

LAUNCH UK

Leading the
commercial
space age



Foreword

Access to space is changing. As satellites get smaller, launch costs decrease, opening up new opportunities for both existing and new entrants. Ten years ago, only a few nations could afford to access space. Today it is becoming accessible to a new range of private companies, academic institutions and public sector users for scientific research and commercial endeavour.

The UK already has a global leading small satellite industry, world class science and technology expertise and institutions, and a forward looking, ambitious Industrial Strategy which seeks to boost the UK's productivity and economy. But we cannot stand still as this market grows.

The government's aim is simple. In the new commercial space age, we want to be the first country in Europe to offer small satellite manufacturers a direct end to end route to launch, building on our leading small satellite industry. We also want to enable UK and international scientists and space tourists to harness the unique environment of space. These services will be carried out safely and responsibly and will bring new jobs and economic benefits to communities and organisations eager to be a part of the rapidly growing UK space sector.

The UK is the best place to lead this new spaceflight market; we have the right geography, the right business environment and the right industry. We are at the forefront of pioneering spaceflight innovation and services, ready and able to exploit these new commercial opportunities.

The UK Space Agency, the Department for Transport and the Civil Aviation Authority have worked together to introduce the Space Industry Act 2018, which will enable safe and responsible spaceflight to take place through an effective and proportionate regulatory regime.

The UK Government has awarded grant funding to kick-start commercial activity to achieve launch from the early 2020s, igniting a fast-paced UK spaceflight sector, and inspiring the next generation of space scientists and engineers. Government is also working towards agreements with international partners, to ensure that UK and overseas based companies can proceed with confidence that they may conduct spaceflight operations from the UK.

Industry and government are creating opportunities today for the future of tomorrow, and are seeking to unlock exciting possibilities for generations to come in areas like hypersonic travel and in-orbit manufacturing and servicing. New small satellite constellations will improve our access to data and communications and revolutionise services such as satellite navigation and earth observation, enhancing the way we see ourselves and interact with our planet.

These opportunities stretch out in front of us all and will change our view of what is possible. It is our firm belief that there is no better place to invest in the future of space and the coming age of commercial spaceflight, than the UK.



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Graham Turnock
CEO, UK Space Agency



A stylized, handwritten signature in black ink.

Dan Micklethwaite
Director of Aviation,
Department for Transport



A stylized, handwritten signature in black ink.

Richard Moriarty
CEO, Civil Aviation
Authority

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Introduction

The UK has been a pioneer in space technology for over 50 years. From the development of early rocket technology embodied by the UK's Black Arrow launcher to the development of the first 150lb microsatellite, our heritage speaks to the demands and opportunities of the new commercial space age.

The UK leads the world in key space technology and services, and our universities are respected globally for their space science research.

We have extensive upstream and downstream capabilities, such as Goonhilly Earth Station, for tracking and monitoring.

Today, our ambition is to be at the forefront of new developments in small satellite launch and sub-orbital flight to establish a new commercial space age in the UK. Industry and government are working together to develop UK spaceports, as well as launch vehicle and small satellite technology. These will be complemented by modern space services, such as cutting-edge test facilities. Bringing launch to the UK will be a catalyst for growth in most other sectors of the industry.

This brochure sets out the UK's natural advantages as a destination for developing, licensing, launching and exploiting small satellites and other pioneering space services.

Whether you are an established space company, a start-up or a new entrant to the sector, based in the UK or overseas, you will be part of a thriving space ecosystem that offers everything you need to succeed in the new commercial space age.



*Credit:
Science Museum Group
(SMG) / Docubyte*

LaunchUK: The UK's Spaceflight Programme

Government's vision is for the UK to be at the global forefront of small satellite launch and emerging space transportation markets – providing world-leading capability, bringing new markets to the UK and inspiring the next generation of British space scientists, engineers and entrepreneurs.

Our Spaceflight Programme aims to establish commercial vertical and horizontal small satellite launch from UK spaceports. This will support the government's aim of growing the UK's global market share of the space sector to 10% by 2030.

