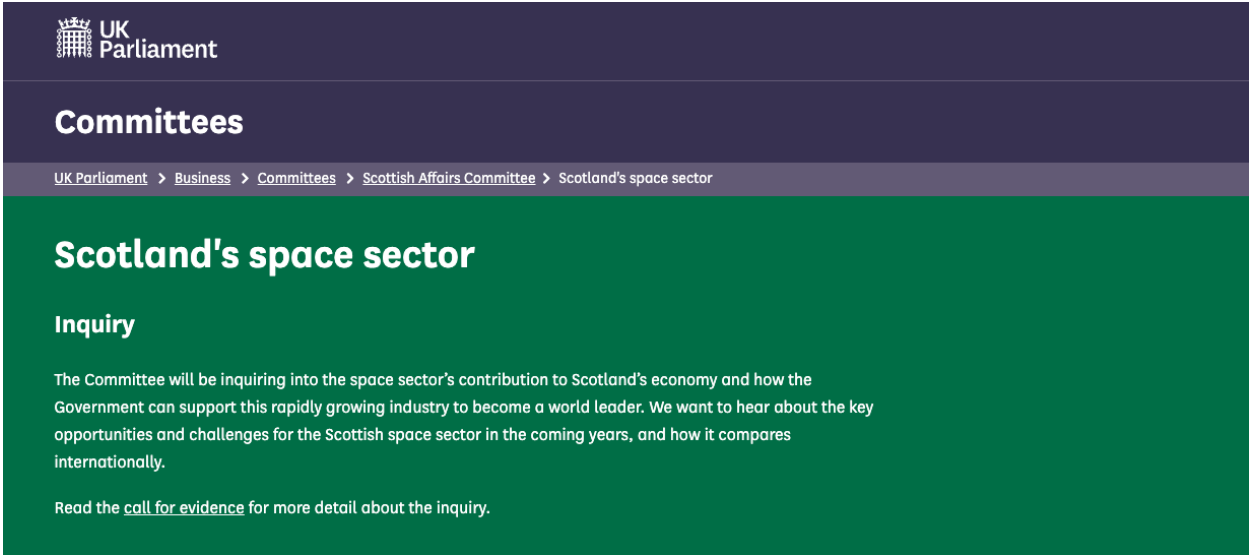


# Written Evidence

## Scottish Affairs Committee for the Scotland’s space sector inquiry

Dr. Nicholas P. Ross (Niparo Ltd.)

12th September 2023



The screenshot shows a webpage from the UK Parliament. At the top left is the UK Parliament logo. Below it is a dark blue header with the word "Committees" in white. A breadcrumb trail reads: "UK Parliament > Business > Committees > Scottish Affairs Committee > Scotland's space sector". The main content area has a green background with the title "Scotland's space sector" in white. Below the title is the word "Inquiry" in white. The main text reads: "The Committee will be inquiring into the space sector's contribution to Scotland's economy and how the Government can support this rapidly growing industry to become a world leader. We want to hear about the key opportunities and challenges for the Scottish space sector in the coming years, and how it compares internationally." At the bottom, there is a link: "Read the [call for evidence](#) for more detail about the inquiry."



# Written Evidence to the Scottish Affairs Committee Commons Select Committee for the Scotland's space sector inquiry

**Dr. Nicholas P. Ross (Niparo Ltd.)**

12th September 2023

## **1. Background**

This evidence is submitted by Dr. Nicholas P. Ross on behalf of Niparo Ltd.

Niparo is the UK's first space sustainability consultancy firm working at the research-policy-industry interface and is headquartered in Edinburgh, Scotland. We are experts in space sustainability, space policy and have a particular focus on the UK and Scottish Space Sectors.

Niparo is at the forefront of ethical and sustainable investment, consultancy and the UK's efforts in the worldwide half-a-trillion pound Space Sector. We aid space sector businesses, upstream, in-orbit and downstream to deliver value to clients and customers in a sustainable manner. Our skillset covers both the technical and the regulatory aspects of the space sector.

The Founder & CEO of Niparo is Dr. Nicholas P. Ross. With a background in astrophysics and space law, Dr. Ross has over 20 years of experience in the Space Industry. Dr. Ross is Scottish. He was born and raised in Edinburgh, though has considerable worldwide experience including stints working for NASA, the US Department of Energy (Lawrence Berkeley National Lab) and Penn State University.

