

A STRATEGY FOR  
**SPACE IN  
SCOTLAND**

---



OCTOBER 2021



Cover image Courtesy of Clyde Space

# CONTACT

E: [admin@scottishspace.org](mailto:admin@scottishspace.org)

W: <https://scottishspace.org>

---

*Copyright © All rights reserved 2021*

*You may reuse reasonable portions of this document provided that such reproductions are properly attributed to us with: A Strategy for Space in Scotland 2021.*

*This document was produced by AstroAgency.*

---

# CONTENTS

---

<b>1</b>	<b>FOREWORD</b>	
	SPACE SCOTLAND CO-CHAIR FOREWORD	1
	SCOTTISH SPACE ACADEMIC FORUM CHAIR FOREWORD	2
	SCOTTISH GOVERNMENT JOINT MINISTERIAL FOREWORD	3
<b>4</b>	<b>INTRODUCTION</b>	
<b>6</b>	<b>VISION</b>	
	VISION	6
	MISSION	6
	THE AMBITION	7
<b>8</b>	<b>STRATEGIC CONTEXT</b>	
<b>12</b>	<b>THE OPPORTUNITY</b>	
	THE VALUE OF SPACE	12
<b>15</b>	<b>PARTNERS &amp; AUDIENCE</b>	
	A COMMITMENT TO COLLABORATION	17
	AN INTEGRATED SECTORAL MANAGEMENT HUB	20
<b>21</b>	<b>DELIVERING THE STRATEGY</b>	
	STRATEGIC ACTIONS	22
	THE CHALLENGES AHEAD	28

---

---

# FOREWORD

## SPACE SCOTLAND CO-CHAIR FOREWORD



---

“ This document, and the manner in which it has been developed with our valued partners across Government and academia, represents the spirit of collaboration that the space sector is becoming known for and continues to demonstrate as it expands. It carries a clear desire to work together for the benefit of a more inclusive, sustainable and commercially resilient sector as a whole, rather than for any individual organisation.

Since its establishment in 2017, the Scottish Space Leadership Council has focused on output-generating initiatives that seek to drive sectoral development, enabling and connecting space companies throughout Scotland as part of the wider UK proposition. The Council is delighted to have played a leading role in the creation of Scotland's first Space Sector Strategy and our focus now turns to the delivery of its vision and crucial next steps. The publishing of the Strategy marks the very beginning of an exciting new era for Scottish space.

We thank the Scottish Government Space Group and Scottish Space Academic Forum for their efforts over the past few months, as well as our Council members for their vision and continued work in supporting a growing sector that can deliver a wide range of benefits to various industries, the environment and wider society.

*Craig Clark MBE & Daniel Smith*

---

# SCOTTISH SPACE ACADEMIC FORUM CHAIR FOREWORD



---

“  
The Scottish Space Academic Forum was formed in 2021 to support the Scottish Space Higher Education Institution sector in all its breadth, promoting national capacity and capabilities, and ensuring we maintain an inclusive, collaborative and successful community in Scotland. It is appropriate, therefore, that the Forum was able to play an important role in shaping Scotland's first Space Sector Strategy. Higher Education Institutions in Scotland have a key role in fostering the talent and scientific innovation needed to fuel the growth in the space sector promoted by the Strategy.

We thank the Scottish Government Space Group for bringing the strategy together, and Space Scotland for their highly collaborative approach that has ensured a range of views have been incorporated. We also thank the members of the Forum for their insightful contributions. Forum members are now keen to ensure a successful delivery of the Strategy so that it enhances the Scottish space ecosystem.

*Prof. Iain Woodhouse*

---

# JOINT MINISTERIAL FOREWORD



---

Scotland's space sector has reached a pivotal moment in its evolution and the Scottish Government is delighted to have worked alongside industry and academia to develop this joint Strategy. This forward looking collaboration provides the direction to enable stability and growth of the sector and offers long-term prosperity and sustainability to Scotland. “

The space sector has been one of Scotland's best kept secrets. Over the course of a few short years, our nation has developed a world class capability; World class in small satellite manufacturing, with a cluster of companies in Glasgow producing more small satellites than any other city in Europe; World class in data analysis and exploitation, with Edinburgh hosting the largest centre for informatics in Europe and the location of more than 170 data sciences companies. And, in the Highlands and Islands, we are making great progress toward realising the final piece of the end-to-end space value chain – launch capability – with vertical launch sites in the advanced stages of development and, working alongside Scottish based launch vehicle manufacturers, launches set to take place in the very near future.

Space is economically important to Scotland and, as we build on our present strengths, we must also focus on our future sustainability. The current climate emergency demonstrates that the stakes could not be higher and, jointly, we are all determined to show that Scotland can be a leader in the global fight against the biggest challenge of our time.

From the establishment of the Scottish Space Leadership Council in 2017 to the formalisation this year of its executive arm, the Scottish Space Group, the space community in Scotland has been proactive in organising collectively to advance the space agenda. And as a Government, we have identified space as a key economic priority. Our Inward Investment Plan, and the latest Programme for Government, sets out our desire for Scotland to become a leading space nation and deliver a full end to end solution for satellite design, manufacture and testing, launch, and data exploitation.

---

All of this leads to an ambition of targeting a £4 billion share of the global space market and 20,000 jobs in the sector by 2030.

Space is also a priority for our enterprise agencies, Scottish Enterprise and Highlands and Islands Enterprise, which provide support to companies across the space supply chain. Scottish Development International, our trade and foreign direct investment agency, connects and informs overseas businesses to investment opportunities within Scotland and the world class facilities and technologies available in what we consider to be a leading global destination to anchor your space business.

We are grateful to the industry, the academic community and the other members of the public sector Scottish Government Space Group for their contributions and making the commitment to working in partnership that has produced this document. The actions and challenges set out within this Strategy lay the foundations for the next phase of Scotland's space sector growth, galvanising the whole of our space community, across the public, private and academic sectors to realise our collective ambition of becoming Europe's leading space nation.

