

STFC: Science, Technology and Innovation

Transcript of STFC Innovations film

Tim Bestwick, Director of Innovation, STFC

The Science and Technology Facilities Council is one of the UK's government research councils. We support a wide range of quite extraordinary science ranging from particle physics, astronomy, space science, nanostructures - a great range of extraordinary research. It's done at our laboratories which are here at Harwell, at Daresbury and at the UK Astronomy and Technology Centre in Edinburgh. We also support international collaborations such as CERN and the European Space Agency, and we support university research as well through grant funding.

Underlying a lot of what the Science and Technology Facilities Council does, is a quest for some really important fundamental questions. Some of what we do is much nearer term and isn't about the fundamental structure of material or fundamental science questions, it is more about technology and detector technology. Some of it is more practical - space instrumentation for example to measure the surface of the sea - and out of that will come innovation in the long term but who knows there's all kinds of ways in which innovation can be created. Now we know that to reduce innovation to practice will involve partnerships so partnering with businesses in particular is extremely important to us so that those creative ideas that arise from the science, or may be even from the use of our facilities, can actually be turned into commercial reality.

David Gahan, Oxsensis Ltd

Oxsensis, that's Oxfordshire and Sensor, really came out of a challenge from the aero-industry of how do you put sensors and measuring instruments into the heart of a jet engine so that you can control it and reduce emissions and increase efficiency, and what goes for jet engines goes also for power stations and power production.

We know that this is one of the world centres for the type of micro engineering that we require. So here at the Micro and Nanotechnology Centre we use reactive ion etching which is something of a local speciality here. We use full suite clean room and photolith techniques and very importantly, measurement and analysis abilities which are second to none. Putting a sensor into your car engine or into an aero-engine is in many respects like putting one into a space probe or into the Large Hadron Collider in that it tests the materials and the

packaging to their absolute limits. So we use the special techniques workshop of the space science group here to help with our packaging to make sure that not only the sapphire element but also the packaging around it can withstand the 1000 degree temperatures, high vibrations and general very difficult conditions.

By being here at the STFC Rutherford Appleton Laboratory we've been able to bring together a very large number of technologies. By being able to do that we've been able to get credibility with all of the major world wide manufacturers of power station equipment and aero-engines. It's very difficult, normally speaking, for a small company to play in these markets but we've had such a leg up and come in at such a high level of technology really thanks to STFC Rutherford Appleton.

Peter Stibrany, MDA Space and Robotics Ltd

MDA is a provider of essential information solutions and we met with Rutherford Appleton Laboratories a few years ago when we were building our first constellation and first observation satellites. There are three key advantages for us – the first probably is the close proximity to the people, the talent pool that's here. These are very specialised people and they come with some very specialised facilities as well. Other companies in the UK also use the Rutherford Appleton facilities but we feel that if we are located very nearby that gives us a distinct advantage. Finally the relationships that we have formed mean that we are much more able to network with the British space establishment as well. Now that the European Space Agency has located their centre here at Harwell it means it gives us the opportunity to network with those people as well fairly closely.

The work that we have done together is built on the existing products that were part of the spin out which we purchased. We've developed a new line of higher performance orbital cameras and we are now moving into the space robotics area. What it will mean for this area is that we will be able to site an increasing presence of highly professional staff and the fact that we are close to universities and we have that relationship again through STFC, means that we can find those people and that they can be part of a greater environment where there are many innovation companies and spin outs and a lot of fast paced activity in the area. So hopefully we will be able to entice more people here and grow our presence.

John Burgoyne, Oxford Instruments

ISIS is a neutron facility which means it uses neutrons which are part of the particles that make up atoms, and they use them essentially as a very big microscope to understand matter, materials and the design of new devices, understand the basic physical properties of those materials, and how they are going to take them forward in to the new objects that will affect our everyday lives.

The scientists who visit this facility will be using the neutron beam to probe into materials, and then the instruments that Oxford Instruments supplies enable them to do that in an environment which has a strong magnetic field and a low temperature, and because those two parameters affect the behaviour of materials and the physics of them, that gives the scientists a very wide range of views into what those materials are doing.

The advantages for us as a company of working so closely with customers in groups like these are that we start to understand the science that they are trying to achieve and therefore the impact that this has for us on the design of the instrument. This enables us to continually innovate, continually develop our technologies and continually be probing the directions that this science is going in at a quite fundamental level because this inevitably shapes the sort of instruments people are looking for in the future.

So we see ourselves working very hand-in-hand with the scientists. They define the needs of their experiments, we define the innovations, the technologies that are available to them, and by bringing those two together, obviously with the funding provided by STFC and other bodies, then we get the results that take science forward here in the UK and abroad.

Tim Bestwick

I think innovation has a huge impact on all our lives. It has an impact through creating economic wealth through new businesses, through enabling existing businesses to be more creative. It also has other implications for our lives. A lot of what we depend on in our day-to-day lives actually has arisen through technical innovation which has found its way into the consumer products that we all use.

So STFC has amazing facilities doing leading science which are underpinned by very advanced technology. We want to see that technology and science facilities exploited through innovation and having an impact. In order to do that we need to work with the right commercial partners.