Technology Pitching

If you are interested in setting up a one-to-one discussion with any of the pitchers please contact matthew.edwards@stfc.ac.uk with your requests.

Mars Space Ltd, Prof. Stephen Gabriel

Mars Space Ltd is a University of Southampton spin-out providing services and consultancy in the fields of space and plasma engineering. In these areas the goal has been to develop a device, which has long lifetime and high efficiency/ performance. In practice, tens of thousands of hours of operation with no repair or maintenance are required in order to achieve the mission targets in space. High efficiency is also paramount to minimise the electric power needed and mass of the device.

Technologies to be presented
- Plasma Processing of Waste and Biofuels – more information
- Improved Ion Beam Sources – more information

Potential application areas
- Plasma processing of waste
- Burning of biofuels
- Broad beam ion sources
- Very fine ion beams for milling or implantation

ESR Technology Ltd, Simon Griffin

ESR Technology Ltd, with support from the European Space Agency, operates the European Space Tribology Laboratory (ESTL). ESTL specialises in providing solutions to friction, wear and lubrication issues relating to the precision mechanisms that operate in the vacuum environment of space, or in terrestrial vacuum applications. Ultra low friction films and active preload bearings are just a few of the solutions that have been developed at ESTL.

Technologies to be presented
- Ultra Low Friction Films of MoS₂ – more information
- Active Variable Preload Bearings – more information

Potential application areas
- Precision medical equipment
- Semiconductor manufacture
- Extreme temperature applications
- Precision or high-reliability pointing/tracking or positioning

Mullard Space Science Laboratory, Dr Dhiren Kataria
MSSL have a long heritage in plasma instrumentation and they are developing a complete instrument including detector and electronics will weigh less than 300gms. The instrument is designed to detect charged particles hitting the outer surface of space craft. Due to the energy of these charged particles they become trapped within the thermal Mylar insulating material which can create a build up of charge which could cause damage to sensitive equipment if it were to discharge through components.

Technologies to be presented
- Charged Particle Spectrometer – ChaPS – [more information]

Potential application areas
- Low energy, charged particle detection

**Shadow Robot Company, Rich Walker**

Shadow is one of the longest running robotics companies in the UK, established in 1987. For the past ten years Shadow have been developing dexterous manipulation for humanoid robotics. They now have a humanoid robotic hand which provides 24 movements to reproduce, as closely as possible, the degrees-of freedom of the human hand. It has been designed to provide comparable force output and movement sensitivity to the human hand.

Technologies to be presented
- Humanoid Robotic Hand – [more information]

Potential application areas
- Tasks that would be hazardous for human hands
- Nuclear decommissioning
- Bomb disposal

**University of Glasgow, Dr Christian Killow**

The Space Glasgow Research Cluster work with key organisations to expand knowledge and expertise in space science, technology and engineering. Glasgow has extensive experience in the use of hydroxide catalysis bonding for the production of ultra-stable, low mechanical loss optical assemblies. A seamless, ultra-thin, extra strong and optically perfect joint is achieved during this process. They have also developed a space qualified optical bench interferometer for use in a proposed ESA mission. It is designed to observe gravitational waves in the richly populated low frequency part of the spectrum.

Technologies to be presented
- Hydroxide Catalysis Bonding – [more information]
- Optical Bench Interferometer – [more information]

Potential application areas
- Alignment of optical components
- Bonding of silicate-like materials
- Precision metrology
- Interferometric assemblies
**RAL Space Laser Spectroscopy, Dr Hugh Mortimer**

The Laser Spectroscopy team carries out research and development on tuneable laser spectroscopy methods, instruments, technologies, and applications. Spectrometers analyse the interaction of light with solids, liquids or gases to give information about their chemical composition. A new generation of spectrometers are being developed which are compact, lightweight and robust, and can be configured to work in the ultraviolet, visible or infrared spectral regions. They are based on a novel, static, and stable optical configuration, making them well suited for use in hostile, industrial environments.

Technologies to be presented
- Miniaturised Solid State Fourier Transform Spectrometer – [more information](#)

Potential application areas
- Process monitoring
- Laboratory R&D
- Remote sensing
- Emissions monitoring
- On-site forensic analysis
- On-site analysis of chemical & biological threats

**RAL Space Robotics, Kim Ward**

The Robotics Group at RAL Space is developing autonomous robotic platforms that can be used both for space and terrestrial applications. The group was formed to exploit existing in-house expertise in electro-mechanical systems, sensors and autonomous systems. Research and development is currently underway as to how such devices may be used, not just in the space arena for the exploration of the Moon and Mars, but also importantly, for the large number of potential applications here on Earth.

