK.

As shown in Table 2 below, **new entrants** into the industry were the largest contributors to growth, adding **£129m** to growth over this period. This is followed by **organic growth** of companies (**£31m**) and identification of a larger sample of relevant space organisations (**£12m**). These contributors to growth were partially offset by losses from **changes to estimates** (revisions) of Scottish space activity (**£21m**), **negative growth** (contraction) in some companies (**£21m**) and the **exit of companies** (attrition) who have ceased trading (**£14m**).

Table 2 Decomposition of Scottish space industry income growth, 2012/13-2017/18



Note: Values are in constant 2017/18 prices to account for inflation between 2012/13 and 2017/18

Source: London Economics' analysis

Out of a total UK space industry income (incl. DTH) of £15,938m in 2017/18, Scotland represents **1.6%**. This compares to an estimated UK share of 1.1% in 2012/13.

By excluding DTH – an activity that is not undertaken by any company headquartered in Scotland – Scotland's share of the UK space industry rises to **2.9%**.

Processing of satellite data (e.g. EO) (space applications) represents the single largest activity in the Scottish space industry with a share of **17%** of the total industry income. This is followed by **third-party ground segment operation (12%)**, **manufacture of sub-systems for satellites and spacecraft (11%)**, and **market research and consultancy services (8%)**. Together, these four activities alone account for more than **45%** of total industry income.

Areas where the Scottish industry is more concentrated than for the UK include launch services, third-party ground segment operations, processors of satellite data (e.g. EO), and scientific instruments.

What are the strengths, weaknesses, opportunities and threats of the cluster?

There are a broad range of factors which support the development of the Scottish space cluster – including political, economic, social, technological, legal and environmental factors.

Strengths of the Scottish space cluster

The strength of Scotland's **research institutions**, and the quality of R&D, relocation and export **support** are factors that have been key pillars for the Scottish space industry for several years. More recent developments include the emergence of a deep **network for industry coordination** (e.g. the Scottish Space Leadership Council) and **business incubation** (e.g. Higgs Centre for Innovation), as the development of the Ayrshire launch cluster which is strongly positioned to become Europe's leading centre for launch following passage of the Space Industry Act 2018 – a piece of legislation that provides the legal basis for launch.

The strength of the Scottish space industry also rests on its possession of **market leading sub-segments**, such as small satellite manufacturing and EO application providers; **the attractiveness of the Scottish business environment**, such as the level of available support, access to suppliers, customers and talent – particularly in adjacent sectors such as Oil & Gas, the proximity of research institutions, and the **image of Scotland** as a growing space cluster with a strong commitment to market-leadership and a high quality of life.

The range of businesses across the upstream and downstream sectors also indicates the **end-to-end capabilities** of the Scottish space cluster.

Weaknesses of the Scottish space cluster

Despite these strengths, the Scottish space industry has some identifiable weaknesses. This includes the presence of **few OEMs and traditional primes**, few satellite operators, no ground segment suppliers, and an underrepresentation of space application providers. The small size of the industry means there is **no critical mass** so vulnerabilities in a few key companies could translate to the sector as a whole.

The **talent pool** is also shallower when comparing to other clusters such as Harwell or Bavaria. The space industry faces competition for highly skilled workers from other lucrative sectors – potentially a potential barrier to future growth for the cluster.

Several stakeholders consulted for this study also expressed concerns of an **underrepresentation** of Scotland in the UK's national coordinating bodies and for space in particular. The lack of physical presence from space agencies such as the UK Space Agency (UKSA) was identified as a contributing factor to this.

Opportunities for the Scottish space cluster

The twin emergence of **Scottish Spaceports** and the UK Spaceflight Programme offers Scotland an opportunity to create a European centre for launch companies and provide the nationally strategic capability that will allow Scotland to influence the **development of UK Space strategy** more broadly.

This capability may also contribute towards demand for Scotland's world-leading **small satellite manufacturing** capability – a part of the cluster that is strongly positioned to benefit from NewSpace developments, and cements Scotland as a '**one-stop-shop**' cluster.

Likewise, Glasgow's scheduled hosting of **COP26** in November 2020 offers the Scottish space industry a global platform to showcase how its expertise and technologies can be leveraged to mitigate climate change and protect the environment. The Scottish space industry can also support the **transition of Scotland's Oil & Gas** industry by providing more efficient solutions to enhance

management and operation of existing assets and absorbing redundant talent. This is key given the maturity of North Sea oil and the pressure to transition to a low carbon economy.

Threats to the Scottish space cluster

While **Brexit** presents an opportunity for Scotland to attract firms that need to set-up legal entities to service the UK market and benefit from the 'Global Britain' agenda, it also presents some threats. This includes the loss of access to EU funding sources, contracts and R&D collaborations. More general **protectionist trends** could also hinder Scotland's highly integrated cross-border supply-chains and potential for export-driven development. **Access to talent** remains a key concern for companies, particularly in the parts of the industry, such as space applications, where space companies compete for talent with other high-tech sectors.