*Kate Forbes and Ivan McKee*

---

# INTRODUCTION

The Scottish Space Strategy has several purposes, but its primary objective is to articulate Scotland's space ambitions from now towards the next decade and beyond. This document defines the vision, ambition, context, opportunities, and outlines an actionable plan to realise the ambition through the prism of several challenges the Scottish space sector wishes to meet.

Getting from here to there will be an exciting and rewarding journey for Scotland and one to be taken collaboratively. To understand the destination, the ambition must be defined – this is expressed in the Vision and Mission. To ensure a coherent direction of travel, there is a need to know where Scottish space activities are now – this is provided in the Strategic Context and Opportunity sections. Similarly, to make sure Scotland has the right means and expertise, it is important to comprehend what and who will take the journey – this is defined in the Partners and Audience section. Finally, while the precise detail of the route will change over time, there is a need to begin with an outline plan in mind – this is the purpose of Delivering the Strategy and The Challenges Ahead sections.

Delivering the Strategy is not simply a matter of following a plan. In fact, diligent and unwavering adherence to a rigid plan is likely to miss

emerging opportunities by stifling the very dynamism and entrepreneurialism that characterises the space sector and removing the ability to exercise flexibility in response to new developments. The heaviest burden on any good strategy is to truly enable choice. Accordingly, this Strategy intends to provide guidance for the journey's direction. Stakeholders can see how their specific activities align with the direction chosen by Scotland as part of the UK space sector proposition, and feel empowered to drive ahead, with the knowledge that the ecosystem is rallying behind them.

Where divergence from the Strategy exists, ideally this will be considered within the context of the wider space ecosystem, allowing choice and endorsement of the variation sought, to ensure collective Scottish space benefits. This is the essence of an agile strategy and given the rate of change of space capabilities and technologies, this nimbleness will serve Scotland's space sector well. It will also demand adept and responsive governance, and this is explored in this document, to ensure all stakeholders understand how it works and their role in the ecosystem.



# VISION

## VISION

Scotland, the best place on Earth to build a Space Business

## MISSION

Collaborate to make Scotland the home of New Space – capitalising on a heritage of traditional space missions and entrepreneurship in order to maximise the economic, environmental and societal benefits for Scotland, caring for the environment and promoting a skilled and diverse workforce.

Harnessing our existing strengths and, through a coalition of partners across industry, academia and government, the Scottish space community will further develop a diverse space ecosystem to provide solutions for UK and international clients. In doing so, we will facilitate new business and industry growth and enhance our growing reputation for dynamism, competitiveness and innovation, further encouraging inward investment into cutting edge research, solution provision, infrastructure and value chain development.

# THE AMBITION

This Strategy introduces the behavioural concept of “Team Scotland”, which has, at its core, the idea of a mindset of altruism towards the realisation of Scotland’s space ambition. Not only does this underpin true collaboration between industry, academia and government, but it drives a philosophy of:

---

## SUCCESS THROUGH COLLABORATION, FOR THE BENEFIT OF SCOTLAND.

---

To give this colour, many Scottish space stakeholders already have the same barriers to overcome and opportunities to capture – by adopting a Team Scotland approach, these barriers and opportunities can be met and outcomes managed together, exploiting the strength of a national view and response.

Team Scotland will “collaborate to make Scotland the home of New Space – capitalising on a heritage of traditional space missions and entrepreneurship in order to maximise the economic, environmental and societal benefits for Scotland, caring for the environment and promoting a skilled and diverse workforce”.

Enshrined in this brief sentence is our commitment to rally the Scottish space sector to enhance the global environment, provide exciting and sustainable openings for Scotland’s population, and relentlessly capitalise on opportunities to enhance the Scottish economy, society, and the creation of high value employment. We will do this by filling the gaps

in Scotland’s space value chain and making Scotland the nation of choice for national and international space customers.

Our ambition is derived from the combination of our current space strengths (what we do well now – continue to grow), the opportunity (what we could do – stimulate and support) and the market (what the global space market requires – assessing the target size).

### AT THE HIGHEST LEVEL, OUR AMBITION FOR 2030 IS FOR SPACE SCOTLAND TO DELIVER:

---

An annual contribution to the Scottish economy in **excess of £4bn.**

---

A **5 times** increase in the workforce<sup>1</sup>

---

A globally recognised strategic location and European **leader** for commercial space developments.

---

A range of managed launch and orbital services, supporting the highest launch cadence in Europe

---

An increased and diverse workforce with improved participation that is fully reflective of Scottish society and ensures space is open for all.<sup>2</sup>

THIS REFLECTS YEAR-ON-YEAR  
**GROWTH OF 26%**, WHICH IS  
CHALLENGING BUT REALISTIC.

<sup>1</sup> Excluding Direct to Home broadcasting

<sup>2</sup> All in this context is not limited to physics, astrophysics, mechanical engineering and other ‘traditional’ space science and technology skillsets, but also environmental science, geography, geology, data science – it should be a valid career choice for those who are non-technical or scientific as well.

---

# STRATEGIC CONTEXT



Image courtesy of NASA

The Scottish Space Strategy will be consistent with and supportive of the broader UK Space Strategy within which this will play a significant part.

---

AS PART OF THE SCOTTISH SPACE STRATEGY, THE SCOTTISH SPACE SECTOR **WILL STRIVE:**

---

1. To develop a world-class space enterprise infrastructure and research environment to enable economic growth through increased exports, innovation opportunities, access to investment for company growth and the attraction of inward investment.

---

  2. To build on Scotland's position as a leading UK location and its environment for cutting-edge, market-led space technology development.

---

  3. To forge collaboration opportunities with the UK Space Agency, the UK Government Departments of International Trade and Business, Energy and Industrial Strategy, and the European Space Agency, and to engage with international opportunities to work with other space nations or regions.

