

## Newsletter of Oxford Technologies Ltd

### News In Brief

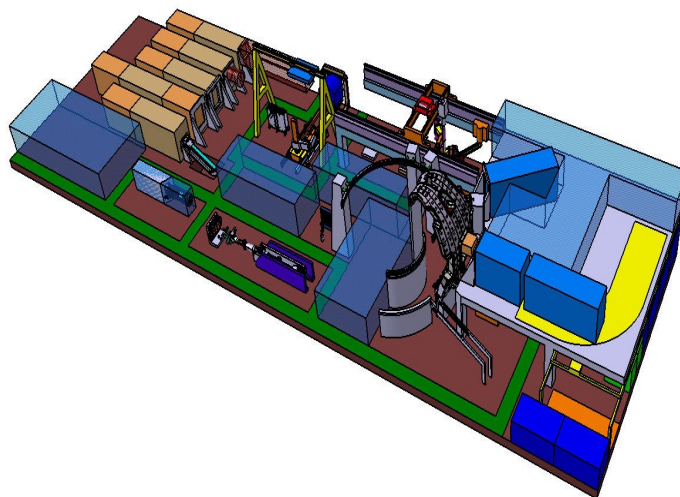
- Robin Shuff, and Ryan King, the first PhD Researchers to complete their work under the PREFIT training scheme, have joined the company's full time staff. Robin's research work addressed the joining of two misaligned pipes using a brazing technique and has resulted in a patent application for his novel method. Ryan's research concerned the integration of multi-sensor information into an Augmented Reality environment.
- Jesse Scholtes has joined our subsidiary, Oxford Technologies BV, as its first employee. Jesse is a graduate of Eindhoven University and brings expertise in the design, optimisation and modelling of control systems for dexterous manipulators.
- We have purchased and installed an ABB industrial robot to use as a general purpose robotic test platform. It will be used in a variety of projects covering robotics, viewing, tooling and HMI's and in the first instance will be used to study the suitability of this type of industrial robot for dexterous remote handling tasks with loads up to 20kg.

## Test Facilities for ITER Remote Handling

In November 2009 we concluded a detailed study and definition of the test facilities which will be required to support the remote handling activities throughout the life of ITER.

The work was conducted jointly with our partner Comex Nucleaire of Marseille and entailed a detailed analysis of the testing requirements followed by the creation of layouts for the facilities to be integrated into the ITER buildings and infrastructure.

The ITER RH equipment requires facilities for site acceptance testing, testing after repair and testing for fault finding. ITER RH operations require facilities for handling task development, RH procedure validation, RH operator training and ITER plant RH compatibility checks.



Layout of the recommended 'cold' ITER remote handling test facility

Many of the tests will be unavoidably conducted on equipment within controlled access zones and testing on complex remote handling systems within controlled areas requires particular care and attention to the facilities' infrastructure and layout.

A major outcome from the study was the definition, layout and implementation plan for two major facilities. One recommended to be located within the ITER Hot Cell building and a second 'cold' facility recommended to be located within the ITER Assembly Hall.

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## Oxford Technologies wins two ITER remote handling framework contracts

In August 2009 we were awarded a service framework contract to support the ITER Remote Handling section for the specification and development of remote handling strategies and equipment over the next 2 years. In addition to this we won, as part of an alliance led by Assystem (F) and including UKAEA Ltd and Scientific Magnetics Ltd (UK), a framework

contract to support the ITER Organisation in the area of Tokamak Engineering. This contract engages the partnership to provide support to ITER for various aspects of the Tokamak design and build including the methods and tools required for first assembly, remote maintenance, engineering of superconducting coils and high heat flux components. Of vital importance to ITER

is the need to ensure that the Tokamak is designed with features and components suitable for remote maintenance throughout its lifetime. Our role under this contract will be to assist ITER designers in this endeavour by bringing our extensive and unique experience gained at the JET project where we have ensured remote handling compatibility for the past 15 years.

## TACO— Development of an adaptive 3D camera

*“...Oxford Technologies will lead the verification and testing stage...”*

Oxford Technologies Ltd is part of a consortium that has been awarded a €3.6million grant under the EU's Framework 7 program. The TACO (Three-dimensional Adaptive Camera with Object Detection and Foveation) project brings together seven partner organizations from Austria, Germany, Norway and UK to develop a state of the art 3D vision based sensor.

The team aims to create a system with faster and more accurate object detection using foveated digital image processing which will automatically assess coarse image infor-

mation and use object recognition algorithms to identify regions of interest within the scene for subsequent higher resolution sampling.

The MEMS (Micro Electro-Mechanical Systems) mirror based sensor will provide image and positional data which will be used to inform a system with a selected level of automation to perform remote handling operations.

During the 3 year project, Oxford Technologies Ltd will provide expertise to help develop the sensor and will also lead the system verification and testing stage by implementing

the state of the art sensor in a variety of remote handling and robotic scenarios. We will quantify the system performance and establish its benefits for remote handling operations. The remote handling testing suite is currently under development at our Abingdon facilities and will include industrial robots, manipulators, modular test stillages and HMI's.

For more information go to: [www.taco-project.eu](http://www.taco-project.eu)



## Using Discrete-Time-Event Simulation to optimise remote handling processes

*“...The model allows the user to monitor the whole process as time progresses from first to last day of the waste recovery project...”*

Oxford Technologies Ltd has completed a contract from Dounreay Site Restoration Ltd (DSRL) for the creation and delivery of a time domain computer simulation of the D3200 Shaft and Silo waste processing facility. The waste processing facility is being designed to handle all the remote operations on the waste from the initial retrieval of solids and liquids through to final encapsulation in storage drums.

