Enterprise Ireland

Space Activities in Ireland 2025

Space-related developments in Ireland supported by the **European Space Agency** and **European Union**



esa

Rialtas na hÉireann
Government of Ireland

Cover image: 50 years of Ireland in ESA © ESA

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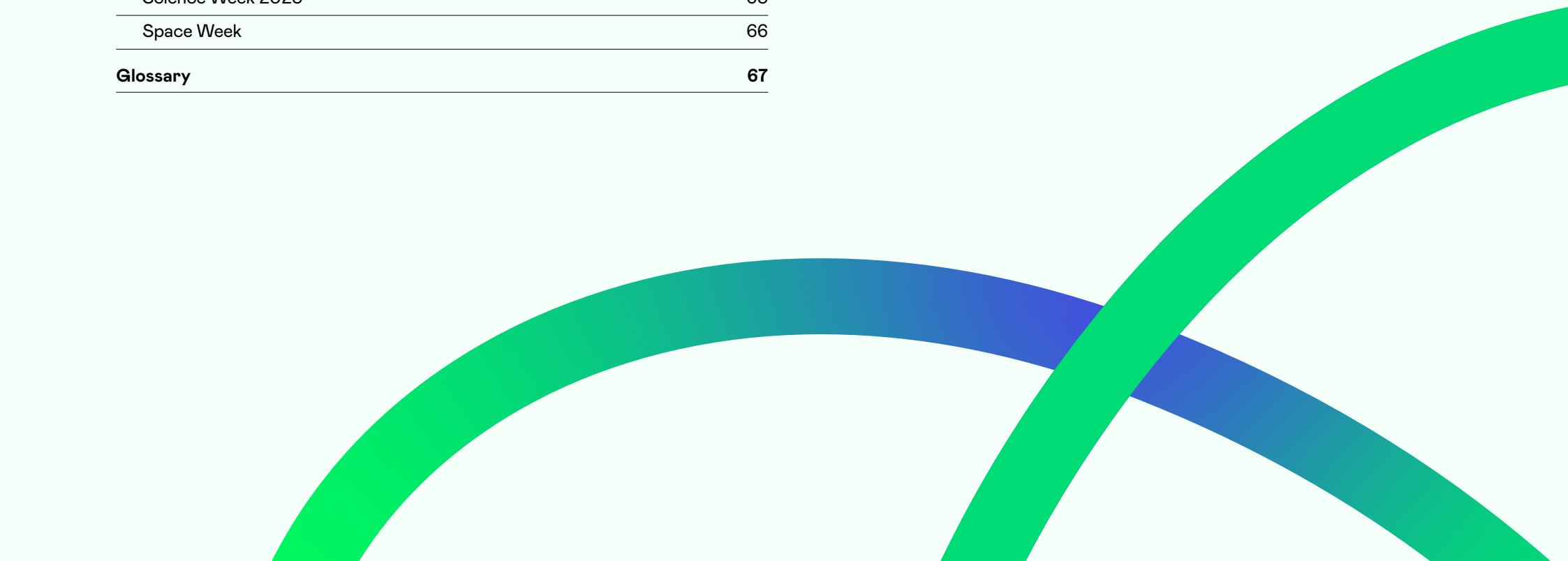
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Foreword by Minister

2025 marked the 50th anniversary of the European Space Agency (ESA) of which Ireland is proud to be a founding member. Over the course of 50 years, Ireland's space ecosystem has grown with its current strength and breadth evident from this Space Activities Report. I was delighted to represent Ireland at the Agency's Ministerial Council "CM25" in Bremen, Germany in November, where along with Ministers and high-level representatives from the other ESA Member States, I approved two important ESA Resolutions. The "Resolution on Elevating the Future of Europe Through Space" provides a high-level strategic overview advocating for an ambitious European investment in space, fully aligned with the societal needs for autonomy, resilience, competitiveness, and scientific excellence. The second Resolution agreed the level of funding for the Agency's Mandatory (Science and Basic Activities) Programmes. In that context I was proud to announce Ireland's largest funding contribution to ESA to date. An additional €40 million has been committed bringing Ireland's overall investment in ESA to over €170 million for the period 2026-2030. I also approved Ireland's participation in the ESA Space Safety Programme. This significant investment and programme expansion underscores Ireland's strong commitment to the European space sector and will ensure the continued growth and success of our domestic space sector, by supporting the creation of new enterprises and enabling established companies to scale across both space and space-adjacent industries.

As we look ahead, we do so from a position of strength, following an excellent performance for the sector in 2025. The policy direction set by the National Space Strategy for Enterprise 2019-2025, combined with our investment in ESA has resulted in 126 companies entering into contracts with ESA by end 2025. The value of contracts entered into in 2025 alone amounted to €26.7 million – the highest level of investment secured in any single year to date – providing a clear indicator of the strength, capability and competitiveness of Ireland's space sector on the European stage.

The establishment of the ESA Φ-Lab in 2025 is another strong signal of the maturity and credibility of the Irish space sector to lead on research, innovation and commercialisation of space technologies. Over 2 years ago, Ireland became a space faring nation with the launch of EIRSAT-1, which was built by a team in University College Dublin through ESA's Fly Your Satellite! Programme. EIRSAT-1 successfully de-orbited in September 2025 and its mission was a success. Its legacy will live on – not only through the analysis of the data it transmitted back to Earth, but also in how it will inspire future generations of scientists, engineers and innovators to pursue careers in this sector and develop world-class space innovations that can be built and delivered in Ireland.

Reflecting on the success stories in this Report, and on the breadth of space-related events hosted both in Ireland and internationally, I am confident that the Irish space sector will continue to grow in 2026, further demonstrating its innovative capacity and international competitiveness. Enhanced Government support for the indigenous space sector, coupled with the review of the current National Space Strategy for Enterprise, will ensure that Ireland remains well positioned to capture future opportunities, strengthen our skills base and deliver lasting economic and societal benefits.



Alan Dillon

Minister of State for Business, Employment and Retail
Department of Enterprise, Tourism and Employment

Foreword by Jenny Melia, Enterprise Ireland

2025 was a milestone year for Ireland's space sector – a year in which Irish companies moved decisively from development into commercial delivery, and in which Ireland's presence on the international stage grew considerably.

It was also a year of celebration. ESA marked its 50th anniversary, and Ireland, as a founder member, marked five decades of scientific, technological and industrial achievement alongside it.

Across the sector, Irish companies took significant steps forward. MBRYONICS opened its Photon-1 volume manufacturing facility in Galway and was selected for the strategic European partnership delivering ESA's HydRON programme. Companies like Ubotica, Réaltra, Lios and Proveye continued to demonstrate the depth of Irish capability, from onboard satellite intelligence to launcher telemetry and precision agriculture.

Earth Observation solutions developed here are having tangible impact — in habitat and peatland monitoring, water quality, forestry compliance and grassland management. The connection between space technology and the challenges we face on the ground has never been clearer.

Enterprise Ireland is proud to support this ecosystem: through our colleagues that form part of the Irish Delegation to ESA; the management of ESA BIC Ireland, which recorded its strongest year to date; through the arrival of ESA's Phi-Lab Ireland in Mullingar; and through international activity including Ireland's first national pavilion at Space Tech Expo Europe in Bremen, our Irish Space Tech Days market visit to Turin, and Dublin's hosting of the ESA Scylight Conference.

Ireland's commitment of more than €170 million to ESA programmes to 2030, announced at the ESA Council of Ministers in Bremen last year, gives Irish companies a strong platform on which to compete. Together with the Irish Delegation to ESA and our academic and public sector partners, we are building a connected, competitive and ambitious space sector.

Enterprise Ireland will continue to champion that growth – helping Irish companies to innovate with confidence, to scale internationally, and to take their place in the global space economy. Enterprise Ireland's ambition lies in Irish companies becoming the primary drivers of the Irish economy.



Jenny Melia

Chief Executive Officer
Enterprise Ireland

ESA in Ireland 2025 Highlights



€170 million

investment by Ireland in ESA programmes



€25.3 million

– record investment in industrial ESA-placed contracts



€1.3 million

in contracts to Universities



126

companies actively engaging with ESA



15

ESA BIC Ireland new space-active entities

Introduction

Ireland continued to expand its base of space-active companies during 2025. These companies leverage participation in the world's second-largest space market to generate economic value and to secure new supply-chain opportunities in international markets.

The European Space Agency (ESA) placed contracts worth a record €26.7 million in Ireland in 2025, with industrial activities accounting for €25.3 million of that total. Contracts totalling €1.3 million were placed with Irish research performing organisations (RPOs) during the same period. The number of companies currently active with ESA also continued to grow, totalling 126 at the end of the year and including 15 new space-active entities.

2025 was also ESA's 50th anniversary. As a founder member, Ireland's space community celebrated five decades of scientific, technological, and industrial achievements which underpin essential services in Earth Observation (EO), navigation and communications.

Of particular significance during the year was the ESA Ministerial Council (CM25) meeting in Bremen, Germany in November. The meeting was held to determine future funding and strategic priorities to strength Europe's competitiveness, resilience and long-term space ambitions.

CM25 proved to be a landmark meeting where Member States committed a record-breaking €22.3 billion – an increase of 31% over CM22 – to advance key science, exploration, transportation and technology programmes, as well as major space application domains including EO, navigation and secure communications.

Ireland has announced its largest-ever investment in the European Space Agency, committing more than €170 million to ESA programmes through 2030. This includes an additional €40 million investment, underscoring the Government's strong and growing commitment to the space sector as a strategic driver of innovation, economic growth, and high-value employment. This record level of funding will create significant new opportunities for Irish industry to compete for international contracts, scale globally, and strengthen Ireland's position within the rapidly expanding space economy.

To put the scale of those opportunities in context, the global sector was valued at over US$611 billion in 2025 and is projected to grow to more than US$1,141 billion by 2034; a compound annual growth rate of 7.2% during the forecast period.[1]

However, European space companies face challenges including declining competitiveness and launcher instability, making expansion into fast-growing, well-funded global markets like the UAE and Japan an attractive path to secure new partnerships, investment and long-term growth.

In 2025, the European Commission published the EU Space Act, proposing a harmonised regulatory framework focused on safety, resilience, and sustainability. The initiative aims to strengthen the functioning of the EU internal market for space activities while providing greater regulatory certainty for the sector.

In line with the National Space Strategy for Enterprise, Irish companies continued to bring technology innovation to the space sector in 2025. An outstanding example was MBRYONICS, which was selected to be part of the strategic European partnership delivering the ESA HydRON (High thRoughput Optical Network) programme. The company also opened its new Photon-1 volume manufacturing facility in Galway, which will create 125 new jobs over two years in deep tech engineering and advanced manufacturing.

1. https://www.fortunebusinessinsights.com/space-technology-market-115460

Another outstandingly successful company during 2025 was Proveye, whose AI-driven precision fertiliser solution uses satellite, drone and environmental data to generate variable-rate fertiliser maps that cut costs and emissions while boosting productivity for farmers. The company, through new partnerships with MILJO and Howard Farms, now integrates advanced grassland and nutrition insights into services for over 1,000 dairy and beef farmers across Europe.

2025 was also a very important year for ATG Innovation. The company won contracts with ESA for grid-stiffened composite central tubes and with Rocket Factory Augsburg for RFA ONE interstage structures. These contracts marked ATG's transition from years of ESA-supported R&D into full commercial production of lightweight, high-performance space structures, with manufacturing carried out in partnership with ÉireComposites in Galway.

ESA Business Incubation Centre Ireland (ESA BIC Ireland) recorded its strongest year to date, securing 15 incubation contracts and one Spark Funding contract, bringing totals for the 2022–2025 cycle to 30 incubation and eight Spark projects.

Overall, 2025 was a year in which Ireland significantly deepened its role in Europe's space ecosystem – strengthening industrial capability, advancing homegrown innovation, and positioning the country to compete and thrive in a rapidly expanding global space economy.

1

Ireland invests €170 million in ESA programmes

Ireland will invest more than €170 million in ESA programmes between now and 2030 to boost the growth of Irish space technology companies, creating fresh opportunities for Irish industry to compete and scale within the rapidly expanding global space technology sector. The funding will support projects in EO, secure communications, navigation, space transportation, and human and robotic exploration.



Figure 1. ESA Director General (Josef Aschbacher, centre) together with Ministers from 23 ESA Member States, including Minister of State Alan Dillon TD at the 2025 ESA Council of Ministers Meeting (CM25) in Bremen, Germany © ESA

Aligned with Ireland's National Space Strategy for Enterprise, the investment aims to strengthen a sustainable domestic space industry and enhance its global competitiveness. The announcement was made in November 2025 at the ESA Council of Ministers' meeting (CM25) in Bremen, Germany. CM25 proved to be a landmark event, with Ministers committing a record-breaking €22.3 billion to advance key science, exploration, transportation and technology programmes, as well as major space application domains including EO, navigation and secure communications.

The ESA Science Programme received an unprecedented boost, with funding set to grow by 3.5% per year above inflation to deliver flagship Cosmic Vision missions such as LISA and NewAthena, while also progressing the technology development essential for future Voyage2050 missions. Announcing the €40m increase in funding, Minister of State Alan Dillon TD said: "Space impacts so much of our daily life, often without us realising. This investment will help Irish businesses grow, create jobs, and tackle big challenges like climate change and cybersecurity".



Figure 2. Minister of State Alan Dillon TD, together with Enterprise Ireland and Department of Enterprise, Tourism and Employment (DETE) members of the Irish Delegation to ESA, at the launch of the 2024 “Space Activities in Ireland” report at the 2025 ESA Council of Ministers Meeting (CM25) in Bremen, Germany © ESA



Figure 3. Minister of State Alan Dillon TD, together with members of the ESA Astronaut Corps at the 2025 ESA Council of Ministers Meeting (CM25) in Bremen, Germany © ESA

2

Earth Observation, Ireland and the green agenda

Ubotica collaborates in world-first demonstration of Dynamic Targeting

In a collaboration with satellite data specialist Open Cosmos in July 2025, Ubotica demonstrated how its SPACE:AI technology can enable satellites to detect and respond intelligently and autonomously to changing conditions on Earth. The technology enables satellites to analyse imagery in real-time and automatically trigger follow-up observations of events of interest.

Applications include maritime and environmental monitoring and disaster response. This was the first time for Dynamic Targeting, a concept developed at NASA's Jet Propulsion Laboratory, to be demonstrated in orbit. In Dynamic Targeting, a lookahead image is captured and immediately processed with on-board AI to detect features of interest. The satellite then readjusts its orientation as it overflies the target area in order to focus on those features. This improves mission efficiency, reduces unnecessary data capture, and maximises the value of the acquired imagery.

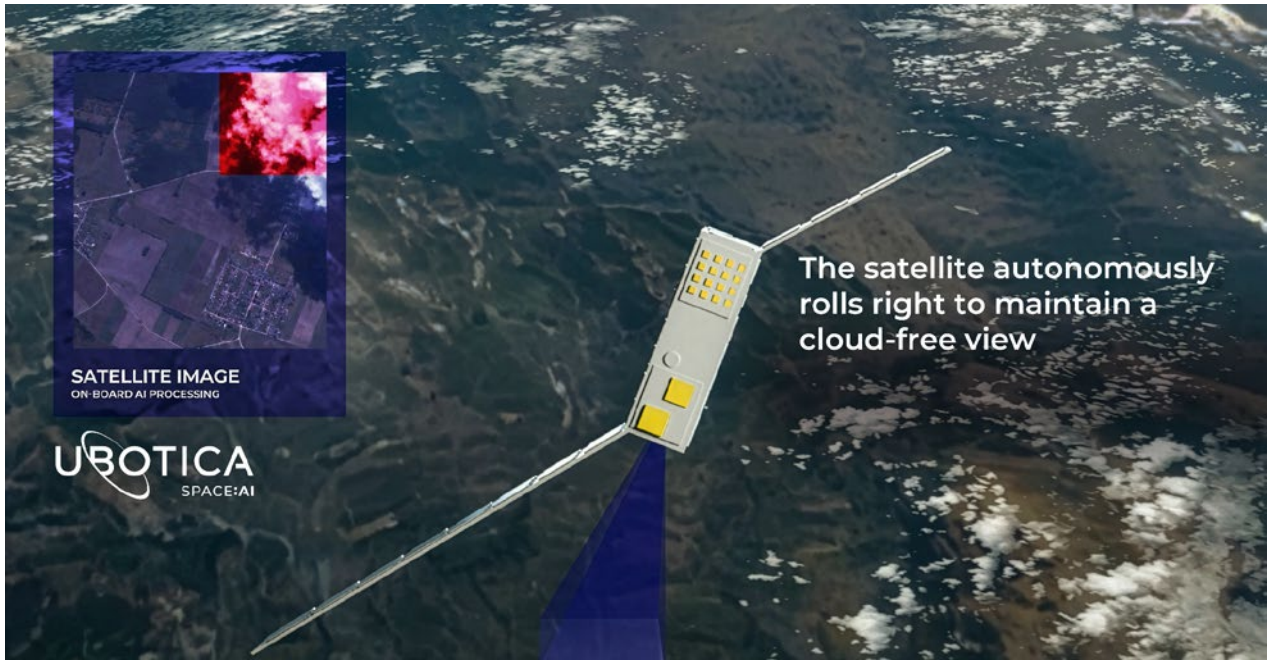


Figure 4. Dynamic targeting: CogniSAT-6 looks ahead, detects clouds to the left, and autonomously reorientates to capture cloud-free usable data © Ubotica Technologies Ltd.

Supporting offshore renewable energy development using space data

Marine data specialist and Earth Observation (EO) data provider TechWorks Marine completed an ESA funded project (EO4WIND) in 2025 aimed at expanding the use of satellite data in Europe's renewable wind energy sector.

The project saw the company develop three products to address the core business areas where EO data delivers the greatest value to the wind energy sector. One of those products is Wake Effect which focuses on how turbines influence wind speed, a key factor in wind farm planning. The Wake Effect service illustrates the downstream effect of wind energy loss due to turbine interaction, which influences energy yields. This product is particularly useful for offshore wind farm siting, where wind farms owned by different organisations might be co-located.

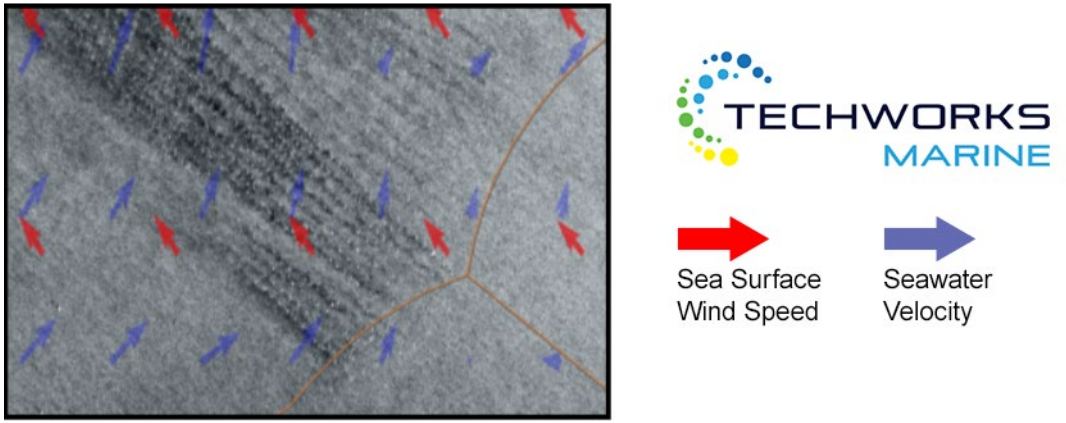


Figure 5. EO4WIND Derived products (L-R; 10m wind speeds from Sentinel-1 SAR image with Copernicus Marine Service wind (red) and current (blue) vectors © TechWorks Marine Ltd.