---

  4. To build on the sector's established capabilities to grow a domestic and international customer base, providing end-to-end solutions encompassing spacecraft manufacture, launch vehicle and launch site development, data delivery, data analytics and downstream services, as well as space supply chain and ancillary support services. Building on Scotland's heritage and strengths across the small satellite value chain, the sector will encourage the exploration of new commercial space market opportunities, such as renewable energy, space based solar power, in-space manufacturing and space-based mineral and metal resources, whilst continuing to support the established developers and suppliers in the traditional/institutional market.

---

  5. To facilitate, support and develop the Scottish launch sector, providing an environment for businesses to grow and deliver both vertical and horizontal launch services. Initially focussed on the needs of the small satellite sector, the Scottish Launch Sector will be supported to explore new market opportunities and to grow to address these global market needs.

---

  6. To ensure that Scotland's space ambitions and the plans for their delivery are in line with Scotland's target to transition to a net zero society by 2045. Space has a pivotal role as a force for good in the global challenge<sup>3</sup> to address climate change and Scotland's space sector businesses will be encouraged to continue to recognise the importance of sustainable environmental practices and enshrine them as a core business value.
- 

<sup>3</sup> For example, detection of Greenhouse Gases, carbon offsetting, discovering, monitoring and measuring against UN Sustainable Development Goals and corporate Environmental, Social and Governance commitments.

---

CURRENT STATUS: THE LATEST SCOTTISH SPACE CLUSTER 2020 REPORT AND UK SPACE INDUSTRY SIZE & HEALTH 2020 REPORT SHOWS THAT SCOTLAND ALREADY PUNCHES WELL ABOVE ITS WEIGHT IN THE SPACE SECTOR.

---

1. Scotland has a space industry estimated to generate £880M GVA for the Scottish economy in 2017/18 with a sustained annual growth rate of 12% Scotland has seen an increase in employment of almost 10% since 2016.

---

2. Scotland is home to almost one fifth of all UK space sector jobs.

---

3. Proportionally, Scotland employs over twice as many people in space as the rest of the UK.

---

4. The number of space businesses in Scotland has increased by more than 65% since 2016.

---

These figures show the strength of the Scottish space sector and, given the global growth forecasts for the sector, underline the significant growth potential within Scotland. This Strategy aims to build on these successes and harness the strength, ambition and opportunities which come from working together as a community to secure Scotland as a globally recognised space sector leader.

# THE SCOTTISH SPACE CLUSTER 2020



**£254M**

Total income  
in 2017/18



**£880M**

Total GVA  
in 2017/18



**8,000**

Employees  
in 2017/18



**12%**

Annual growth rate  
0212/13-2017/18

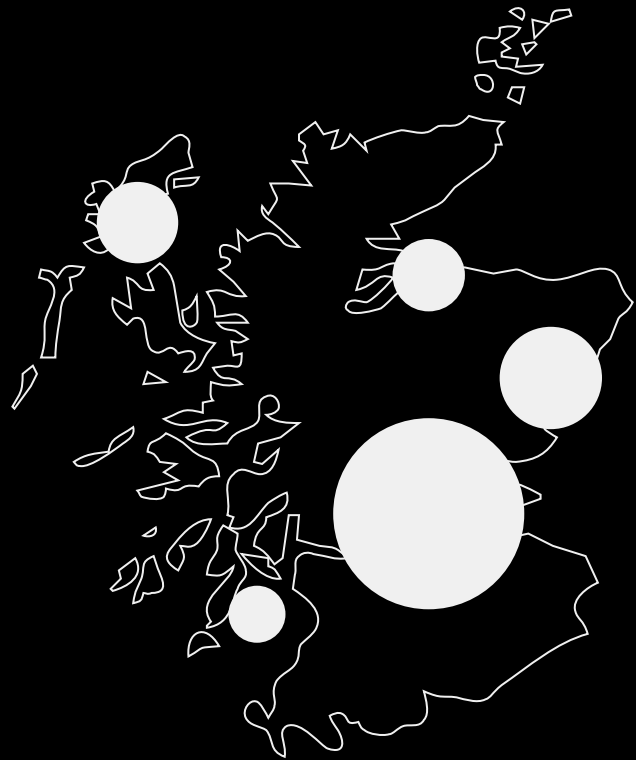


**14%**

Share of UK space  
industry contribution  
to GDP

**133**

**SCOTTISH  
SPACE  
ORGANISATIONS**



	ORGANISATIONS	INCOME	EMPLOYMENT	GVA
Space manufacturing	66	£90M	880	£530M
Space operations	9	£40M	150	£5M
Space <sup>4</sup> applications	57	£101M	6800	£328M
Ancillary services	32	£25M	210	£20M

---

# THE OPPORTUNITY

## THE VALUE OF SPACE

Space has become a critical part of the national infrastructure and of the economic and social fabric of Scotland, the UK and the international community. Satellite, data and communications technologies are behind most aspects of everyday life including online banking, shopping transactions, mapping, location applications, weather forecasts and online meetings.

Space is a vital part of global infrastructure, enabling the operation of international stock markets, providing medical professionals with access to critical information from anywhere on Earth, and for humanity to measure the impact of our behaviours, both positive and negative, on the global environment through remote monitoring.



Image courtesy of Spire Global

The increase in the availability of commercial launch vehicles has been likened to the railways that were the key enablers of the Industrial Revolution. Regular, lower cost and reliable launch services are making space and its services affordable, practical and increasingly an essential proposition for businesses and organisations across the world.

The traditional space sector has been largely characterised by big, expensive satellites and their payloads delivered by incumbent multinational companies. However, today's space market demonstrates a shift to 'New Space' – a segment of the space market promoting a more agile approach to management and processes, focused on miniaturised, low-cost satellite platforms and payloads, and optimising automation and data exchange in manufacturing technologies to deliver affordable data. Scotland is an international leader in the design, manufacture and management of small satellites, particularly in the widely used CubeSat form-factor. These small satellites offer a paradigm shift in access to space to an increasingly wide commercial, civil government, military government, research and private individual user base. This shift in affordability and technical capability has, in turn, seen dramatic growth in the number of new space based applications.