The views expressed herein are Dr. Ross's and Dr Ross's alone. Dr. Ross is a white man with no known disability.

## 2. What contribution does the space sector make to Scotland's economy?

The Scottish Space Sector employs 8,500 people, has an income of £180 million and an impact to the Scottish economy of £4 billion.

This means the Scottish Space Industry employs around 0.3-0.4% of the Scottish workforce.

Compared to other regions in the UK, Scotland *has the smallest income per employee* (Table 1). This is deeply concerning for the future of the Scottish Space industry as the direct economic benefit to the Scottish economy from a Scottish Space sector employee is a fraction of what is contributed per capita elsewhere in the UK (the North West being the one comparable region).

An ADS Group report from earlier in the calendar year notes "Scotland's aerospace and space sectors generated over £4 billion in turnover in 2022."<sup>1</sup> The ADS Group is the UK trade association for aerospace, security, defence, and space. The GDP of Scotland is estimated to be around £181.0 billion,<sup>2</sup> so this is 2.21% of the Scottish GDP.

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<sup>1</sup> <https://www.digit.fyi/scotland-space-sectors-generated-over-4-billion-in-turnover-in-2022/>

<sup>2</sup> (incl. oil and gas extraction, 2021)

Region	Income (2020/21, £m)	No. of Employees	Income £/employee	Ratio cf. Scotland
London	10,541	13,848	761,192	36.23
West Midlands	849	1,292	657,120	31.28
East of England	2,161	4,111	525,662	25.02
South East	2,856	10,170	280,825	13.37
Wales	79	603	131,011	6.24
South West	313	2,473	126,566	6.02
Northern Ireland	28	232	120,689	5.74
North East	129	1,310	98,473	4.69
East Midlands	111	1,185	93,670	4.46
Yorkshire	138	1,811	76,200	3.63
North West	63	2,862	22,012	1.05
Scotland	180	8,568	21,008	1.00

**Table 1.** Income from the Space sector and number of employees in the Space Sector for the given regions of the U.K. The fourth column is the income per employee and the fifth column the ratio of the income per employee normalized to the Scotland values. **Data:** *Size & Health of the UK Space Industry 2022, Summary Report for the UK Space Agency*, Know.Space, March 2023

### 3. What are the key opportunities and challenges for the Scottish space sector in the coming years?

The key opportunities for the Scottish Space sector are as follows.

**Spaceflight.** The opportunity to achieve Sub-orbital and Orbital spaceflight from a Scottish spaceport is truly significant and could be “game-changing”. Achieving launch would resonate far and wide and realise the full space supply chain within Scotland.

**Satellite Manufacture.** With the expertise and considerable experience, the opportunity for the Scottish space sector to continue to lead in quantity and quality of satellites payloads (both hardware and software) remains immediate.

**Sustainability.** The Scottish space sector has a direct moment of opportunity to impart best practices for space sustainability via industrial innovators, academic thought leadership and government regulation. This opportunity could be a decade long effort with Scotland displaying direct leadership.

**Geography.** For spaceflight (being northerly with the possibility to launch over water/very low density populations) and also for geo-economic centres and ability to cluster business and skilled workforces.

**Independence.** An independent Scotland would have direct and significant opportunities to forge the long-term vision for the Scottish space sector.

The key challenges for the Scottish Space sector are as follows.

**Lack of market for Spaceflight.** The critical example of Spaceport Cornwall and Virgin Orbit demonstrates that it does not matter how good the technology or local infrastructure is for spaceflight if the market and launch economics are not present as well. The Scottish Spaceports and Launchers need to head the failure of Virgin Orbit and Spaceport Cornwall.

**Attracting and retaining world leading skills and talent.** The challenge remains and continues in attracting world class talent and the necessary skill sets to Scotland for the space sector. Simply put, Scottish Space companies do not pay well considering the talent they need to attract or retain. Many of the generally smaller Scottish space sector companies do not offer competitive benefits. The Space Sector is the most educated sector<sup>3</sup> in the United Kingdom, but Space companies in general, and Scottish Space companies in particular, do not compensate accordingly.

**Lack of Diversity and Inclusion.** The Scottish space sector, especially in leadership positions, is dominated by one demographic (white men). The whole of the UK Space industry has a horrific problem with diversity. This is no different in Scotland.