The computer simulation will help the D3200 project team to validate the baseline facility design, to size the capacity of process equipment, identify the bottle-necks and identify any opportunities to optimise the layout by smoothing the process flow. The simulation will also help examine finer details such as the effects of altering staff shift patterns, utilisation of raw materials and machine breakdowns. Complex interactions such



as the effect of using limited resources like servo-manipulators and crane required in multiple areas of the process will also be analysed.

The simulation is designed to be intuitive, user friendly and an effective presentation tool allowing the customer and project stakeholders from all professional backgrounds to interact with it and extract meaningful data.

The model provides information about the status of all processes ongoing in

time as the shaft and silo are emptied and the waste sorted, size reduced, assayed, packaged and shipped. The model allows the user to monitor the whole process as time progresses from first to last day of the waste recovery project or any time period within.

Oxford Technologies has applied the SIMUL8 modelling package for this work having successfully applied this previously to other work for DSRL and also ITER.

## Oxford Technologies builds a Mock-up facility for DSRL

Dounreay Site Restoration Ltd (DSRL) is preparing to empty and decommission the shaft and silo. The project requires the removal, treatment and packaging of nuclear waste from each store using remote handling methods.

Oxford Technologies has been engaged to study the requirements and develop the remote equipment required to sort, size reduce and

handle the waste once it has been retrieved to the surface. As part of this we have designed and built a full scale mock-up of the waste sorting and size reduction manipulation facility. With a view to cost minimisation and maximum use of COTS equipment an industrial robot will be evaluated for this work.

A 150kg capacity KUKA robot will be used as a manipulator under man-in-

the-loop control with camera based viewing from a remote control room. The robot will be positioned using an X-Y gantry system designed and built by Oxford Technologies. The gantry stands 4.5m high and can position the robot within the 1m x 4m envelope to within 5mm to facilitate the handling tasks. A tool changer has been included so that tools and grippers can readily be exchanged and a force-moment sensor has been included so that the manipulation forces can be monitored.

The system is presently installed at the Oxford Technologies test area in Abingdon where it will be evaluated, enhanced and optimised by development of the tooling, the tool changing and the operational techniques for size reduction and handling. It is intended to transfer the system to the DSRL site later in 2010.

*“...a full scale mock-up of the waste sorting and size reduction manipulation facility...”*



Waste sorting & size reduction test facility

## Support for the HiPER project

Oxford Technologies Ltd has won a contract to provide expert support to the “HiPER” European High Power Laser Energy Research Facility.

HiPER is a multi-national project aimed at demonstrating the feasibility of laser driven fusion as a candidate future energy source. Planned for construction towards the end of the decade, the project is presently defining the technical and strategic path to delivering inertial fusion.

Oxford Technologies' role is to identify fit-for-purpose remote handling solutions to facilitate through-life

operation of the plant.

Stephen Sanders, marketing manager of Oxford Technologies explains; “The first demonstration of ignition and energy gain from laser-driven fusion is expected to be achieved within the next two years at the National Ignition Facility (NIF) in California. Once NIF has demonstrated scientific “proof of principle” on a single shot basis, the next stage will be to build a demonstration facility capable of operating in a repetitive mode.

HiPER's specification is to demonstrate ignition several times per second

in a burst mode of 100 shots, thus proving the technology in an environment close to what will be needed for commercial power production. This mode of operation will increase the activation of the fusion chamber and require remote maintenance of key components.

There is a real synergy between this and our work on magnetic confinement fusion which we will use to enhance our contribution to this important project.”

*“...there is a real synergy between HiPER and our work on magnetic confinement fusion ...”*



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*“Oxford Technologies Ltd is dedicated to the development of technologies and expertise for the implementation of cost effective solutions to remote handling applications.*

*We operate in the interests of our customers, our staff and our stakeholders and we measure our success by the level of our reputation for operating with the highest of professional and ethical standards.”*

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## People & Places

### New Staff Profile - Ian Hassall



Ian joined the company in December 2008 to work as an Electrical Engineer in the remote handling team at EFDA-JET, Culham.

Ian has joined Oxford Technologies after almost 20 years working in the electronic and car racing industries. He brings to Oxford Technologies experience in wiring of complex electrical/electronic systems, diagnosis and repair of electrical/electronic systems, use of modern measuring equipment, training and support of customers.

### New Staff Profile - Clare Hughes



Clare joined the company in January 2009 as our first full time Senior Administrator. Clare has taken responsibility for the organization and running of the main HQ office and support facilities and also liaises with suppliers and clients.

### New Staff Profile - Serge Gale



Serge joined the company in 2009 to work as a Control and Software Engineer in the HQ team.

He graduated with an upper second MEng degree in Cybernetics from Reading University in 2007 with specialization in non linear control systems, mobile robotics, neural networks and embedded electronics. Since Graduation Serge worked for 2 years as a developer of software for AI applications before joining Oxford Technologies.

### New Staff Profile - Jack Sky



Jack joined the company in August 2009 to work as a Mechanical Design Engineer in the HQ team.

In 2004 Jack graduated with an upper second class MEng degree in Engineering Science from St Catherines College, Oxford. Before joining us Jack has been working in product design for Geith International and Doosan Infracore in the area of large scale handling equipment.