Compass Informatics pioneers AI-driven Earth Observation for Irish conservation

Compass Informatics partnered with the Irish National Parks and Wildlife Service (NPWS) in 2025 to use advanced EO to transform how internationally significant turloughs (seasonal lakes) and saltmarshes are monitored and protected. The project explored the innovative use of EO and machine learning (ML) to develop robust methods for mapping and monitoring these unique and vulnerable Irish habitats and validated the reliability and feasibility of using automated vegetation and habitat classification from Sentinel-2 satellite imagery to provide data-driven insights for conservation and land-use decisions.



Figure 6. Earth Observation study of Atlantic saltmarsh (left) and Mediterranean saltmarsh (right) habitats © Compass Informatics

Ubotica SPACE:AI powers maritime intelligence partnership

Ubotica Technologies partnered with geodata solutions provider Fugro and data management software company DTACT in 2025 to launch a new data fusion and intelligence platform designed to strengthen maritime security and protect critical underwater infrastructure. Ubotica's SPACE:AI technology delivers near real-time satellite vessel tracking and analytics, which is combined with Fugro's world-leading geodata and DTACT's advanced data fusion capabilities to provide government organisations with a comprehensive picture of activity around subsea assets such as pipelines and communications cables.

By integrating satellite intelligence with subsea and surface data sources, the platform enables authorities to detect, identify and monitor suspicious behaviour more effectively across vast ocean regions.

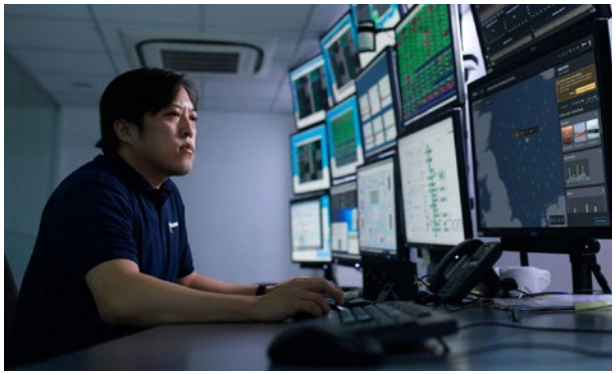


Figure 7. Live dashboard from the Ubotica Technologies, Fugro and DTACT partnership © Fugro

Advanced hedgerow and habitat EO monitoring solutions from Senus

Senus made a number of significant advances in the development of advanced habitat monitoring solutions in 2025. The company's EXACT project successfully integrated low-cost precision GNSS/GPS (Global Navigation Satellite System/Global Positioning System) technology with its soil and habitat survey mobile apps. EXACT enables Android and iOS apps to pair with a Bluetooth GNSS unit, providing a high-precision alternative to internal GNSS receivers.

This facilitates sub-meter soil sample locations and habitat surveys as well as supporting the use of Galileo High Accuracy Service (HAS) as an alternative to commercial NTRIP (Networked Transport of RTCM via Internet Protocol) services. Project Purlieu, a ground survey and EO hedgerow and habitat monitoring solution, progressed to the pilot phase with 360° imagery, LiDAR, and EO data collected at five sites.

Also in 2025, Senus acquired Loamin, a geospatial intelligence company specialising in land and soil monitoring. Loamin's algorithms applied to satellite EO data enable accurate observation and monitoring of soil properties, land-use change, and biodiversity trends, giving users evidence-based data to support sustainable land management at scale.

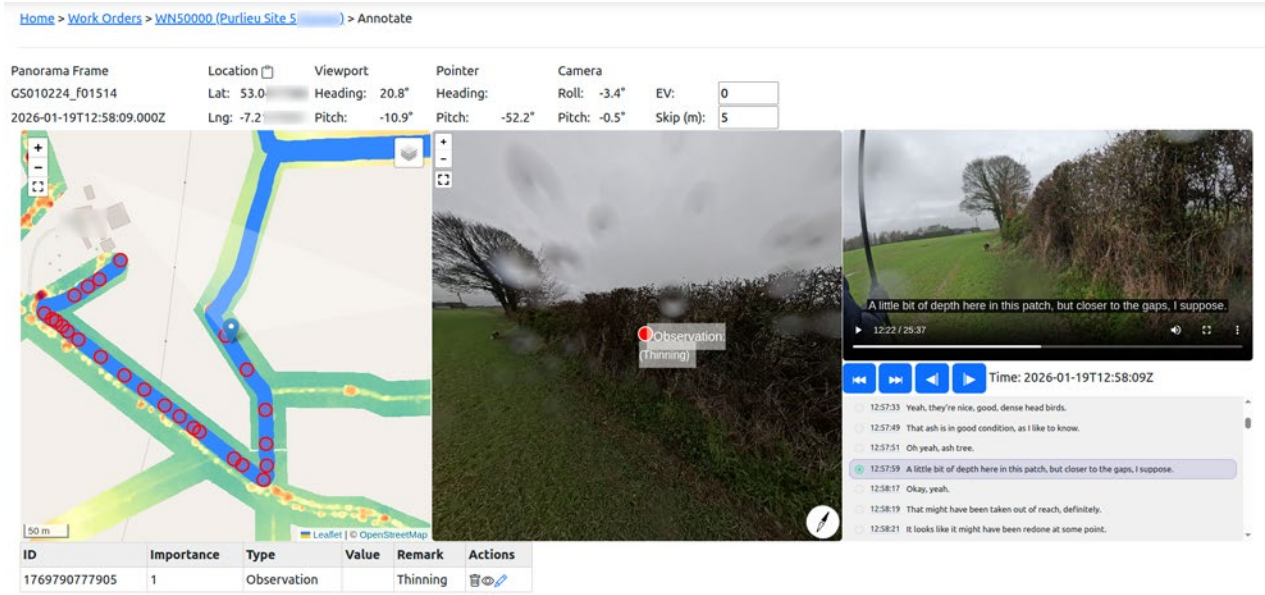


Figure 8. Purlieu ecologist 360 image annotation tool featuring GNSS positioned and time synchronized 360° spherical camera panoramas, GoPro headcam and 3D structure from LiDAR, EO and aerial products © Senus PLC

Validating satellite chlorophyll measurements in the Irish sea

During 2025, TechWorks Marine integrated ML with satellite and in-situ data to validate its Sentinel-3 OLCI (ocean and land colour instrument) water quality monitoring products. The team combined satellite-derived chlorophyll-a measurements with in-situ measurements from a buoy deployed in the Irish sea. The ML model incorporated a range of data from the buoy, and the results demonstrated the value of validated chlorophyll measurements from space. The vast majority of water quality monitoring is currently dependent on in-situ measurements, and this work presents opportunities for global coverage from space with validated measurements. It is particularly valuable for challenging marine environments such as those found off the West Coast of Europe.

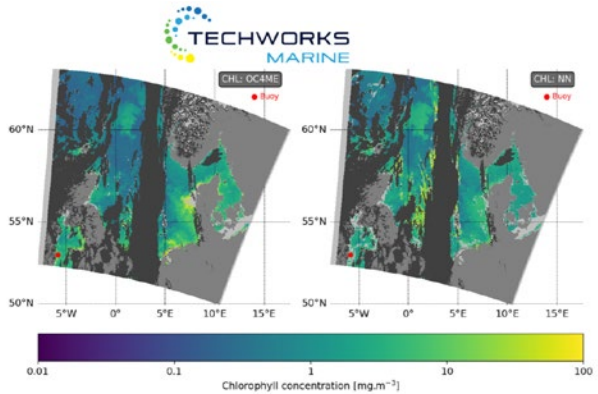


Figure 9. Comparison of OLCI chlorophyll-a concentration maps at full resolution © TechWorks Marine Ltd.

Compass Informatics wins major UK geospatial monitoring contract

Compass Informatics was awarded a contract in 2025 by the UK's Rural Payments Agency (RPA) to deliver a cutting-edge geospatial analytics and remote monitoring service. The five-year contract, valued at up to £9.6 million, and with options to extend for a further five years, will incorporate satellite imagery and geospatial data within a wide area monitoring service, transforming how agricultural land use is monitored and managed across the UK. The RPA, an executive agency of the Department for Environment, Food and Rural Affairs (Defra), is responsible for administering payments across a range of agricultural and environmental schemes. Through this new service, the RPA aims to streamline and modernise monitoring of land, using technology to deliver faster, more accurate insights that reduce administrative burden and support better land management decisions.

Space technology distinguishes sustainable forestry from illegal deforestation/degradation

NGIS EU has been awarded funding by ESA to develop ForestHD, an innovative monitoring service designed to support the timber industry's journey to compliance with the EU Deforestation Regulation (EUDR). The project, which commenced in December 2025 and will run for 24 months, addresses critical challenges posed by the EUDR for the timber and forestry sector. By utilising Sentinel-1 and Sentinel-2 satellite data, IoT (Internet of Things) and a range of ancillary data, NGIS EU will develop ML models to distinguish between sustainable timber harvesting and illegal deforestation/degradation to provide timber companies with automated tools to verify "deforestation-free" or "EUDR compliant" supply chains.

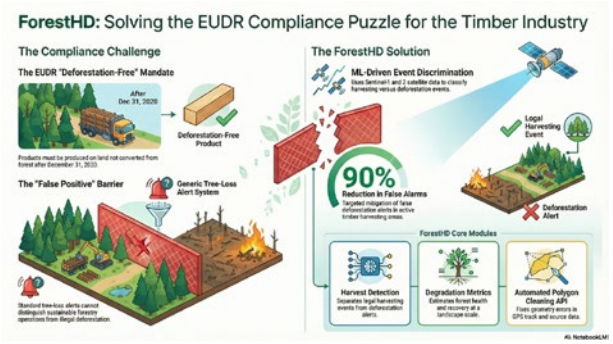


Figure 10. 'Overview of NGIS' ForestHD module delivering EUDR compliance and beyond for the timber industry © NGIS EU

Equal1 to cooperate with ESA on hybrid quantum computing system

In 2025, Equal1 was selected by ESA to install a cutting-edge Hybrid Quantum Computing (HQC) system to advance EO applications. Through ESA's FutureEO flagship programme and Φ-lab's Quantum Computing for Earth Observation (QC4EO) initiative, Equal1 will deploy its Bell-1 Quantum Computer to accelerate the processing of complex EO data. The collaboration aims to enhance capabilities in climate modelling, weather forecasting, disaster monitoring, and precise satellite data analysis.

Bell-1 leverages silicon spin qubits fabricated using CMOS (Complementary Metal-Oxide-Semiconductor) technology, offering a scalable, energy-efficient quantum solution designed for seamless integration into existing high-performance computing environments. By combining quantum and classical computing, the HQC system will enable ESA researchers to explore quantum algorithms for applications such as synthetic aperture radar data processing and satellite constellation mission planning, demonstrating clear advantages over purely classical approaches.



Figure 11. Bell-1 Quantum Server © Equal1

STARLIGHT on...Proveye:

Reducing the environmental footprint of dairy and beef farming

For decades, artificial fertilisers have played a vital role in European food production, but their widespread use has also contributed to nutrient loss, water pollution, and greenhouse gas emissions. Proveye's mission is to tackle these challenges by pioneering AI-driven remote sensing for smarter grassland management.

Proveye and MILJO partner to deliver next-generation AI insights

In November 2025, Proveye announced a strategic commercial partnership with MILJO, which has developed a nutritional advisory and feed order management platform, to transform pasture and animal nutrition management for dairy and beef farmers. The partnership creates a new seamless service that will support farmers, increase dairy and beef production whilst optimising feed value. Under the partnership, MILJO will incorporate Proveye's cutting-edge, satellite-based grass monitoring technologies into its extensive nutritional and feed management platform to bring advanced grassland measurement and grass cover insights, along with award winning nutritional advisory services to feed mills and farmers across the country. Munster based agricultural feed and nutrition provider Howard Farms will offer the new service to its 1,000 plus dairy and beef farm customers.

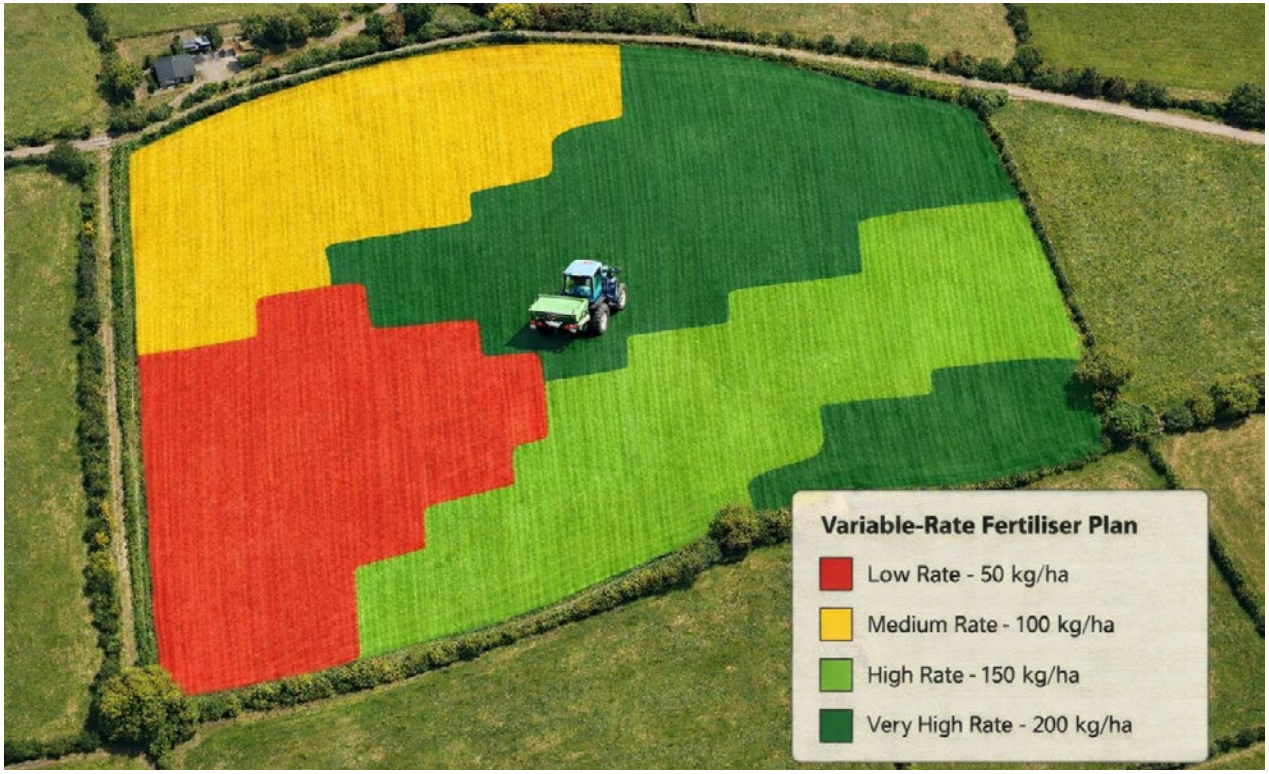


Figure 12. Proveye's pioneering AI-driven remote sensing ProvVari platform for smarter grassland management © Proveye

ProvVari, from Proveye, is a breakthrough precision fertiliser solution designed to boost productivity, reduce farm costs, and significantly lower the environmental footprint of grassland farming across Europe. Built on Proveye's ProvGrass platform, ProvVari combines satellite imagery from ESA's Sentinel-1 SAR and Sentinel-2 multispectral missions with high-resolution drone imagery, GNSS guidance, and detailed soil and meteorological data. Using this information, the technology generates variable rate application maps that optimise fertiliser use, protect water quality, and support national and European climate and biodiversity goals.



Figure 13. (L-R) Jerome O'Connell (CEO, Proveye), Aoife Drennan (COO, MILJO), Patrick Howard (Howard Farms) © Howard Farms

3

Irish technology innovations for the space and non-space sector

Up goes Lunar Link

In 2025, ENBIO was selected to provide the thermal and electrical protection required for the return to the Moon as part of NASA's Artemis programme. The company was contracted by Sener Aerospacial and Thales Alenia Space to provide specialised thermal control coatings for the Lunar Link communications module on the Artemis Gateway. Lunar Link will provide essential communications and navigation services between the Gateway and assets operating on and around the Moon, including surface rovers, human landing systems and lunar orbiting spacecraft. ENBIO provided high performance coatings for the module's two high gain antennas and additional structural subcomponents critical to system performance.

The company also supplied thermal control coatings for the multi angle polarimeter instrument on the Copernicus CO2M Sentinel mission during the year. In addition, ENBIO expanded its thermal vacuum testing for Irish and European customers and commenced an ESA funded programme to enhance electrical conductivity of advanced thermal control materials.

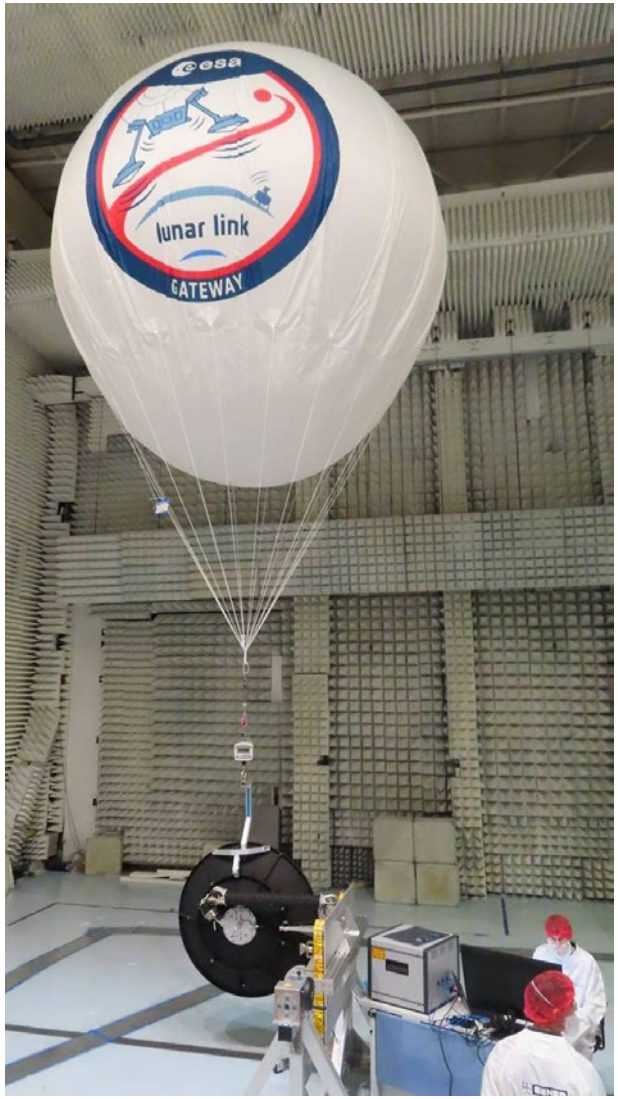


Figure 14. Weight compensation deployment test of a SolarBlack-coated Lunar Link antenna to simulate zero gravity © Thales Alenia Space

Electromagnetic compatibility in Space

Based in Dunshaughlin, Co. Meath, Compliance Engineering Ireland (CEI) is a test laboratory for electro-magnetic compatibility and safety and certification of electronic products. In 2025, CEI provided extensive test campaigns and certification for four space companies: Realtra's Viki Video Telemetry system (previously tested at CEI for the launch of the James Webb Telescope) was tested for further installations – a GNSS receiver for the Skylex Rocket launched in December 2025 and a PayLoad Interface Unit (PLIU) for the PLATO satellite expected to launch in 2026; Curtiss-Wright tested a telemetry subsystem for ESA's reusable Space Rider system due to launch in 2028; InnaLabs tested three-axis ARIETIS gyroscopes for the PLATO and LSTM satellites due to launch in the coming years; and Portugal-based EVOLEO tested onboard DC-DC power supplies for the onboard electronic equipment on the GEO satellite scheduled for launch in 2027.