Image courtesy of Spire Global

Satellites are only the beginning. The space market is set to grow, adding new products, systems, and services, including: renewable energy, microgravity manufacturing, space-based mineral and metal processing, space-based solar power generation, high-speed and dedicated private communications, quantum cryptography, and harnessing space-based assets to leverage the Internet of Things for applications such as Agriculture, Forestry, Transport and Smart Cities. Human space flight is seeing a similar step change, with new and developing commercial space applications becoming a reality this decade.

Space is a rapidly growing international market offering significant commercial opportunities. Scotland has an extensive and diverse ecosystem of small and



---

medium businesses that have the capabilities needed by the space sector. In addition, Scotland boasts world class university research and undergraduate programmes that feed directly into the growing space sector. Scotland can take a global leadership position in this emerging and burgeoning New Space sector and the wider commercial space market, to develop and deliver a wide range of materials, technologies, products, systems and services which will meet the growing demand. Furthermore, with the presence of launch, satellite production and satellite-based data products and services in Scotland, the country will uniquely be able to provide a complete value chain in this New Space sector.



Image courtesy of Prestwick Spaceport

---

# PARTNERS & AUDIENCE



Image courtesy of Saxa Vord Spaceport

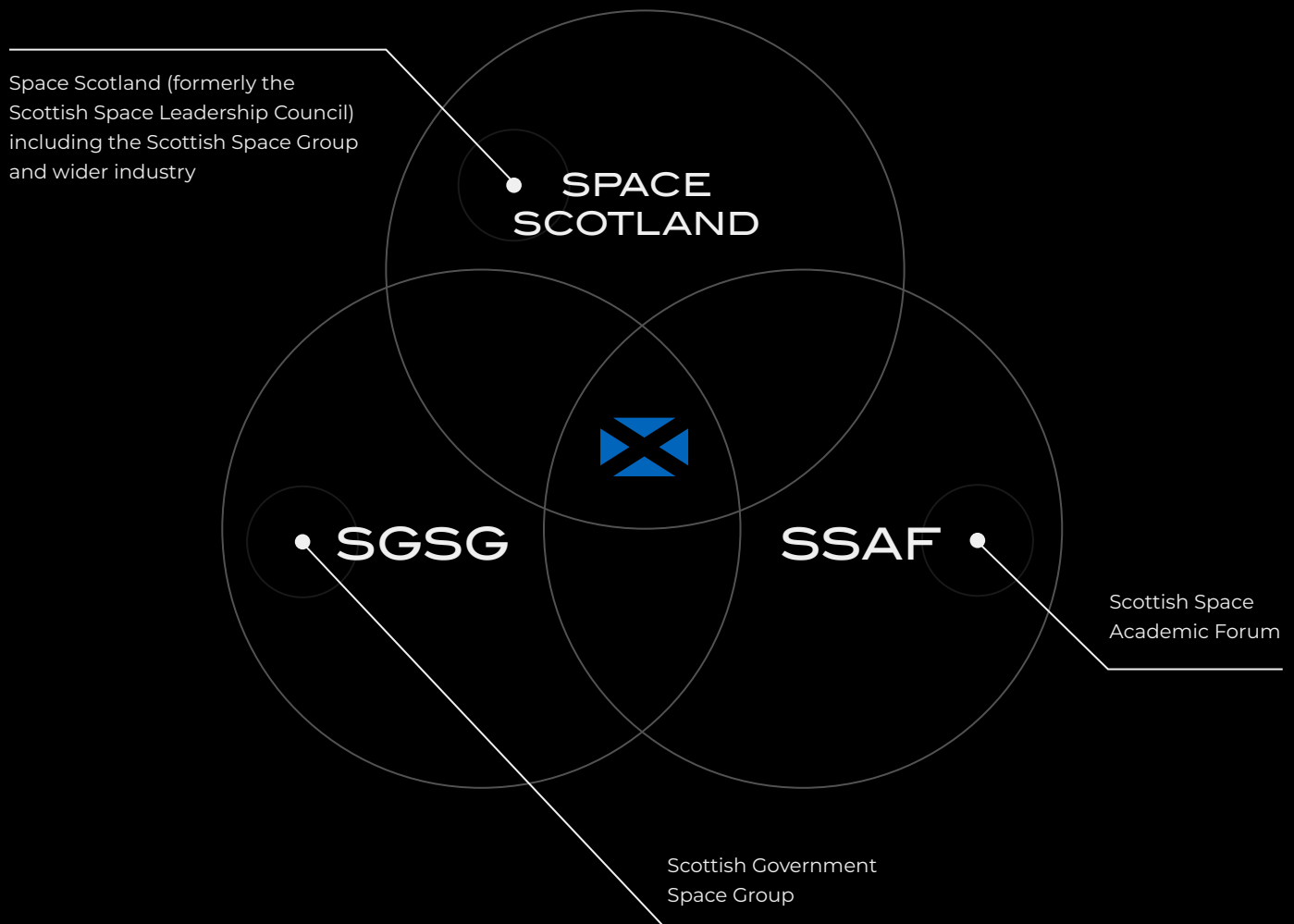
Scotland has developed a vibrant and enthusiastic cohort of business and academic institutions, and, with the support of the Scottish and UK Government, has adopted a collegiate approach to addressing the challenges of securing the position of being a recognised player in the global space community.

Projecting Scotland's space industry to new heights will require our technological expertise, experience and endeavour to be cohered through an intensified collaboration between industry, academia and government agencies to enhance pan-sector connectivity, build scale and set the scene for future inward investment. While Scotland already has an established, growing reputation for small satellite manufacture and a rapidly developing capability for the launch of small payloads, Scotland's ecosystem will be strengthened by coherence, purpose and a clear set of common goals to deliver the country's strategic aspirations. This must be addressed in the short term.

