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A 21 km SMART Cable for earthquakes and tsunami detection operating in the Ionian Sea

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Continuous seismic and environmental monitoring at remote seabed sites always faced a major challenge due to technical, logistical and financial effort. Commercial Telecommunication submarine cables continuously expand the coverage of ocean seafloor following society's needs to increase connectivity between distant countries and remote sites. Cables over thousands of kilometres long are equipped with in-line repeaters which compensate for optical losses due to such long distances.

A Science Monitoring And Reliable Telecommunications (SMART) Subsea Cables, designed by a Joint Task Force (JTF) across the International Telecommunication Union, World Meteorological Organization, the UNESCO Intergovernmental Oceanographic Commission, may host, inside repeaters, scientific sensors for seismic, ocean and climate monitoring and disaster risk reduction in cases of tsunamis.

The recent successful deployment at the Western Ionian Sea, one of EMSO (European Multidisciplinary Seafloor and water column Observatory) Regional Facilities, of the InSEA Wet Demo SMART Cable displays a world first demonstrating the feasibility of such installation using standard cable-laying techniques to show proof of concept. Commercial viability for these systems relies on the cable being laid as if the scientific element did not exist, thereby minimising additional deployment costs and reducing barriers to cooperation with cable laying companies. Güralp Systems Ltd and INGV deployed three seismometer-accelerometer pairs housed in inline repeaters along the 21km cable long. Each repeater also provides temperature and pressure devices which respectivley enable the real time monitoring of sea environment state and of sea surface level for tsunami detection.

This pioneering installation demonstrates the feasibility of smart cable initiative which may lead to global coverage of ocean seafloor with a network of scientific sensors enabling the real time monitoring of seismicity and tsunami events at remote locations thanks to a collaboration between scientific and commercial parties.