

About 70 Irish companies have participated in European Space Agency programmes over the past decade.

***Anthony King** talks to some of Ireland's part-time space crusaders about technologies and benefits.*

A rocket launch from French Guiana in May sent a space telescope and surveyor satellite into orbit on an important European Space Agency (ESA) mission. Companies and researchers from the Irish space sector were involved to the tune of €5 million in contracts for the two craft, the Herschel Space Observatory and the Planck Surveyor Satellite. Irish companies will, therefore, play a role in the study of the Cosmic Microwave Background, the leftover radiation from the beginning of time, the Big Bang.

Software company Captec in Dublin and Farran Technology in Cork both contributed to the mission. In fact, about 70 Irish companies, mainly from sectors such as telecommunications, software, materials, technology and optoelectronics, have participated in European Space Agency programmes since 2000.

INTO ORBIT Sensl in Dublin specialises in applications concerned with sensing low levels of light. It is presently working with a gamma-radiation detector for ESA; the space agency is interested because the new detector is lighter and more rugged than previous technology. And gamma rays tell astronomers about what goes on in stars and about sources of this high-energy radiation in space. Sensl is facilitating these aims, but as its Chief Operations Officer Stephen Keeney explains: "We are interested ourselves for other more commercial reasons."

The company is working on a small, hand-held gamma ray detector that could detect illicit nuclear material and even dirty bombs. This is because such material gives off detectable gamma radiation. While the gamma detector for ESA is the size of a novel, as it seeks out faint radiation in space, a handheld device could host a detector half the size of a postage stamp. Keeney foresees every border control officer or

police officer having one attached to their belt; the device would harness the same technology that Sensl is working on for the space agency, just on a different scale.

"We're using the knowledge and development we're doing with ESA and importing that over to commercial systems," says Keeney. Radiation detectors already exist, but they are expensive and bulky. Working with ESA allows Sensl to lean on their expertise, and the company is also getting funding to gain knowledge that may later turn up trumps in its commercial products.

EireComposites is an Irish company that designs and manufactures aircraft parts and has linked up with the ESA in recent years. The company, spun-off ten years ago from research in NUI Galway and the University of Limerick, is developing carbon-reinforced plastic materials to replace metals. This technology could be used to reduce the weight of satellites and rocket tanks, so ESA has helped fund its R&D.

"It's all about weight and performance," explains Conchúr Ó'Brádaigh, joint managing director with EireComposites. With ESA funding, he hopes the company's new thermoplastics can replace titanium and aluminium-based materials in certain applications. "ESA has provided us with stable medium to long-term funding, which has enabled us to grow our technologies and develop know-how and intellectual property in the area of thermoplastic composites, which has applications in commercial aircraft."

The thermoplastics are planned for future aircraft and on replacement components for existing aircraft. Ó'Brádaigh says there has been quite a downturn in the civil aerospace market, but ESA funding can help fill the gap: "Being able to keep our engineers busy on funded programs from ESA with long-term commitments is fantastic."

SPACE CR

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SPACE USADERS

Irish companies
working with the
European Space Agency



FRINGE BENEFITS ESA programme manager at Enterprise Ireland Tony McDonald foresees five new companies from this country getting involved this year. He says Irish participants tend to be small and innovative.