The **reliance on a few customer groups** (e.g. Oil & Gas) and the **failure of a few standard bearer customers**, also represent sizeable risk to the entire Scottish space cluster. **Failure of the UK spaceflight programme** could also undermine many of the opportunities identified for Scotland.

What is the maximum projected growth trajectory of Scotland?

The UK's Space Innovation and Growth (IGS) Strategy from 2010 defines a target for the UK space industry to capture 10% of the global market by 2030. In order for the UK achieve its target, all countries and regions of the UK need to contribute to this ambition.

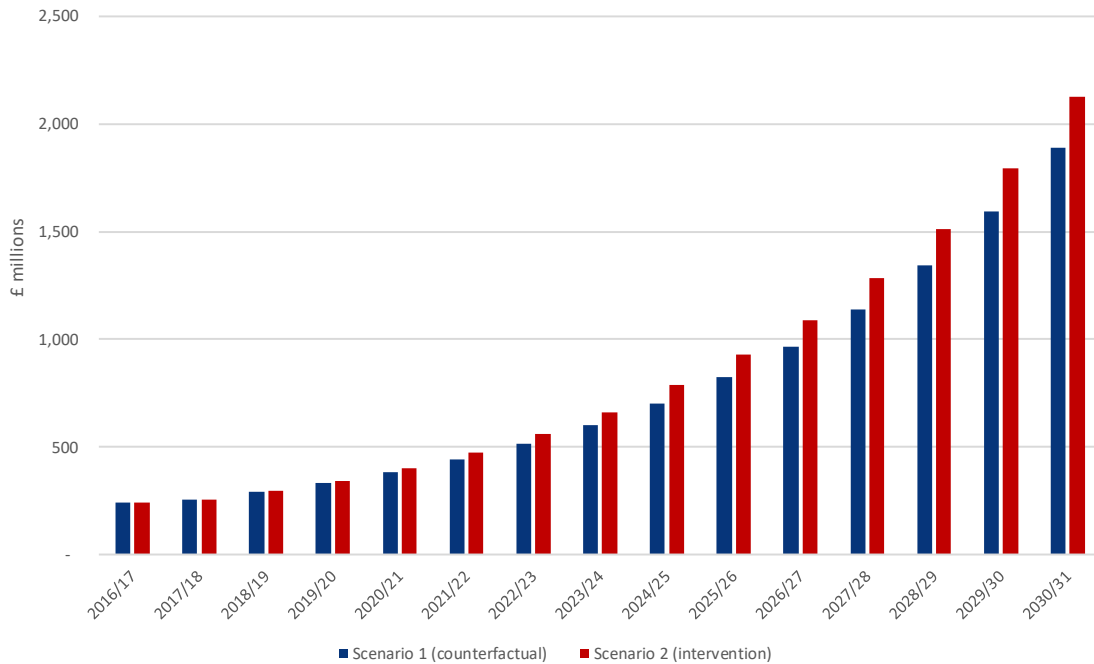
To assess Scotland's potential contribution to these efforts, this study presents an indicative forecast to demonstrate how Scottish space industry income could evolve assuming Scotland maintains its **current capabilities** and commitments (Scenario 1) and if **further action is taken to address Scotland's gaps** (Scenario 2).

- Growth under **Scenario 1** (assuming current capabilities and commitments) accounts for the success of Scottish launch capability and benefits of this to the broader supply-chain.
- Growth under **Scenario 2** (addressing gaps) accounts for the temporary additional uplift in growth (over and above Scenario 1) that may be associated with both industry wide and segment-specific measures to address gaps.

NB: these forecasts are indicative and sensitive to assumptions of growth in specific subsegments, changes in labour productivity, and the effect of specific measures to address gaps. All estimates are presented as nominal values (i.e. not accounting for inflation). At the time of writing, the space industry has not publicly suffered from major impacts from COVID-19. As such, the analysis does not consider either adverse or positive impacts from the ongoing global crisis.

Total Scottish space industry income is estimated at **£254m** in 2017/18. The potential growth trajectory of income for the Scottish space industry under the two growth scenarios are presented in the Figure below.

Figure 1 Potential growth trajectory of income for Scottish space industry (2016/17 – 2030/31)



NB: these forecasts are *indicative* and sensitive to assumptions of growth in specific subsegments, changes in labour productivity, and the effect of specific measures to address gaps. All estimates are presented as *nominal* values (i.e. not accounting for inflation). Details of these growth scenarios are available in the Full Report. This report is available from Scottish Enterprise on request.

Source: London Economics analysis

Potential by 2020 (short-term)

By 2020, estimates of Scottish space industry income are forecast to reach:

- **Scenario 1** (current capabilities and commitments): **£380m**
- **Scenario 2** (further action to address gaps): **£400m**

Potential by 2025 (medium-term)

By 2025, estimates of Scottish space industry income are forecast to reach:

- **Scenario 1** (current capabilities and commitments): **£820m**
- **Scenario 2** (further action to address gaps): **£920m**

Potential by 2030 (long-term)

By 2030, estimates of Scottish space industry income are forecast to reach:

- **Scenario 1** (current capabilities and commitments): **£1,900m**
- **Scenario 2** (further action to address gaps): **£2,100m**



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