# Report of Transnational Access Projects

*(Note: the information here will be publicly disclosed in the Geo-INQUIRE website, do not include sensitive information)*

**Project ID:** *C3-TA1-44-2-2*

**Principal investigator:** *Athena Chalari, Silixa Ltd, [ORCID: https://orcid.org/0000-0001-6395-5857]*

**Project team (if applicable):** *Athena Chalari, Andy Clarke, Rumen Karaulanov and Plamen Atanassov.*

**Project title:** *Evaluation of distributed acoustic sensing (DAS) signals in cross-well and surface seismic applications for high resolution imaging of the subsurface*

**Project acronym:** ***SeisDAS***

**Hosting installation:** *PiTOP, TA1-44-2, OGS-ECCSEL*

**Hosting team:** *Cinzia Bellezza, Andrea Schleifer, Fabio Meneghini, Andrea Travan, OGS (Italy).*

**Period of access:** *4-18 April 2025*

**Report of activities:**

In the SeisDAS project the tests have been performed using different energization methods and various acquisition instruments. Three main experiments have been conducted, as explained hereafter.

**Experiment "Exp1"**

This test is a VSP carried out in the well **PITOP2**, using a Vibroseis truck (Minivib) as the acoustic source and both a cemented borehole geophone array and a suspended downhole DAS fibre cable as receivers. The objective of Exp1 was to evaluate DAS responses in a VSP configuration at PITOP2, comparing recordings from a downhole fibre cable interrogated by Silixa iDAS/Carina with a co-located 3C borehole geophone array, under controlled Vibroseis energization. A sketch of the test configuration is reported in Figure 1.

Geo-INQUIRE is funded by the European Commission under project number 101058518 within the HORIZON-INFRA-2021-SERV-01 call

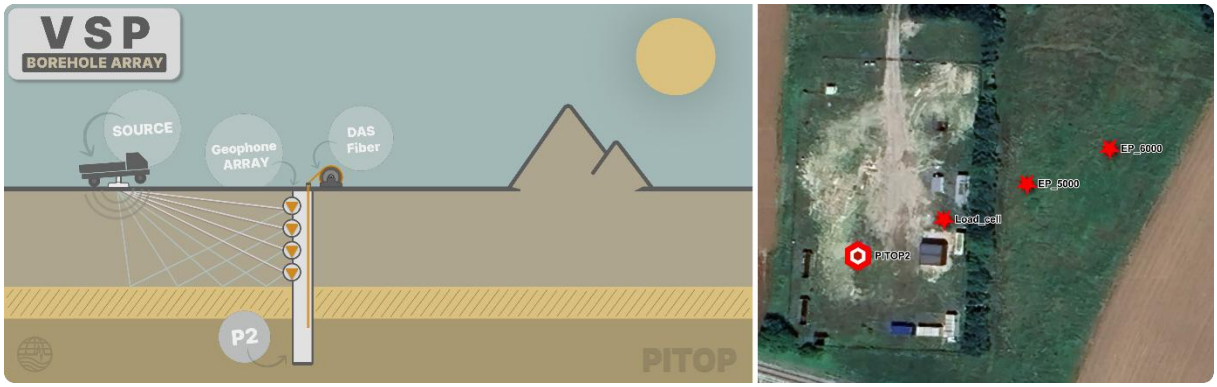


**Figure 1.** Left: Schematics of the VSP test performed in PITOP2 in the SeisDAS project. Right: Top view of the site, sources location (Load cell, EP_5000, EP_6000) and receivers location (in PITOP2).

Representative results are shown in Figure 2.