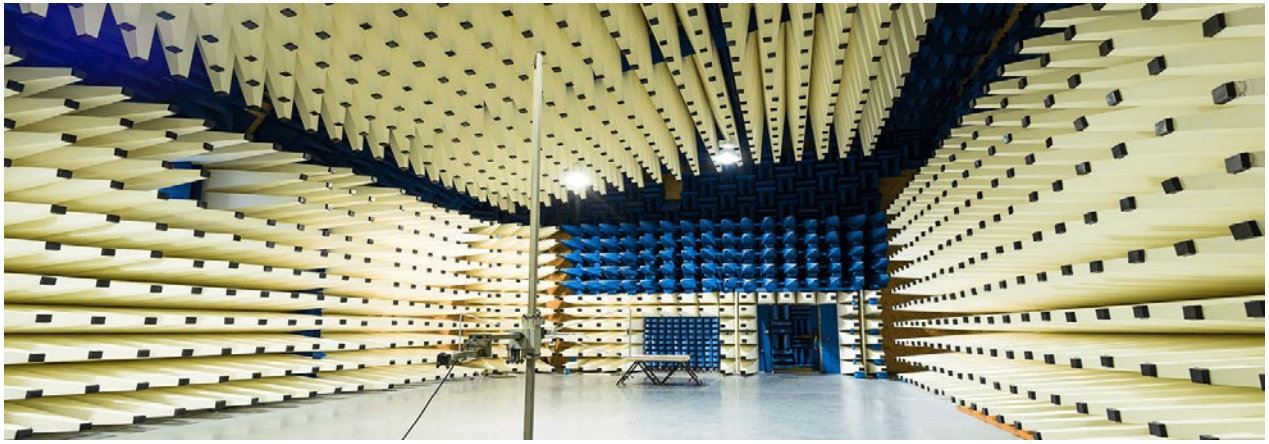


Figure 15. 10 Metre Shielded Anechoic Chamber in Dunshaughlin for EMC testing © CEI Ltd.

Irish cooling technology on the lunar surface

Enovus Labs achieved a landmark moment for Irish space innovation in 2025 with the flawless operation of its lightweight thermal radiator on the lunar south pole. Designed and tested entirely in the company's bespoke Dublin laboratory, the Segri-COOL radiator delivered advanced cooling performance in the extremely harsh environment of the lunar surface. The radiator delivers dramatically improved size, weight and power (SWaP) compared with previous solutions, demonstrating that high-performance space hardware can be both ultra compact and exceptionally efficient.



Figure 16. Tánaiste Simon Harris officially opens Enovus Labs' new laboratory and celebrates the landing of Irish hardware on the Moon (from L-R: Brian Donnelly (Enovus Co-Founder, CEO), Tánaiste Simon Harris, Nick Jeffers (Enovus Co-Founder, CTO)) © Enovus Labs/Maria Rusk Photography

Delivering components for the largest observatory ever built

Galway based ÉireComposites secured a contract in 2025 to manufacture three satellite central tubes for the LISA (Laser Interferometer Space Antenna) mission. LISA is a groundbreaking space observatory led by ESA in collaboration with NASA and will be the largest observatory ever built. The mission consists of three satellites flying in a triangular formation, each separated by 2.5 million kilometres, designed to detect and study gravitational waves. The central tubes — the primary structural chassis of each satellite — will be designed by ATG Innovation using its patented lightweight, high-stiffness, grid-stiffened structural architecture. ÉireComposites will be responsible for component and structural assembly testing, autoclave curing, bonding, and precision machining.



Figure 17. LISA Mission project team including representatives from OHB, ATG and ÉireComposites © ÉireComposites

SoundBounce takes another step towards lift-off

As part of the Future Launchers Preparatory Programme with ESA, Lios's advanced acoustic material SoundBounce achieved another milestone on its pathway to use in space flight in 2025. The company completed phase two of the work to investigate the potential to adopt SoundBounce as a fairing acoustic protection (FAP) material. In phase one, Lios achieved the acoustic performance required by ESA. The goal of phase two was to maintain that performance while reducing weight. Developed by Lios co-founders, Rhona Togher and Eimear O'Carroll, the unique ability of SoundBounce to attenuate low-frequency noise means that it outperforms both conventional and emergent acoustic materials on the market.

Coupled with SoundBounce's lighter, thinner and adaptable design, these traits mean that it is in demand for applications in aerospace, construction, automotive and home appliances.



Figure 18. SoundBounce comprises an advanced material core and adaptable composite housing © Lios

From the playing field to spaceflight

An advanced head impact sensor developed by Sports Impact Technologies was selected for a research programme with the International Institute for Astronautical Sciences (IIAS) involving Dr. Norah Patten in 2025. Originally developed to help sports teams monitor head impacts and movement in training and competition, the lightweight behind-the-ear wearable records detailed head-motion data in real time. The sensor was tested on two parabolic flight campaigns in June and October 2025, generating its first datasets in microgravity and supporting early validation for space-based research. This demonstrates how Irish-developed technology can make the transition from the playing field to advanced aerospace research.



Figure 19. (left) Sports Impact Technologies founder Eóin Tuohy with IIAS research astronaut, Norah Patten with the wearable sensor, (right) Norah Patten with the wearable sensor on the IIAS parabolic research flight wearing the sensor © Sports Impact Technologies

KineMo and ESA BIC Ireland advance astronaut health monitoring

Focusing on the specialised health and exercise needs of astronauts, KineMo further developed its motion tracking technology through the ESA BIC Ireland programme during 2025. The Irish company utilised its AI-driven platform for tracking and quantifying whole body movement in 3D using only a single camera and validated the possibilities in three core use cases: exercise movement tracking in pre-mission training; monitoring in-flight resistance exercise; and guiding post-mission rehabilitation. By transforming standard 2D video into detailed 3D metrics, the technology provides space medicine staff and astronauts with objective assessments previously only possible in terrestrial laboratories. The project's success in 2025 has opened the possibility for follow-on, larger-scale proof of concept to further investigate and extend the platform into additional exercises, metrics and outcomes across the astronaut lifecycle from training to mission and rehabilitation.



Figure 20. KineMo team visiting the European Astronaut Centre (EAC), Cologne (L-R: Jonathan Scott (ESA Engineer, Mission Officer at MEDES – Institute for Space Medicine and Physiology), Prof. Ciaran Simms (KineMo CSO, Co-founder) © KineMo

PixQuanta low-cost infra-red image sensors for space

Cork-based PixQuanta is pioneering a silicon-based CMOS sensor technology covering an ultra-wide spectral range from the ultra-violet to the extended short-wave infrared (IR). The sensor substantially reduces the manufacturing costs of IR imagers. The technology can be used in a broad range of space and terrestrial applications including short wave infrared image sensors for free-space optical communications; biometric sensing for wearables; 3D imagers (LiDAR and consumer); high-gain cameras, and ultra-low dose X-ray imaging. In 2025 PixQuanta completed the fabrication of a 1550nm wavelength VGA (video graphics array) imager for free-space optical communications applications as part of an ESA GSTP (General Support Technology Programme) element 2 project, partnering with a major EU-based IR camera supplier.

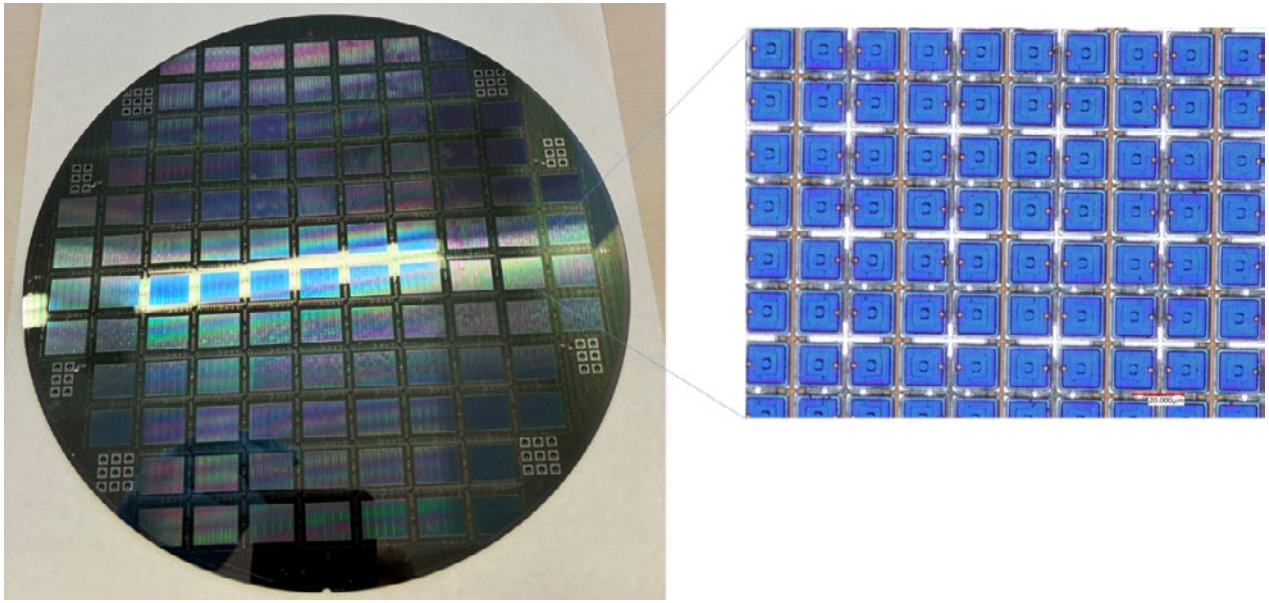


Figure 21. (left) 200mm wafer with VGA imager arrays for Free-Space Optical Communications applications, (right) microscope close-up of image arrays © PixQuanta

Altius mission baffle manufacture

ÉireComposites is approaching the final phase of its contribution to the ALTIUS mission with the manufacture of three high-precision carbon-fibre baffles. These components are designed to suppress stray light within the satellite's advanced optical system, enabling the capture of high-quality atmospheric imagery. ALTIUS is an ESA-funded EO mission focused on monitoring the Earth's atmosphere, with particular emphasis on the ozone layer and other trace gases. Final painting and assembly of the baffles are scheduled for January 2026, ahead of the satellite's planned launch in 2027 from Kourou, French Guiana, aboard a Vega-C launch vehicle.



Figure 22. ÉireComposites engineers performing final assembly of the ALTIUS baffles © ÉireComposites

Testing pathogen capture technology in spaceflight conditions

In 2025, Aquila Bioscience progressed its ESA Discovery Programme project to develop and validate nature-inspired, biomaterial-based pathogen capture technology for biological decontamination in space. A key milestone was achieved with parabolic flight testing conducted in October 2025 in collaboration with the International Institute for Astronautical Sciences (IIAS).

This campaign exposed Aquila's decontamination formulations and packaging to realistic spaceflight gravity transitions. Samples were returned to the laboratory and shown to retain full functionality, demonstrating robustness beyond ground-based testing.

Laboratory studies further validated performance against space-relevant microbial contaminants, while independent high-biosafety viral testing was progressed with French partner NeoVirTech. Guided by ESA expertise, the work remains aligned with planetary protection requirements and space hardware constraints, strengthening readiness for future space missions.

STARLIGHT on... ATG Innovation:

Providing the backbone of ESA's LISA mission

ATG Innovation signed a contract in 2025 to provide the structural backbone, the central tubes, for each of the three spacecraft involved in ESA's pioneering LISA mission. LISA will be the first space-based observatory to detect and measure gravitational waves. It will consist of a constellation of three spacecraft that will fly in a triangular formation trailing the Earth in its orbit around the Sun. Each side of the triangle will be 2.5 million km long (more than six times the Earth-Moon distance), and the spacecraft will exchange laser beams over that distance.

By measuring changes smaller than the width of a helium atom across millions of kilometres, LISA will allow scientists to study the formation of galaxies, the nature of dark matter, and even test Einstein's theory of general relativity on cosmic scales.

The central tubes will be designed and produced using ATG's patented lightweight grid-stiffened composite architecture to provide an optimum structural solution that can also withstand the extreme conditions of deep space. Manufacturing and assembly of these advanced composite structures will be carried out by ÉireComposites in Galway.



Figure 23. ATG's grid-stiffened composite lower interstage for the RFA One launcher © ATG Innovation Ltd.

Supporting Europe's commercial launch market

Also in 2025, ATG signed its first commercial contract with Rocket Factory Augsburg to provide the interstage structures for the RFA ONE launcher. The contract sees ATG's grid-stiffened composite technology move from the R&D phase into recurring production and commercialisation of lightweight, high-performance structural solutions that meet the demands of modern space missions.

These achievements are the culmination of many years of development work, including multiple projects funded and supported by ESA.



Figure 24. Artists impression of the LISA (Laser Interferometer Space Antenna) observatory © OHB

4

Irish companies connecting satellite communications systems

Enabling 6G satellite communications

In November 2025, Celtonn was awarded a contract by ESA under the ARTES Programme to develop a 130 GHz medium-power amplifier for EO applications. This high-frequency amplifier will ensure signal integrity and reliable performance in next-generation satellite systems, unlocking 6G-class performance and supporting the development of satellite architectures capable of delivering 6G signals.

In 2025, the company was selected as one of 20 startups from hundreds of applicants across Europe to participate in the CASSINI Business Accelerator. Through the programme, Celtonn engaged with European investors and received non-dilutive seed funding to support its continued growth and technology development.



Figure 25. Celtonn Team Aoife Kelly and Mark Kelly showcasing some of Celtonn's W-band technology © Paul Sharp, Sharppix

Supporting advanced satellite and deep space communications

During 2025, National Space Centre (NSC) Ltd. worked with Amazon to commission and secure regulatory approval for Amazon's Project Kuiper satellite communications gateway at Elfordstown Earthstation in Cork. Project Kuiper aims to deliver fast, reliable, low-latency internet worldwide, with significant benefits expected for rural and remote communities across Ireland. The new gateway positions Ireland among the first European countries to host the next-generation broadband network. The company also signed a Memorandum of Understanding (MoU) with Contec Space Group to advance restoration of the iconic 32-metre "Big Dish" antenna, supporting future deep-space communications capability and preserving important European space infrastructure.



Figure 26. Taoiseach Micheál Martin joined representatives from Amazon and National Space Centre (NSC) Ltd. at NSC's Elfordstown facility in Midleton, Cork to mark the announcement of regulatory approval from The Commission for Communications Regulation (ComReg) for the Project Kuiper gateway at Elfordstown. Pictured (l-r): Alison Dunn (Country Manager, Amazon Ireland), Micheál Martin (TD, An Taoiseach), Holly Sullivan (VP of Worldwide Economic Development, Amazon) © Gerard McCarthy photography

O.C.E. Technology introduces new products to international markets

In a busy year for O.C.E. Technology, the company participated in trade missions to France and Italy, introduced its multicore operating system at the RISC-V space conference in Gothenburg, and exhibited at Paris Space Show, Embedded World (Nurnberg), Space Tech Expo (Bremen) and Semicon Japan (Tokyo). O.C.E. also continued to enhance its range of software products developing secure boot and board support packages for Microchip Technology's radiation hardened RH71 microcontroller. The company also filed a patent on aspects of its real time operating system during the year while Trinity College Dublin is continuing work on the formal verification of the system. In addition, O.C.E. and Réaltra continued development with Viasat to deliver a terminal controller for that company's proposed constellation of optical communication satellites. The Viasat project is part of ESA's AIDAN Next programme.

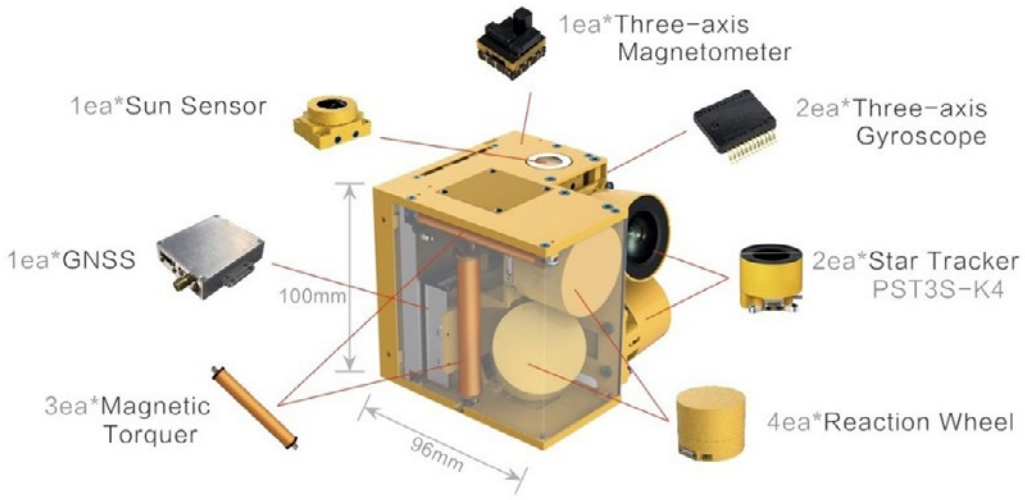


Figure 27. Attitude Determination & Control System © O.C.E. Technology Ltd

Eblana Photonics supports space-based quantum communication

In a project funded by ESA under the ARTES 4.0 Strategic Programme, Eblana Photonics helped to enable space-compatible Quantum Key Distribution (QKD) by designing and manufacturing high-performance laser diodes suitable for QKD transmitters.

Eblana's approach significantly simplifies QKD transmitter design. The company's discrete mode and distributed feedback edge-emitting laser diodes were evaluated for operation in a Low Earth Orbit (LEO) radiation environment. Through its partnership with ThinkQuantum SRL, which provides QKD system expertise and source characterisation, the project bridged component-level innovation with full system requirements for space quantum communications.

Informing the design of future high capacity satellite communications systems

In 2025, Farran Technology, a specialist in millimetre-wave system design, manufacture, and test, secured an ESA-funded contract to support advanced satellite communications research. The company's Q-band amplifier is deployed in ground systems supporting the ongoing Alphasat programme, enabling detailed radio-wave propagation measurements and experimental telecommunications tests. The resulting data contributes directly to improved understanding of atmospheric effects at millimetre-wave frequencies and informs the design of future high-capacity satellite communication systems.