Our ambition is for the first UK launches to take place from the early 2020s and we

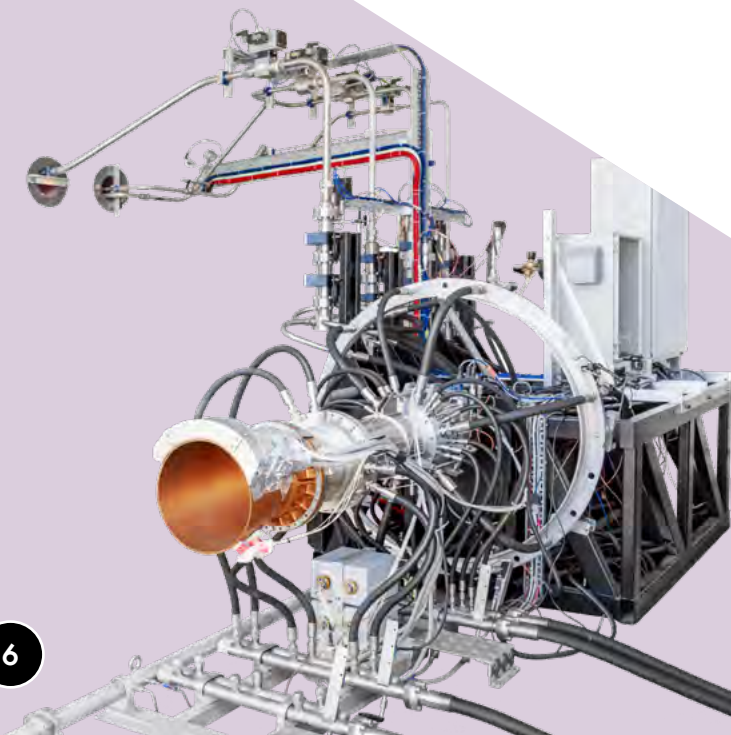
have already put in place the Space Industry Act 2018, a flexible high-level regulatory framework. We also have strong international relationships, giving us access to global markets, financing and supply chains around the world.

To help grow the UK's spaceflight capabilities, government is funding a range of industry-led projects including £31.5 million to help establish launch services from a new spaceport in Sutherland, Scotland, and up to £7.85 million as part of £20 million central and local government fund, to support horizontal launch from Spaceport Cornwall, subject to business case approval.

We additionally opened a £2 million fund to support plans for small satellite launch and sub-orbital flight from aerodromes in the UK.

Separately, we are also investing in related facilities and technology, including £99 million for a new National Satellite Test Facility in Harwell and £60 million to develop a revolutionary hybrid air-breathing rocket engine.

*Credit:
Science Museum Group
(SMG) / Docubyte*



Our vision

2010s

We are creating the conditions necessary to enable the UK to be the first country in Europe to achieve commercial small satellite launch, establishing the foundations for ongoing market growth and commercial sustainability.

We are the first country in Europe to put in place new spaceflight laws designed for the commercial space age.

International launch operators and investors will be attracted to the UK through positive international relationships, enabling agreements and compelling opportunities.

Spaceflight operations will start to mature in the UK, supported by the development of new supply chains and a growing pool of launch talent and innovative technology.

2020s

The UK has the infrastructure and capability in place to achieve small satellite launch. Maturing spaceflight supply chains, regulators and industrial capability are helping the UK space sector to capture an increasing share of the global launch market.

2030s

UK spaceflight supply chains and services are sought after for their world-class reputation, and the vital contribution they provide to UK space science and discovery.

2040s+

The UK leads commercial access to space for small satellites and is home to game-changing spaceplane technology.

