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CTI Success Story

Innovative Swiss technology for oil companies

In future the oil and gas industries should know more precisely where it will pay to drill. The CTI label company Spectraseis AG has developed a new measurement technology for evaluating the results that are providing an industry operating far from Switzerland with valuable bases for decision-making, and generating billions in turnover. The method is to be further refined in two CTI projects, with ETH Zurich leading the research.

It all began with the publication of a past research project by the University of Zurich: three management experts recognised the commercial potential that lay in its findings. Zurich-born Martin Wagen, Chilean Kent Johnson and New Zealander Ross Newman had become acquainted during their EMBA studies in London and New York, and together they drew up a business plan for a new company. In summer 2003 they founded Spectraseis as a limited company, and single-mindedly set about implementing the idea in the market. Endeavouring to adopt a professional approach right from the start they applied for the CTI start-up label, which they acquired in a record time of only six months.

Breakthrough with Brazilian oil companies

The greatest challenge facing Spectraseis as a small, unknown Swiss company was how to make contact with the major oil and gas producers, who operate far from Switzerland. The breakthrough came in 2004 with the state-owned Brazilian company Petrobras, which declared itself willing to support a pilot project. Spectraseis was thus able to begin to generate turnover and to add more scientists to the team. A year later, Norsk Hydro came on board; the Norwegian energy group now owns around a 21% share in Spectraseis.

Major customers on three continents

Meanwhile Spectraseis has grown to around 30 employees and counts major oil concerns on three continents among its customers: besides Petrobras and Norsk Hydro these include Statoil in Norway, Pemex in Mexico and several state-owned oil companies in the Middle East.

The Spectraseis method also works offshore: the seismometer (below the yellow flotation unit) measures underground vibrations on the sea bed. Spectraseis uses its technology to evaluate the vast quantity of seismic data generated. Photo: Spectraseis

A wealth of experience and ten patents

Spectraseis' method for detecting underground oil and gas deposits cannot replace traditional seismic methods, nor is this the company's intention. The method supplements these and allows the oil industry to predict even more accurately where oil or gas can be found. Unlike seismic, which triggers active waves (for example by means of explosions) and measures the "echo" of these waves from the interior of the earth, Spectraseis uses the naturally occurring waves, the "murmurs" below the ground. With seismometers, which are also used for earthquake research, it measures waves in the low frequency range (<10 Hertz). The real art – and an important innovation by Spectraseis – is the evaluation of the complex data: it is a matter of drawing the right conclusions from an enormous amount of information. The customer receives these conclusions in the form of a comprehensive report, together with graphic 3D representations of the analysed data. The conversion of the extensive measurement results into meaningful descriptions and maps depends partly on so-called digital simulation by means of mathematical models. In order to retain as great a lead as possible over potential imitators, Spectraseis has protected its knowledge and technology through a total of ten patents. Moreover it has accumulated a wealth of experience over the years and thus gained a lead which will not be easy to close.

ETH Zurich gains new renown

The Spectraseis method has been further refined and substantiated through two CTI projects undertaken in collaboration with ETH Zurich. Already Spectraseis has been able to further improve its analytical methods and to optimise the network of measuring points in a given terrain. The many lectures and interviews given by the seven researchers involved in the CTI projects have greatly increased scientific awareness of their work. At the same time ETH has been able to make a name for itself worldwide in the field of mathetical modelling of the spreading of low-frequency waves through rock: its research in this field began with the first CTI project.

One of the long-term goals of those involved in the CTI research project is for ETH to build upon its newly-acquired renown in the field of mathematical modelling by founding its own institute and chair in this field, which has a great future ahead of it. This is because the need for knowledge, and thus the budget is vast, and not just in relation to the detection of oil deposits. In the context of the climate change currently under debate worldwide, mathematical modelling could become an important method in (alternative) energy research or for finding groundwater.

Important support through CTI start-up

Spectraseis AG also expects its long-term activities to be wider than just the detection of oil and gas deposits on land. Offshore measurements have already been taken in the North Sea. In the medium term the company wishes to concentrate more intensively on data evaluation and to outsource the data collection.

According to Martin Wagen the CTI start-up-coaching provided important support in the difficult early stages, and led to a product that is in demand in the market. The CTI Start-up label eventually acquired also opened up access for the rapidly expanding company to major investors. Thanks to the CTI projects undertaken in cooperation with ETH Zurich the innovative new method is becoming increasingly established in science and industry. The future propects are excellent, both for the Swiss and foreign scientists at ETH Zurich and for the international Spectraseis team: many exciting questions still await scientific investigation followed by commercial implementation.

Further information

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