Technologies to be presented
- General overview of the robotics developed within RAL Space

Potential application areas
- Automation & Robotics

**Surrey Space Centre, Dr Yang Gao**

The wood-wasp is capable of drilling into wood to lay its eggs, despite its small size, limited power and light weight. The wood-wasp achieves this without the need for high amounts of overhead force in order to drive the drill bit through the substrate. Such an astonishing capability has raised much scientific interest within the space community. In response to this interest, Surrey Space Centre have developed a new technology inspired by nature, termed Dual Reciprocating Drilling (DRD).

Technologies to be presented
- Wood Wasp Drill – [more information](#)
Potential application areas
- Self burying probes
- Solution for delivering sensors through existing boreholes
- Automated drilling/mining

**Magnaparva, Andrew Bower**

Magnaparva develop science and technologies for use in hostile environments such as space. They have developed a highly reliable restraint and release mechanism, with a high force capability up to 30kN yet very light weight, and very low power. The mechanism is resettable thereby facilitating testing. The design is scalable over a wide range of sizes and was originally developed for the release of deployable equipment on spacecraft.

Technologies to be presented
- Electromechanical Release Mechanism – [more information](#)

Potential application areas
- Automotive mechanisms, door, bonnet, tailgate etc
- UAV mechanisms such as payload release
- Air drop mechanisms, such as canopy sequencing, balloon release
- Emergency functions such as building fire door releases, lifeboat deployment, etc

**Oxford University, Dr Karen Aplin**

Silicon field emission devices (FED) used as electron sources in the neutralisers could have interesting applications for the non space industry; they are essentially a very sharp μm silicon tip which requires only a small electric field to be applied to facilitate the emission of electrons. Carbon nanotubes are attractive for neutraliser devices because they have low emission threshold potentials, high current densities, stable field emission over prolonged time periods and are simpler to manufacture than silicon field emission arrays. As field electron emission is principally a function of applied electric field, the CNT alignment optimises geometrical field enhancement and reduces operating power.

Technologies to be presented
- Silicon Field Emission Devices – [more information](#)
- Carbon Nano Tube Field Emitters – [more information](#)

Potential application areas
- Electron generation in a vacuum
- Microscopy
- X-ray generation
- Microwave tubes

**University of Birmingham, Prof Clive Speake**

The School of Physics and Astronomy was fifth equal in the 2008 Research Assessment Exercise in terms of research of world-leading quality. They cover a broad range of physics and astronomy in our work, both pure and applied in nature. A novel, high performance interferometer has been developed that offers a number of advantages for applications that require a device which is both
compact and robust. EUCLID (Easy to Use Compact Laser Interferometric Device) is a measurement module that is packaged as a simple plug and play unit.

Technologies to be presented
- Ultra-Precise Measurement Device – more information

Potential application areas
- Integrated circuit manufacture
- Length metrology
- Nanophysics
- Geophones
- Gravitational wave observations

Green Metals Ltd, James Hamilton

A method has been developed by Green Metals Ltd that allows for oxygen and metals, including titanium, to be produced in-situ on the moon. Electrolysis of solid lunar regolith is the latest development and Green Metals have derived this from their process for the electro-deoxidisation of metals and metal oxides.

Technologies to be presented
- Production of Oxygen from Regolith – more information

Potential application areas
- Green Extraction of titanium and other metals

Cambridge Microfab, Robert Venn

Cambridge Microfab have developed a highly efficient solid state neutron detector. This new, more efficient detector was developed for planetary space studies in support of the European Space Agency’s Science and Robotic Exploration programme. The detector was designed to meet requirements for low applied voltage, compactness, robustness, high efficiency and simplicity of operation. The measured neutron count rate depends on the incident neutron flux, the sensor area, the sensor configuration and the lower limit of discrimination used in the signal chain. The operation of the device is simple, making the sensor ideal for use in the field or in harsh environments.

Technologies to be presented
- Highly efficient solid state neutron detector – more information

Potential application areas
- Medical
- Laboratory
- Environmental
- Hand held devices

Scisys UK Ltd, Chris Lee
A UK based company has been developing and operating software at the cutting edge of autonomous space systems for over 15 years. The engineering challenges faced by their software while on board deep space explorers or planetary rovers, are of increasing interest in terrestrial markets such as oil exploration, transport and security, where robotics and the software that controls them have evolved to the level where they can bring real benefits. In order to reduce the time to test new autonomy functionality, such as the ability to identify objects of interest by physical characteristics, the company has assembled a unique test platform.

Technologies to be presented
- An Open Approach to Robotics and Autonomy – [more information](#)

Potential application areas
- Oil/gas exploration
- Nuclear
- Transport
- Security

**ESA Patents, Matt Edwards**

While developing their vast range of space technologies ESA file a significant number of patents. A selection of these are made available for licensing under very flexible terms. There is a great variety in the patents; ranging from electrical systems to waste disposal solutions. A brief overview of some of the patents will be given along with an explanation of how to access them and the licensing terms.