Overall, the indigenous industry is keen to establish an interconnected ecosystem comprising satellite and component manufacturers, downstream exploitation companies, spaceport operators, launch platform and service providers, payload developers, academia and R&D facilities which can offer a complete end-to-end solution to those wishing to access space and space services. The complex landscape around delivering the sector's aims is one where skills development, environmental considerations, regulation, international collaboration and supply chain will require significant coordination. Hence, it is proposed that this connectivity is best facilitated by the

establishment of an integrated Sectoral Management Hub comprising industry, academia and the Scottish Government and its agencies, with the underlying principle being to jointly serve the best interests of the Scottish space sector community in delivering the national economic agenda.

A collaborative engagement process across the space community will provide the basis for leveraging our collective capabilities to deliver the sector's potential.



---

# A COMMITMENT TO COLLABORATION

## INDUSTRY

---

Industry. Elements of the Scottish space industry have come together to form **Space Scotland**, an industry-led group possessing extensive space experience, with representation from business, academia, public sector and government stakeholders. Space Scotland provides a single voice to represent the collective Scottish industrial space community, provide sectoral level leadership and support to enable, promote and grow the Scottish space sector. Space Scotland will formalise its operations through the creation of an executive delivery body, the **Scottish Space Group (SSG)**, which is tasked with providing Space Scotland with resources it requires to enhance, accelerate and improve sectoral growth.

Furthermore, with support from the **SSG**, Space Scotland will provide in-depth industry perspectives, guidance and advice to support the future growth and success of "Team Scotland". Space Scotland will continue to be an advocate for collective Scottish business interests and in this regard will expand its membership and, in doing so, encourage active participation from all parts of the sector to maximise growth aspirations through collaboration.

Industry will seek, encourage and enable more Scottish companies to participate in the space value and supply chains, growing the value of the sector to Scotland and the space industrial sector. This collegiate approach will be applied to, for example, creating special interest working groups to address any national or international issues which impact the sector in a responsive,

Working with Government and its agencies, industry will identify sectoral gaps which could be addressed by specific and focussed inward investment, or identifying international entities or partners with whom we can collaborate.

The Scottish space sector is already leading by example on the sustainability front, through developing initiatives to build net zero contributions at the core of emerging businesses and technologies. Industry will further this work in partnership with government and its agencies to build on this sustainability baseline and support the delivery of the Scottish Government's Net Zero aspirations, promoting activities and goals to facilitate a more environmentally conscious approach, whilst also gaining a competitive advantage over other international propositions.

Industry recognises that attracting inward investment capital to the Scottish space sector is a key enabler to the accelerated growth ambition, and hence there is an ongoing commitment to working with government and academic partners to promote Scotland as an international space 'destination'.

## ACADEMIA

---

The **Scottish Space Academic Forum (SSAF)** has been established as an initiative and management forum aimed at ensuring alignment across research, development and education to provide support to maximise the research potential of Team Scotland for world class innovation and economic growth.

The relationship between academia and industry is critical in terms of accelerating the technical readiness levels of innovation – from R&D through to system certified solutions which are available for full commercial deployment.

In addition, our academic institutions have a truly international reach and unique relationships with UK and overseas research centres which can be used to develop research partnerships, underpinned by a funding landscape which is well understood by academia.

Furthermore, a key feature of academia's contribution to Team Scotland will be to take a future view of the nature of the developing space landscape, thus facilitating the development of the appropriate skills required to help deliver the desired outcomes. This will be accomplished in conjunction with our academic infrastructure and allied agencies e.g., Skills Development Scotland. Attracting overseas students and inspiring the next generation of engineers and scientists, who are essential for seeding new business start-ups and playing a key role in the delivery of our Space Strategy, will be fundamental challenges that our academic institutions are best served to address.

---

## GOVERNMENT AND ITS AGENCIES

The Scottish Government has formed a cross-agency initiative, the **Scottish Government Space Group (SGSG)**. This forum gathers the Scottish Government and its Enterprise and Skills agencies together to discuss and advance the Scottish space agenda, with the commitment of Ministerial oversight.

Acknowledging that space is a reserved matter of the UK Government, the SGSG forum regard space as a key opportunity for our future economy and are committed to using their

powers to support initiatives that are consistent with the Sector Strategy. SGSG will work collectively to provide support to the Scottish space sector, through ensuring alignment with and access to existing funded initiatives across manufacturing, data, skills, innovation and economic development. In parallel, Scottish Government and its agencies will work to develop specific projects and initiatives aimed at the development and growth of the Scottish space sector, focussing on specific, high value activities designed to enhance the capabilities, infrastructure and resources of the Scottish Sector as well as the international profile and 'brand awareness' of Scotland in the global context.

An enabling cornerstone is a commitment to collaboration with adjacent sectors who could benefit from or indeed provide value to the space sector, to support and enable maximum economic impact across the whole of the Scottish economy. In this regard the SGSG will work closely with the sector and beyond to ensure that appropriate infrastructure and investment across the public and private sectors is provided to enable growth and enhance employment opportunities. The SGSG will work with its sector partners to encourage and facilitate third party/external/inward investment projects focussed on strengthening and growing the industry in support of international exports, and positioning Scotland as a recognised player within the global space market.

The SGSG will ensure that initiatives are consistent with the Strategy, that they deliver long-term growth and equitable economic impact, are environmentally sustainable, and help leverage appropriate complementary private sector investment.

---

## OTHER PUBLIC SECTOR BODIES

---

There are also a number of other public sector bodies operating across Scotland who are stakeholders in, and in some cases active delivery partners for, Team Scotland. These include UK Non-Departmental Public Bodies (NDPB's), such as the Science and Technology Facilities Council (part of UK Research and Innovation) and its Scottish base at the Royal Observatory Edinburgh – encompassing both the UK Astronomy Technology Centre and the Higgs Centre for Innovation. The former is a significant player in international astronomy missions, and the latter a key delivery partner for supporting growth of the regional space ecosystem. There

are other direct public sector stakeholders, for example the Satellite Applications Catapult and the European Space Agency's Space Solutions Regional Ambassador Platform network; plus, many indirect space-user stakeholders including the Scottish Environment Protection Agency (SEPA), Scottish Association of Marine Science (SAMS), Marine Alliance for Science and Technology for Scotland (MASTS), etc. Collaboration and engagement across these bodies ensures the wider ecosystem is informed of, participates in, and benefits from Scotland's space activities.