The company also won contracts for specialised test and measurement solutions that allow ESA researchers to characterise the performance, linearity, and efficiency of high-power solid-state amplifiers. These instruments support research into amplifier technologies expected to play a key role in future E- and W-band satellite communications systems, helping to accelerate the adoption of higher-frequency spectrum for space applications.



Figure 28. FPA-22-0002 Q-band solid-state high-power amplifier unit © Farran Technology

Supporting sustainable air traffic across Europe

Dublin-based Airtel ATN supported ESA's IRIS SATCOM programme in 2025 by validating safety-critical communication software used to secure messages between pilots and air traffic controllers over a SATCOM Internet Protocol Suite (IPS) link. Airtel's technology included a gateway system that enables existing aviation communication equipment to connect with newer satellite-based services, alongside ground-based equipment that provide ground access to existing ground systems. These tools were used during IRIS testing to help ensure reliable, continuous communication when aircraft move beyond the reach of ground infrastructure.

This capability supports the gradual introduction of new IPS technology with new satellite services into existing European aviation operations thus enabling trajectory-based operations, which aims to optimise flight paths, reduce air traffic congestion, and cut fuel usage and emissions by up to 10%.

5G and satellite integration

Building on its established expertise in 5G core network technology, Druid Software has expanded into satellite and 5G integration and non-terrestrial networks (NTN). Through the ESA-funded 5G-Reach project, Druid pioneered the integration of legacy satellite networks and 5G. The initial phase of the 5G-Reach focused on the integration and validation of key 5G capabilities within the company's Raemis platform. In 2025, the project shifted focus to the development of a standards-based Access Gateway Function (AGF) within the Raemis platform. The AGF allows legacy satellite networks to connect to Druid Software's standards-based 5G core network to allow the satellite networks to be operated and managed by 5G core networks. This provides a critical first step in the migration of satellite network operators to 5G.

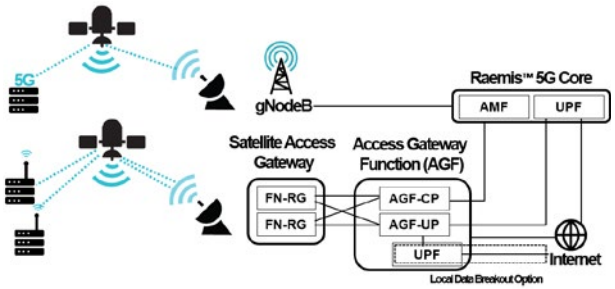


Figure 29. Legacy satellite integration with 5G using Access Gateway Function (AGF) © Druid Software

Flipping the switch for space applications

Tyndall National Institute, in collaboration with ESA and Analog Devices Inc (ADI), completed a comprehensive test programme to assess the suitability of ADI's RF MEMS (Radio-Frequency MicroElectroMechanical) switch technology for space applications. Environmental, radiation and endurance testing carried out in 2025 provided assurance that the ADI switch is suitable for a number of space applications including LEO SATCOM. A new reliability model was developed and validated using the endurance test results and this predicted a lifetime of 10 years for the switch under the specified operating conditions. The design, development and manufacture of ADI's MEMS switches is carried out at the company's European regional headquarters in Limerick.

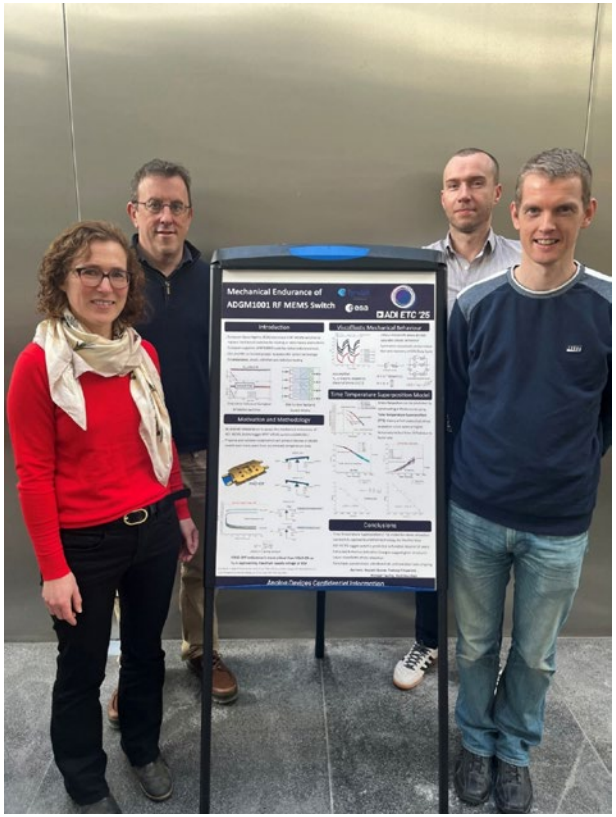


Figure 30. From L-R: Ruth Houlihan (Tyndall), Russell Duane (Tyndall), Padraig Fitzgerald (ADI) and Michael Twohig (ADI) together with their poster "Mechanical Endurance of ADGM1001 RF MEMS Switch" presented at ADI European Technical Conference 2025. The poster won an award for best external poster © Tyndall, ADI

Next generation systems integrate satellite and terrestrial with 5G ecosystem

ST Engineering iDirect announced the general availability of Intuition 1.1, its next-generation satellite ground system, in 2025. Built on cloud-native, multi-orbit architecture, Intuition 1.1 introduces advanced capabilities designed to unify satellite operations, enhance adaptability and maximise efficiency. During the year, the company successfully demonstrated the system's capability to seamlessly integrate satellite and terrestrial networks for scalable and efficient global connectivity.



Figure 31. ST Engineering iDirect's next generation of 5G NTN capable, cloud-native, multi-orbit Satellite-ground system © ST Engineering iDirect

Pilot Photonics takes top honours in Paris

Pilot Photonics won the Innovation Challenge Award at Paris Space Week 2025 for its wideband optical frequency generator unit (OFGU) product. The OFGU uses comb laser technology and photonic integration to generate wide-range, low-noise mmWave carriers for next-generation space applications. Just one week later, the company was selected as the winner at TechTour Photonics for its multi-wavelength laser product, developed for AI datacentres, but now also attracting interest for scaling bandwidth in on-board optical communication satellite links.



Figure 32. Colonel Noël Farnaud (French Space Command) presenting the Innovation Challenge Award to Frank Smyth (Pilot Photonics) at Paris Space Week 2025 © Pilot Photonics

STARLIGHT on... MBRYONICS:

Powering the internet in space

MBRYONICS, a key Irish player in photonic technology solutions and satellite optical communications systems, opened its new Photon-1 volume manufacturing facility in Galway in 2025 as it pursues its mission of delivering the internet in space. Also during the year, co-founders John, Ruth and David Mackey, joined Minister for Enterprise, Tourism and Employment, Peter Burke TD, Enterprise Ireland Executive Director Kevin Sherry and the Irish ESA Delegation Leadership team to announce the creation of 125 new jobs over two years in deep tech engineering and advanced manufacturing as the company continues its commitment to driving space tech in the West of Ireland by delivering innovation to global customers in the ever-growing space economy.

European benchmark for optical Space communications testbed

Another significant achievement during the year saw the company selected to be part of the strategic European partnership delivering Element#2 of the ESA HydRON (High thRoughput Optical Network) programme. The programme aims to demonstrate the world's first entirely optical multi-orbit transport network. Element #2 will provide critical infrastructure for global coverage and increased data processing capacity, enhancing the amount of data that can be transmitted per second while reducing the cost of sending each bit of information.



Figure 33. (L-R) David Mackey (CTO, Co-Founder MBRYONICS), Peter Burke (Minister for Enterprise, Tourism and Trade, DETE), Ruth Mackey (CSO/COO, Co-Founder MBRYONICS), Kevin Sherry (Executive Director, Enterprise Ireland) © MBRYONICS

MBRYONICS will provide full end to end testing capability and build the mission validation testbed for the optical links. This is mission critical as it ensures the system's interoperability, performance and reliability. It also supports European capability to independently benchmark and validate interoperability.

MBRYONICS is providing first-of-its-kind testing capability in Europe and has extended its capabilities to test multiple standards including SDA comet modem testing (3.2 and 4.0) and ESTOL (OpenZR+, OpenRoadM). The company recently demonstrated high speed 400G links on its test bed with the MBRYONICS StarCom optical communication terminal.

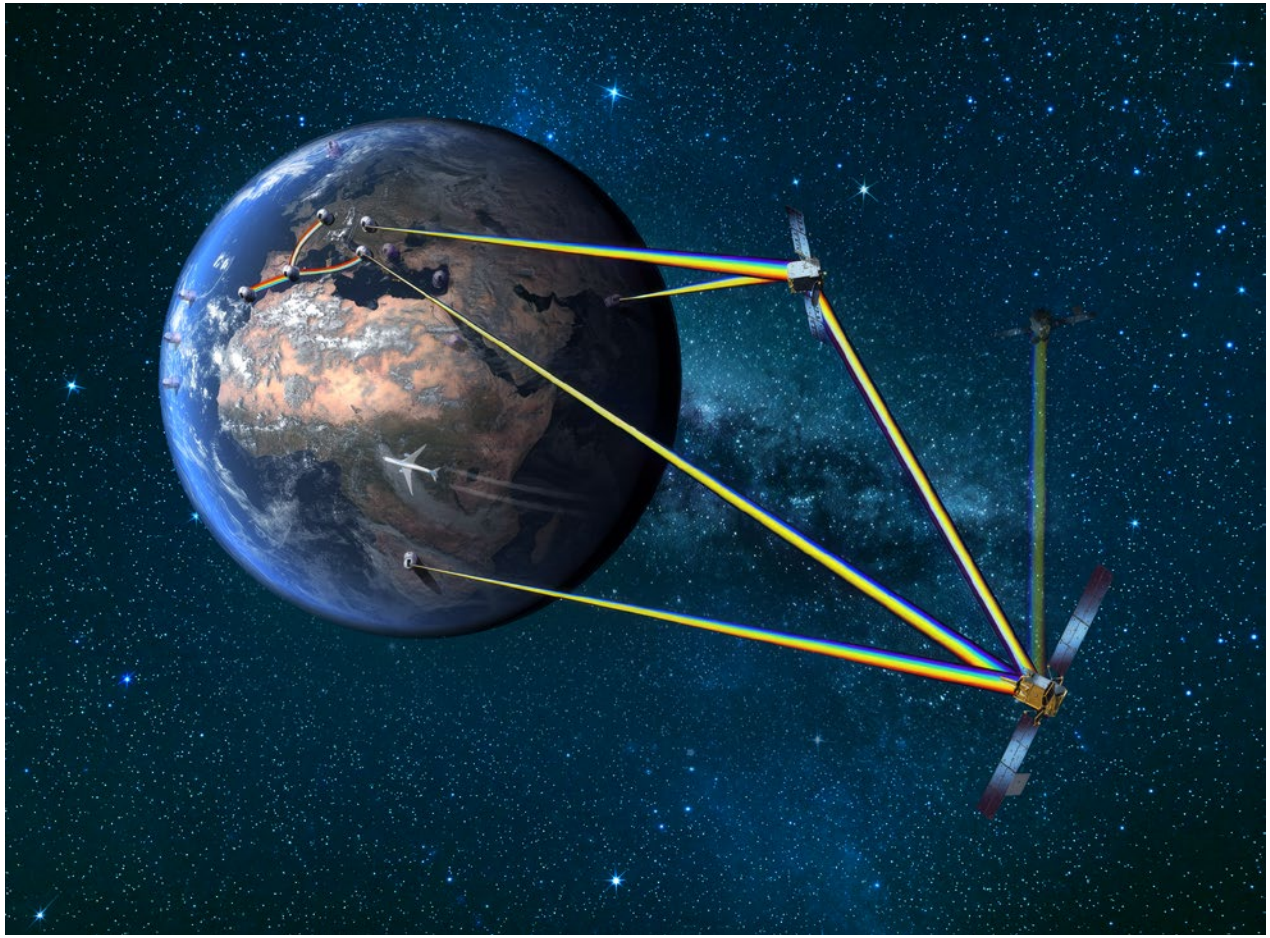


Figure 34. ESA's HydRON project for space-based optical communications moves forward © ESA

5

Positioning & Navigation solutions from Ireland powered by space

Vehicle location mapping breakthrough

An automotive radar algorithm developed by Provizio enables vehicle safety systems to continue to run even when GNSS signals are blocked such as when driving through tunnels or built-up cities – a world first.

Development work on the algorithm was completed in July 2025 under the ESA-funded NAVISP (Navigation Innovation and Support Programme Element) 2 programme. The algorithm enables automotive radars to maintain their location in the absence of satellite positioning, navigation, and timing (PNT) signals. It requires no other sensor inputs or external computing power and is suitable for wider, cheaper adoption as an advanced driver-assistance systems (ADAS) sensor for use on all vehicle classes.

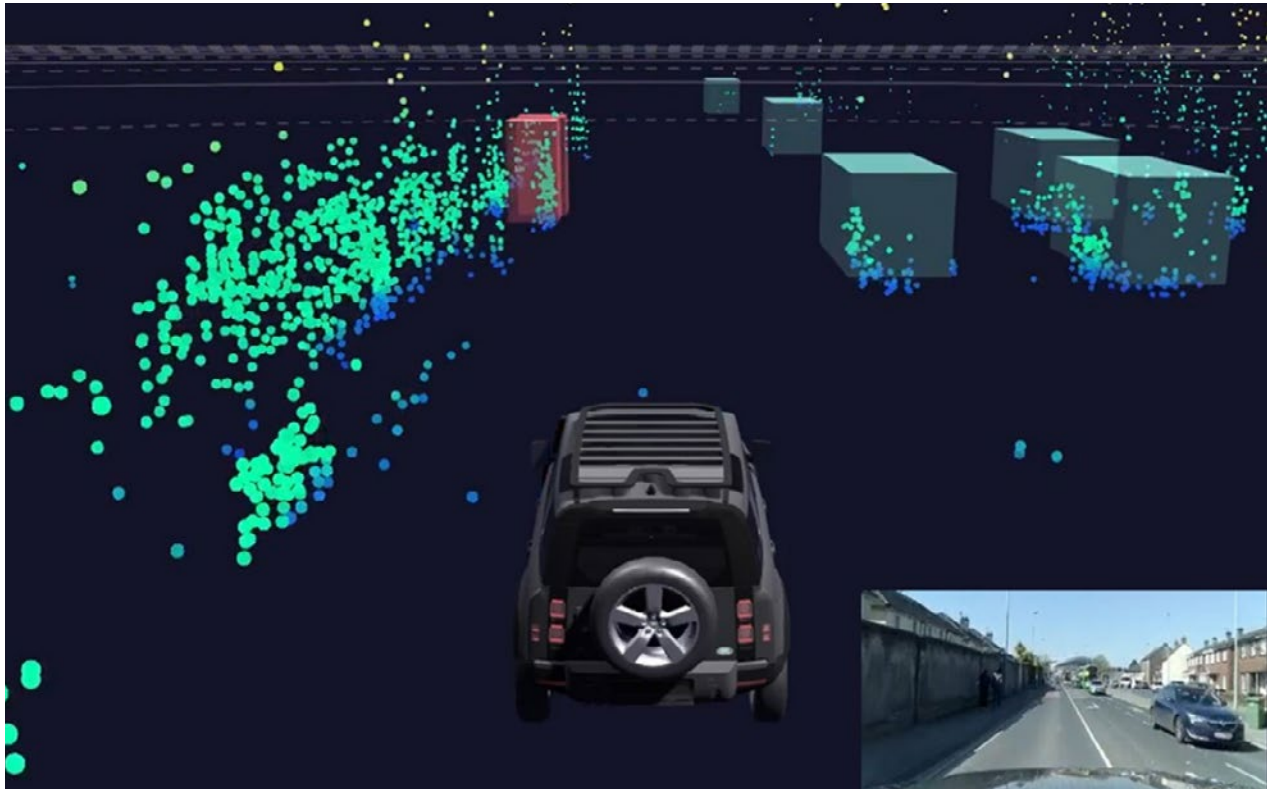


Figure 35: Provizio's radar in operation using the algorithm developed under the NAVISP Element 2 program © Provizio

PARS: Physical AI readiness for safer automation

Dublin-based danalto's physical AI solutions process real-world spatial, location, and radio data to enable organisations to transition from simply tracking assets to orchestrating automated, AI-driven physical workflows. During 2025, the company was awarded ESA NAVISP Element 2 support in 2025 for EPISODE (Enhanced Positioning Services on authenticated Enterprise Infrastructure) and developed physical-AI-readiness-as-a-service (PARS). danalto is now finalising the PARS service which creates a privacy-aware spatial data layer and digital twin, producing a readiness score based on measured movement, congestion, interactions and safety-risk signals — not assumptions. Following implementation customers will be able to identify which workflows are safe and viable for spatial automation and autonomous robotics, and where changes are needed. The PARS service is being prepared for rollout to early customers in Q2 2026.



Figure 36: Dimitri Tintikakis (Business Development Lead) showcasing danalto's latest product release at the recent MWC (Mobile World Congress) in Barcelona in March along with 14 other deep tech companies on the EIC Europe pavilion. danalto demonstrated its Cardinal AI platform that leverages GNSS and terrestrial radios to enable spatial intelligent applications in healthcare, smart buildings and the physical world © danalto

The future of antennas is clear

In 2025, Taoglas completed a research project in collaboration with ESA to develop transparent antenna technology for automotive satellite connectivity. As modern vehicle designs increasingly feature panoramic windows and glass roofs, traditional antennas like the sharkfin have become impractical. The Taoglas project addressed the challenge by designing transparent antenna arrays that integrate directly onto vehicle glass without compromising aesthetics. Beyond automotive applications, the technology has demonstrated promise for smart buildings, electric vehicle chargers and industrial applications where visible external antennas would be intrusive.



Figure 37: Glass placement options on a vehicle © Taoglas

6

Irish companies supporting access to Space

Curtiss-Wright supports successful Vega-C missions

In 2025, Curtiss-Wright delivered remote terminal units (RTUs) and central terminal units (CTUs) for the Vega-C launch programme, forming a core part of the launcher's flight telemetry architecture.

The company's hardware supported three successful missions during 2025. These launches deployed advanced EO satellites, including Biomass, CO3D, MicroCarb and KOMPSAT-7, reinforcing Vega-C's reputation as a reliable launcher for both institutional and commercial missions.

