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Successful Deployment of a 21km SMART Cable with Force-Feedback Seismometer and Accelerometers in the Mediterranean Sea

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Autonomous Ocean Bottom Seismometer (OBS) deployments have often involved a degree of “drop-and-hope” due to the inherent lack of seismic data communication during installation as well as waiting extended periods before data collection. Cabled solutions provide real-time data during and immediately after deployment, sometimes with opportunity to adjust the instrument before it is left to operate remotely. However, cabled solutions are inherently financially and logistically challenging both in terms of seismic hardware and arguably more significantly, deployment hardware (ships, ROVs, cables etc.). The geographical reach of these experiments is also often limited to within a few hundred kilometres of the coast. These constraints often mean cabled OBS are beyond the scope of most scientific bodies.

Güralp Systems, in collaboration with INGV, has successfully manufactured and demonstrated a method of reducing financial and logistical constraints and extending geographical range by utilising force-feedback seismic instrumentation in cabled OBS systems. The recent successful deployment of the InSEA Wet Demo SMART (Science Monitoring And Reliable Telecommunications) cable displays a world first in how science can partner with industry to achieve this.

SMART cables are primarily telecommunication cables that secondarily serve as hosts for scientific monitoring equipment. Commercial viability for these systems relies on the cable being laid as if the science element did not exist, thereby minimising additional deployment costs and reducing barriers to cooperation with cable laying companies. GSL and INGV deployed 3 seismometer-accelerometer pairs housed inline repeaters along the 21km cable length using standard cable-laying techniques to show proof of concept.

This pioneering installation using telecommunication cables marks a significant step towards drastically improving local knowledge of inaccessible oceanic regions as well as global azimuthal coverage for teleseismic events, all in real time.