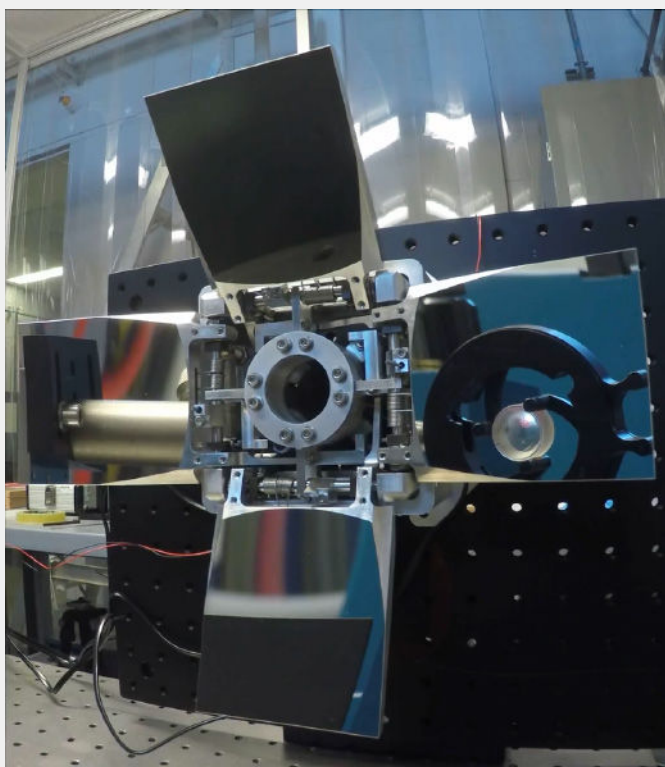


Image courtesy of STFC

---

# AN INTEGRATED SECTORAL MANAGEMENT HUB

Scotland needs to forge its place in the global space industry.

Having a **“Team Scotland”** mindset to develop our industrial space ecosystem will encourage both synergy and diversity, driving a strong emphasis on building collaboration against the backdrop of significant international competition. A Hub approach is proposed, comprising industry, academia and the Scottish Government and its agencies, which is designed to ensure that the focus of participants is consistent with the delivery of our Strategy and New Space agenda as the country seeks to capitalise on the broad strengths of a unified Scottish space industry for:

- 
1. Delivering the Strategy, drawing on the commitments of the stakeholder communities, providing a “challenge-based focus” to establishing, enabling and growing specific aspects of the Scottish space sector, its infrastructure, environment and associated enablers.
  2. Consistently promoting Scotland's space strengths internationally through structured coordinated branding, which will be key.
  3. Capability mapping and space sector cooperation around infrastructure, equipment and facilities will maximise the efficiency of capital employed.
  4. Making space “connections” and working with partners across industry, academia, and government, which is key to accelerated growth.
  5. Vigorously promoting a shared vision of an integrated commercial space industry: its supply chain, economic development, venture capital support, R&D and government space ambitions as a coherent whole.
  6. Identifying ongoing initiatives e.g., NMIS, Industry 4.0, which have the potential to accelerate development of the Scottish space sector to stimulate collaboration, innovation and growth.
  7. Harnessing the extensive space experience and knowledge-base that exists in Scotland, to ensure that the decision making process is both strategically and economically viable.
- 

<sup>5</sup> National Manufacturing Institute Scotland (NMIS).

<sup>6</sup> Industry 4.0 – The 4th Industrial Revolution embracing the digital age.

---

# DELIVERING THE STRATEGY

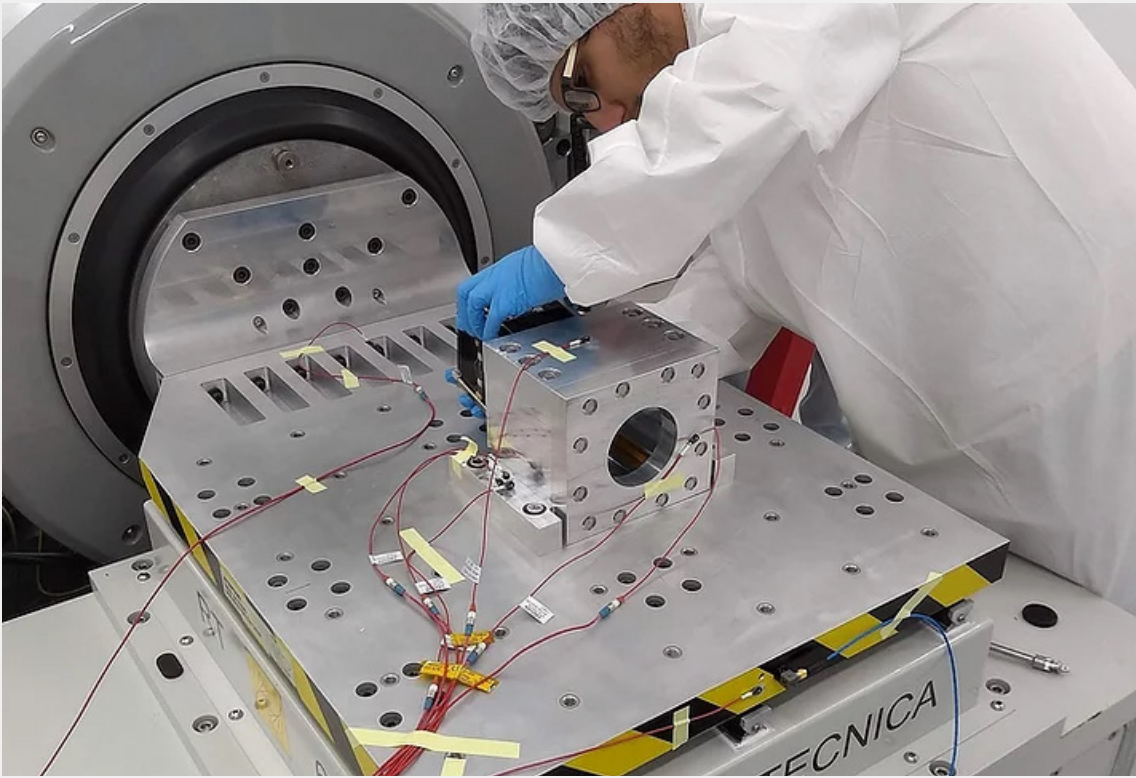


Image courtesy of STFC, Astrosat and Universidad del Valle de Guatemala (UVG)