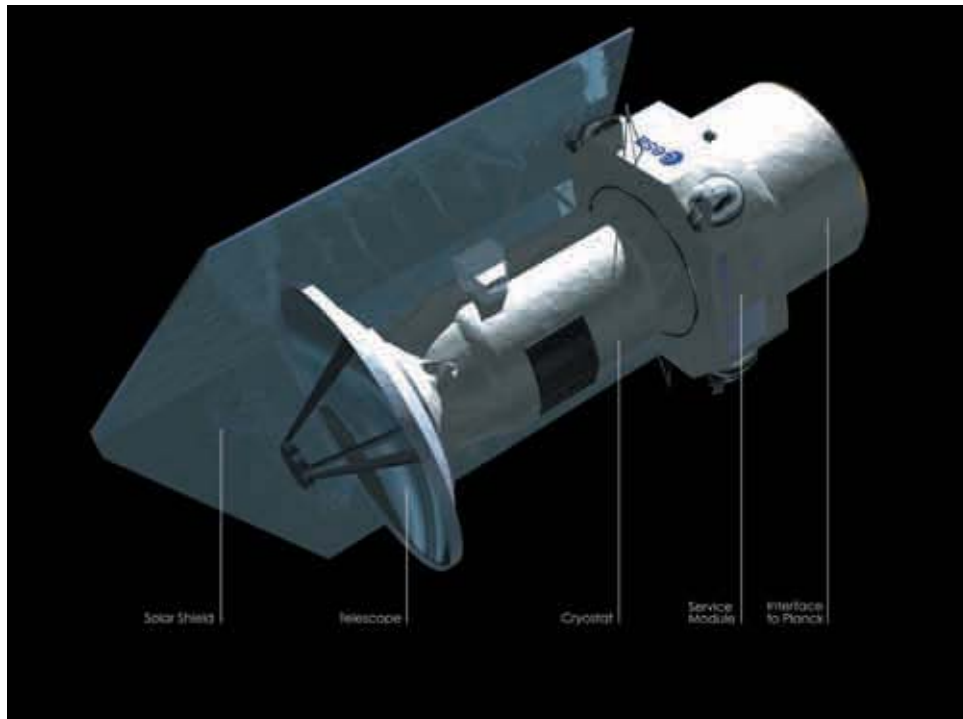
Aside from helping companies to generate revenue, develop their R&D capability and improve commercial links, participation has other strategic benefits, he adds. ESA has exacting requirements in terms of reliability and performance, and links to the agency can open new sectoral or geographical markets.

Ó'Brádaigh agrees that ESA involvement brings invaluable kudos: "Intellectual property is important in the aerospace sector, but reputation and capability is equally important, and ESA enhances our reputation for sure."

Sensl's Keeney adds that the networking opportunities are also important. Most of Sensl's markets are overseas, so the contacts developed through ESA are pivotal. "As we move into commercial systems, we have developed relationships, know-how or access to knowledge that we wouldn't otherwise have had."

Irish companies with experience of ESA projects say that the bureaucracy is less than for other European funding programmes such as Framework 7. Additionally, small companies don't necessarily have to partner with a larger firm and can have a direct line of contact with the space agency.

ESA is less concerned about the process than other EU projects, according to Keeney, and more concerned with the results.



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"They are not so particular about how you arrived at a result. They are more commercial in that way and for many small companies that is better," he adds. "We don't have the time for a lot of bureaucratic overheads."

Security of funding is another benefit that participants highlight. ESA is funded to the tune of €3 billion each year by member countries, and it is not going out of business any time soon. Keeney says Sensl is working on projects ten years away from launch, which provides time to learn and make mistakes. It's pure R&D, and you do not necessarily know the outcome; you are developing a capability, a tool or a piece of equipment, he says.

Chief Commercial Officer with EnBIO, Joe O'Keeffe, recently helped his company submit an ESA proposal (see panel). "At a practical level, it is a good grant system because it's less complicated and easier to apply for than some other funding mechanisms, and there is less red tape," he agrees.

He says it's a particularly suitable support system for smaller companies but thinks not enough Irish businesses are taking advantage.

EI's Tony McDonald stresses that companies should only get involved in ESA for sound strategic reasons. It's important for applicants have the technical capability, he says, but even more important that they have a clear strategic vision of how they are going to commercialise any resulting technology.