2010s



Enable

2020s



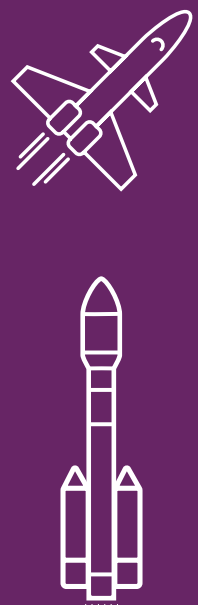
Capture market

2030s



Empower industry and science

2040s



Leader in small satellite launch and spaceflight

Why the UK?

The UK is well placed to host new commercial spaceflight activities. We have:

- **the right geography** to access a range of valuable polar and sun-synchronous orbits
- **the right environment** in which to grow your space business – the UK space sector is worth an estimated £14.8 billion and employs 41,900 people
- **the right industry** to support and exploit new launch opportunities – our space and aerospace sector is world class and home to many thriving companies and capabilities
- **the Space Industry Act 2018** – a major step towards establishing a safe and supportive regulatory framework to enable launches to take place from the early 2020s
- **strong global relationships** giving us access to markets, financing and supply chains all around the world



One of the large dishes at Goonhilly

Geography and location

The UK's long coastline and island location make it well suited to host different types of launch services.

Scotland is the best place in the UK to reach in-demand satellite orbits with vertically launched rockets. There are also a number of aerodromes around the UK, each with their own unique geography and local infrastructure, giving the UK the capability to host a variety of different types of spaceflight activity including both horizontal and vertical launch.

Government will work with any location interested in developing a commercial spaceport, and there are a number of potential launch sites the length of the

country, from Newquay in Cornwall to Unst in the Shetland Isles.

Wherever you are based in the UK, you are only ever a few hours from industrial centres, world class service providers, cultural centres and global logistic hubs.

Prospective UK spaceports

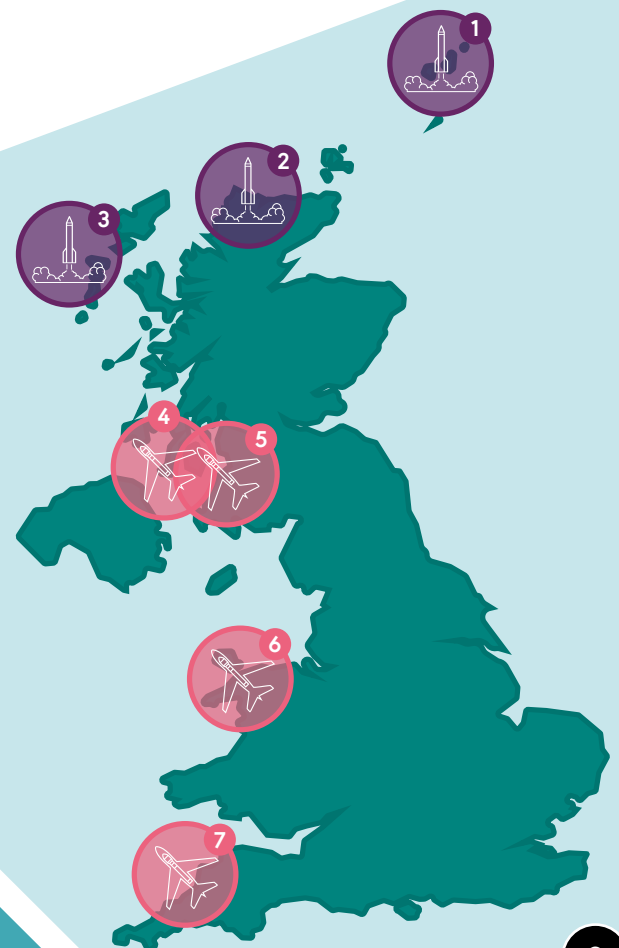
- 1 Shetland, Scotland
- 2 Sutherland, Scotland
- 3 Western Isles, Scotland
- 4 Campbeltown, Scotland
- 5 Prestwick, Scotland
- 6 Snowdonia, Wales
- 7 Newquay, England



Air launch from a carrier aircraft



Ground launch directly from spaceport



Industrial capability and skills

The UK is a world leader in small satellite technology applications, telecommunications, robotics and earth observation, and UK universities are among the best globally for space science.

