

# Global and local



As an integral part of the world's third-largest civil aircraft manufacturer, Bombardier Aerospace, Belfast looks to its involvement with the Royal Academy of Engineering's research schemes to make an impact on its operations and on the local community in its long-established base in Northern Ireland.

Bombardier's experience of the Academy's research schemes goes back more than a decade and the company is already developing ideas for further involvement.

Gavin Campbell, Bombardier's Director of Design Engineering and Technology Development, said, "The company is selective in picking partners for this kind of initiative. It's the standing of the Academy that has attracted us. There's a reputation for excellence, and the calibre of output that's expected from the appointees is very high. It also provides us with an independent and valuable validation, not just of the candidate but also of the field of study that we've chosen."

## **The impact of research**

Bombardier Aerospace has had a substantial presence in UK engineering over many years, principally through its acquisition in 1989 of Short Brothers, one of the great names of UK aviation and engineering. The company is the oldest aircraft manufacturer in the world, having secured the first-ever orders from the Wright brothers for six Wright flyers in early 1909. The company set up a base in Belfast, Northern Ireland in 1936.

Bombardier Aerospace, Belfast's links with higher education and with university research are strategically important to it on several levels, enabling it to achieve international competitiveness and to

demonstrate commitment to the local community.

Bombardier has just embarked on its second partnership with the Royal Academy of Engineering through the appointment of Professor Brian Falzon as a Research Chair in advanced aerospace composites at Queen's University Belfast. "The new appointment reflects not just the company's research priorities in terms of subject matter, but also the way in which it likes to approach the organisation of research," said Campbell. Previously, the group and the Academy had collaborated on the appointment of Professor Srinivasan Raghunathan at Queen's University Belfast.

Bombardier identifies its priorities in terms of future products and processes and then looks to see which technologies can be de-risked to help achieve those priorities. "So we tend to look at the universities to be continuously trying to bring technologies forward from basic research," Campbell said.

The relationship between Bombardier and academia is, however, evolving. "In the past, professorial supervised research would take place exclusively in the academic environment with large research facilities and highly specialised research equipment, and our work would be very much on the applied side," Campbell said. "But more recently, we've helped develop a cross-sectoral centre for the research and development of advanced engineering and advanced materials technologies, along with Queen's and the University of Ulster, and with investment from the Department for Business, Innovation and Skills and Invest Northern Ireland."

Professor Falzon's role at Queen's University Belfast is intended to be "the pivotal position in the relationship between the engineering community in the company and the engineering community in the university", said Campbell.

### Measuring the impact

As part of an international company, Bombardier Aerospace supports work in several UK and European universities. Campbell said, "The recent chair at Queen's University, Belfast was the pinnacle of its involvement with academia in the UK. The direct support and involvement of the Academy is an important component in the development of this research".

But there is an international dimension too: two of the engineering professorships that Bombardier sponsors in Canadian institutions also cover the important aerospace technology of engineering composites. "We hope to develop an international network that will clearly

### Bombardier Aerospace and Royal Academy of Engineering's jointly funded Research Chairs (Past and Present):

**Professor Srinivasan Raghunathan**, Professor of Aerodynamics at Queen's University Belfast

**Professor Brian Falzon**, Professor of Aerospace Composites, also at Queen's University Belfast

benefit us but also benefit the professors and the universities", said Campbell.

The direct impact of the new post will be felt in three areas. "The first is the pull-through of new technologies and the validation of ideas into projects with clearer industrial application. We recognise that it can take many years to develop a product or a process, but we also recognise the need to keep the pipeline of ideas topped up with projects at all stages of maturity," said Campbell.

The second is to ensure that key skills within the company and the universities are enhanced. "We recruit very actively from the universities, both at graduate level and increasingly at doctorate and post-doctorate levels," Campbell said. In tandem with this, there is an emphasis on the transfer of skills and knowledge. "There can be frontline support, maybe some personal mentoring and certainly advice on challenging problems from someone who is a leading expert in their field."

Chief Technical Engineer David Riordan said that this kind of knowledge transfer had been a feature of the earlier joint professorship with the Academy "Professor Raghunathan brought extremely good links into the wider university and also into other industrial companies. We gained both from his specific knowledge and from his breadth of knowledge."

The third specific area that Bombardier Aerospace has for its involvement with the Academy is a local one. "We're very much a company that tries to live by its

corporate social responsibility, and we run an educational outreach programme," Campbell said. "We see this as an important part of what Bombardier as a company puts back into society locally and nationally."

There is a strong Northern Ireland aspect to this. "When we were developing the proposal with the Academy we were obviously looking for academic excellence," Campbell said. "But the geography is also important because it's not just a matter of writing a cheque and waiting for the research to flow; it's about a relationship that works across a number of levels, and the prestige locally of being involved with the Academy is a very important part of that too."

Professor Brian Falzon said he was looking forward to promoting greater collaboration between the academic world and the requirements of industry. "This is an exciting role which facilitates the exploration and exploitation of new ideas and innovations with one of the world's leading aerospace companies and with the support of the Academy. The requirement for reduced development and production timeframes, lower life cycle costs and increasingly stringent environmental targets, presents a number of intellectually challenging and complex problems. For example, the further development, utilisation and integration of computational tools for 'high-fidelity' virtual testing and design of advanced composite aerostructures has the potential to transform current design philosophies and methodologies," he said.



"The Royal Academy of Engineering research schemes work very well with our ambitions as a company and with our objectives overall"

Gavin Campbell