Technologies to be presented
- List of patented technologies available – [click here](#)

**Space Tech Transfer Examples**

**Geo Cento, Kim Partington**

GeoCento has as its goal making satellite imagery easier to select, plan and access, particularly for non-space users who often find the range and complexities of earth imaging technology challenging to exploit within their own businesses. The company was established in December 2011 and is based at the European Space Agency Business Incubation Centre at Harwell. GeoCento is currently developing a webservice called EarthImages which will enable users to select and plan satellite imagery from the wide range of civilian satellites currently in orbit, as well as from archives of already collected data. This service is currently under development with support from both ESA and a Technology Strategy Board SMART grant and is planned for launch in 2013.

**Radius Health, Mark Evans**

Radius Diagnostics Ltd is developing a ‘solid state-like’ planar X-ray source offering similar benefits to those offered by LCD over vacuum-tube based VDU: a transformation in cost, weight and bulk. This offers enhanced portability, improved usability and changes deployment economics. Also making the device ‘solid-state’ changes the maintenance models from ‘man-in-a-van’ to ‘customer swap-
An “X-ray source on a chip” offers new form factors which will result in highly portable diagnostic devices and allow 3D imaging from planar X-ray (which currently allows only 2D imaging) so giving clinicians enhanced information. By changing the capital and maintenance cost of clinical planar X-ray, which makes up 60% of all radiology procedures, Radius will transform an existing $5bn industry and disrupt an existing $1.5bn market. Solid-state planar X-ray sources viably represents a >$100m opportunity before anticipated market growth resulting from lower prices and improved portability and utility. There are additional markets, such as security that can be addresses and Radius was the UK winner of the 2011 Global Security Challenge. Radius was the Healthcare winner of the 2011 European Venture Challenge reflecting an experienced management team that can demonstrate international customer traction and a defined pathway to access a material market with a transformational technology.

**Instantview, Mark Habgood**

Instantview develops geotagged image workflow services. Instantview’s Accident Notes uses geolocation services to help motorists capture vital information at the roadside following a road traffic accident. The service makes use of the user’s GPS location, combined with third party data, to automatically provide the location, map, date, time, weather conditions and traffic conditions at the place of the incident. The use of Automatic Number Plate Recognition, Vehicle Registration Mark Lookup and Postcode lookup services simplify the collection of third party and witness addresses. The user submits the completed information and receives an electronic copy of the incident report within moments. Their insurer will be alerted to the accident and may log into the secure server to see the incident report, accident photographs and map of the incident. Future activities include the use of digital SLR’s and Very High Resolution Earth Observation images for professional, first responder and insurance users as well as the development of bespoke hardware to capture and communicate the location of remote objects or persons in real-time.

**Cryoconnect, Terry McManus**

Cryoconnect design and manufacture ESA & NASA approved space-flight qualified electrical wiring harnesses for spacecraft structures, instruments requiring low temperature detector systems, infra-red array systems, and housekeeping on cryogenic systems of all scales. In our UK facility, we make and terminate fine wire ribbons to very small gauges in a variety of materials and high resist wires. We work on gauges from 8AWG down to 48 AWG. We have many applications on space missions and currently have a contract with Northrop Grumman to supply all the spacecraft wiring for the James Webb Space Telescope and have successfully completed qualification testing & CDR. Cryoconnect encompasses thermal design, RFI & EMC shielding, heat sinking, vacuum feedthroughs, all connector and termination styles, and can provide comprehensive test capabilities.

**XCAM, Karen Holland**

XCAM Ltd developed as a spin-out from the world class space science research at the University of Leicester in 1995. The company is based near Northampton, and specialises in the manufacture of advanced camera systems which uses charge-coupled-device (CCD) technology and CMOS imaging sensors. These skills developed from x-ray astronomy are proving useful in a range of industrial and scientific sectors, but it is the life science applications that are currently driving forward the most innovation. Initially XCAM was a sensor controller spin out company, but after a number of interesting projects it was realised that there was the potential to reach into other markets such as
bioscience. CCD & CMOS imaging technology is now being used in advanced life science studies to gain clearer images of atomic level structures such as viruses and proteins.

RAL Space Laser Spectroscopy, Damien Weidmann -

The laser isotope ratiometer instrument and its novel underlying principles were developed within the Earth Observation and Atmospheric Science Division of RAL Space, focusing on carbon isotope ratio measurements. Originally intended for monitoring of Earth's and planetary atmospheres the instrument was developed with a view to conducting planetary sample analysis as part of the ESA AURORA programme mission to Mars. This technology has a variety of potential terrestrial uses. It has already been used as a replacement for mass spectrometers in food adulteration tests and has also received a CLASP award for development of medical applications.