Sensor Coating Systems Ltd

Press release

ASME Turbo Expo 2014: Prestigious John P Davies Award received by team members of Sensor Coating Systems

London/ Düsseldorf, 16th June 2014

Members of the London based Sensor Coating Systems Ltd - J.P. Feist, P.Y.Sollazzo and Stéphane Berthier - together with its collaborative partners will be awarded the *John P Davies Award* for the application of a novel integrated measurement technique on an operating turbine engine at the ASME Turbo Expo 2014 in Düsseldorf, Germany.

The American Society of Mechanical Engineers (ASME) International Gas Turbine Institute's Turbo Expo Technical Conference is long recognized as the world's leading conference on all aspects of gas turbine technology. The *John P. Davis Award* is given in recognition of technical papers from time to time - not necessarily each year - that most significantly: (a) describe new or continuing gas turbine applications; (b) identify planning, installation, operating and/or maintenance problems and their solutions; and (c) exemplify candid exposure of real-world problems and solutions and are judged, therefore, to be of exceptional value to others supplying or using gas turbines and their support systems.

The Sensor Coating Systems team successfully conducted a gas turbine engine test on a Rolls-Royce Viper engine using its patented sensor coating technology to measure temperatures on-line. The work was conducted under the project *'Sensor Coating System – SeCSy',* which was co-financed through the Technology Strategy Board (TSB) and was in cooperation with RWE npower , LAND Instruments and Cranfield University. The award also goes to Dr Jonathan Wells (today Siemens) and Mr Bernard Charnley (today Alstom) who co-authored the original publication.

In 2013, the paper received a Best Paper Award from the Manufacturing Materials & Metallurgy Committee at the conference in San Antonio, US. Pontus Slottner, ASME departing Chair of Manufacturing Materials & Metallurgy Committee, Siemens, said in 2013: '*The successful application could have considerable impact on future engine development by increased precision in coating system performance thereby reducing risk and allowing accelerated development speed.'*

'We feel extremely honoured by the decision of ASME IGTI. The implementation of the on-line temperature technique together with our recently developed other technologies (e.g., Thermal History Coatings and self-healing TBCs), has established the company at the forefront of modern gas turbine technology.' says Dr Jörg Feist, Managing Director at SCS. '*One of our goals is to provide the technology to other areas of power generation such as steam turbines where temperature monitoring and control could have a major commercial and environmental impact.*'

The Award will be presented to the authors by Karen Thole, Chair of the ASME IGTI Board, on Monday 16th June during the opening session of this year's conference.

About phosphor thermometry in thermal barrier coatings

The technology promises remote on-line temperature detection with better than 5°C accuracy in harsh environments. Classical temperature detection methods such as the use of thermocouples or pyrometers come with disadvantages specific to the gas turbine environment. Higher uncertainties in these methods can result in lower operating temperatures in order to maintain a safety margin with the consequence of less efficient operation. SCS's coating system provides an on-line monitoring tool which enables more accurate remote detection of temperature on and in the thermal barrier coating (TBC) – a key component in the hot gas path section of a modern gas turbine. This novel capability will lead to a reduction of temperature safety margins and thus to an increase in efficiency.

The technology combines the advances observed in the development of today's high temperature protective coatings with the luminescence properties of ceramics used in TV screens or in energy efficient light bulbs. When illuminating the novel coating with light the coating starts phosphorescing and this phosphorescence can be used both to read temperature and detect evidence of ageing in the coating.

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About Temperature History Coatings and Paints

SCS' thermal history coatings and paints are based on the light emitting properties of a class of ceramic materials, which, when exposed to particular levels of temperature, undergo irreversible changes in the material structure or chemistry. When excited with a probing light the material starts to phosphoresce and this can be observed with specialised optical components to establish a correlation between the observed light and the past temperature. The readout device can be bench based or hand held, the latter enabling in-situ temperature profiling on a component. Unlike existing solutions in the market, the reading of temperature does not require human subjectivity.

About Sensor Coating Systems Ltd.

Sensor Coating Systems Ltd. (SCS) spun out of Southside Thermal Sciences (www.stscience.com) in 2012 and is based in London at the Imperial College Incubator. SCS pioneers sensor technology based on luminescence materials for engineering applications in demanding environments. Its award winning technology enables accurate temperature detection, corrosion and erosion monitoring and life-time predictions and, in doing so, assists in optimising the operation of machinery, lowering fuel costs and maintaining material integrity. The main industrial sectors for application are the power generation industry, aero engines, automotive and machinery operating in extreme environments such as oil & gas and petrochemical plants.

Sensor Coating Systems (SCS) received the British Engineering Excellence Award 2013.

Meet Sensor Coating Systems at the ASME Turbo Expo 2014

Thursday, 19th June 4pm	Room 7a	Operation of a Burner Rig for Thermal Gradient Cycling of Thermal Barrier Coatings
Friday, 20th June 3.30pm	Room 1	On-Line Temperature Measurement Inside a Thermal Barrier Sensor Coating During Engine Operation
Friday, 20th June 4pm	Room 1	Off Line Temperature Profiling Utilising Phosphorescent Thermal History Paints and Coatings

SCS is planning a brief celebration for our clients and partners during the week.

References

Best Paper, ASME Turbo Expo 2012:

Application of an Industrial Sensor Coating System on a Rolls-Royce Jet Engine for Temperature Detection
J. P. Feist, P. Y. Sollazzo, S. Berthier, B. Charnley, J. Wells; Journal of Engineering for Gas Turbines and Power. 135(1), 012101 (Nov 21 2012); doi: 10.1115/1.4007370

Associated papers:
'*Precision Temperature detection using a phosphorescence sensor coating system on a Rolls-Royce Viper engine*' ; *JP Feist, PY Sollazzo, S Berthier, B Charnley, J Wells; Publication date 2012; Paper No. GT2012-69779, Proceedings of the ASME Turbo Expo, Copenhagen, Denmark.*

Best Paper, Ceramic's committee, 2008, ASME Turbo Expo 2008
Sensor Thermal Barrier Coatings: Remote In Situ Condition Monitoring of EB-PVD Coatings at Elevated Temperatures ; Rémy J. L. Steenbakker, Jörg P. Feist, Richard G. Wellman, John R. Nicholls; Journal of Engineering for Gas Turbines and Power. 131(4), 041301 (Apr 10 2009); doi: 10.1115/1.3077662

A video presentation of the actual work can be found on YouTube:
'Inside a jet engine – measuring temperatures through flames'
http://www.youtube.com/watch?v=_jLWNkYYr8U

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