

# Down to Earth - Spin off from the Beagle 2 Project

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A question frequently asked of space scientists is: "Wouldn't the money spent on satellites be better employed on medical care, social problems, education, the environment, crime prevention, and so on?"

The most famous UK involvement in space in recent times was the Beagle 2 Mars lander. A unique feature of that project was its mass spectrometer designed to look for life. This tiny instrument was built with the help of funding by the Wellcome Trust in the expectation that, after the Mars programme, the technology could be transferred into clinical/medical fields of more general interest to the Trust. It was also recognised that in other areas on planet Earth miniature instruments which are operated remotely, and which have the capacity to survive the hazards and rigours of space travel, might be of great use.

The project team have recognised quite a number of possible activities including measurement of stable isotopes and combined gas chromatography-mass spectrometry. They wish to broaden their perspective and welcome contact with anyone whose science could benefit from the availability of small mass spectrometer systems.

On 27th May I was very pleased to be able to extend a welcome to a room full of scientists and engineers supported by my fellow members of the Science and Technology Select Committee, Dr Ian Gibson MP, Dr Brian Iddon MP and Sandra Gidley MP.

In complete contrast with the fiasco surrounding the secret report prepared at the behest of the UK Government and the European Space Agency on the

failure of Europe's Mars rover, Beagle 2, this meeting had all the smell of success as project after project involving the onboard science package was rolled out before us for our critical inspection.

Professor Colin Pillinger had brought along a mass spectrometer, built and paid for by PPARC, and supported by Wellcome Trust funding to help keep the Open University team together during the period of down stream spin-off development. He explained that the miniature machine on the table right in front of us, the sibling of the machine on board Beagle 2, was itself a spin-off development from Ptolemy, an evolved gas analyser (GCMS) on board Philae, a cometary lander attached to Rosetta, Europe's comet chaser.

Colin emphasised that the technology on show would be internationally competitive until 2007 when he hopes, Aurora permitting, Beagle will fly again, hopefully in tandem. His science team comprising Dr Ian Wright and Dr Geraint 'Taff' Morgan, then brought on a select group of invited speakers to demonstrate the actual and potential applications for the miniature mass spectrometer.

Mr Jason Hall of Roke Manor Research described the role of mass-spectrometry in border security, especially detection of human trafficking by roadside scanning of soft-sided vehicles and onboard cargo characterisation. Currently testing, whether for drugs, explosives or people, requires transmission of samples to a laboratory. What he envisaged was gas analysis with a hand-held instrument. This view was supported strongly by Professor Dick Lacey of the Police Scientific Development Branch, who emphasised

the utility of such an instrument for dealing with terrorism. Mr John Wicks of Tricho-Tech Ltd foresaw the opportunity provided by a portable machine to improve the onsite analysis of hair samples for drugs. The current procedure for analysis of hair is laborious, lengthy, expensive and time-consuming.

Dr Ben Fairman of LGC Limited, the recently privatised Laboratory of the Government Chemist, also retains the responsibility of the National Measurement Institute (NMI) for high accuracy chemical analysis. Ben described the full range of mass spectrometer (MS) based techniques used in the laboratory. It became clear there would be multitudinous new analytical opportunities afforded by robust portability, including field applications such as scrapie genotyping on sheep, and police applications such as the use of urine analysis for drugs.

On the medical front, Dr Sergei Kharitonov of the National Heart and Lung Institute is interested in the prospects for a home-based machine for monitoring diabetes patients, with a small MS linked to a mobile phone technology connecting remotely to a hospital supervisor.

It was left to the last two presenters to catch the mood of the meeting with fanciful insights into the future. Dr Ed Houghton of HFL Newmarket, the first laboratory in the world to bring the full resources of the modern chemical laboratory to the racetrack, saw opportunities for extending the current chip technology by putting a lab on a chip especially for drug detection and for continuous health checks. Dr Cathy Wise from Glasgow University Veterinary School also welcomed the opportunity provided

for non-invasive breath analysis of animals and detection of chronic disease in racehorses. Perhaps ultimately there will be a tiny spectrometer on the nose of every racehorse!

How can we stem the defection of our young people from science and engineering? The Open University has a vision that every school science classroom will have a mini-portable MS to allow its students a powerful insight into the natural world. Human breath has, we are told, two hundred

components, and sometimes an analysis can identify sickness without the need for invasive investigation. I cannot but think that students would enjoy using such a powerful instrument. Thanks to Beagle and the Open University team, we are currently world leaders in this technology. We must ensure that for once we do not lose the benefits of discovery; and that needs the OU team to get the funding needed to stay together. Wellcome has done a terrific job, but one suspects that other

funding agencies are needed if a team of this calibre is to be allowed to develop its full potential.

In conclusion, I should note that our meeting lasted two and a half hours, that it brought together in a common purpose a host of innovative scientists and considerable number of stars of industry. I feel that this sort of in-depth seminar is the very best way to handle science in a Parliament which is too often disinclined to see things from a scientific or a technological point of view.

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