



# WATCH THIS SPACE

Ireland's contribution to the global space industry has grown rapidly in recent years, and forecasts suggest that this trend is set to continue. **TIERNAN CANNON** sets out to get a sense of some of the companies working within the sector and how they intend to remain viable down the line.





It may come as something of a surprise, but the space sector in Ireland is increasingly big business. While the country isn't launching its own rocket to the moon just yet, the development of its first ever satellite, EIRSAT-1, shows just how giant a leap the Irish have

taken into the industry. A growing number of companies here work within the sector, facilitated largely by Ireland's membership of the European Space Agency (ESA).

ESA is an inter-governmental agency comprising 22 member states, which seeks to shape the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world. By coordinating the financial and intellectual resources of its members, ESA can undertake programmes and activities far beyond the scope of any single European country.

ESA is funded primarily through member states' contributions. Ireland, which joined the agency in 1975, currently provides €17.8 million per annum, representing approximately 0.5 per cent of total ESA member state contributions. In return, Irish companies and research teams are permitted to bid for ESA contract development work in a range of space programmes.

According to a spokesperson for the Department of Business, Enterprise and Innovation (DBEI), which is responsible for managing Ireland's membership of the ESA, the number of Irish companies working with ESA has almost doubled over the past five years, with 60 companies currently engaged and more expected. Total employment in ESA-participating companies has grown from 1,300 in 2008 to almost 2,000 in 2016, and is projected to exceed 5,500 by 2020.

This high level of activity and growth in employment reflects the combined efforts of Government in investing significantly in R&D, of Enterprise Ireland and IDA Ireland in working with industry, and of ESA itself translating the innovation capacity in Irish industry into products, systems and services for the European space programme and the global space market.

"ESA programmes and contracts allow Irish industry to develop the specific capabilities required for the commercial space market, such as launches, satellites, downstream equipment and services," says

the DBEI spokesperson. "Ireland's specific focus within the space sector is on technology innovation. DBEI supports Irish companies working within the space sector through Enterprise Ireland, R&D supports, research collaborations and specifically a number of other supports."

## TERRESTRIAL APPLICATIONS

An increasing number of Irish companies have engaged in extremely specialised work as part of ESA contracts. Cortona 3D, for example, which is headquartered in Booterstown, Co Dublin, produces visualisation and simulation software that was chosen by ESA for spacecraft crew and astronaut training for the Automated Transfer Vehicle (ATV), a fleet of 20 tonne space transport vehicles used to bring fresh food, clothes, water, fuel and oxygen to the International Space Station (ISS).

"Our project is aimed at improving the quality and performance of ISS crew operations and training," says one member of the Cortona 3D team. "Training and mission operations are of crucial importance to the International Space Station and other similar sophisticated programmes."

The type of work carried out by Cortona 3D is critical to the space sector, but the company is not bound entirely to it. The benefits of the company's visualisation and simulation software extend across a large variety of industries, including automotive, manufacturing, consumer electronics, aerospace, high-tech, defence and medical.

This is an important feature of many of the technologies produced by companies working within the industry, as the ability to bring space technologies back down to earth is often essential in ensuring the continued viability of the company producing them. Dr Frank Smyth, CEO and founder of Pilot Photonics, knows as much.

"One of the things that ESA insists on is that the technology produced can also be applied to more regular, earth terrestrial markets," he says. "Otherwise, what happens is you have this technology that's only suitable for space, but the space market is too small to support it and the company goes bust, because it didn't have a sustainable market on the ground. So when you put proposals together [for ESA] there has to be a terrestrial business case for it as well."

