



Physics Scotland

Ultrasound arrays for therapeutic applications

A secondment funded from the SUPA INSPIRE project has proved a great success for all concerned, leading to potential new sales, academic papers, and valuable experience for the seconded physicist.

The industrial partner, Diagnostic Sonar Ltd (DSL), was founded in 1975 and produced the first real-time medical ultrasound scanner manufactured in the UK. Over the following three decades, the company expanded into other areas of Industrial Non-Destructive Testing and Medical Imaging and is now a major exporter in varied fields from Aerospace to Nuclear inspection in many countries.

Recently, DSL introduced new ultrasound array control electronics, which are particularly accessible for those wishing to explore the physics-based limits of ultrasound arrays and are ideal for applications involving medical imaging and non-destructive testing. However, new research into ultrasound therapy had highlighted a need for new capabilities of the system. The aim of the secondment was therefore to investigate the limits of the current hardware, prototype a method of extending the limits, and conduct experiments on a selection of ultrasound arrays with novel configurations.

The seconded physicist, Roderick Habeshaw, began by investigating the current limitations of the hardware. During this process Rod found errors in the external manufacturer's data for one of the components, which had been limiting the theoretical system performance. Once these were addressed, a prototype was constructed and used to drive novel ultrasound arrays manufactured as part of two major projects with the University of Dundee. Immediate results were obtained, proving the capabilities and creating data for grant applications, papers and publicity.



The experimental setup

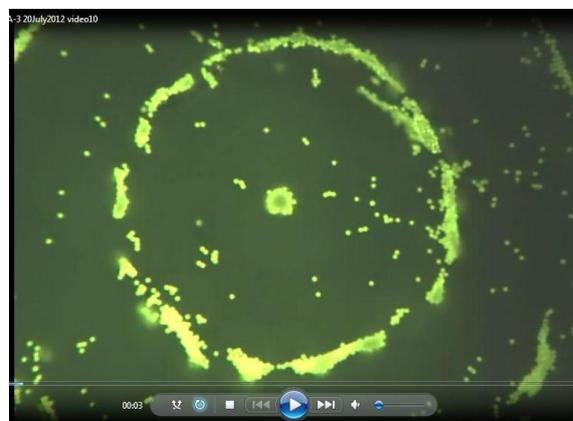


Image of particles trapped using ultrasound

As a result of the secondment, DSL now have accurate knowledge of the capabilities of their system for the therapeutic market with a user-friendly method to determine suitability, a set of LabVIEW tools to provide detailed control of a variety of array types, a proven method of extending the power capabilities of their hardware, and examples of the controller in operation on novel arrays.

Dave Lines, Chief Engineer at DSL said: *“I have been involved in a wide range of collaborative schemes over the last few decades, but we have found this attachment one of the most worthwhile. We anticipate that this work will lead to a number of new orders for our hardware and software.”*

The secondment was also successful for Rod personally: *“This secondment has proved very helpful and greatly deepened my understanding of the hardware and programming involved in this area,”* he said. *“I also believe my project has been of benefit to the University, partners and DSL itself with some very good results obtained and documented.”*

INSPIRE is made possible by the Scottish Funding Council SPIRIT programme and aims to build university-industry collaborations in the area of physics and life sciences or medicine. Funding is still available for secondments from universities to companies and vice versa. For further information please contact Mat Wasley, 0131 451 4427, matthew.wasley@supa.ac.uk.

