iDAS™ Oil and Gas Well Fibre Optic Intelligent Distributed Acoustic Sensor - Aim

- The project's aim is to develop a fibre optic based in-well distributed acoustic flowmeter based on the revolutionary iDAS™ technology, developed by Silixa.
- The British Government-funded Technology Strategy Board (TSB) is to invest over £750,000 over three years towards the total project budget of £1.8 million under its initiative Maximising Recovery of UK's Oil and Gas Resources.
- Silixa is the second successful company after Sensornet formed by Dr Mahmoud Farhadiroushan who was trained in laser, holographic and optical fibre research in Department of Electronic and Electrical Engineering, UCL by Dr David R. Selviah
- The development project, which is now underway, will produce an *iDAS* system to meet extreme performance requirements, and includes the development of a novel neural network data acquisition and signal processing system making use of UCL's expertise. The project will encompass laboratory and flow loop testing along with field trial installations, which have already begun in the North Sea.

iDAS™ Oil and Gas Well Fibre Optic Intelligent Distributed Acoustic Sensor - Consortium

- Consortium members include Chevron North Sea Ltd., Silixa, Statoil, University College London (UCL), and Weatherford.

iDAS - Principle

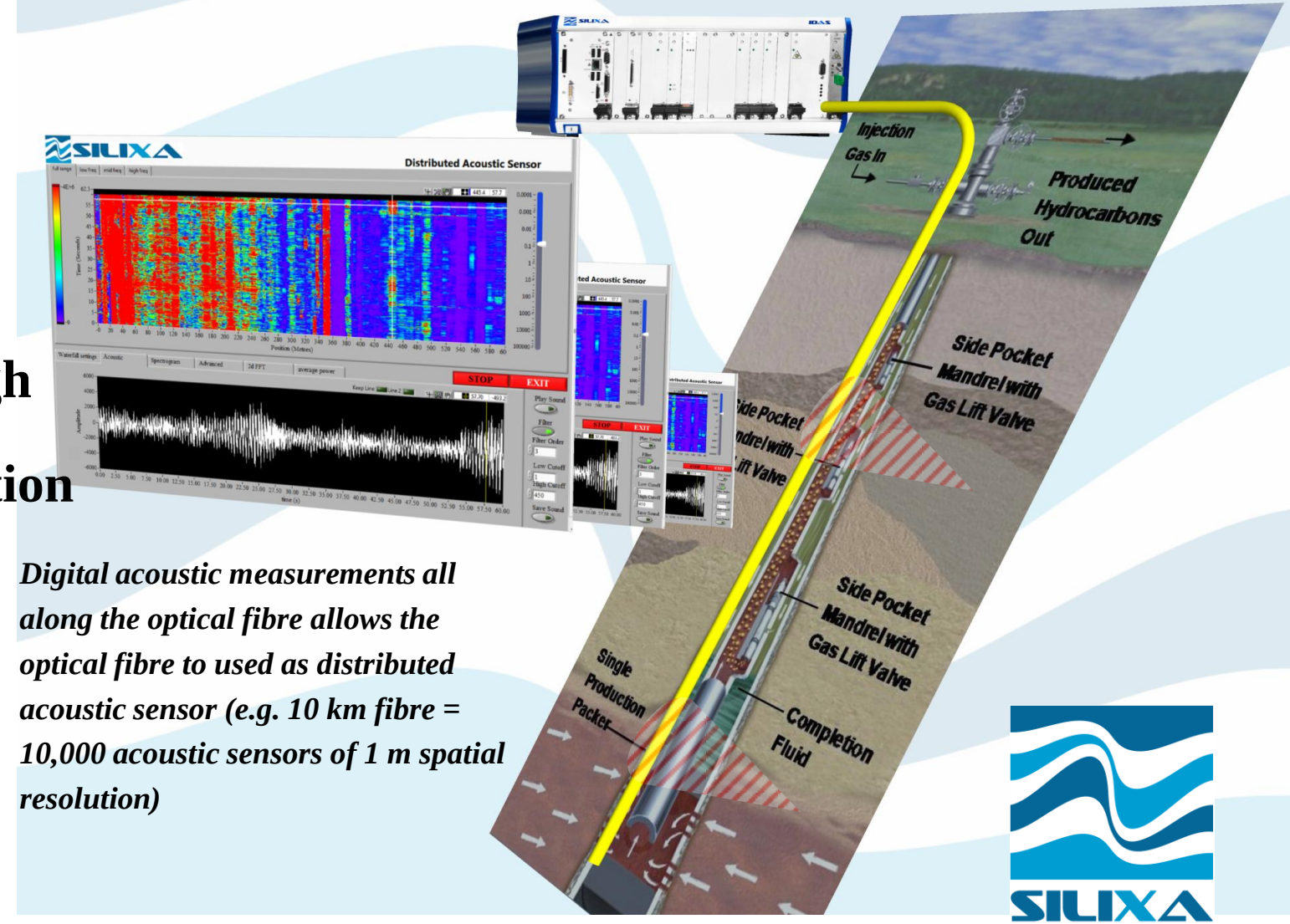
- The *iDAS* measures the true acoustic field every 1 m over up to 50 km of sensing fibre.
- It does this by sending an optical signal into the fibre and looking at the naturally occurring reflections that are scattered back all along the glass.
- By analysing these reflections, and measuring the time between the laser pulse being launched and the signal being received, the *iDAS* can measure the acoustic signal at all points along the fibre.
- The *iDAS* can measure from one end of a standard single, standard telecoms fibre – there are no special components, such as fibre gratings, in the optical path, but special fiber optics cables are required for in-well use.
- It can even be used on existing cables, although custom cables may give a better response.

iDAS Technology

- The acoustic frequency response and sensing range are selectable by the user, and can be used to optimise the *iDAS* for a particular measurement requirement.
- Acoustic sensitivity is dependent on the cable design and installation.
- As an example, the *iDAS* can listen to sounds near a cable in air, or detect and locate manual digging many metres from a buried cable.
- It uses a novel digital optical detection technique to precisely capture the “true” full acoustic spectrum at every point.
- It has the potential for many in-well monitoring applications including distributed flow measurement, sand control system performance and sand detection, gas breakthrough, artificial lift optimization, intelligent completions performance, leak detection and formation subsidence, and is therefore viewed as having significant potential benefits for optimizing and maximizing production in many types of oil and gas fields by facilitating informed decisions.

iDAS™ Downhole Applications

- -Distributed flow
- -Perforations
- -Sand detection
- -Gas Breakthrough
- -Gas lift optimisation
- -Casing leaks
- -Subsidence
- -ESP monitoring
- -Seismic



Digital acoustic measurements all along the optical fibre allows the optical fibre to used as distributed acoustic sensor (e.g. 10 km fibre = 10,000 acoustic sensors of 1 m spatial resolution)

iDAS – Press articles

- http://www.spe.org/jpt/2010/03/ie-10-acoustic-sensing-system-developed/
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- http://www.worldoil.com/Weatherford_Silixa_sign_agreement_for_permanent_acoustic_sensing_systems.html
-
- http://www.rigzone.com/news/article.asp?a_id=89879
-
- http://drillingcontractor.org/people-companies-products-17-5309

- http://www.oilit.com/ Oil Information Technology Journal, April 2010, page 12

iDAS link to Kao

- In October 2009 Professor Charles Kao was awarded a Nobel prize for Physics for groundbreaking achievements concerning the transmission of light in optical fibres, joining 20 previous Nobel laureate former academics and graduates.
- Such fundamental fibre optics communications work forms the basis of many industrial optical sensing systems such as *iDAS*