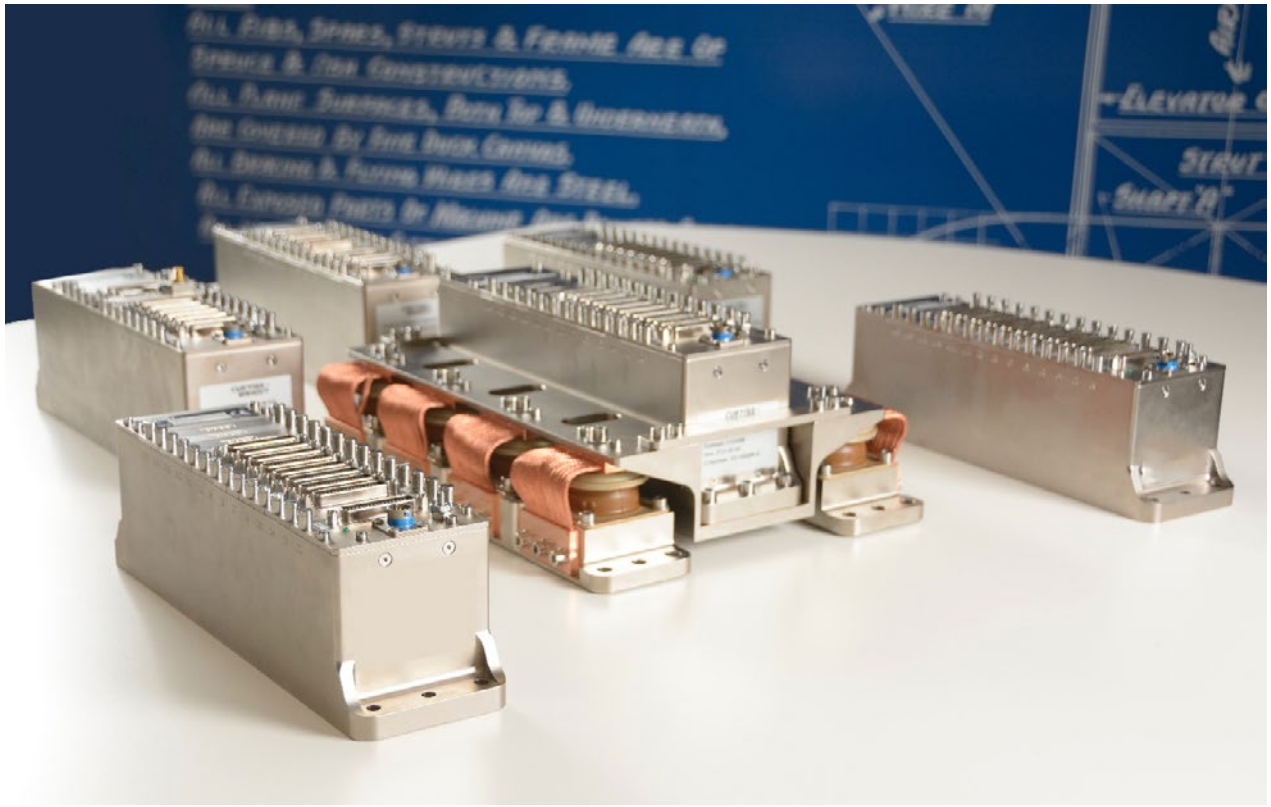


Figure 38. Curtiss-Wright RTU and CTU hardware for VEGA-C © Curtiss-Wright

EU interoperable rocket engine test bench passes Critical Design Review

SUAS Aerospace, together with its consortium partners, has successfully completed the Critical Design Review process for a mobile rocket engine test bench. The EU-BEST programme project aims to develop and operate a cost-effective, interoperable, modular, and mobile rocket engine test bench to address growing European demand for testing facilities. Funded under Horizon Europe, the project brings together seven organisations from four European nations, combining expertise in business development, ground infrastructure engineering, regulation, and logistics. Achievement of this key milestone enables the consortium to proceed to the construction and system integration phases ahead of the demonstration hot-fire test campaign at Lleida–Alguaire Airport, Spain. SUAS's contributions include regulatory assessments for potential secondary test sites, risk analysis associated with deploying interoperable test infrastructure in Ireland and elsewhere, and completion of an environmental impact assessment for a secondary hosting location.

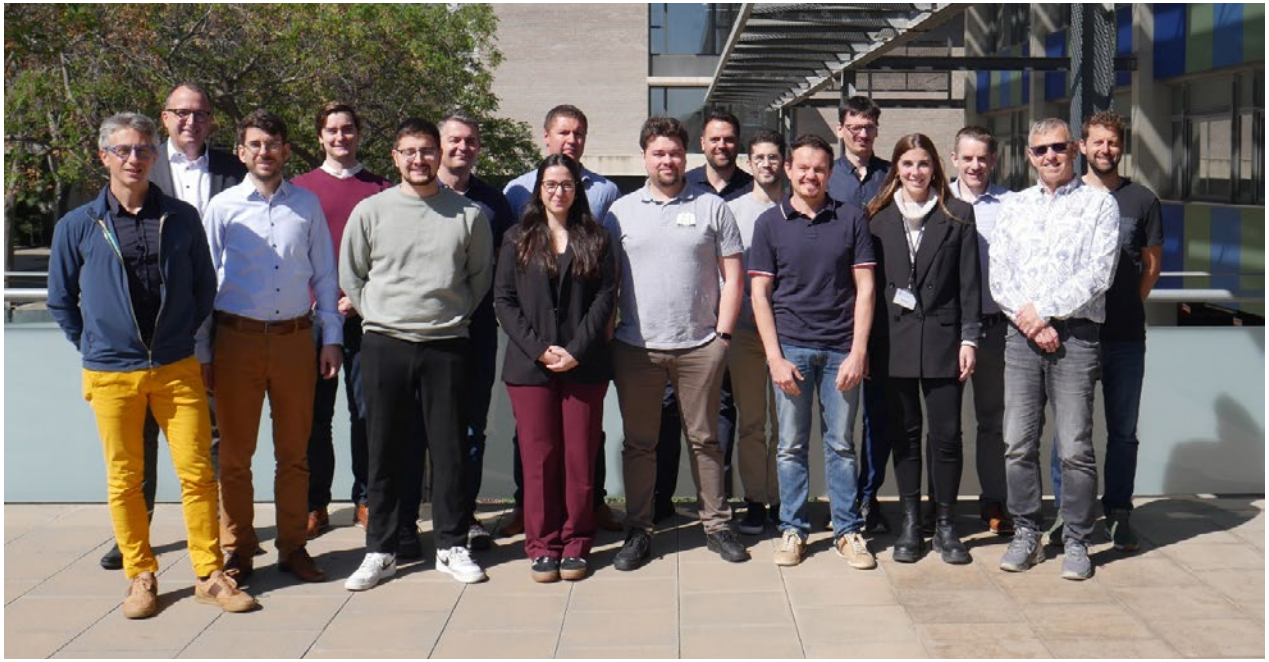


Figure 39. Eu-BEST consortium team meeting for Critical Design Review in Barcelona, Spain (23 April 2025) © Eu-BEST consortium

Réaltra and Nammo technology onboard fourth Ariane 6 commercial flight

Ariane 6 flight VA266 featuring Irish-designed technology successfully launched from the Kourou spaceport in French Guiana on 17 December 2025. Irish space firm Réaltra Space Systems Engineering supplied the VIKI video telemetry system, providing live HD footage from six onboard cameras, while Nammo Ireland contributed components for both the Vulcain 2.1 main engine and the Vinci upper-stage engine.

The Vulcain 2.1 powered the initial ascent before the Vinci engine took over to guide the payload to its target orbit. The launcher carried two additional satellites for the EU's Galileo navigation system, designed to strengthen Europe's autonomy in global positioning services. The satellites will operate in medium Earth orbit at 22,922 km above the planet's surface and will bring the Galileo constellation to 34 spacecraft, greatly bolstering the system's reliability and ensuring continuous 24/7 navigation services for users worldwide.

Higher efficiency power core module from Microchip

In 2025, Microchip Technology Ireland successfully completed verification of a Power Core Module (PCM) designed to support Thrust Vector Control (TVC) for lower-stage launcher applications. The PCM integrates two 80 kW silicon carbide (SiC) motor-drive power stages which achieve a peak efficiency greater than 99.4%. As part of the programme, Microchip partnered with Belgian company SABCA to integrate SABCA's control loop processor on the PCM, demonstrating a complete, integrated hardware and software solution for TVC. Compared with previous solutions, the PCM delivers higher efficiency, higher power density, and reduced mass and helps pave the way for next-generation launcher actuation systems. Development of the PCM was supported by funding under ESA's GSTP programme.

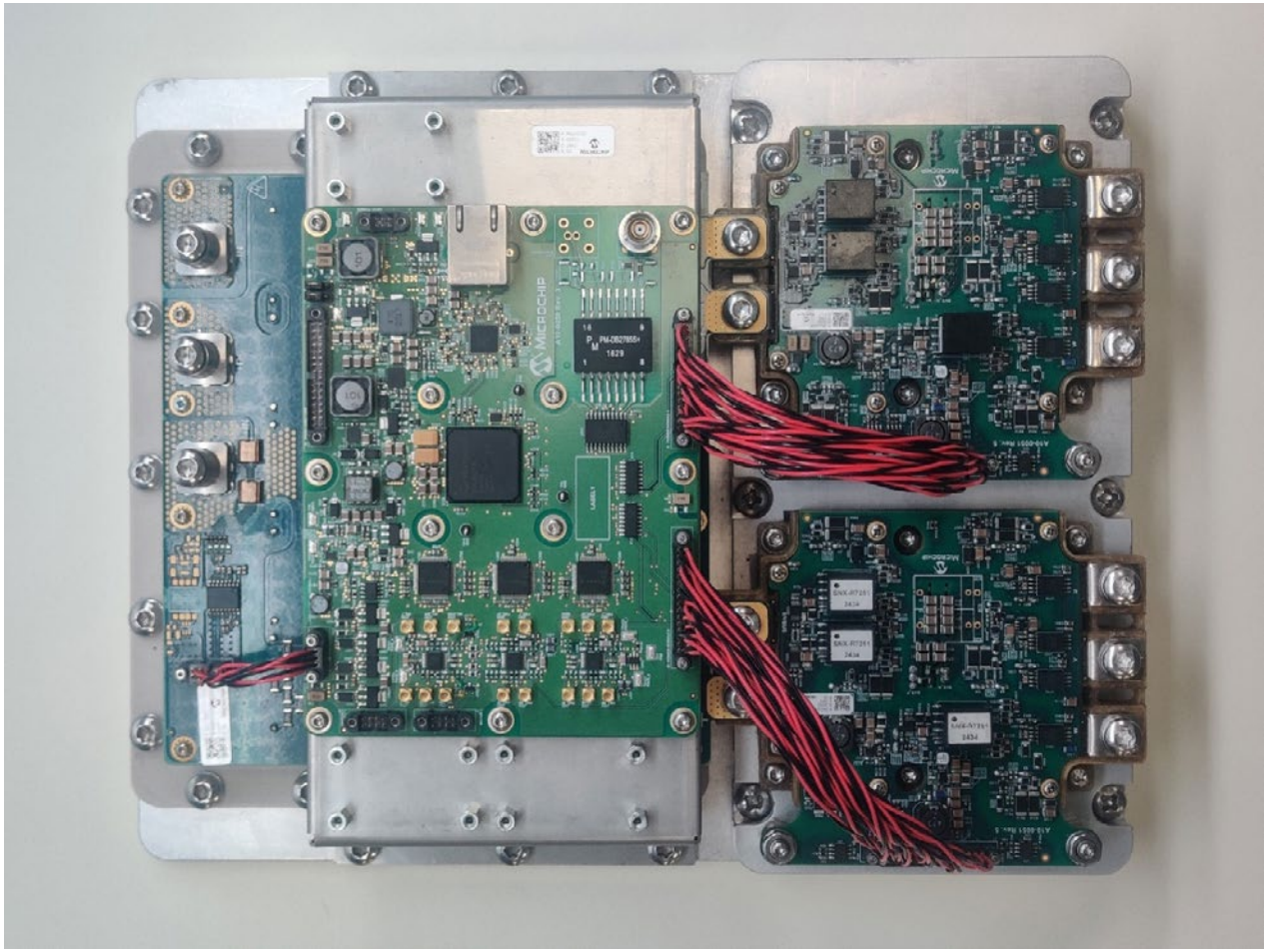


Figure 40. Microchip Power Core Module (PCM) demonstrator © Microchip Technology

Réaltra continues reaching for the stars

Réaltra Space Systems Engineering, with the support of Irish manufacturing partner Realtime Technologies, delivered the payload interface unit (PLIU) for ESA's PLATO mission in 2025. PLATO is scheduled to launch in early 2027 and this was the first time in 30 years that an Irish company had produced a Class A deep space instrument. Réaltra's partnership with ArianeGroup was strengthened through a contract to supply seven of its VIKI camera system kits for future launches. The company also developed and delivered CRYOCAM, a camera capable of operating in the cryogenic temperatures of a launcher's fuel tank, to monitor propellant. Additionally, Réaltra partnered with TTTech to produce the compact MYTHOS Ethernet Switch for space applications. The company's cameras and switch were integrated as part of Horizon Europe's SALTO launcher.

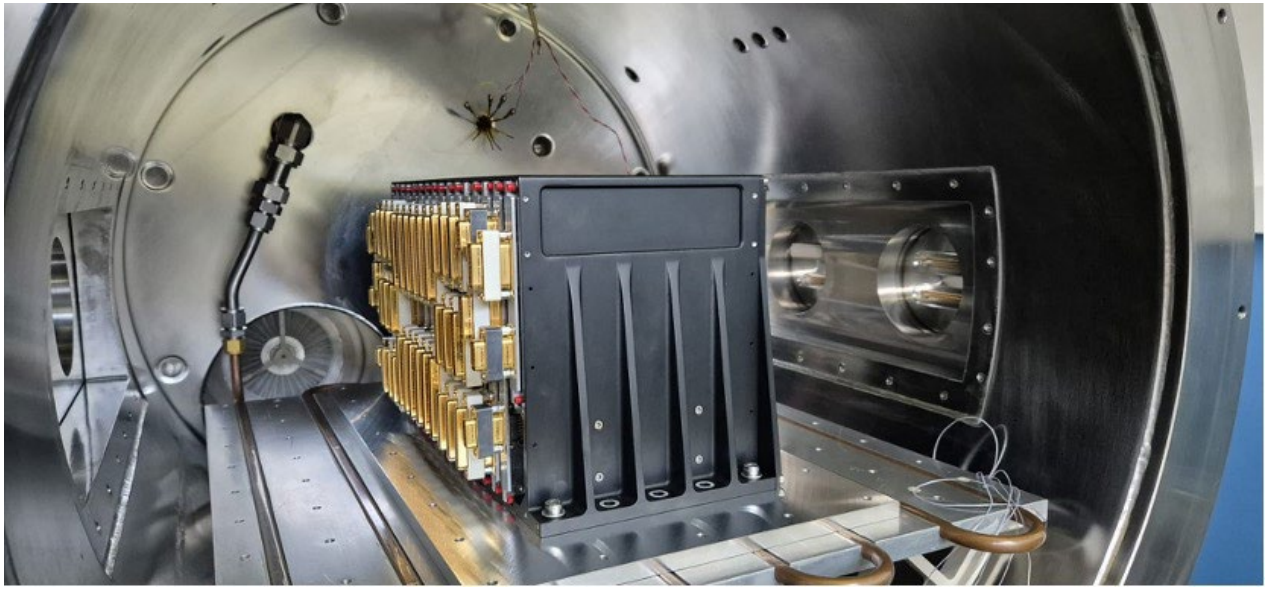


Figure 41. The Flight Model PLIU that was delivered to ESA/OHB for integration on the PLATO spacecraft in 2025 © Réaltra Space Systems Engineering

7

Supporting the next generation of space start-ups in Ireland

ESA BIC hits new heights

ESA BIC Ireland had its most successful year since its inception in 2016 with a record 15 incubation contracts executed during the most recent reporting period. This brought the total number of contracts signed to 30 during the current funding cycle (2022-2025).

ESA BIC Ireland is part of a network of 36 ESA BICs operating across 23 ESA Member States established to empower entrepreneurship and to allow local economies to benefit from space data, technologies and assets. This constitutes the largest space innovation network in the world.

Funded by the Department of Enterprise, Tourism and Employment, through Ireland's membership of ESA, and Enterprise Ireland, ESA BIC Ireland supports start-ups that are developing innovative applications that can either be used in space or that can leverage existing space assets or resources such as EO data and satellite communications. Start-ups supported are involved in the development of a broad range of applications across the business spectrum, including agritech, biodiversity, medical device, health and wellness, materials science, semiconductor, cybersecurity, disability support, carbon capture, sports performance and micromobility.

ESA BIC Ireland is managed by the ESA Space Solutions Centre Ireland (SSCI) Consortium, which comprises seven partners – Tyndall National Institute (lead partner), Atlantic Technological University (ATU), Dublin City University (DCU), Maynooth University (MU), Munster Technological University (MTU), Technological University of the Shannon (TUS) and University College Dublin (UCD).

ESA BIC offers business, technical and financial supports, together with national and international networking opportunities. Incubation space is also made available to start-ups at each of the consortium partner locations, thereby providing an immersive and experiential environment for founders in which to grow and scale their respective companies.

One ESA Spark Funding contract was executed during the reporting year, bringing the total number of such projects contracted to eight during the current funding cycle.

In addition, ESA BIC Ireland hosted a well-attended National Networking Event in Kilkea Castle, Co. Kildare in May 2025. The event featured speakers from the National Delegation to ESA, Enterprise Ireland and also included a training workshop.

New ESA Phi-Lab at Irish Manufacturing Research in Mullingar

May 2025 saw the establishment of ESA's Phi-Lab Ireland at Irish Manufacturing Research in Mullingar. The Phi-Lab – the tenth across ESA Member States – is a dedicated ecosystem designed to bring industry-based research closer to commercialisation by bridging disruptive innovation and commercial needs. Through competitive open calls, and the provision of significant supports to chosen projects, ESA Phi-Lab Ireland will ensure Irish start-ups and scale-ups can continue to play a leading role in both the European and global New Space sectors. ESA Phi-Lab Ireland operated a very successful first open call in 2025, with two projects chosen for kick-off in 2026, confirming Ireland's Midlands Region as a new strategic location for Ireland's commercial space efforts.



Figure 42. ESA Phi-Lab Ireland beginning operations at Irish Manufacturing Research's Advanced Manufacturing Lab in Mullingar in May 2025 © Irish Manufacturing Research

Lios secures €6.25M in funding and wins top EIC innovation prize

Lios celebrated a double victory during 2025. Co-founder Rhona Togher was awarded the prestigious EIC Women Innovators Prize and, two months later, the company secured €6.25 million in funding from the European Innovation Council (EIC) Accelerator in June to scale its operations. The funding will help to fast-track the deployment of Lios's advanced acoustic material, SoundBounce, into global markets. The Lios team worked closely with the EIC National Contact Point (NCP) team within Enterprise Ireland to secure the investment (horizoneurope.ie/category/innovative-europe/european-innovation-council).



Figure 43. Lios co-founders Rhona Togher (left) and Eimear O'Carroll awarded EIC Accelerator funding in 2025 © Lios

8

Space events related to the Irish space sector in 2025

LISA Ireland community kicks off

Researchers from across the island of Ireland came together in January 2025 to form the LISA Ireland research community. LISA is the flagship ESA mission to detect ripples in the fabric of space and time from cosmic events such as merging supermassive black holes. The mission recently moved to the construction phase, and this opens new avenues for funding and leadership roles for Irish researchers. The kick-off LISA Ireland event highlighted the breadth of expertise in LISA science to be found in Armagh Observatory, Maynooth University, Trinity College Dublin, University College Cork (UCC), UCD and the University of Galway.