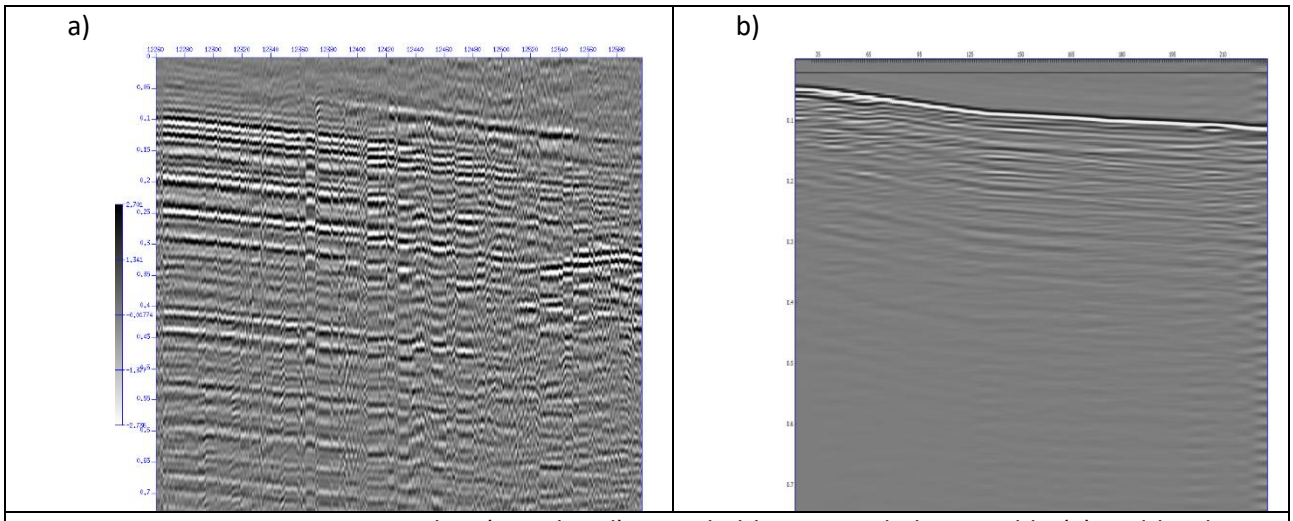


Figure 2: Representative seismic shot (correlated) recorded by suspended DAS cable (a) and by the 3C cemented geophones in PiTOP2.

**Experiment "Exp2"**

The experiment "Exp2" was focused on a surface seismic study, using a Vibroseis truck (Minivib) as the acoustic source and DAS fibre cables (both in trenches and on the surface) as receivers. The objective of Exp2 was to investigate the signals from an active seismic acquisition by DAS cables in shallow trenches and at surface, comparing recordings from various types of DAS cables (e.g. standard, constellation, HWC) and from different depth, interrogated by Silixa iDAS/Carina® under controlled Vibroseis (Minivib) energization. The results of this experiment were aimed to provide a further insight on the behavior of different fibre types embedded in the same cable. Moreover, the data comparison from fibres deployed at the surface and in shallow trenches (50-100 cm) in the same surface position were aimed to explore the possibility to perform DAS surveys without extensive digging operations in order to facilitate logistics. A sketch of the test configuration is reported in Figure 3.

Geo-INQUIRE is funded by the European Commission under project number 101058518 within the HORIZON-INFRA-2021-SERV-01 call

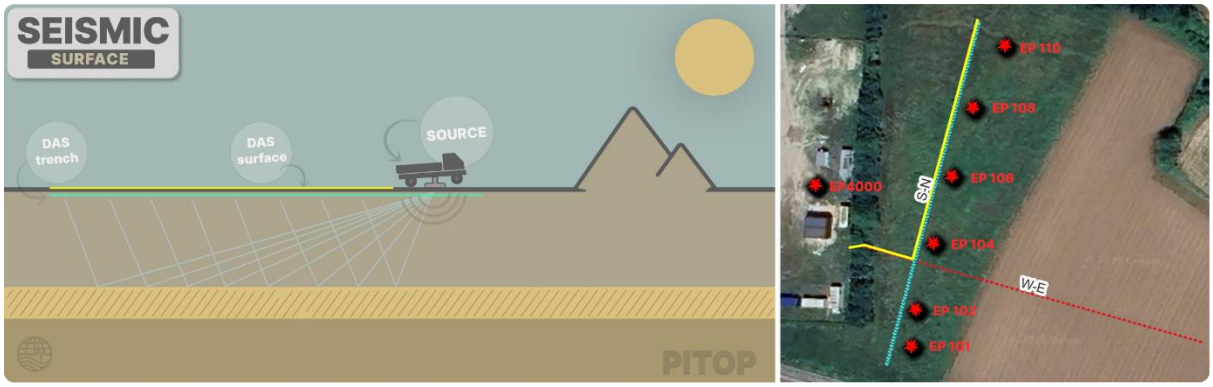


**Figure 3.** Left: Schematics of the surface test performed in the SeisDAS project. Right: Top view of the site, sources location (EP) and DAS lines (yellow = standard cable; red = standard cable in shallow trench, blue = HWC cable).

