



Space 2040 The global space economy is set to reach €1 trillion by 2040 - the commercial space race has begun

Ireland's potential for upstream space leadership



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The commercial space age is witnessing the creation of an entirely new value chain, in which companies can build new business models around launching hardware into space (upstream), supporting space-based hardware from earth (midstream), and applying space data to business problems on earth (downstream).

The world's most developed and viable space industry clusters will combine all three of these elements, which are strongly interdependent. Whilst Ireland's ability to compete in both the midstream and downstream segments is demonstrably strong, it cannot afford to neglect its upstream potential.

The necessity of upstream

According to KPMG research, general awareness of the commercial space sector is low across Irish industry. Many Irish businesses are unaware that the government even has a specific space strategy. Enterprises and institutions that are already thinking about space tend to focus on downstream opportunities, which dovetail most obviously with some of Ireland's key strengths, including software engineering and data analytics.

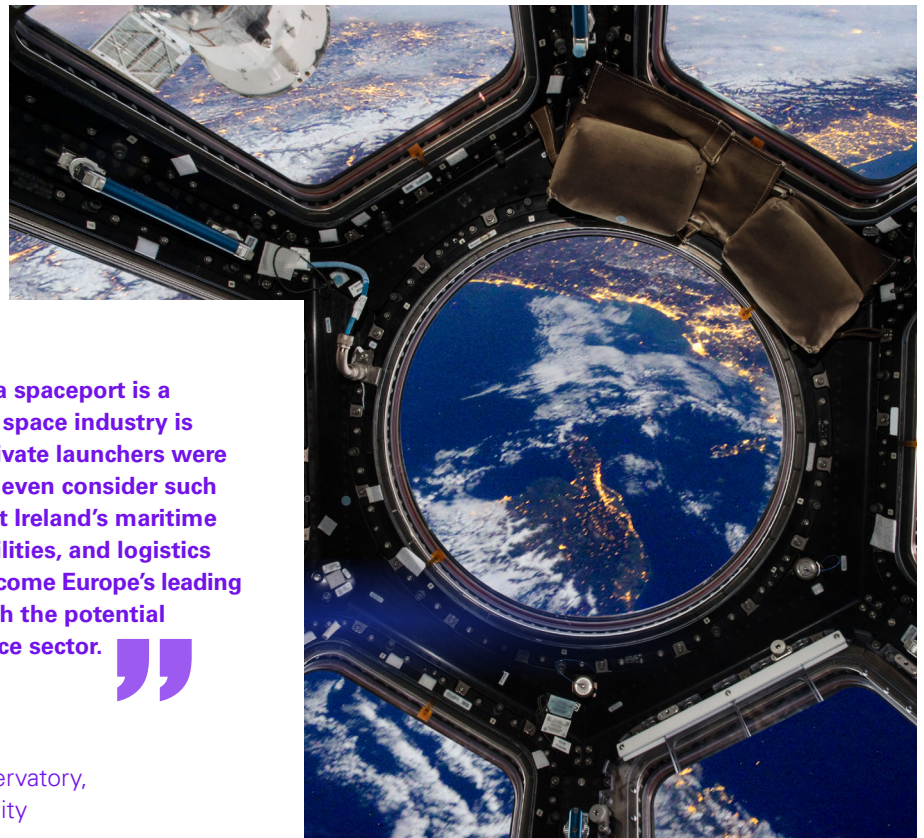
Whilst Irish businesses are certainly well placed to develop profitable use

cases for space data in major sectors like agri, pharma, and financial services, such downstream business models are generally dependent on space-based assets owned and launched in other jurisdictions, leaving Ireland dependent. The long term security of the island of Ireland's space ecosystem could therefore benefit from expanded domestic presence in the upstream market segment. Indeed, the 2019 National Space Strategy acknowledges the 'interdependence between upstream and downstream technology', but fails to thoroughly spell out a clear vision for upstream development.

“ The idea that Ireland could host a spaceport is a great example of how the global space industry is rapidly changing. Ten years ago, when private launchers were in their infancy, there was no appetite even consider such an option. Now, there's a recognition that Ireland's maritime location, advanced manufacturing capabilities, and logistics expertise make it an ideal candidate to become Europe's leading spaceport, especially for polar orbits, with the potential to drive a thriving upstream onshore space sector. ”



Dr. Niall Smith
Head of Blackrock Castle Observatory,
Munster Technological University



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Challenges and their solutions

Building the upstream space sector is, of course, a major task. For the Republic of Ireland, the primary barrier could be the absence of a developed domestic aerospace industry, which tends to serve as the foundation for spaceflight launch, which Northern Ireland stands to benefit from.