Companies such as AAC Clyde Space and Spire in Glasgow and Surrey Satellite Technology Limited in Guildford, lead the UK's thriving small satellite industry, alongside a burgeoning downstream sector that develops applications to exploit satellite data.

Government is committed to growing modern industrial capability across the UK, and is

investing in new space facilities, technology and centres of excellence to ensure the UK remains at the forefront of the 'new commercial space age'.

Examples of this support include a £60 million award to Reaction Engines Limited (REL) to develop SABRE (Synergetic Air Breathing Rocket Engine). SABRE is a new class of engine for propelling both high-speed aircraft and spacecraft, and is unique in delivering the fuel efficiency of a jet engine with the power and high-speed ability of a rocket.

Harwell Space Cluster

hosts 92 space organisations, including the UK Space Agency, RAL Space, the Satellite Applications Catapult, the Science & Technology Facilities Council and the European Space Agency's European Centre for Space Applications and Telecommunications. The UK Government has committed £99 million for a new National Satellite Test Facility in Harwell to provide facilities for the assembly, integration and testing of space payloads and satellites. This new facility will enable UK industry to develop next-generation launch technologies, satellites and testing capabilities to construct satellites and deliver payloads into orbit.



Westcott Space Cluster and Venture Park

is a hub for the UK's rocket propulsion community. Westcott has a strong heritage in the space and aerospace industry, having been a rocket engine test site for over 50 years. It has a long-established health and safety and regulatory environment to support its rocket test functions and will be home to the National Propulsion Test Facility, allowing UK companies and academics to test and develop space propulsion engines.

Modern and supportive regulatory and licensing frameworks

The UK Government is supporting the development of UK spaceflight activity, creating business-friendly regulation and legislation that is focused on public safety. We have already put in place the Space Industry Act 2018, a flexible high-level regulatory framework, to enable launches to take place from the early 2020s.

We are working closely with industry to establish the environment for responsible commercial operations from UK spaceports to help operators develop safe, sustainable and cost-effective spaceflight activities.

We have legislated to allow for the regulation of a wide range of new commercial spaceflight technologies, including traditional vertically launched vehicles, air-launched vehicles and sub-orbital spaceplanes and balloons.

Government will work together to ensure a joined-up and coordinated regulation process, making it easier for industry to engage with us to conduct space activities in the UK. Legislation will be flexible enough to accommodate emerging technological advancements and changes to the international legal landscape.



The Space Industry Act 2018

The UK's Space Industry Act 2018 (SIA) is an ambitious and forward-looking piece of legislation, specifically designed to address the challenges and opportunities presented by a rapidly evolving space industry. The Act:

- makes provision for effective regulation of all spaceflight and associated activities carried out from the UK
- gives the regulator powers to grant launch vehicle operator, satellite operator, spaceport and range control licences
- allows for the creation of safety and security regulations across licensed activities, and other supporting provisions
- gives the regulator powers to monitor licensed activities and enforce compliance with legislation, licence conditions and the UK's international obligations
- contains provisions on liabilities and insurance that strike a balance between managing the risks of space activities and the benefits it brings to the UK economy
- gives the government powers to establish an outcome-focused, proportionate regulatory regime which fits a range of technologies and activities



The SIA makes provision to regulate all spaceflight activities carried out from the UK. "Spaceflight activities" encompass both sub-orbital and space activities. **The Outer Space Act 1986** (OSA) currently regulates space activities carried out by UK entities. However, once the SIA comes into force, the OSA will apply only to space activities carried out by UK entities overseas.

We will enable arrangements to ensure that activities currently regulated by the OSA will smoothly transition to regulation by the SIA.

Click [here](#) to find out more about the different types of licences needed for UK spaceflight.

International co-operation

With established international relationships and a reputation for high regulatory standards, the UK is firmly positioned to thrive in a competitive global spaceflight marketplace.