**Scottish Space Strategy:** The Scottish Space Strategy outlined in the “A Strategy for Space in Scotland” document published in October 2021 is not realized. Two key political advocates, Kate Forbes MSP and Ivan McKee MSP have both left the Scottish Government since the Strategy was published and the Scottish Space Strategy is now being overshadowed by the National Space Strategy.

**The Scottish Space Cluster.** Scotland has long been a leader in the UK space cluster network but this early advantage may be disappearing.

**Public Perception.** Space has a “Billionaire’s Problem”. There is a disagreement between the cost of space programmes (and wealth of some individuals) and the general public. Overall public sentiment in Scotland is positive for space and recognizes the key utility, but there is also a grudging acknowledgement to the opportunity cost invested in space. The Scottish

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<sup>3</sup> By percentage of PhDs employed.

Space Sector en masse is guilty of 'talking down' to the general public when discussing space. This patronizing and does not help with the image problem the space sector has.

**Independence and International Commitments.** An independent Scottish state would have to renegotiate its place in the United Nation (UN) including any and all UN Space treaties, as well as rejoin the Artemis Accords. An independent Scotland would also most likely need to seek new ESA membership.

#### **4. In which specific areas of the space industry is Scotland's sector well-placed to succeed?**

There are several areas of the space industry that Scotland is well-placed to succeed. One of these is sustainability. Scotland has embraced Net Zero and Scottish industry at large is transitioning to a Net Zero economy. Scotland's energy generation is now predominantly renewable and the Scottish population, when it can, acts in an environmental and sustainable manner.

Space operations will always need considerable energy expenditure and this is still generated by chemical reactions in e.g. rocket engines. These are a key producer of greenhouse gases (GHGs). The Space Sector does not carry out low GHG emission activity, but can find ways in which to act and lead in a responsible, sustainable and just manner.

With the right public and private backing, several companies including Niparo are well place to succeed in a sustainable Scottish space sector.

## **5. How does Scotland's space sector compare with those of its international counterparts?**

Two countries with comparable populations to Scotland are Singapore and New Zealand.<sup>4</sup>

Singapore is a critical space hub in the Asia-Pacific region with 2.35 times the GDP of Scotland.

As of writing, New Zealand has achieved orbital launch over 30 times from a commercial spaceport.

## **6. What opportunities does the Scottish space sector have for international collaboration?**

Scotland is well placed both geographically, and geopolitically for international collaboration.

Scotland can be, and is, an excellent strategic site of US Defense operations, and can look to exploit those links.

Continued ESA collaboration is essential if the Scottish Space sector looks to have a long productive net economic impact.

## **7. To what degree do the UK and Scottish Governments 'space strategies have the right priorities for the Scottish space sector?**

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<sup>4</sup> Scotland's population assumed to be 5.6 million (2023 figures).



Although not perfect, the National Space Strategy clearly sets out four key pillars, five goals and a ten-point plan. It gives a critical direction to the UK space sector and space ambitions. Crucially, updates and ‘mission progress checks’ are being carried out for the National Space Strategy, as was demonstrated recently by the publication of the recent “National Space Strategy in Action” document. The National Space Strategy aims to boost all of the UK Space Sector, and ‘a rising tide helps all ships’, will aid the Scottish space sector.

## **8. What can the UK and Scottish Governments do to support the establishment of Scottish spaceports and help them to succeed?**

The number of spaceports in Scotland will ultimately be zero or one. In order to ensure it is not zero, the single most decisive activity the UK Government can do to support the establishment of the Scottish spaceports and help them to succeed is to become *the* foundational customer for launch. The UK Government, as well as the Ministry of Defence must provide contracts to launch companies that plan to utilize the Scottish spaceports. The UK Government must take on the risk, and associated insurance and related costs, for the initial launches.

## **9. How can the UK and Scottish Governments help to provide Scotland’s space sector with the skilled workforce it needs?**

There is an oft-talked about “skills gap” in the Space Sector. As noted above, this is not obvious. There is more likely a pay gap at a given skill-level that the Space Sector needs to recognize this and start paying its employees the going rate.

## Summary

With the noted above, I conclude by noting that while the Scottish Space Sector is often - and rightly - held as a key success story, there a critical and perhaps sector-making or sector-breaking challenges on the horizon.

Dr. Nicholas P. Ross

12th September 2023