



# The Scottish Space Sector

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## The Bank

The Scottish National Investment Bank was launched in 2020. The Bank focuses on investing in businesses, projects and communities across Scotland that support the development of a fairer, more sustainable economy. In keeping with this, all investments must deliver both commercial and mission-impact returns, supporting at least one of the Bank's missions:

### Net Zero Mission

Achieving a Just Transition to Net Zero by 2045

### Place Mission

Extending equality of opportunity through improving places by 2040

### Innovation Mission

Harnessing innovation to enable our people to flourish by 2040

The Bank has recently announced a £17.8 million investment in **Orbex**, a Scottish launch services company based in Forres. This investment will see the company complete development of their next generation launch vehicle as well as funding the construction of a new dedicated spaceport in Sutherland.

This investment represents the Bank's first direct foray into the Scottish space industry but is unlikely to be its last. Scotland is already home to a number of space companies and the space industry in Scotland represents a key opportunity to grow a highly skilled and innovation led sector for our economy.



## Orbex given a boost

The Bank's investment into Orbex enables the company to finalise development of their Low Earth Orbit (LEO) launch vehicle. Burning bio-propane at 1/10th the environmental impact of kerosene, and recovering ~80% of the stage 1 vehicle, this new rocket has the potential to offer a reliable, regular and low carbon service to LEO for satellite operators globally. Further, the investment enables construction of the first launch pad at Space Hub Sutherland (SHS 1), with 12 launches per year planned from this facility. With the ongoing conflict in Ukraine sparked by the Russian invasion, access to Russian launch sites has been curtailed; over the past decade, over 1/4 of European and UK satellites were launched from Russian facilities, which are now no longer accessible to western companies. This reduction in launch capacity, combined with the rapidly growing number of small satellites designed for earth observation, communications, and a range of other cases, gives a large and growing market for Orbex to serve.

## A new route to space

Legacy launch solutions typically involve large rockets capable of launching high-mass payloads to LEO. As satellites have shrunk in size and mass the most common way to send small satellites into orbit has been to hitch a ride on a launch with a larger payload. While these so-called ride-share launches are economical, small satellite operators often suffer delays and displacement from launches as they are not the primary customer who dictates when the rocket launches and which orbit it will target. A new generation of small launchers has emerged across the globe, offering bespoke launch services to customers who want to control the launch timing or target a specific orbit. Scotland is uniquely suited to host spaceports targeting polar or sun-synchronous orbits, given the expanse of ocean to the north which allows for safe launch in that direction. Our geography, as well as our world class academic institutions and vibrant innovation environment, make Scotland a leading prospect to become a global leader in the new-space industry.

A native launch capability which can offer small satellites a regular, reliable service to LEO will anchor the space sector more firmly in Scotland. Having companies such as Orbex operating from Scottish soil will also lower cost and risk for space companies across Scotland, the UK, and Europe, and will enable us to use satellites to offer deeper insights into life on earth.

## Small satellites – pint sized powerhouses

The recent high-profile growth in satellite constellations offering space-based broadband internet has captured many of the headlines. Whilst these satellites are driving the growth in small form factor space vehicles, the earth observation sector remains hugely important and is a particular area of growth for Scotland, given the polar and sun synchronous orbits available to them from here.

The growth of cubesats (small 10cm cube, no more than 2kg satellites, typically using off the shelf components) and more standardised smallsats (typically no more than 1,200kg) has opened the market up to a far larger group of commercial operators. Rapid growth in data processing capabilities and the ability to process images before transmission to the ground has further cut the cost for operators. These changes open the market to ever more potential use cases: insurance companies assessing risk from weather events; radars used to "weigh" carbon sinks for sequestration markets; and remote sensing for methane leaks to target interventions and enforce environmental protections.

Further falls in the cost of access to space will open additional markets, allowing more granular analysis of remote parts of the planet and increases in productivity for existing sectors. Scotland is already an outsized player in the space market, both in the UK and internationally, with just under £1 billion in gross value added (GVA) generated by the sector in 2017/18, the market can grow more rapidly at every stage from designing, building, launching, and operating satellites through to the downstream use of data they enable.

	Organisations	Income	Employment	GVA
Space Manufacturing	66	£90m	880	£530m
Space Operations	9	£40m	150	£5m
Space Applications	57	£101m	6,800	£328m
Ancillary Services	32	£25m	210	£20m

Source: Scottish Space – A Strategy for Space in Scotland.