The Strategy will be delivered through a series of sectoral level actions and challenges, aimed at addressing a number of aspects critical to growing the Scottish space sector to meet its full potential. All Scottish space stakeholders will have a role in collaboratively delivering the Strategy and, with robust governance and coordination, we will maximise the benefits of the delivery activities by exploiting the interconnected nature of a Strategic Delivery Plan.

---

SIX FUNDAMENTAL ACTIONS AND **3 KEY CHALLENGES**  
WILL FORM THE BASIS OF THE PLAN AS FOLLOWS:

---



---

# STRATEGIC ACTIONS

# 1.

## SECTOR ANALYSIS, INDUSTRY GROWTH & INWARD INVESTMENT PROGRAMME

---

The Action: The Scottish space ecosystem to work together to deliver a targeted inward investment programme with the goal of plugging critical gaps in capability and delivering greater economic opportunities to Scotland.

Objectives relevant to Core Vision: Improve the commercial baseline and environment of and for the Scottish space sector, creating the conditions for growth of Scotland's industry and to increase the level of inward investment into Scotland.

---

### PROJECT OUTLINE

---

## 1.

Undertake a joint, sectoral level, Scottish Space Sector Assessment to undertake a deep capability mapping and gap analysis across the broad themes of launch, satellites, space data, research and other space disciplines. From this analysis, Scotland will have the necessary information to initiate positive action to identify, seek and fill identified gaps utilising Scottish based solutions, leveraging Scotland's expertise in areas such as electronics, advanced manufacturing, big data and artificial intelligence.

---

## 2.

Starting in 2021, this activity will provide a regular assessment of the Scottish space landscape, identifying gaps in the value chain, opportunity capture, infrastructure and the support ecosystem on an ongoing basis, which will contribute to a proactive planning initiative aimed at ensuring optimal alignment of the sector to the market.

---

## 3.

Resources will be harnessed to help entrepreneurs and ambitious growing space businesses find investors, markets and collaborators. Individuals who have made the entrepreneurship journey themselves will be sought to mentor the next generation. Scottish Enterprise will invest in the brightest prospects and Scottish National Investment Bank will help young enterprises scale once they have proven their business model.

---

## 4.

This analysis will also provide the basis to design and deliver a programme for targeting inward investment into the Scottish space sector that addresses the gaps and issues, and best aligns with the priorities outlined in the vision directly contributing to the Scottish Government's Inward Investment Plan.

---

---

## 2.

### ENHANCING INTERNATIONAL MARKET OPPORTUNITIES

---

The Action: Explore ways to engage space companies into new international markets and build their international capacity and strategy, through targeted individual support, to drive export growth.

Objectives relevant to Core Vision: Development of a Scottish business, facilities and academic ecosystem to enable economic growth through increased exports, new internationally leading innovation opportunities, access to investment and the attraction of overseas investment.

---

### PROJECT OUTLINE

---

1. Scottish Development International will work with space companies on an individual basis to develop their skills, knowledge, understanding and approach to international market opportunities.
  2. Identification of new international trade opportunities, relationships and partnerships to engage a wider audience of space companies, to support market entry, or to drive new products into the market.
  3. Showcase Scotland's expertise in the space sector, working collaboratively across our networks at home and abroad.
- 

## 3.

### SCOTTISH LAUNCH PROGRAMME

---

The Action: Explore ways to engage space companies into new international markets and build their international capacity and strategy, through targeted individual support, to drive export growth.

Objectives relevant to Core Vision: Development of a Scottish business, facilities and academic ecosystem to enable economic growth through increased exports, new internationally leading innovation opportunities, access to investment and the attraction of overseas investment.

---

## PROJECT OUTLINE

---

1. Identify the infrastructure and investment needs of Spaceports, Launch Service Providers, Satellite Manufacturers and their end customers.

---

2. Develop a clear understanding of how the launch segment is likely to be developed in Scotland and work collaboratively to develop a plan which ensures Scotland can best position itself as the best place in Europe to launch satellites.

---

3. Develop a plan to ensure that the supply chain enabling Launch activity is established in Scotland, filling gaps in capability and ensuring Scottish companies are supported in positioning themselves to take on new demands, and inward investment opportunities are identified and delivered.

---

4. Understand future global developments in launch activity that are relevant to Scotland and seek to optimise and influence the market interest and investment.

---

Image courtesy of Skyrora



# 4.

## NATIONAL SPACE ACCESS CENTRE

The Action: Provide coordinated access to space facilities, capabilities and expertise for the space sector.

Objectives relevant to Core Vision: Maximising the opportunities for sector entry to SMEs, encouraging international customers, investment and partnerships and providing an applied research capability to Scotland's Universities.

### PROJECT OUTLINE

1. Building on government initiatives already funded and underway across Scotland, the creation of a 'virtual' Scottish space centre will provide access to resources (e.g. payload integration facility, high quality environmental test facilities, advanced manufacturing, engine test rig, simulation and modelling environment).
2. The National Space Access Centre will provide the means for SMEs to have affordable access to significant facilities and resources not typically available to such businesses.
3. It will also provide a focus for and the means to encourage and facilitate new applied research between SMEs and the Scottish research base.