**Experiment "Exp3"**

Experiment "Exp3" was a VSP carried out in the well **PITOP4**, using a Vibroseis truck (Minivib) as the acoustic source and both cemented and suspended downhole DAS fibre cables as receivers. The objective of Exp3 is to evaluate DAS responses in a VSP configuration at PITOP4, comparing recordings from a cemented or suspended downhole fibre cable interrogated by Silixa iDAS/ Carina®, under controlled Vibroseis (Minivib) energization. A sketch of the test configuration is reported in Figure 4.

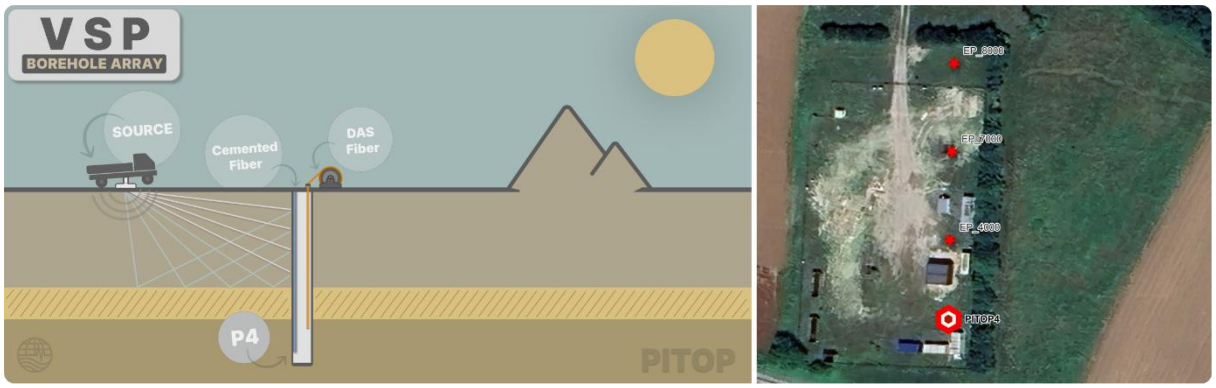


**Figure 4.** Left: Schematics of the surface test performed in the SeisDAS project. Right: Top view of the site, sources location (EP) and receivers location in PITOP4 (cemented or suspended DAS cables).

A comprehensive processing of all project results is currently ongoing. The preliminary results achieved to date enable to state that VSP with suspended temporary fibre optic cable is technically feasible and represents an advance for seismic studies with dense arrays in pre-existing boreholes, although challenges and precautions should be considered (e.g. source position, cable clamping, receiver coupling, synchronization and data management).

Geo-INQUIRE is funded by the European Commission under project number 101058518 within the HORIZON-INFRA-2021-SERV-01 call

**Main project outcomes:**

*Project and datasets:*

- EXP1: https://pitop.ogs.it/transnational_2025-04-seisDAS.php?tab=exp1
  DOI: 10.13120/0DTM-JX93
- EXP2: https://pitop.ogs.it/transnational_2025-04-seisDAS.php?tab=exp2
  DOI: 10.13120/VWF5-K454
- EXP3: https://pitop.ogs.it/transnational_2025-04-seisDAS.php?tab=exp3
  DOI: 10.13120/M28G-7X76

*Website page for the Transnational Access Project*: https://pitop.ogs.it/transnational_access.php

*Publications/communications at Conferences and seminars:*

- *Integrated geophysical studies at the OGS PITOP testing site: an interdisciplinary approach for subsurface characterization*. Travan et al. **EGU 2025.**
- *Comparison of borehole seismic recordings from Distributed Acoustic Sensing and conventional 3C geophones: a VSP experiment at the PITOP testing site (OGS-ECCSEL).* Travan et al. **EGU 2026**
- *Virtual access to onshore and offshore boreholes in Europe*. **Geo-INQUIRE** online training (May 2026)
- Summer school at the University of Camerino "Geology in the energy transition". 22-26 June 2026