## High altitude, high impact

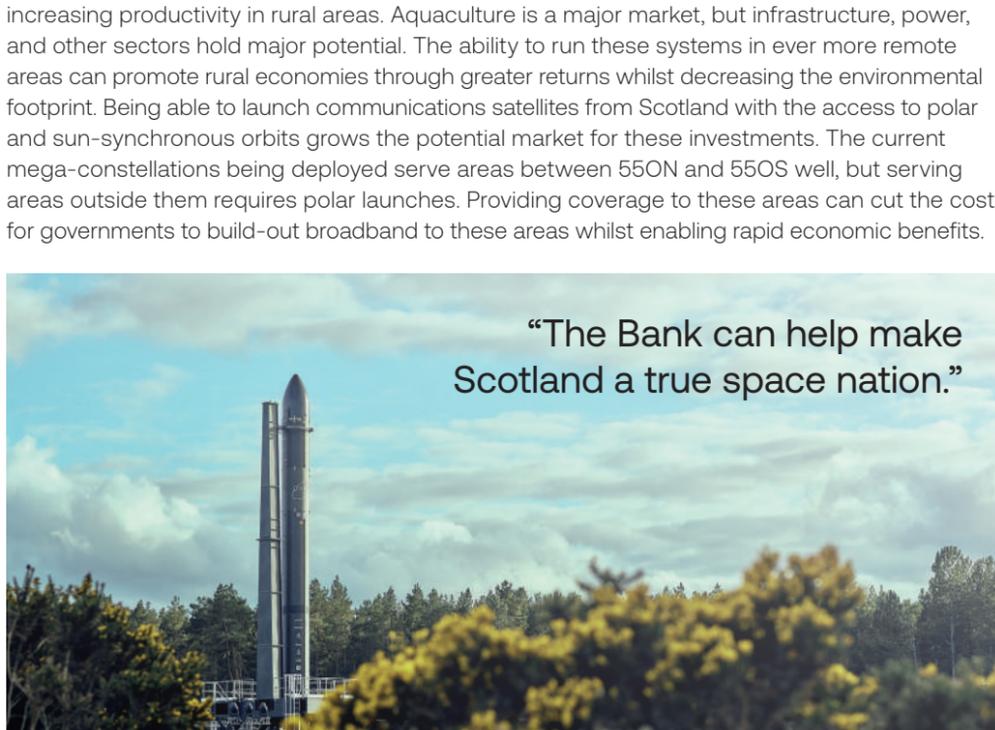
The potential positive impacts arising from investing in the Scottish space sector are huge. The growth of the space sector further enables more investment in universities and in spin-outs from universities as novel use cases are developed for satellite platforms. The lower barrier to entry dramatically increases the universe of opportunities, and grows the innovation community in Scotland.

The ability to launch from Scotland also improves the environmental case for investments in the sector. A more local solution means fewer flights of personnel and equipment to distant spaceports. Satellites can be launched a few hours up the road from where they were designed and built with shorter, more resilient supply chains for parts and equipment. The environmental cost of going to space is therefore cut alongside the option for lower carbon fuel with resultant carbon reductions.

The high paying service and manufacturing jobs created from the space sector are well spread out across Scotland, and boosting investment in the space sector will only spread that opportunity further. The space sector's presence has the potential to be felt across Scotland, from spaceports and their associated space clusters in the Highlands and Islands, to city-based companies designing and building payloads and analysing data returned from orbit.

## A new frontier of opportunity

Small-satellite technology has the potential to unlock a new wave of innovation, bringing space age technology to bear on terrestrial problems in new and unforeseen ways. The Bank has previously invested in **Krucial** (formerly R3 IoT), an internet of things company focused on increasing productivity in rural areas. Aquaculture is a major market, but infrastructure, power, and other sectors hold major potential. The ability to run these systems in ever more remote areas can promote rural economies through greater returns whilst decreasing the environmental footprint. Being able to launch communications satellites from Scotland with the access to polar and sun-synchronous orbits grows the potential market for these investments. The current mega-constellations being deployed serve areas between 55ON and 55OS well, but serving areas outside them requires polar launches. Providing coverage to these areas can cut the cost for governments to build-out broadband to these areas whilst enabling rapid economic benefits.



“The Bank can help make Scotland a true space nation.”

All images courtesy Orbex (orbex.space)

## A wee space nation

The Scottish National Investment Bank believes that Scotland can leverage its geographical location, strong businesses, and vibrant innovation landscape to make us one of the most significant players in the new space race. Opportunities lie ahead throughout the space industry, including growing the launch services market, scaling up and commercialising satellite companies, or investing in supply chains in Scotland. The Bank can help make Scotland a true space nation.