In countries with significant upstream market presence (e.g. US, China, France), this tends to be anchored by aerospace conglomerates of sufficient scale (e.g. Boeing, Airbus, and Thales) to provide the manufacturing and advanced avionics capabilities required.

Ireland's limited defence spending is a second obstacle, since space is a key enabler for modern defence operations, and upstream space capabilities such as satellite launch, ISR (intelligence, surveillance and reconnaissance), and space control are often developed by or for defence contractors. In the UK, for example, the Ministry of Defence is investing over £6.5bn over the coming decade in ISR, satellite communications, command and control, and other relevant technology, spend which is strategically intended to stimulate innovation, commercialisation, and growth across the wider space sector. Similarly, Ireland's non-membership of NATO disqualifies it from supplying a number of defence and space programmes.

However, none of this precludes Ireland from finding entry points into the upstream space sector. Its advanced electronics and semiconductor companies, together with its extensive mechanical and electronic engineering talent pool, give Ireland an obvious technological platform to build on. By orienting these capabilities, and collaborating with Northern Ireland's established aerospace capabilities, to support spaceflight and control, the island of Ireland together can drive engagement in upstream space activities and build a meaningful presence in the sector.



“ With regard to Northern Ireland, initial assessments have ruled out vertical launches from these shores due to airspace constraints, with other regions also being more suitable for horizontal launches. However, Northern Ireland can grow its upstream impact by providing products and services into the UK space supply chain in order to support and augment the launch ecosystem there. ”



Rob Hill
Director,
Northern Ireland
Space Office

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Shaping the future: a collective effort

“ Look at New Zealand, an island nation like Ireland. There is the proof that you can start from almost scratch and build a credible upstream capability. They’ve got launches happening in their coastal waters and they’ve even figured out how to use their boat-building know-how to develop composite materials for satellite components. It just goes to show, that we shouldn’t be limiting ourselves to thinking that the opportunity for Ireland is only in the downstream. ”

Executive, Government Enterprise Agency, Dublin

Developing a stronger upstream space presence is both achievable and necessary to ensure the long-term health of Ireland’s space economy as a whole, but requires multi-stakeholder action. Specifically, we would recommend as a minimum:

National Policy Makers

- Prepare a detailed understanding of the upstream opportunity: whilst the UK’s Department for Business, Energy & Industrial Strategy published a report on the upstream opportunity as far back as 2018, no Irish equivalent has been progressed. This should identify policies proven to facilitate upstream space activities, alongside international best practices. Furthermore, a detailed understanding of the upstream opportunities could feed into the next iteration of the Irish National Space Strategy.
- Undertake feasibility studies for the development of launch and ground support infrastructure – an essential step towards anchoring Ireland’s upstream space ambitions in tangible terrestrial assets.

Academic Institutions

- There is a clear imperative to fast-track the development and delivery of practical space courses at undergraduate, diploma and postgraduate level, to seed the upstream opportunity led by higher education institutions (HEI) with support from training organisations such as Skillnet Ireland.
- HEIs should deepen ties with industry active in the space value chain on the island, and vice versa, facilitating the swift commercialisation of space tech research.

Investors

- Review existing portfolios to identify companies that could benefit from an upstream space sector play, based on practicality and viability of adapting their technologies for space applications.
- Incorporate upstream space suitability into standard assessment processes for new investment opportunities, especially in hardware, materials science, and optics.

Private Enterprise

- Explore opportunities to adapt terrestrial technologies for upstream application.
- Explore opportunities to adapt and optimise existing on-Earth technologies for applications in the upstream space context.
- Enhance advocacy efforts towards policy makers: with the Irish political sphere’s limited awareness of upstream space opportunities, there’s a need for intensified advocacy and lobbying efforts from the industry.
- Deepen collaboration with HEIs active in the space value chain on the island to facilitate relevant knowledge and skills acquisition.

“ Companies within Northern Ireland’s globally-focused, agile and innovative Aerospace & Defence cluster are well-placed to pivot their light-weighting technologies to space manufacturing. The Denroy Group is a great example of a company which has the ability to diversify into space with its PEEK technology and join companies like the Technical Metals Group which has already deployed its spring technology on Space programmes from Pegasus in the 1990s to this year’s JUICE Mission to Jupiter. ”



Kelly Murphy
Space Sector lead,
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