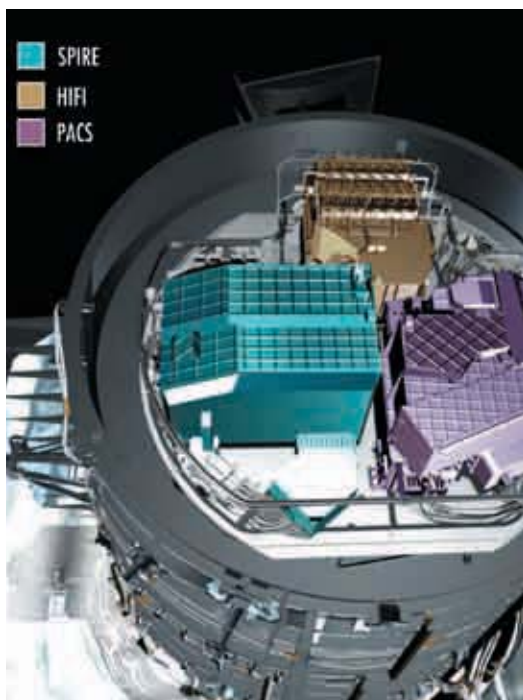
McDonald explains that Enterprise Ireland aims to optimise the value of Ireland's participation. "We like to see that there is a high value so that companies can leverage that return to the maximum extent possible," he says.

"ESA has to ensure that the value of contracts based in any member state, including Ireland, is within a range determined by that member state's contribution." Quality of participation is measured by looking at the strategic impact on the company in terms of technical innovation and development of intellectual property.

Once a company gets involved with ESA, it seems there are good chances for repeat business. Simon Kennedy, a manager at Captec, which was involved in the May launch, explains that his engineers helped validate software used on the Herschel-Planck mission and had previously worked on software for the Venus Express and Mars Express missions.

The company also writes space software that keeps a satellite pointing in the right direction and in the right orbit and deals with any commands from the ground. Captec was involved in the Rosetta mission, which has been launched and is scheduled to meet up with a comet in 2014. The lander will use software from the Dublin firm to communicate with the mother probe.

Captec has benefited by a low staff turnover: the contracts are long, so people can really get their teeth into them. "There is a huge sense of achievement after a project is launched or when it's completed." Kennedy says. 🎧



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PAINTING THE TOWN BLACK: CORK COMPANY ENBIO VIES FOR ITS PLACE IN SPACE

EnBIO, a small company in Cork, earlier this year made contact with the European Space Agency and has now submitted a proposal that could ultimately put its know-how into space.

Previously, the company had focused on orthopaedics and metallic implants, including pacemakers and stents, using a core system, capable of altering the surface of metals. Enbio was aware that its technology had broader potential, but it didn't have the resources or bandwidth to exploit this situation.

Chief Commercial Officer Joe O'Keeffe spoke to the ESA around February and subsequently submitted a proposal aimed at helping solve a colour problem on spacecraft exteriors. Application-wise, it's a world away from EnBIO's medical work, but it stems from the same original invention.

Pioneered by EnBIO's founder John O'Donoghue, the innovation involves a twin blasting system. One nozzle blows sand at metal, churning up the surface. Titanium and aluminium surfaces that are damaged in this way instantaneously react with oxygen, present in air, to form a new metal oxide coating. Another nozzle then fires in an additive just as the new coating is forming.

In orthopaedics applications, this second agent could be a substance that grows well on bone; whereas for spacecraft, it could be a black pigment or powder aimed at 'painting' the material as dark a colour as possible. Any craft that is not completely black absorbs heat from the sun when it is sun-side in its orbit. It will then cool down on the other side. A blacker surface means less temperature variation.

Currently, spacecraft are blackened by paint or anodising. Paint is a problem because solvents evaporate in space and can damage sensitive optical devices. Anodised surfaces can chip-off, and it's difficult to get a perfectly black surface.

"It looks like this blackening is something our technology can do," O'Keeffe says. A formal proposal, covering an initial feasibility study of about a year, was recently submitted.

"We hope it will be the start of a series of projects to move from an idea to something practical and usable. It allows us to step outside our focus area with additional resources," he adds.

Though the initial emphasis is on blackening a surface, the funding will allow the company to evaluate other uses of the technology. It could be used to harden the surface of metals, for example, to make them more wear-resistant. Another possibility is in colouring civilian jets, since paint adds weight to an aircraft, and some airlines have begun only partially painting exteriors to save on fuel. O'Keeffe says the idea has not been evaluated yet, but the ESA funding opens up this possibility.