IXV SPACEPLANE FLIGHT HELPED GUIDE IRISH FIRM TO NEW BUSINESS

IXV launch

11 February 2016 Working with ESA – leading in turn to a key contribution to the IXV spaceplane – was the catalyst to help turn one Irish firm into a full-fledged space solution company, whose customers today include NASA, SpaceX, Boeing and Airbus Defence and Space.

The 100-minute flight of ESA's Intermediate eXperimental Vehicle (IXV) one year ago today was keenly followed all across Europe, but especially in the crowded lunch canteen of Curtiss-Wright in Dublin.

"It was a fantastic day, witnessing the launch on a large screen," recalls Danny Gleeson, the company's Space Business Development Manager. "I felt like an expectant father! Our company had put years of work into IXV, making a mission-critical contribution.

"The whole point of IXV was to get as full a picture as possible of the impact of the extreme conditions of atmospheric reentry on the spacecraft, and it was our systems that were gathering all the data from the hundreds of sensors on board, to be transmitted back to the ground.

"In the event it all worked perfectly, and we hope to be playing a similar part in the follow-up Programme for Reusable In-orbit Demonstrator in Europe, PRIDE, mission."

Test flight instrumentation

The company was founded back in 1991 by a quartet of Dublin City University graduates, originally named 'Acra' – from the Gaelic for 'utensil' – and specialising in data acquisition systems for test flights. Acra was acquired by Curtiss-Wright in 2011.

Each time a new aircraft is first sent aloft, its test pilots are accompanied by a multitude of sensors capturing data on every aspect of its performance, in terms of acceleration, vibration, shock, temperature extremes and so on, usually in tandem with video.

"The key aspect is that these systems have to be rugged, because test flights are all about exploring the extremes of the aircraft performance envelope," adds Mr Gleeson. "So when we were thinking about markets to expand into, the thought came: what about space missions?"

European space laboratory Columbus

To operate in the space environment involves significant challenges, including exposure to vacuum, a still wider range of temperature and vibration extremes and increased radiation exposure above Earth's atmosphere.

IXV recovery

ESA is the European authority on working in space, and in 2002 an initial contract to subject the Acra equipment to the space environment was arranged through the Enterprise Ireland development agency. On the ESA side, the attraction was the prospect of 'spin in' – transferring an existing, well-proven technological solution to the space sector.

"There's been a lot of interest in making use of what's called 'commercial off-the-shelf', COTS, products for space in recent years," comments Mr Gleeson.

"For space missions you get to shorten the development cycle, starting with existing products and adapting them, rather than starting from a blank piece of paper. What is needed is to 'qualify' them – to carry out the exhaustive tests to prove the products, once suitably modified, can perform as required. This is a process we call 'space-qualified COTS'

"So the testing ESA carried out, and the resulting documentation, opened up other opportunities, not only for IXV – which we began to work on in 2009 – but with other space companies."

Micro-sections for electronics testing

Curtiss-Wright Dublin began working with SpaceX in 2006, supplying equipment to the Falcon family of launchers and the Dragon reentry spacecraft while also contributing to experimental SpaceX 'DragonEye' payloads flown on some of the final Space Shuttle flights in 2009 and 2011.

The company is also supplying sensor data acquisition systems to the Boeing-CST crew vehicle. It has also won contracts with Airbus Defence and Space to supply data handling systems: the most recent as part of the Advanced Closed Loop System (ACLS) ISS Life Support System payload– converting waste carbon dioxide into breathable air.

Curtiss-Wright was also selected by ESA as prime contractor for an ISS payload to monitor the micro-gravity environment for experimental payloads, destined for the European Columbus module of the International Space Station.

Columbus module

"Our success in the space sector has led us to forge a local supply chain here in Ireland, with a variety of partner companies, including Realtime and Schivo," adds Mr Gleeson. "Our needs include quality electronics and mechanical parts – one supplier, Schivo is actually primarily a medical device company, so they understand the reliability and quality we need.

"We've also built up an indigenous skill base. We're one of about 20 Irish companies with common training needs that are participating in the national Space Industry Skillnet, the only space industry skills training network in Europe – building up the expertise we will need to go on making inroads into space markets and growing the space sector in Ireland."