Presentations at the event included work on modelling merging black holes, the formation of galaxies, the life and death of massive stars, and modelling the laser beams for the LISA instrument itself. More recently, hardware engineers at the Tyndall Institute and ATG Innovation joined the group. Tyndall Institute researchers have been contracted by ESA to test components for LISA mission, while ATG Innovation has been awarded a contract to design the central tube in the spacecraft. A new website (lisa-ireland.ie) has been created to provide updates and more information.

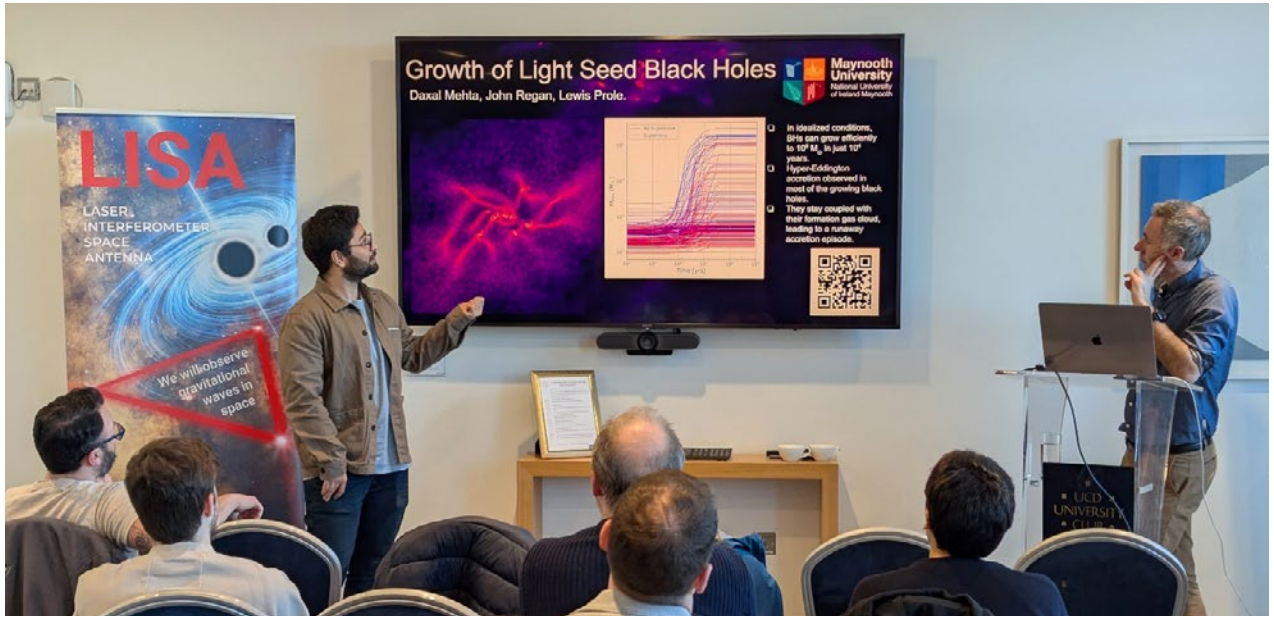


Figure 44. PhD student Daxal Mehta (Maynooth University) presents his research on black hole growth to the newly formed LISA Ireland group © Niels Warburton

Neighbourly collaboration

The second Scotland-Ireland conference on 'Growing the Space Economy Together' took place at the University of Strathclyde in Glasgow in February 2025, with more than 100 attendees from academia, industry and space agencies. This event series strengthens the Scotland–Ireland partnership by demonstrating how research, innovation, and space-enabled solutions can address major local and global challenges, including the transition to net zero and support for rural, coastal, and island communities.

The Glasgow edition showcased some of the collaborative projects that have emerged since the inaugural Dublin conference and explored new opportunities within the shared space economy, including in quantum, maritime and life sciences. The signing of a research MoU between the University of Strathclyde and UCD signalled the intent to foster new research activities and create opportunities for staff and student exchanges. This significant space collaboration was also marked at the launch of the '*Ireland-Scotland Bilateral Cooperation Framework 2030*' in Iveagh House in November, attended by Scottish First Minister, John Swinney, and Minister Neale Richmond TD.



Figure 45. Stephen McArthur (Vice-Chancellor, University of Strathclyde), Paul Bate (CEO, UKSA), Katherine Robson Brown (Vice-President for Research, Innovation and Impact, UCD) signing the research MoU between the University of Strathclyde and UCD at the Scotland-Ireland conference 2025 © University of Strathclyde

Paris Space Week 2025

An exceptionally strong delegation of Irish companies showcased the country's growing space expertise at Paris Space Week in February 2025. Notably, Pilot Photonics won the Innovation Challenge award, an accomplishment that highlighted Ireland's strategic commitment to developing cutting edge photonics and optical communication solutions. Other companies on the delegation included Celtonn, O.C.E. Technology, Plasma Bound, Réaltra Space Systems Engineering and the National Space Centre (NSC) Ltd. which demonstrated advanced capabilities in a range of areas including aerospace electronics, optical systems, plasma-based materials technologies, and mission critical data analytics. A highlight of the week was the visit of representatives of the Irish Embassy in Paris who met with the participating companies to show institutional support, strengthen bilateral engagement, and reinforce Ireland's commitment to fostering collaboration with French and international partners.



Figure 46. Attendees at the Irish Space Association (ISA) pavilion at Paris Space Week 2025, featuring representatives from space-active Irish companies, Enterprise Ireland, Expertise France, French Embassy in Ireland, Irish Embassy in Paris, as well as Norah Patten, Ireland's first astronaut candidate © Enterprise Ireland

Celtic Cosmos: Ireland's journey to the stars

First broadcast in March 2025, Virgin Media Television (VMTV) documentary Celtic Cosmos presented a compelling portrait of a country rapidly emerging as a significant contributor to Europe's space ambitions. VMTV reporter Paul Quinn travelled to the ESA European Astronaut Centre (EAC) in Cologne, Germany and the European Space Research and Technology Centre (ESTEC) in Noordwijk, Netherlands, where he met some of the Irish scientists, engineers and technicians who are contributing to major space missions.

Featuring contributions from the Irish Delegation to ESA, science communicator Niamh Shaw and Ireland's first astronaut candidate Norah Patten, the documentary highlighted how Irish expertise across research, engineering, and industry is helping shape the future of space technology. The documentary showcased the innovation, ambition and growing influence of the over 116 Irish companies involved in the space sector, illustrating how their work supports ESA missions ranging from satellite development to deep-space exploration. The documentary also featured contributions from husband and wife team Aidan and Kim Cowley, Science Officer and Maintenance Manager respectively at EAC, Irish ESTEC staff members Stephen Ennis (ISS system engineer) and Neil Murray (Argonaut engineering team lead).



Figure 47. 'Celtic Cosmos'; a Virgin Media News documentary released in March 2025, showcasing Ireland's expanding role in European space missions © Virgin Media Television (VMTV)

North, South, East and West space Industry events

The West & North-West Space Industry Event 2025 in March provided a platform for regional space active companies, researchers, and stakeholders to showcase capabilities, spark collaboration, and strengthen Ireland's position in the global space economy, particularly within the vibrant West and North-West innovation corridor.

Related regional and thematic space initiatives during the year included the '*Irish Space Tech Event*' at DCU Innovate Hub in July, co-organised by the Irish Space Association (ISA), ESA Phi-Lab Ireland and the ESA Space Solutions Centre, and the '*Lift Off – Unlocking Space Sector Opportunities for the South West*' event at (MTU) in October.



Figure 48. At the West & North West Space Industry Event in Atlantic Technological University (ATU) in March were (L-R© Finola Howe (ATU), Conor Sheehan (Irish Delegation to ESA), George McCourt (ATU), Lisa McNamee (RCSI), Orla Flynn (ATU), Peter Finnegan (ESA Space Solutions Centre and Tyndall National Institute), Xavier Velay (ATU), Patricia Moore (ISA), Catherine Lenehen (Space Industry Skillnet), Laura Byrne (DETE), Hilary McPartland (Regional Skills, North West) © ATU

National Advisory Forum for Space Research (NAFSR) meets

The second meeting of the National Advisory Forum for Space Research (NAFSR) took place in Maynooth University (MU), during Irish Astronomy Week in March 2025. Established in 2024, the NAFSR brings together a broad range of stakeholders and expertise to map out a future roadmap for the broad spectrum of space and space-related research and innovation in Ireland. The meeting discussed the results of a space research-focused survey, which provided a baseline of space research and innovation activities across the country. A first draft of a National Strategy for Space Research and Innovation was circulated for comment and feedback to stakeholders in December The NAFSR is working towards presenting a draft strategy for further consideration before the end of 2026.



Figure 49. Members of the National Advisory Forum for Space Research (NAFSR) © Research Ireland

ESA Scylight Conference

In a first for Ireland, Dublin hosted the 8th ESA Scylight Conference, which focuses on the optical and quantum communications technology sectors. Over 250 delegates convened at the Aviva Stadium in Dublin in June for the three-day event. The audience comprised representatives from industry, academia, space agencies, governments and other stakeholders from across Europe, Canada, Japan, the United States and Australia, focused on advancing secure, high-capacity, space-based connectivity. Space communications are transitioning from traditional radio waves to high-capacity laser-based systems – an area where Ireland is building real strength. The conference offered Irish companies such as MBRYONICS, Pilot Photonics and Eblana Photonics an international platform to raise their profile and build new partnerships. Research-performing organisations including the Walton Institute (Southeast Technological University), Tyndall Institute (UCC) and DCU also got to share their work, with speakers from each addressing the conference. IDA clients, including Intel spinout Viasat, also attended the conference.



Figure 50. ESA Scylight Conference 2025 attendees at Aviva Stadium © ESA

EU Space Act

The EU Space Act was published in June 2025 with the general objectives of supporting the development and functioning of the internal market for the space sector and providing a harmonised legal framework for space activities across the EU. Built around the three core principles of safety, resilience and sustainability, the Act will apply to both EU and non-EU operators offering services across Europe.

Ireland supports the objectives of the legislation and, during 2025, highlighted the importance of regulation to boost European competitiveness and of not creating an unnecessary burden on industry, particularly SMEs. During its six-month tenure, the Danish Presidency oversaw 17 Council Space Working Party meetings, with Ireland participating throughout. Building on these extensive discussions, it published a compromise text in December designed to simplify and streamline the text and improve its overall clarity and coherence.

EU Competitiveness Council (Space) considers space-based data use and EU Space Act

The EU Competitiveness Council (Space) met twice in 2025, in May and December The May Council focussed on the use of space-based data for enhancing resilience, security and crisis management in the EU. Ministers approved the Council Conclusions on the use of satellite data, in particular from EO constellations, for civil protection and crisis management. At the December Council, the Danish Presidency presented the progress report on the EU Space Act (published in June 2025). Additionally, the European Commission provided an update on the first *Implementation dialogue on Space*, which took place in Brussels in November and brought together key industry leaders to discuss EU space policy.



Figure 51. Space Panel, Avcon 2025: Addressing 8,000 students and teachers at Ireland's largest aviation and aerospace career expo in October L-R: Ally Garvey (Presenter), Rob Conway-Kenny (ESA Phi-Lab Ireland), Patricia Moore (Irish Space Association, ISA), Paul Kennedy (Irish Aviation Authority) © Avcon by Shannon Irvine

Enabling contact with ISS

In June 2025, the Irish Space Association (ISA) supported an ARISS (Amateur Radio on the International Space Station) event with Technological University Dublin which enabled DEIS (Delivering Equality of Opportunity in Schools) primary school students to make direct contact with an astronaut aboard the International Space Station.

ISA contributed to Ireland–Scotland collaboration through participation in the '*Scotland & Ireland Space Event: Growing the Space Economy Together*' event at the University of Strathclyde in February and engaged with stakeholders at Space-Comm Scotland in December ISA also co-organised the '*IE Space Industry – Connect by CNES'* webinar in March In October, ISA engaged with students and teachers at AvCon, Ireland's largest aviation and aerospace career expo. There were 8,012 in-person and 6,000 online attendees on the day with 176 schools represented on site.

ESA PRODEX delegation visits Ireland

The Irish Delegation to ESA welcomed representatives from ESA's PRODEX (PROgramme for the Development of scientific EXperiments) programme to Enterprise Ireland's EastPoint, Dublin office in July 2025 for the annual Ireland-PRODEX Bilateral 2025. PRODEX is an ESA initiative that funds the development, operation, and exploitation of scientific instruments and experiments for ESA missions – primarily supporting universities and research institutes by enabling them to design, manufacture and verify space experiments through targeted industrial contracts, while ensuring participating countries gain fair industrial return on their ESA investments. Topics discussed included plans for the ESA Council of Ministers' meeting in November 2025, as well as feedback from the recent PRODEX call for ideas. Guest presentations were also welcomed on the National Space Subsystems & Payload Initiative (NSSPI), the National Advisory Forum for Space Research (NAFSR) and upcoming National R&I Space Strategy, as well as on PRODEX support for Solar Orbiter (SOLO), James Webb Space Telescope (JWST) and ARIEL (Atmospheric Remote-sensing Infrared Exoplanet Large-survey) missions, among other projects.



Figure 52. ESA PRODEX Delegation visit Enterprise Ireland offices, Eastpoint Dublin. L-R: Peter Gallagher (DIAS, TCD), Niall Smith (MTU, Blackrock Castle Observatory (BCO)), David McKeown (NSSPI, UCD), Julia O'Malley (Head of Irish Delegation to ESA, Department of Enterprise, Tourism and Employment, DETE), Michel Lazerges (PRODEX), Theo Ridder (PRODEX), Veronique Dowson (PRODEX), Peter Healy (Department of Further and Higher Education, Research, Innovation and Science, DFHERIS), Jean-Philippe Halain (PRODEX), Padraig Doolan (Irish Delegate, ESA Science Programme & PRODEX) © Enterprise Ireland

Liftoff: Unlocking space sector opportunities for the South West

The Technology Industry Alliance (TIA) in association with Blackrock Castle Observatory (BCO) ran the 'Liftoff: Unlocking Space Sector Opportunities for the South West' industry event at BCO in October 2025. The event was designed to focus on the rapidly changing landscape of the space industry, recognising that it represents one of the fastest growing industries on, and off, the planet. Over 60 attendees engaged with a panel of experts with disparate viewpoints and experiences of the space industry and the challenges faced by industry and SMEs in particular in embedding space as an important element of their business planning. Keynote speaker – retired NASA astronaut Dan Tani – provided first-hand insights from his time aboard the ISS and highlighted the breadth of space-related opportunities available to companies across a wide range of disciplines.



Figure 53. Panellists presenting at the Technology Industry Alliance space industry event at Blackrock Castle Observatory © Technology Industry Alliance

ISA also used the event to poll companies about their experiences in support of the Regional Skills Initiative.

Bremen Space Tech Expo 2025

In November, Ireland marked a significant milestone at Space Tech Expo Europe 2025 in Bremen by hosting its first-ever national pavilion at Europe's leading space industry event. The Irish presence was coordinated by National Delegate to ESA Barry Jennings, together with the Enterprise Ireland project team Colm Foley, Leo Martinez, Lambert Schalk, Sara Bonomi, Martina Forster and Mykolas Kralia. Irish companies exhibiting at the pavilion included Réaltra Space Systems Engineering, Farran Technology, MBRYONICS, Celtonn, Pilot Photonics and the Emerald Aero Group. A highlight of the week was the Ireland Networking Reception, opened by the Ambassador of Ireland to Germany, Maeve Collins, which attracted hundreds of visitors to the stand.



Figure 54. A selection of images from 2025 Space Tech Expo Europe in Bremen, Germany, featuring Ambassador of Ireland to Germany, Maeve Collins, attendees from Enterprise Ireland, Réaltra Space Systems Engineering, Farran Technology, MBRYONICS, Celtonn and Pilot Photonics © Enterprise Ireland

Irish and Canadian commercial astronauts-in-waiting touch down in Dublin and Galway

In November 2025, ISA co-organised a week-long programme welcoming Canadian and Irish astronauts and crewmates Dr. Shawna Pandya and Dr. Norah Patten to engagements across Dublin and Galway. Delivered with the Embassy of Canada in Ireland and Ireland Space Life Sciences – a small but growing Irish network initiative focused on research at the intersection of space and biology/medicine, the programme explored the scientific, commercial and societal dimensions of space. Engagements included talks and panel discussions at the Royal College of Surgeons in Ireland, the Institute of International and European Affairs (IIEA) and UCD, alongside academic roundtables at the University of Galway and innovation sessions at DCU Innovate Hub and CREW – Creative Enterprise West.



Figure 55. Academic Roundtable on Space Medicine Research Updates and Opportunities, hosted by Lokesh Joshi, Vice President for Research and Innovation at University of Galway in November © University of Galway by Martina Regan



Figure 56. Exploring Frontiers: Space Medicine and Human Potential at Royal College of Surgeons in Ireland (RCSI) in November L-R: Norah Patten (IIAS), Lisa McNamee (RCSI), Garry Duffy (RCSI), Shawna Pandya (IIAS), Patricia Moore (ISA), Aamir Hameed (RCSI) © RCSI

Taking Irish space tech to Turin

Enterprise Ireland organised an Irish Space Tech Days market visit to Turin in December 2025. This two-day initiative was aimed at deepening Ireland's engagement with the Italian space technology ecosystem, particularly in Piedmont, Italy's leading region for aerospace.

During the visit, the Irish delegation met with major industry players including Thales Alenia Space Italia, Altec, Argotec and Space Industries, gaining insights into their programmes and engaging with key technical and commercial teams. Nine Irish companies—Ubotica Technologies, Enovus Labs, Skytek, Celtonn, O.C.E Technology, Eblana Photonics, Pilot Photonics, Realtra and Plasma Bound—participated in site visits, B2B meetings and networking events.



Figure 57. The Irish delegation during the visit to Argotec's headquarters in San Mauro Torinese, Italy © Enterprise Ireland

Building academia–industry partnerships in Ireland's Space sector

In December 2025, ISA partnered with UCD to host '*Building Academia–Industry Partnerships in Ireland's Space Sector*', attracting almost 200 registrations from across academia, industry and government. The event also marked the launch of '*Beyond the Horizon: Building Ireland's Space Workforce'*, a report by Regional Skills, ISA, Space Industry Skillnet and Ireland Space Life Sciences, providing a national analysis of Ireland's space skills needs.



Figure 58. Launching Beyond the Horizon: Building Ireland's Space Workforce at the ISA/UCD "Building Academia–Industry Partnerships in Ireland's Space Sector" event in December were (L-R© Patricia Moore (ISA), Natasha Kinsella (Regional Skills, Dublin), Denise Rocks (Regional Skills, West), Minister for Further and Higher Education, Research, Innovation and Science James Lawless TD, Hilary McPartland (Regional Skills, North West), Catherine Lenehan (Space Industry Skillnet) © UCD

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Ireland at the forefront of space research

Mission accomplished for EIRSAT-1

After 9,892 orbits around the Earth and having travelled approximately 430 million kilometres, EIRSAT-1 (Educational Irish Research Satellite-1) completed its mission after nearly two years in space when it re-entered Earth's atmosphere on 04 September 2025, burning up as it did so. Built and operated by students and staff at UCD, with the support of the ESA Academy "Fly Your Satellite!" programme, the CubeSat carried experiments for gamma-ray detection, materials characterisation and a novel magnetic attitude control testbed.

