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A showcase pilot of seismic campaign using Distributed Acoustic Sensing solutions

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Distributed Acoustic Sensing (DAS) is a rapidly evolving technology that can turn a fibre optic cable into thousands of acoustic sensors. In this study, we propose to present a seismic survey conducted as a business showcase relying on a collaborative work supported by five partners: FEBUS Optics, RealTimeSeismic (RTS), Gallego Technic Geophysics (GTG), Petro LS and Well-SENSE. The project was carried out at a deep solution mining site developed for salt production, operated by KEMONE, and located nearby Montpellier (South of France).

The seismic campaign was based on two different cable deployments.

On the first hand, a Vertical Seismic Profile survey was conducted on borehole seismic measurements using two different fibre optic cables deployed in a 1800m deep vertical well. The first set of tests was performed along a Petro LS wireline cable including optical fibres. This deployment corresponds to a conventional wireline operation. The second set of data has been acquired along a FibreLine Intervention system (FLI) developed by WellSENSE. The deployment of the FLI system relies on the unspooling a bare optical fibre using a probe along a wellbore. This solution is single-use and sacrificial and can be left in the well at the end of the survey.

On another hand, a short 400m-surface 2D profile has been achieved along both a fibre optic cable and a set of STRYDE nodes deployed by GTG.

Fibre optic cables have been connected to FEBUS DAS interrogator to collect distributed acoustic measurements. The seismic tests, performed in collaboration with GTG, have been achieved with basic "weight drops" (1T falling from 4m) for the checkshot surveys and with an "IVI Mark 4" 44,000-pound seismic vibrator for VSP shots at offset from wellhead reaching 865m. Acquired data have been analysed by RTS.

This work will describe the survey, present the results, and discuss the learnings in two ways: the optimisation of acquisition setups and processing parameters to obtain the best exploitable results and seismic surveys perspectives and challenges using DAS technology.