Furthermore, the UK is a respected and active player in multilateral organisations such as the UN and the European Space Agency. We will use our membership of these organisations to complement our excellent national technical, scientific, legal and business expertise.

The UK Spaceflight Programme is creating opportunities for space companies from around the world and throughout the supply chain.

We are establishing the safeguards, protections and agreements needed to make the UK an attractive destination for spaceflight activities.



The UK's business environment

The UK Space Agency and its partners across the UK Government are committed to ensuring space investments build capability, advance scientific knowledge and generate strong economic return.

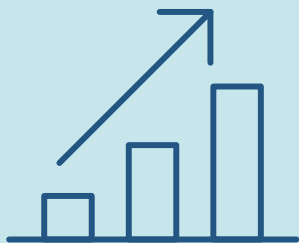
There are a wide range of opportunities and organisations available to support space-related companies in the UK, from incentives such as reduced taxes, simpler planning rules and financial benefits, to innovation funding and research grants.

The UK Government sees the importance of investing resources and funding in world-class research and development (R&D) to support pioneering technology and services.

Innovate UK is part of UK Research and Innovation a non-departmental public body funded by a grant-in-aid from the UK Government. Its aim is to drive growth by working with companies to de-risk, enable and support innovation by connecting businesses to partners, customers and investors that can help turn ideas into commercially successful products, services and business growth.

Innovate UK SMART R&D grants are available for game-changing and disruptive ideas from business. Grants are for projects that can provide evidence for considerable potential to gain market share and generate economic impact and exports.

The UK space sector is growing, worth a total **£14.8 billion** (2016/17), contributing **£5.7 billion** gross value added to the economy and **employing 41,900**.



The sector's average annual growth over the last 2 years **(3.3%)** outpaces the general UK economy **(2.0%)**. It has grown an average **7.8% per annum** since 1999/2000.

Exports account for **£5.5 billion** (2016/17) or **37.4%** of total income – one-third higher than the UK economy.



Satellite services support other industries worth over **£300 billion** to the UK's GDP **(15.3%)**.

Business benefits

Whether a domestic or overseas organisation the UK offers a range of benefits for businesses such as:

- the most business-friendly tax system of the 10 largest economies in Europe, both in terms of tax rates and administrative burdens
- the most competitive average labour costs in Western Europe owing to low employer social security contributions making overall cost of labour lower – the World Bank Rigidity of Employment Index also ranks UK labour flexibility above Germany, Italy, the Netherlands, Spain and France
- **Small and Medium Enterprises (SME) R&D tax credits** which support SMEs that work on innovative projects in science and technology – this allows companies to deduct an extra 130% of their qualifying costs from their yearly profit, as well as the normal 100% deduction, to make a total 230% deduction
- SME Payable Tax Credits, which allow loss making SME's to 'surrender' the losses relating to the R&D relief in return for a payment(non-taxable) of 14.5%. The maximum payment on £100 qualifying R&D spend is £33.35
- **Patent Box** which incentivises companies to develop new, innovative patented products in the UK and allows an effective 10% corporation tax on profits from qualifying UK and qualifying foreign patents
- **Research and Development Expenditure Credit (RDEC)**, which is a form of tax relief aimed at larger organisations – RDEC is 12% (taxable) of eligible R&D project costs

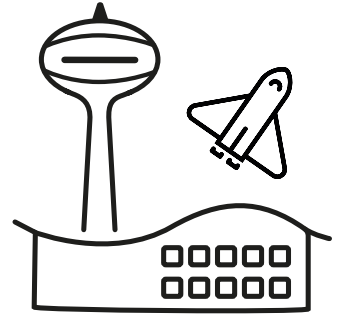
Export support

The Department for International Trade supports export opportunities through the new Space Exports Campaign. This is a new government initiative to further enhance the position of UK-based companies in the international market. This campaign will bring space trade missions to priority countries, provide detailed information about new markets and allow access to a network of overseas market specialists in 105 countries.

Did you know?