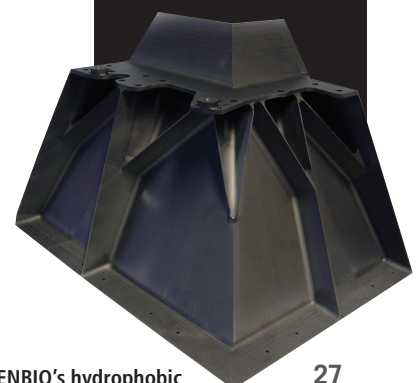
Dr Smyth's company, Pilot Photonics, is a spin-out company of DCU, founded



## A ROADMAP FOR EMERGING SPACE STATES

At the International Space University's Space Studies Program 2017, held this year in Cork, a report entitled '*A Roadmap for Emerging Space States*' was presented, which provides a general roadmap for Ireland and other emerging space states to build and expand their space sector capacity. The report included the following recommendations:

- Establish a national space agency to develop a space policy for Ireland and coordinate the Irish space sector in line with strategic goals.
- Join the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and participate further in international partnerships and organisations related to space.
- Increase investment in space-related STEM education and incentivise space science and engineering programmes.
- Encourage strategically focused private industry to engage in space-related activities that promote Irish technologies, economic growth, and societal benefits.



ENBIO's hydrophobic PTFE-coated stainless steel



Pilot Photic's Chris Leonard, VP of Sales and Marketing; Desi Gutiérrez, R&D Manager; and Frank Smyth, CEO

in 2011, which offers a unique technology applicable to many markets, including communication, spectroscopy, sensing, and metrology. The company is a new entrant into the space market and currently has one ESA contract underway.

“Our product is, at its core, essentially a laser, so it can be applied to anywhere where lasers are used,” Dr Smyth explains. “We’re applying it to optical communications and fibre optics, we’re applying it to optical sensing, we’re applying it to data centre networking – for every space application there’s an analogous ground application that we’re applying the technology to.”

**DEVELOPING RELATIONSHIPS**

The development of space technologies in Europe is pushed largely by ESA. However, as Dr Smyth explains, ESA doesn’t actually manufacture its space technologies itself – rather, it contracts other firms to do so.

“ESA doesn’t build its own spacecraft,” he begins. “It coordinates the programmes to ensure they get done, and it manages the projects, which are funded by each of the member states. Essentially its job is to build up a strong supply chain and ensure that new technologies are

coming on board. But it doesn’t actually manufacture anything. It introduces small companies like ours to the larger contractors and those companies that are very well-established in the space and aerospace markets, and it identifies new technologies that those large prime contractors should be aware of and should consider.”

Developing a good relationship with ESA then is extremely desirable for European space companies, and in Ireland this would perhaps be best achieved by first engaging with supports such as Enterprise Ireland.

Enterprise Ireland, as an agency of the Department of Business, Enterprise and Innovation, is responsible for the development and growth of Irish industrial capacities in the commercial space sector. It assists Irish companies in developing sustainable business models within the sector, with a specific focus on new start-up companies.

“Ireland is a relatively small player in the space field, but growing all the time,” says Dr Smyth. “Enterprise Ireland is hugely supportive and ambitious and is constantly seeking to grow its budget allocations and win more funding from the government that it can apply to companies that claim space-relevant products.”

Aside from the Irish supports directly available to Irish companies, there are also Europe-wide initiatives that can be taken advantage of. ENBIO, an Irish SME headquartered in Dublin with a production facility in Clonmel, has been involved in the space sector for the last six years, and was recently awarded €1.52 million from the European Commission to develop a green alternative to the toxic chemicals necessary in coating metals under the EU’s Horizon 2020 SME Instrument Phase 2 scheme.

This funding was awarded under the premise of the European environmental legislation REACH, which is attempting to reduce the prevalence of hazardous chemical treatments widely used to prepare metal surfaces for bonding or coating. However, it is not just the space sector that needs a replacement but any European industry using wet hazardous metal pre-treatments. The work will be important therefore to aerospace, automotive, and other industries in general.

**EXCITING TIMES**

The space sector is naturally extremely specialised and can prove difficult to break into. Therefore, the various supports – be they Irish-based or Europe-wide – are essential for small Irish companies keen to enter the industry and get a slice of the pie.

“It can be challenging for a small company [based in Ireland], because, for example, if you’re trying to introduce a new technology, it may take a number of years before it is adopted on to a large programme,” says Kevin O’Flynn, General Manager, ENBIO. “So that timespan can present a challenge for small companies. But certainly as a sector, it’s really exciting in Ireland.”

Kevin O’Flynn shares that enthusiasm. “Putting products into space is something that still puts a smile on my face,” he beams. “I love doing it.”