Image courtesy of W. L. Gore & Associates



---

# 5.

## ADDRESSING SPACE SECTOR DIVERSITY AND ACCESSIBILITY

---

The Action: Demonstrate and enable the value of ensuring equality of access to all, irrespective of class, ethnicity, gender, age or disability in and to the Scottish space sector.

Objectives relevant to Core Vision: A diverse workforce with improved participation that is fully reflective of Scottish society and ensures Space is open for all.

---

### PROJECT OUTLINE

---

1. Working closely with Space Scotland's 'New Voices' group, partners will undertake a Skills, Diversity and Access Review of Scotland's space sector, starting in late 2021, focussed on assessing the current state of the space sector as a whole and developing proposals to improve on the current issues around skills, diversity and access with the intention of implementing these proposals as specific projects beginning in 2022.
  2. Undertake broader skills mapping across adjacent STE(A)M related sectors and identify opportunities for the development of targeted transition upskilling and retraining interventions.
  3. Build awareness and raise sector profile by promoting opportunities through greater engagement between industry and the education sector in areas such as curriculum development, support for career advisors, engagement with primary and secondary schools, and the Higher and Further Education Sectors.
-

# 6

## SUSTAINABLE SPACE FOCUS

---

The Action: To identify methods for public and private sector collaboration that positions Scotland as a thought leader in taking a more sustainable approach to space activity and enables the sector to contribute towards our Net Zero ambitions.

Objectives relevant to Core Vision: Ensure that Scotland's space ambitions and the plans for their delivery are in line with Scotland's target to transition to a net zero society by 2045. Space has a pivotal role as a force for good in the global fight against climate change, and Scotland's space sector business will be offered opportunities to engage in developing more sustainable practices and to place them at the core of their business growth.

---

## PROJECT OUTLINE

---

- 1.** To build on the work of Space Scotland's Environmental Task Force and the Sustainable Space Challenges initiative to set stretch goals and develop a world-leading environmental strategy for the totality of the space industry in Scotland. This will cover not just the full spectrum of vehicle emissions, but also a lifecycle analysis of missions to include those emissions associated with R&D, manufacturing emissions and coherent end of life planning, through to achieving the positive driver of space-based data for environmental monitoring and mitigation. This action will position Scotland as an exemplar in sustainable space and make meaningful progress toward our Net Zero ambition, whilst encouraging our peers globally.
  - 2.** This challenge could take a number of different forms, making it accessible to a broad range of participants.
  - 3.** Businesses could help other sectors in the economy to use space as a resource to further their own net zero goals. By getting businesses to work collaboratively to solve issues affecting the environment and suggesting ways each could benefit, the growth and longevity of the initial Space Scotland challenge is ensured.
-

---

# THE CHALLENGES AHEAD

# 1.

## DEMONSTRATING SCOTLAND'S SPACE CAPABILITY

---

The Challenge: How can the Scottish space sector deliver value to Scotland through the provision of data and information for use across government, and for international and domestic commercial services, whilst demonstrating the breadth of Scotland's capability and exploring new collaborative ventures?

Objectives relevant to Core Vision: Raising global awareness of the Scottish sector by demonstrating the full end-to-end capability available across Scotland, encouraging private capital and stimulating inward investment.

environment of and for the Scottish space sector, creating the conditions for growth of Scotland's industry and to increase the level of inward investment into Scotland.

---

## ADDRESSING THE CHALLENGE

---

1. With Scottish requirements as the driver, how do we engage the sector to initiate suitable new downstream solutions which would be of immediate value to Scotland, but also have an international commercial market offering?
  2. How do we select from these proposed solutions to a specific problem that can be addressed within reasonable financial reach?
  3. How does Scotland leverage this mission, not only to demonstrate the end-to-end capability based in Scotland, but also to encourage educational use and STEM outreach?
- 



Image courtesy of Spire Global

---

# 2.

## FUTURE COMMERCIAL OPPORTUNITIES

---

The Challenge: What does the Scottish space sector consider to be the future opportunities in commercial space beyond small satellites and what areas should Scotland seek to target?

Objectives relevant to Core Vision: Position Scotland in the vanguard of sustainability and orbital manufacturing, and the underpinning science and technology, enabling and supporting through widening of Team Scotland in the near term, to reflect and encompass the expansion of the commercial space market in areas including renewable energy, space-based manufacturing and space-based mineral and metal resources.

---

## ADDRESSING THE CHALLENGE

---

1. What are the next longer-term opportunities in commercial space beyond small satellites that fit with our existing strengths, capacity, ambitions, and priorities?
  2. How do we determine and prioritise practical and viable additions to the range of manufacturing capabilities in Scotland and the UK?
  3. With the priorities identified, how do the Scottish space partners support the sector to undertake an analysis of new manufacturing disciplines and develop some possible concepts, for example the development of a microgravity manufacturing capability and business community in Scotland?
-



# 3.

## EDUCATION AND STEM

---

The Challenge: How do we ensure that the talent pipeline is providing the right mix of skills, in the right quantities, at the right time, to support the anticipated growth trajectory of the sector?

Objectives relevant to Core Vision: Building toward our goal of supporting industry growth through attracting an increased and diverse workforce, and ensuring cutting edge innovation.

---

### ADDRESSING THE CHALLENGE

---

1. How can Scotland's space ambition be reflected to inspire the nation, particularly younger generations, in core skills developments including STEM?
  2. How do we capitalise on our opportunities to inspire the youth of Scotland as part of Scotland's existing space industry story, for example, using the imminent launch of the James Webb Space Telescope to inspire and attract more people into STEM – given that Scotland played a leading role in developing one of the main science instruments on board?
  3. How do we identify how many of which core skill sets the industry requires to achieve the growth aspiration?
  4. What mechanisms can be leveraged to deliver the skills requirements? This may include a combination of relevant work-based learning provision via Foundation, Modern and Graduate Apprenticeships, bringing young people through appropriate courses in our colleges and universities and by retraining experienced people from other sectors. It will require a close partnership between industry, academia and government agencies e.g., Skills Development Scotland.
-