The experiments operated as planned, producing scientific results that included the detection of more than 10 gamma ray bursts and the in-orbit demonstration of an inertial pointing magnetic-only control system. The project marked a major milestone for Ireland's space ambitions, showcasing successful collaboration between academia, industry, ESA, and government. More than 50 students gained hands-on systems engineering and spacecraft operations experience, enabling the development of new UCD teaching programmes and national space initiatives. In recognition of the transformative impact of the EIRSAT-1 mission on Ireland's space sector, UCD was awarded €1 million in Higher Education Authority (HEA) performance funding for taking 'Ireland into the space age'.



Figure 59. HEA Performance funding award (L-R: Lorraine Hanlon (Director at UCD Centre for Space Research, UCD), Orla Feely (President, UCD), James Lawless (Minister for Further and Higher Education, Research, Innovation and Science)) © Higher Education Authority (HEA)

Tracking ecological damage in the Niger Delta using EO and AI

The Niger Delta is among the world's most ecologically diverse regions and is home to nearly 30 million people from over 40 ethnic groups, whose livelihoods, food security, cultural identity, and wellbeing depend largely on farming and fishing across coastal riverine communities. The region also contains Africa's second largest petroleum reserves, underpinning Nigeria's economy, yet oil extraction since the 1950s has released pollution equivalent to over 13 million barrels, devastating ecosystems and creating severe, long-term health risks for residents throughout the delta. Monitoring oil pollution across 9,000 square kilometres is logistically daunting but, in 2025, researchers led by University of Galway, with partners in Ilorin, used Sentinel-1 and Sentinel-2 satellites, AI, and data-fusion techniques to map pipelines and assess forest vitality across wetlands.

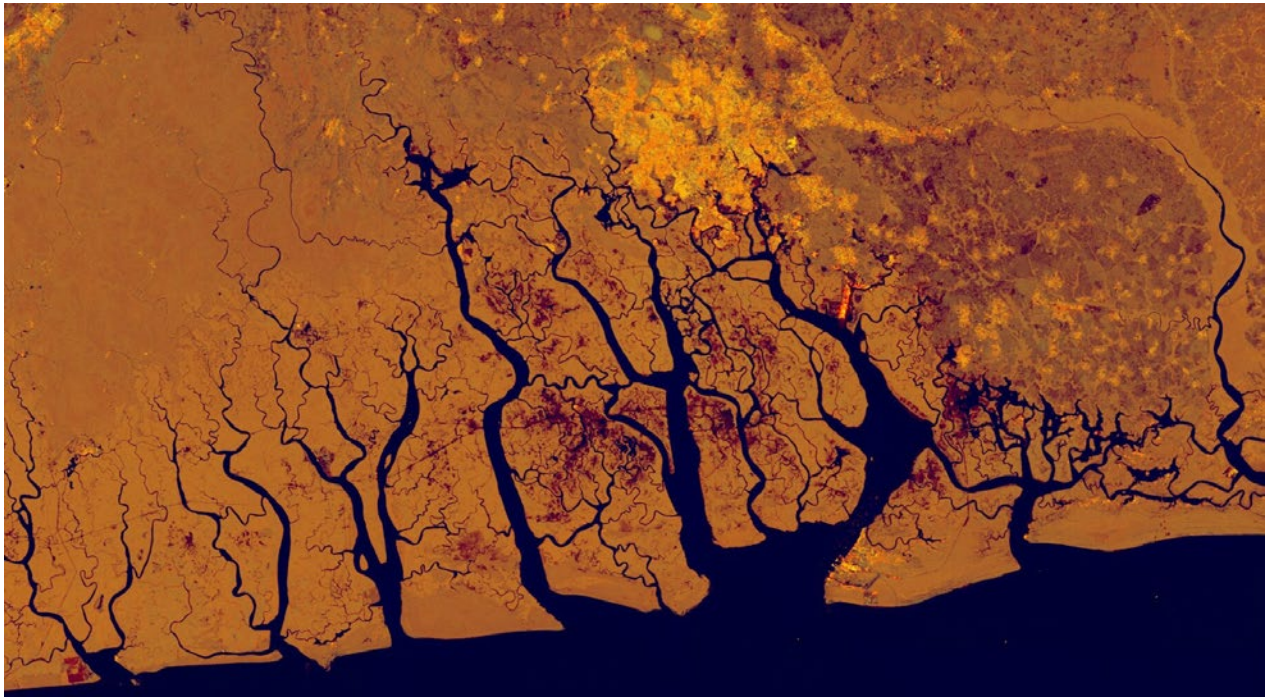


Figure 60. Synthetic Aperture Radar (SAR) image of the Niger Delta, centred on Rivers State, captured by Sentinel-1 in January 2024. The state capital, Port Harcourt, appears in bright orange in the upper centre, while pollution-induced deforestation is visible in the dark burnt-orange regions. This imagery underscores the scale of ecological damage in one of Nigeria's most impacted areas © Jemima O'Farrell (Ryan Institute/University of Galway)

UCD researchers design experiment for microgravity sounding rocket

Researchers from the Phase Transformation Research Group (PTRG) at UCD are contributing to cutting-edge space materials science through the design of microgravity solidification experiments for ESA's MASER-17 suborbital express sounding rocket. Magnesium alloys are lightweight materials widely used in aerospace and in emerging biodegradable medical applications. The project investigates how these alloys solidify in the absence of gravity. Using a specially designed X-ray monitoring solidification furnace (XRMON-SOL), the team carried out extensive ground-based validation tests to refine alloy composition and thermal schedules that can operate within the six-minute microgravity window of a sounding-rocket flight. These tests were completed in 2025 at the Swedish Space Corporation (SSC) in Stockholm, where researchers and engineers from UCD, the University of Manchester, ESA and SSC worked together to finalise flight-ready conditions. The upcoming sounding-rocket experiment will deliver new insights into alloy solidification physics and highlights UCD's growing role in microgravity research.



Figure 61. Research team during the Science Validation campaign at the Swedish Space Corporation, Stockholm, bringing together UCD, University of Manchester, ESA, and SSC. The XRMON rocket module can be seen through the door in the centre © UCD

Irish-Canadian collaboration enabling life sciences on Mars

UCD continued to contribute to leadership in space life sciences in 2025 through international agency-funded research that links deep space exploration with sustainable systems on Earth. Research at UCD includes MARSCROP, one of the only genetics projects in Europe currently funded by both ESA and the Canadian Space Agency (CSA). Delivered through collaboration between leading microbiome scientists in Ireland and Canada, the research is exploring plant-microbiome dynamics to enable crop growth on the Moon and Mars. The MARSCROP team also took part in the 2025 UCD Festival in June, attended by over 20,000 visitors, showcasing how discoveries from Irish space life sciences translate to innovation for sustainable agriculture on Earth through UCD Earth Institute's 'Plants for the Future' exhibit.

UCD also contributed to a NASA-led international roadmap paper in *New Phytologist*, outlining plant science and technology priorities for long term lunar and Martian habitation, including a bioregenerative life support system readiness level framework to assess closed loop air, water, and nutrient recycling.



Figure 62. MARSCROP exhibition at the UCD Festival. Members of the Brereton laboratory (L-R: Cas Cornet (Post-doctoral researcher), Stefania Sabau (ESA-funded PhD student) and Vashika Narasimhan (MSc. student)) showcasing the ESA- and CSA-funded MARSCROP project, highlighting how plant-microbiome research for future lunar and Martian exploration translates into innovation for sustainable agriculture on Earth © UCD

Revealing the origin and birthplace of energetic high-energy transients

A team of scientists at UCD, led by Asst. Prof. Antonio Martin-Carrillo, has been using data from the Hubble Space Telescope (HST) and James Webb Space Telescope (JWST) to study the nature of Gamma-Ray Bursts (GRBs), the most energetic explosions in the Universe. During 2025, the team led the discovery of the counterpart of the longest high-energy explosion ever recorded. Through HST and JWST data, the team was able to study its host galaxy and provide key evidence towards its origin. Using JWST, the group was also involved in the discovery of the explosion from the death of a massive star approximately 13 billion years ago, when the Universe was just 730 million years old.



Figure 63. NASA's James Webb Space Telescope image of GRB 250702B's host galaxy. The tick in the zoomed inset indicates the burst's position, ruling out the GRB's association with a supermassive black hole at the galaxy's core © NASA, ESA, CSA, H. Sears (Rutgers), A. Pagan (STScI)

End of scientific operations for Integral

ESA's International Gamma-Ray Astrophysics Laboratory (Integral) mission came to an end in February 2025, after nearly 23 years of operation, with atmospheric re-entry planned for early 2029. The mission made major contributions to understanding the Universe's most violent and exotic objects, such as black holes, neutron stars, active galactic nuclei, supernovae and gamma ray bursts.

Ireland played a notable role through Prof. Brian McBreen of UCD, a member of the original proposing team and leader of the Irish involvement in the on-board optical monitoring camera. Irish astrophysicists frequently secured competitive observing time and served on user committees throughout the mission's operations. UCD hosted the 2010 Integral conference at Dublin Castle; the only one held in Ireland throughout the mission lifetime. Integral's extensive two-decade dataset will be preserved in the Integral Science Legacy Archive, supporting future scientific research and inspiring new generations of scientists and engineers.

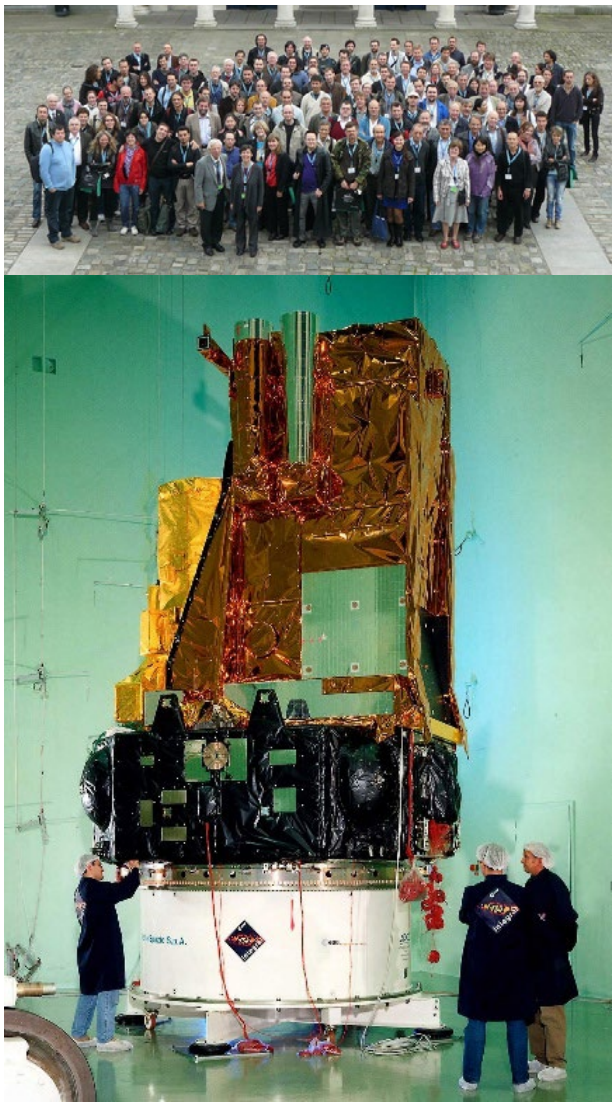


Figure 64. (top) 2010 bi-annual Integral Conference, Dublin Castle © UCD; (bottom) Integral under test at ESTEC, 2002 © ESA

Irish scientists celebrate LISA success

Irish scientists have secured significant funding along with leadership roles relating to the LISA mission. Prof. Barry Wardell (UCD) was awarded €2.5 million from a European Research Council (ERC) Advanced Grant to model gravitational waves from the merger of compact objects with supermassive black holes. This was supplemented by ESA PRODEX funding to work on the LISA Science Ground Segment. Dr. Niels Warburton (UCD) was elected as the spokesperson for the LISA Consortium, an international group of over 1,500 scientists and engineers dedicated to supporting the LISA mission. In addition, Dr. John Regan (Maynooth) and Dr. Chris Kavanagh (UCD) were elected as co-chairs of the LISA Consortium Council and the Waveform Working Group, respectively.

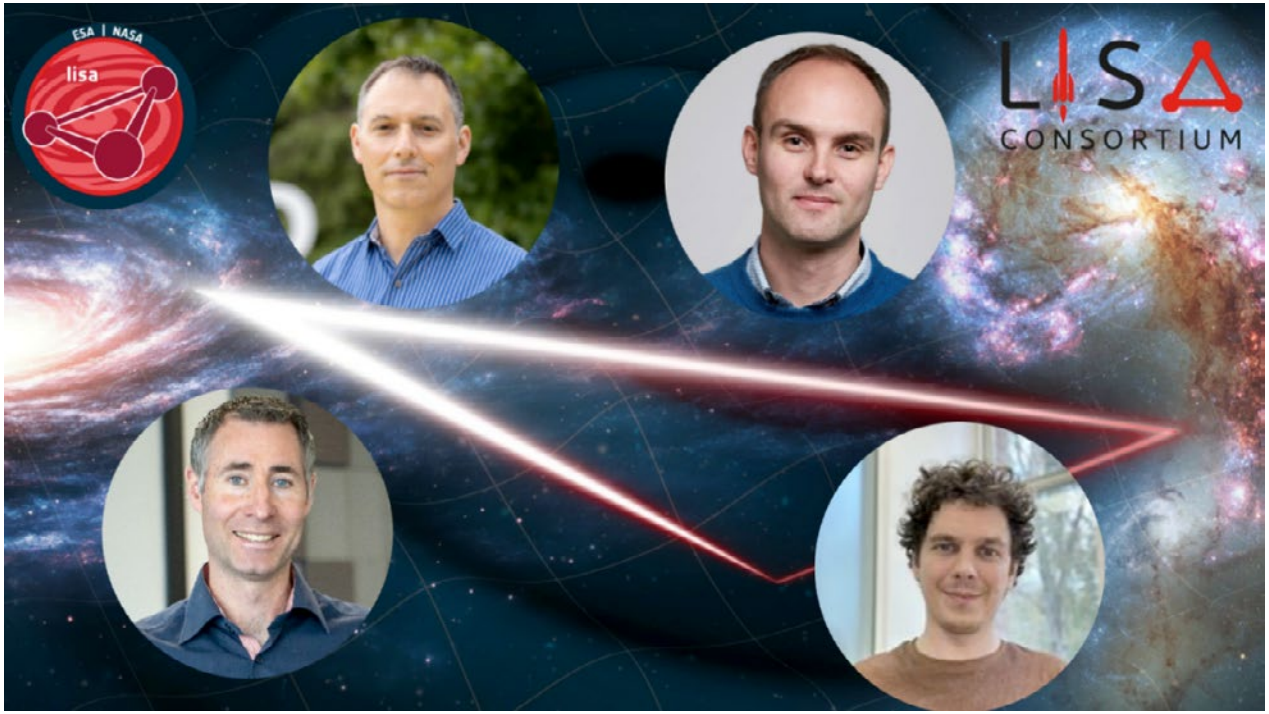


Figure 65. Irish scientists (L-R: John Regan, Barry Wardell, Niels Warburton, Chris Kavanagh) at Maynooth University and UCD have won major grants and leadership roles relating to the LISA mission © LISA Consortium

Maynooth University joins ground-breaking mission to study star and planet formation

With funding from Research Ireland, Maynooth University became a member of the Mauve International Space Science Programme in August 2025. Mauve is an ultraviolet telescope (UV visible satellite) developed by UK-based company Blue Skies Space. The satellite, which was launched aboard SpaceX's Falcon 9 Transporter-15 on 28 November 2025, marks the beginning of a three-year mission to study how stars behave and how their activity influences the habitability of exoplanets. The importance of the Mauve Space Programme is not only in its scientific goals but also in how it represents a new, faster, and more collaborative approach to doing space science. Designed and built in under three years, Mauve is a small, suitcase-sized satellite, weighing around 18kg, equipped with a 13 cm telescope that observes from 200–700 nm. A research team from the Maynooth Department of Physics, led by Dr. Emma Whelan, and including PhD students Patrick Flanagan and Jamie Pritchard Stewart, will use Mauve to investigate how stars and planets form, focusing on a class of young stars known as Herbig Ae/Be stars.

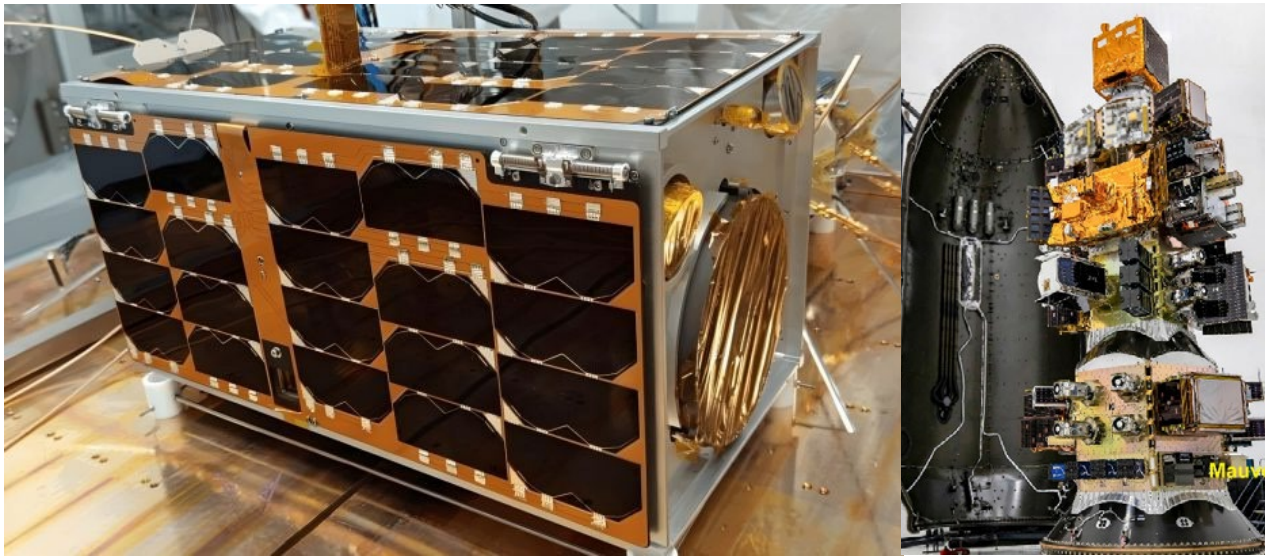


Figure 66. (left) The Mauve Space Telescope after the completion of integration © Blue Skies Space. (Right) A glimpse of the 140 payloads onboard SpaceX's Transporter-15 mission shortly before launch (with Mauve at the bottom right) © SpaceX

University of Galway researchers help discover new planet WISPIT 2b

An international team of astronomers, co-led by researchers at the University of Galway, has made the unexpected discovery of a new planet. Named WISPIT 2b, it lies about 430 light years away and is estimated to be around five million years old. The planet is most likely a gas giant similar in size to Jupiter. It was detected at a very early stage of formation, orbiting a young star resembling an early version of our own Sun.

