

# Spaceports



Image credit: Bill Jelen via Unsplash

The space industry is rapidly growing and evolving. A key driver is the demand for small satellites which provide data, communications and even platforms to conduct scientific experiments.

The UK is set to be a key player on this international stage, expanding not only our own access to space, but providing an attractive investment opportunity for the new generation of international commercial space companies.

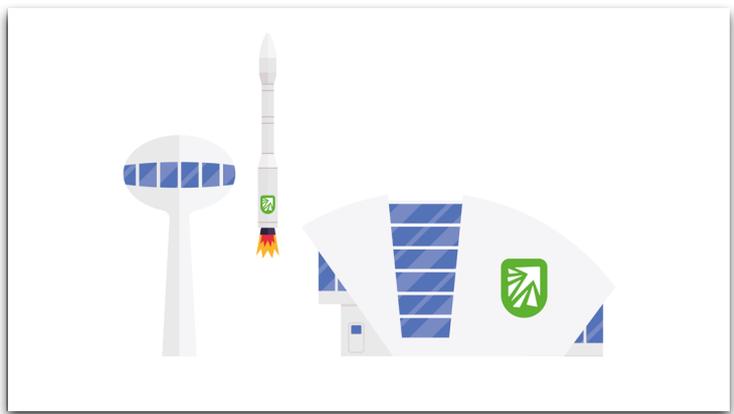
The UK is renowned for its space industry expertise with a skilled workforce and engineering capacity that sets the UK as a world leader in the manufacture of small satellites. The UK is also in a great position to launch small satellites into polar and sun-synchronous orbits. The emergence of spaceports within the UK will allow UK companies to offer a complete package from concept, to launch. In this way, the UK can keep up with demand, maximise the productivity and return on its excellent space industry, and attract new investment so as to continue to harness UK skills in space technology, creating new jobs and opportunities.

## What is a Spaceport?

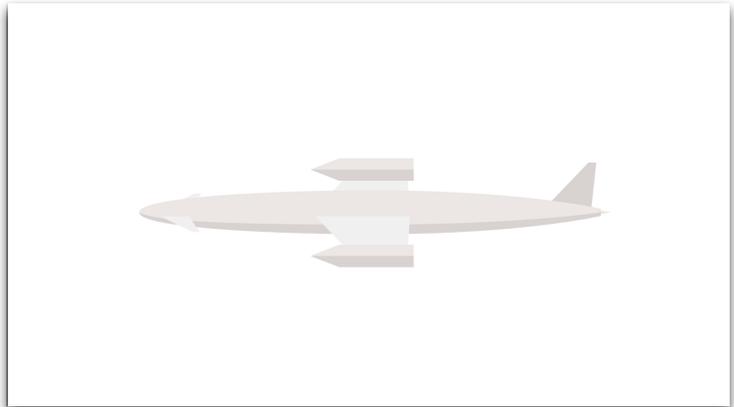
Similar to an airport for aircraft, spaceports launch, and for horizontal spaceports, receive spacecraft.

With an increasing demand for low-cost access to space, and with governments and companies across the globe becoming increasingly reliant on small satellites, new and proposed spaceports are being developed around the globe.

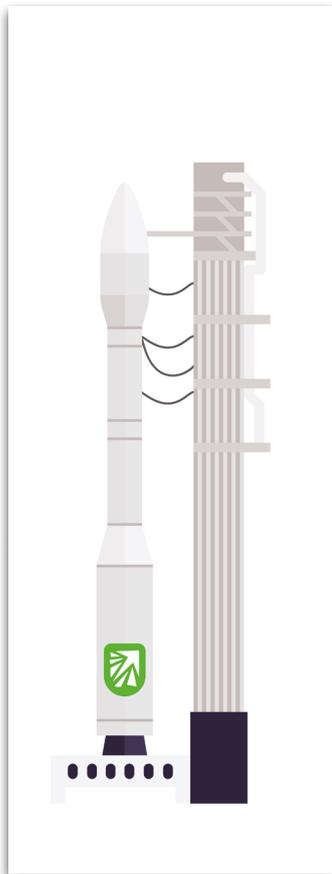
When we think of space travel, we often imagine a rocket launching vertically upwards, but the UK is also exploring horizontal launch.