UK R&D expenditure in 2016/17 stood at **£566 million**, or **3.8% of total industry income**. 10% of direct GVA in the industry was invested in R&D – 6 times higher than the UK average.

How to set up your business in the UK



The UK is a great place to start and run a space business and has the highest number of space-related start-ups in Europe. Not only is it the number one destination for inward investment in Europe, export revenues in the space industry are above the UK average and have enjoyed strong growth in recent years.

Government helps thousands of overseas businesses move here every year with expert help and advice. The Department for International Trade (DIT) can support your company with every aspect of the set-up process in the UK. DIT can help your company get all the information it needs to get you up and running should you choose to invest in the UK.

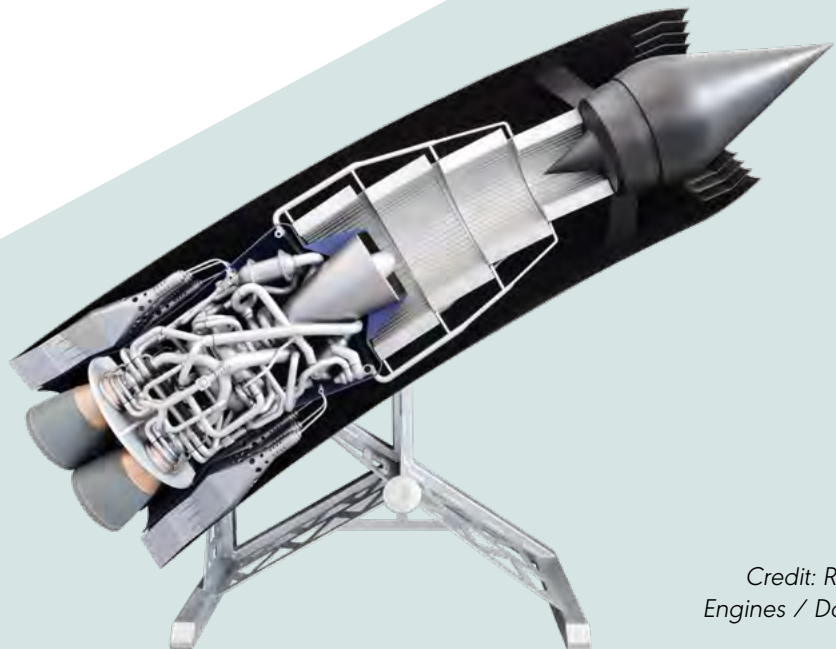
For further information on investing in the UK go to: <https://invest.great.gov.uk>

Research your industry

Need help to decide if the UK is the best place for your business? Contact our [Investment Services Team](#) to get market research and other expert help and advice.

Want to move your business to the UK?

[Read our UK setup guide](#)



Credit: Reaction
Engines / Docubyte

Find out more about LaunchUK

VISIT the [LaunchUK webpage](#) or visit us at:

UK Space Agency @spacegovuk

EMAIL spaceflight@ukspaceagency.gov.uk for information about the programme and industry engagement opportunities such as our LaunchUK Industry Group, Regulation 1-2-1 and plenary sessions.

Key industry groups in the UK space sector

[UKspace](#) is the trade association of the UK space industry. It is dedicated to representing the interests of its members and supporting them to grow and develop their business. Activities include influencing government and agencies at a national and international level, knowledge sharing and networking, and assistance with finance and technical support.



[ADS](#) is the trade organisation for companies in the UK aerospace, defence, security and space sectors. Membership is made up of over 1,000 UK-registered businesses. Its activities are focused on influencing policy supporting manufacturing and supply chains, and encouraging innovation and investment, business support, and promotion of the industries it represents.



[techUK](#) represents the companies and technologies that are defining today the world that we will live in tomorrow. More than 900 companies are members of techUK. Collectively they employ approximately 700,000 people – about half of all tech sector jobs in the UK. techUK works to help members develop markets, reduce business costs and risks, and provide networking, and opportunities.





Department
for Transport

