UNIVERSITY of STRATHCLYDE
OIL & GAS INSTITUTE

University of Strathclyde Glasgow

The University of Strathclyde's Robotics Inspection Capability

This document summarises the University of Strathclyde's capability in robotic inspection systems with a view to supporting the development of the UK Technology Leadership Board's Theme area in Integrity and Inspection.

The University of Strathclyde is a leading international technological University with a track record dating back 200 years. Its recent performance has been recognised through a wide variety of awards, including "Times Higher Education UK University of the Year" 2012 and "Entrepreneurial University of the Year" in 2013.

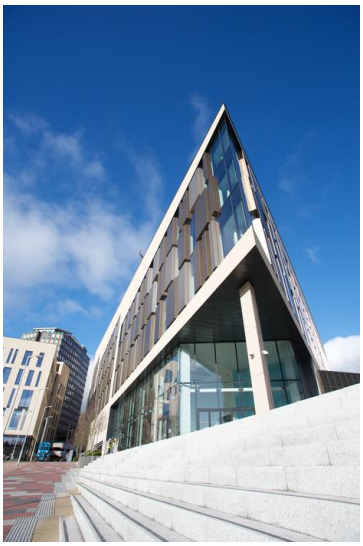
The new £89m Technology & Innovation Centre (shown below) is a dynamic and flexible approach to industry engagement. It will see academia and industry collaborate in state-of-the-art facilities, striving to solve key industrial challenges of our time. This will accelerate the development of research concepts from inception through to application.

The University launched its Oil And Gas Institute in June 2014. The Institute brings together expertise from Scotland's largest Engineering Faculty with other academics and researchers in Science, Business and Social Science. It has a clear focus on supporting the Oil and Gas sector in the area of Asset Integrity. Key themes include: structural health monitoring of equipment; non-destructive testing; sensors and condition monitoring; pipeline integrity; corrosion; power electronics; flow assurance; and decommissioning.

The University is currently conducting world leading research which is of direct relevance to the UK Technology Leadership Board's Theme of Integrity/Inspection and with the aim of developing new robotic inspection methods. The following section outlines the resources available at Strathclyde and highlights relevant industrial engagement:

Key Technology and Innovation Centre Laboratories

The Facility for Innovation and Testing (FIRST laboratory) was established in 2009 as a technology transfer laboratory for Non-Destructive Testing and Evaluation (NDT & E) research. At present the typical time taken to effectively transfer research findings into actual commercial commodities is around 20 years for the NDE industry; FIRST seek to reduce this timescale.



The University of Strathclyde's Technology & Innovation Centre) is specifically designed for industrial engagement. It houses FIRST, HIS and SSP&D.

By working closely with industrial and academic partners, with an emphasis on collaborations through the Research Centre in Non-Destructive Evaluation (RCNDE www.rcnde.ac.uk), FIRST will improve technology transfer and promote rapid industrial uptake of new research.

The University of Strathclyde's HSI Centre, set up in 2009, is the first of its kind in the UK. It delivers signal processing algorithms and turnkey solutions to specific imaging problems for industry and the public sector. Hyperspectral imaging can measure multiple variables including temperature, chemical composition and levels of moisture. There is great scope to apply this technology to corrosion monitoring.

The Sensor Signal Processing & Defence (SSP&D) laboratories specialise in radar (ground based, airborne or spaceborne systems) and sonar technologies for remote sensing, condition monitoring, object identification, classification and tracking for defence and non-defence applications. Through their collaboration with a number of national and international industrial and academic partners the SSP&D group has developed particular expertise and know-how in high resolution imaging and the acquisition and analysis of vibrational and rotational movement in highly cluttered environments that has significant potential in Oil and Gas sector.

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Projects / Industrial Engagement

The core access, inspection and automation requirements for robotic inspection systems are common across the Oil & Gas, Nuclear, Aerospace and Power Generation sectors. By working with RCNDE, Strathclyde is able to pool R&D across industries reducing the cost to each partner, while benefiting from the transfer of knowledge between partners. The following table highlights examples of our industrial engagement.

SILVERWING

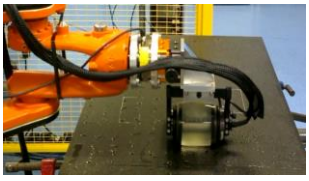
Silverwing and Strathclyde have established a 10 year agreement that exploits fundamental automated NDE research into Silverwing's inspection systems. This works to facilitate safer, higher quality inspections, reducing the risk of unplanned outages and asset failure.
www.silverwingndt.com

Sellafield Ltd
NATIONAL NUCLEAR LABORATORY

Working with NNL, Strathclyde developed a bespoke robotic system for in-service inspection of an otherwise inaccessible Sellafield Ltd vessel located in a cell environment. The robot was deployed on-site where it successfully traversed the cell, captured the required data and then returned to the access point for retrieval.
www.nnl.co.uk, www.sellafieldsites.com

SPIRIT AEROSYSTEMS

Strathclyde is working closely with Spirit AeroSystems to deliver automated integrated inspection capability, along with reduced cycle time and costs, associated with the inspection of large composite parts at the point of manufacture. Such automated technology has the potential to significantly reduce the inspection cycle times coupled with higher accuracy and repeatability.
www.spiritaero.com

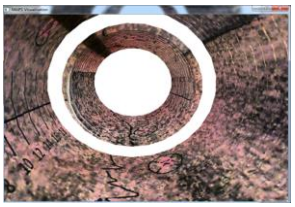


PPS

Strathclyde has entered into a five year partnership with Pressure Profile Systems (PPS), the world leaders in distributed pressure sensing. Strathclyde researchers will support PPS in the development of new robotic applications, such as intelligent pressure sensing grippers.
www.pressureprofile.com

inspectahire
wideblue
making technology happen

Inspectahire and Wideblue, along with NNL, Sellafield, and Strathclyde are collaborating through a substantial Innovate UK R&D project to produce an innovative new optical hardware and advanced image processing techniques for interactive 3D remote visual inspection (RVI) of pipe work.
www.inspectahire.com, www.wide-blue.com



University of Strathclyde Engineering

Researchers at the University are developing an UAV inspection system that enables teams of aerial platforms to autonomously create a 3D texture model of an asset. This technology can be applied to in-service inspection of flare stacks, storage tanks and pipework.
www.strath.ac.uk

KUKA

Strathclyde is working closely with KUKA Robotics UK in the development of new research and teaching capabilities in industrial automation. A key aim of this is to produce a new generation of highly-skilled robotic engineers capable of servicing future opportunities in industries such as Oil and Gas, Aerospace and Nuclear.
www.kuka-robotics.co.uk

For more information contact the Oil and Gas Institute: oilandgas@strath.ac.uk
http://www.strath.ac.uk/oilandgas