Horizontal launches involve specialised aircraft that take off horizontally. Requiring less thrust and less fuel to reach high altitudes, once the horizontal launch craft can go no higher, it will either switch to a rocket engine or deploy a rocket-powered craft that has “piggy-backed” on it in order to power the satellites into space and into orbit.



A horizontal launcher



A more traditional vertical launcher

Vertical launches are still the preferred method of spaceflight for heavier payloads, but horizontal launches can be carried out more frequently using existing airport facilities which have been adapted so it's important that the UK creates opportunities for both launch types.

## Now let's explore how rockets get off the ground in the first place!

### Whoosh Rocket

Watch [this video](#) of the Dynamic Earth team showing you a slow motion video of a small rocket launch.

***This experiment is dangerous – please don't try it at home!***

This mini rocket uses an ordinary plastic bottle with a nozzle attached. The bottle has a small amount of ethanol in it which is vaporised, mixed with oxygen from the air and then ignited.

This combustion produces carbon dioxide, water vapour and energy in the form of heat. The heat causes the gas inside the bottle to expand, forcing the gas through the rear nozzle at high speed. This propels the rocket along.

This is the same as in full-scale rocket launches, when kerosene or another rocket fuel ignites in the rocket engine and provides propulsion to launch the rocket into space.

So we have figured out how to launch a rocket, where in the country should we be doing it?

## Where should we build these spaceports?

The UK has grand plans to become a world leader in the provision of a complete space solutions package, from satellite design and construction to launch.

To do this it will construct several spaceports, but deciding where to put these involves a huge number of considerations.

Use a map of the UK to try to work out where would be a good place to build a spaceport.



Image credit: Tim Mossholder on Unsplash

**Consider the list of factors below when thinking about where to put them:**

### Safety:

Space exploration now feels commonplace, but nevertheless public safety must always be paramount. To minimise risk, spaceports are often built away from large centres of population.

### Clear flightpaths:

Some of the biggest spaceports launch over the sea, or over uninhabited regions for this reason.

### Transport and infrastructure:

Spaceports must also provide not only a place to launch, but the infrastructure to get the craft into space. The pieces of the spacecraft, crew and support staff must be able to reach the launch site, so things like roads big enough for large pieces of rocket to be transported on are important. For safety, rockets are fuelled as close to launch as possible, so this is one of the services that is usually operated by the spaceport. Therefore, while building remotely increases safety, ensuring the location is not too remote is an important consideration, as there must be good or easily-constructible transport links for a spaceport to be successful.

### Hint

sometimes airports and unused military bases are converted into spaceports because they already have all this necessary infrastructure





## UK Spaceports

Great! Now that you have explored where you think spaceports should go, we have listed all of the sites currently being considered for the UK's first spaceports.

Did you guess any correctly?

If yours are placed slightly differently, don't forget that there may be even more built in future as the UK makes its mark on the space industry so one might just pop up in the area that you thought of!

- Campbeltown Airport, Scotland
- Glasgow Prestwick Airport, Scotland
- Snowdonia (Llanbedr Airport), Wales
- Cornwall Airport Newquay, England
- Shetland, Scotland
- Sutherland, Scotland
- Western Isles, Scotland

## Destination Space!

The information for this activity came from the Destination Space programme. Destination Space is a national education programme managed by the Association of Science and Discovery Centres (ASDC), which aims to engage, inspire and involve families and communities across the UK with the amazing stories and innovative science and engineering of the UK's world-leading space sector, especially focussing on UK spaceports, satellite applications and space exploration.

Visit [Destination Space](#) to find out more.

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