This is only the second confirmed planet ever observed at such an early evolutionary phase, with the first discovered in 2018. The planet was captured in near-infrared light, similar to what night-vision technology detects, as it remains glowing and hot from its initial formation. The discovery was made using the European Southern Observatory's Very Large Telescope in Chile's Atacama Desert. The study, led by Leiden University, the University of Galway, and the University of Arizona, has been published in *Astrophysical Journal Letters*.

First of its kind all-Ireland peatland condition monitoring platform

In late 2025, the AI2Peat team won the competitive Future Digital Challenge Prize funding under Research Ireland's National Challenge Fund for its highly innovative raised bog ecology mapping and monitoring platform. Led by CeADAR (UCD School of Computer Science) in collaboration with UCD School of Earth Sciences, the Research Ireland Centre for Applied Geosciences (iCRAG) and the NPWS, the AI2Peat project combines satellite imagery from the EU's Copernicus programme, AI, and domain expertise, to infer aspects of peatland condition at national scale. The AI-generated maps enable the estimation of carbon dioxide equivalent (CO_2e) sequestration/emission values at unprecedented spatial resolution, accuracy and coverage. The team has also devised AI-powered algorithms for national scale mapping which can detect changes in bare peat cover. AI2Peat's peatland condition monitoring platform is publicly available at PeatSense.org.



Figure 67. Bespoke condition assessment on PeatSense. After selecting an area of interest and clicking "Analyse Boundary", AI2Peat's AI model infers ecological classes, and the derived emissions are estimated © UCD

Irish rocketry makes international podium

University of Limerick's High-Powered Rocketry team (ULAS HiPR) is the first Irish team to podium at an international competition. The team came second in Mach 25 Rocketry, an annual competition and conference for university students taking place in Machrihanish, Scotland, having learned from last year's attempts to develop a launch vehicle. The ULAS HiPR rocket 'Macha', which featured a composite airframe, launched successfully, reached a 2.3km apogee and deployed a custom-built AI model payload.

Also in 2025, ULAS HiPR made considerable strides in growing the Irish student space scene. In conjunction with other universities like UCC and MTU, the team established EirSEDS, the Irish branch for the global Students for the Development and Exploration of Space (SEDS) organisation. The new national organisation aims to bring together all student space societies in the country under one banner. In addition, ULAS HiPR hosted the National Student Space conference at UL with special guest American astronaut Dan Tani.



Figure 68. ULAS HiPR at the Mach 25 Rocketry Competition with their rocket Macha. (L-R): UL students Adam Byrne, Elgan Isaac, Ali Albeedeen, Jay Looney (front), Dervla Gargan, Delvin Louis © Madeleine Landell



Figure 69. (L-R): Mícheál Foley (Earth Observation Analyst, Mallon Technology), Jay Looney (student, ULAS HiPR), Daniel Tani (Former US Astronaut), Dervla Gargan (student, ULAS HiPR), Michael Moynihan (UCC Rocketry Society), Darren Moynihan (UCC Rocketry Society) © Dermot Comerford

Keeping an eye on active volcanoes

The findings of a UCD School of Earth Sciences study on the 2024 eruption of Fernandina volcano in the Galápagos archipelago, conducted with partners in Ecuador, Germany, USA and the United Kingdom, were published in 2025 in the *Journal of Geophysical Research – Solid Earth*.

The researchers used Copernicus satellite data to track the evolution of the lava flows through time and calculated the thickness of lava added to the volcano flank. The advance of the lava flow from the volcano summit to the sea, and the consequent creation of 12 ha of new land, was found to have been made possible by a 14-km long network of subterranean lava tubes.

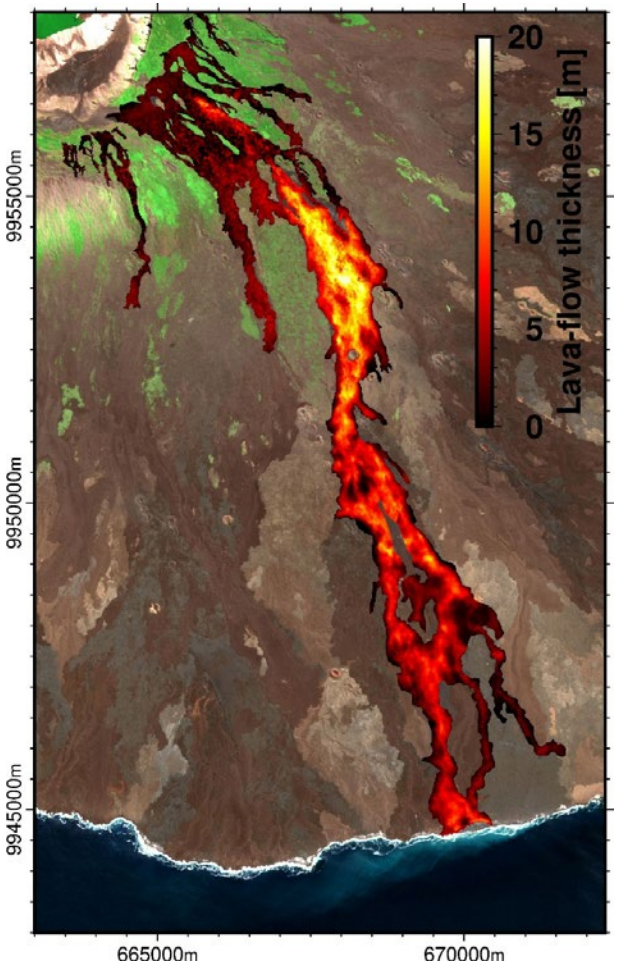


Figure 70. Lava-flow thickness map of the 2024 eruption of Fernandina. Contains modified Copernicus Sentinel-1 and Sentinel-2 data, processed by ESA, and retrieved from Copernicus Data Space Ecosystem and ASF DAAC (2024-2025) © UCD

Supporting JUICE on its journey to Jupiter

Dr. Mika Holmberg of the Dublin Institute for Advanced Studies (DIAS) has been awarded a Research Ireland Pathway Grant to conduct research commencing in 2025 on how the JUICE spacecraft interacts with its surrounding space environment. The work is being carried out in collaboration with international partners and supported by ESA.

JUICE is one of Europe's largest ever space missions and the first to venture to the outer Solar System, with an ambitious goal to explore the habitability of Jupiter's moons. As JUICE travels through harsh space environments, interactions between the spacecraft and charged particles can influence both the spacecraft itself and the measurements made by its scientific instruments. The research group at DIAS is studying these interactions using advanced spacecraft–plasma interaction simulations to identify and quantify their impact on the JUICE observations. This work is essential for ensuring that JUICE data can be accurately interpreted and will play a key role in future studies of the atmospheres, oceans, and potential habitability of Jupiter's larger moons.



Figure 71. Dr. Mika Holmberg in front of a model of the JUICE spacecraft at the April 2023 JUICE launch event at the European Space Operations Centre (ESOC) in Darmstadt, Germany © Mika Holmberg

Additive manufacturing world first for Irish Manufacturing Research

Researchers at IMR achieved an additive manufacturing world first in Mullingar in 2025 with the successful printing of a highly sought after novel, high-performance metallic alloy. The work was carried out in partnership with satellite communications specialist MBRYONICS, using a machine produced by engineering and scientific technology company Renishaw.

The material, which is cost-prohibitive through conventional manufacturing methods will enable the development of affordable, high-specification, and lightweight space mirrors; essential components for improving communications and EO from orbit. It also has the potential to solve current industrial challenges including performance and miniaturisation.

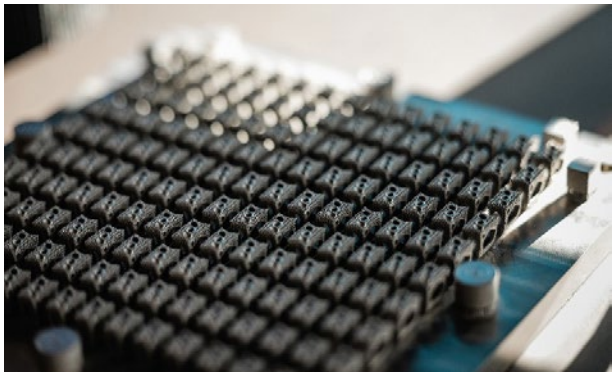


Figure 72. High-performance metallic alloy successfully developed through additive manufacturing for the first time at Irish Manufacturing Research's Advanced Manufacturing Lab in Mullingar in early 2025 © Irish Manufacturing Research

Applying space research to pandemic preparation

Researchers at BCO are using high precision photometry techniques originally developed for astrophysics applications to address the efficacy of masks against the spread of airborne diseases and to track space debris. The work previously received a '*Research Image of the Year Award*' from Science Foundation Ireland (now Research Ireland) and was expanded in 2025 with the recruitment of a postdoctoral researcher and a PhD student. The research uses the latest AI technologies to identify and track airborne droplets, determining the size of the droplets through precision measurements of droplet brightness. The tracking capabilities developed for droplets is particularly exciting as it affords the potential for real time situational awareness monitoring for spacecraft, something the group is actively working on. Droplets and space debris look remarkably similar, but droplets move more erratically under the influence of air currents. By contrast, space debris follows considerably simpler trajectories and is comparatively easy to track visually.



Figure 73. SFI (Science Foundation Ireland) Research Image of the Year 2020 entitled "Talking Heads". The image illustrates the effect of mask wearing on droplets exhaled from two individuals in apparent conversation (represented here by medical dummy heads) © Blackrock Castle Observatory (BCO)

Working to scale

In 2025, the Irish Centre for High-end Computing (ICHEC) won €65 million in funding jointly from national funds and EuroHPC for a new supercomputer known as CASPIr. This represents a 10- to 20-fold increase in high performance computing capacity and capability in Ireland. ICHEC has been developing an EO data cube for publishing national EO data for researchers, SMEs and the public sector, which will include connectivity to an AI factory in France as well as quantum computing capability.

ICHEC has also created a training module (SEODA) for high performance computing (HPC) and ML/AI for large scale analyses. In addition, ICHEC has been deploying these skills for the private sector in a collaboration with FactoryXChange – a European Digital Innovation Hub (EDIH) created to accelerate digital transformation for enterprises across Ireland.



Figure 74. FactoryXChange partners at the FXC summit in November 2025 © ICHEC

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Irish Education and Public Engagement with Space

ESERO Ireland supporting educators and learners

ESERO Ireland, the Irish national office of the European Space Education Resource Office, is an education project of ESA that is co-funded by Research Ireland. Working with national collaborators, ESERO Ireland aims to spark young people's passion for STEM, build their skills, and empower them to pursue careers in space, while also raising awareness of the vital role space research, exploration, and applications play in shaping modern society.

ESERO Ireland supports educators and learners through working with national collaborators and partners to deliver continual professional development opportunities to educators promoting inquiry-based learning, and classroom and activity-based resources linking space related topics to curricula and practical applications. In 2025, there were 1,800 educators and pre-service teachers attending ESERO CPD courses nationwide, including both in-person and online delivery. There were over 760 downloads of space-linked resources from the ESERO Ireland website throughout 2025.

In collaboration with MTU Blackrock Castle Observatory (BCO), ESERO Ireland delivers the 'ESERO Space Goes to School' programme, facilitating researchers and professionals involved in the Irish space sector to link in with school students via interactive live webinars. This engaged 2,425 students in 25 primary and secondary schools during STEM weeks in 2025 including Engineers Week, Space Week, Maths Week and Science Week.

ESERO Ireland also coordinates the ESA School Projects in Ireland, including CanSat which involved 40 student teams from schools nationwide undergoing training with expert mentors and 25 teams participating in regional and national competition stages. The winning team from the CanSat Ireland 2025 National Final attended a 2-day "Space Engineer for a Day" event at ESA's ESTEC (European Space Research and Technology Centre) site in the Netherlands.



Figure 75. Winners of the CanSat Ireland 2025 National Final, students from Confey College, Co. Kildare, at ESA's 'Space Engineer for a Day event' (July) © BCO

Discover Projects & Space Adventures

ESERO Ireland works with partners to deliver programmes and activities to inform and inspire young people, including through Research Ireland's Discover funding programme. These programmes include 'Space Crafts' with DIAS Dunsink Observatory, 'TryFive+' with TU Dublin, 'Town Scientist' with Niamh Shaw and '5*S' with Maynooth University.

2025 has been another exciting year for public engagement at DIAS Dunsink Observatory in Dublin. The institute ran a series of space-related events for children and the general public throughout the year, with their public nights attracting several thousand visitors to connect with researchers and to look through the historic Grubb Telescope – the largest refractor in Ireland. In addition, DIAS Dunsink Observatory continued to run their very popular transition year programme twice during the year, allowing students from secondary schools around Ireland to spend a week at the Observatory and to connect with researchers and other students with a passion for space. A highlight of the year was the continuation of 'Space Crafts', supported by Research Ireland's Discover Programme and the Fingal County Council Arts Office. Space Crafts is a collaboration between astrophysicists and artists allowing local primary school students to explore space through art and science activities – and the artwork produced was certainly out of this world.



Figure 76. Primary School students at a Space Crafts workshop at DIAS Dunsink Observatory © DIAS

Additionally, ESERO Ireland worked with Lismore Heritage Centre to deliver an expanded 'Space Adventure' programme consisting of summer space camps, each 2-3 days in duration, with over 100 students and community engagement Space Workshops, including local libraries, Men's Sheds, Women's Sheds and Youth Groups, involving and inspiring over 280 young people and adults.

Science Week 2025

As part of Research Ireland's Science Week activities in November, ESERO Ireland hosted a careers webinar in partnership with Dream Space as part of the career inspiration output. This "ESERO Inspiring Careers Chat" was an evolution of a successful 2024 event and the 2025 edition targeted young people in second level education including mainstream schools and Youthreach centres nationwide.

Social media influencer Shanice Griffin was the host and interviewed three individuals working in the space sector at various career stages with a range of specialities. This also included a live audience of 27 school and Youthreach learners at the event in Dream Space, with over 1,300 students joining the livestream.

The Curious Minds/ESERO Ireland Science Week show also went out live online with 1,852 schools viewing it live. The recording of the show was viewed by over 3,400 during Science Week 2025, with views increasing since to over 4,300.

A highlight event for Science Week 2025 was the 'Museum of the Moon', an artistic installation of a seven-metre diameter model of the Moon in Merrion Square, Dublin accompanied by a programme of captivating musical and spoken word performances. This inspiration piece successfully engaged the public in conversations about space and Ireland's role in space exploration, with over 3,500 visitors across two days.



Figure 77. Youthreach and secondary school students hearing from three Irish space professionals at ESERO's Science Week Career Chats © Research Ireland



Figure 78. Visitors experiencing the Museum of the Moon in Dublin's Merrion Square as part of Science Week 2025 © Research Ireland

The Science Week 2025 funded programmes included SpaceFest, which was again run by the National Space Centre (NSC) Ltd. and Greywood Arts in Marina Market in Cork with festival programming for adults, teens and families merging science and the arts through creative, captivating events. Baking in Space was also delivered under the Science Week programme, funded by Research Ireland and ESERO Ireland as part of Town Scientist, an initiative from science communicator and writer Dr. Niamh Shaw, to provide community-based public engagement. The event was co-hosted by Niamh and aerospace engineer and Great British Bake Off finalist Andrew Smyth. It used familiar baking processes to explain how humans live and work in space.



Figure 79. ESA Astronaut Rosemary Coogan with Niamh Shaw at Baking in Space in Dundalk during Science Week 2025 © Niamh Shaw Ltd.

The programme included contributions from ESA astronaut Dr. Rosemary Coogan, ESERO Ireland Manager Aine Flood, Professor Lorraine Hanlon and Dr. David McKeown (UCD) and space medicine researcher Dr. Lisa McNamee. Live demonstrations and moderated discussion addressed microgravity, astronaut health and space engineering. The event highlighted Ireland's ESA membership and career opportunities within the Irish and European space sectors, including those delivered through ESERO Ireland. Baking in Space supported increased public awareness of Ireland's space activities and European collaboration.

Space Week

During World Space Week in October, ESERO Ireland actively promoted events taking place across the country via the newly updated ESERO.ie website and on social media channels with high levels of engagement. ESERO Ireland also worked with MTU Blackrock Castle Observatory who coordinated Space Week 2025 in Ireland. BCO delivered the ESERO Space Careers Roadshow with 100 second level students visiting BCO and hearing from individuals working in the space sector in Ireland.

Glossary

ADAS	advanced driver-assistance systems
ADI	Analog Devices Inc
AGF	Access Gateway Function
AI	artificial intelligence
ARISS	Amateur Radio on the International Space Station
BCO	Blackrock Castle Observatory
CMOS	Complementary Metal-Oxide-Semiconductor
CTU	central terminal units
DIAS	Dublin Institute for Advanced Studies
DCU	Dublin City University
EAC	ESA European Astronaut Centre
EDIH	European Digital Innovation Hub
EIRSAT-1	Educational Irish Research Satellite-1
EirSEDS	Irish branch of Students for the Development and Exploration of Space
EO	Earth Observation
ERC	European Research Council
ESERO	European Space Education Resource Office
ESA	European Space Agency
ESA BIC Ireland	ESA Business Incubation Centre Ireland
ESA SSCI	ESA Space Solutions Centre Ireland
ESTEC	European Space Research and Technology Centre
EUDR	EU Deforestation Regulation
FAP	fairing acoustic protection
GNSS	Global Navigation Satellite System
GSTP	ESA General Support Technology Programme
GPS	Global Positioning System
HAS	High Accuracy Service
HEA	Higher Education Authority
HPC	high performance computing
HST	Hubble Space Telescope
HQC	Hybrid Quantum Computing
HydRON	ESA High thRoughput Optical Network programme
ICHEC	Irish Centre for High-end Computing
iCRAG	Research Ireland Centre for Applied Geosciences
IIAS	International Institute for Astronautical Sciences
IIEA	Institute of International and European Affairs
IMR	Irish Manufacturing Research
IPS	Internet Protocol Suite
IR	Infra-red
ISA	Irish Space Association
ISS	International Space Station

JUICE	JUpiter ICy moons Explorer
JWST	James Webb Space Telescope
LEO	Low Earth Orbit
LISA	Laser Interferometer Space Antenna
ML	machine learning
MoU	Memorandum of Understanding
MTU	Munster Technological University
NAFSR	National Advisory Forum for Space Research
NAVISP	Navigation Innovation and Support Programme
NPWS	National Parks and Wildlife Service
NTN	Non-terrestrial network
NTRIP	Networked Transport of RTCM via Internet Protocol
OFGU	optical frequency generator unit
OLCI	ocean and land colour instrument
PARS	physical-AI-readiness-as-a-service
PLIU	PayLoad Interface Unit
PCM	power core module
PNT	positioning, navigation, and timing
PRODEX	PROgramme for the Development of scientific EXperiments
QC4EO	Quantum Computing for Earth Observation
QKD	quantum key distribution
RF MEMS	Radio-Frequency MicroElectroMechanical Switch
RPO	research performing organisation
RTU	remote terminal unit
SSC	Swedish Space Corporation
SWaP	size, weight and power
TIA	Technology Industry Alliance
UCC	University College Cork
UCD	University College Dublin
ULAS HiPR	University of Limerick's High-Powered Rocketry team
VGA	video graphics array
VMTV	Virgin Media Television



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Image: Copernicus Sentinel image of island of Ireland © ESA

