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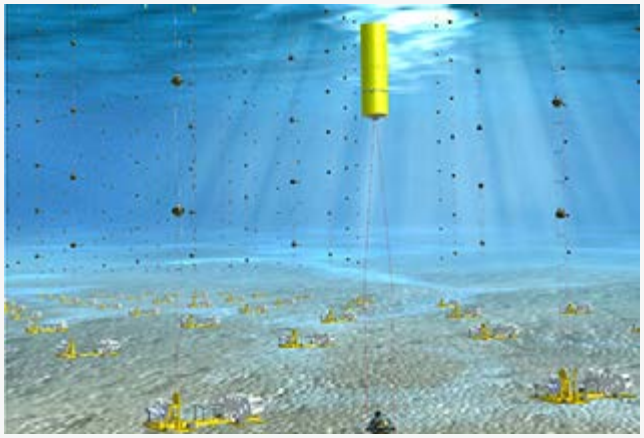

IDMAR FOR THE DEVELOPMENT OF STRATEGIC RESEARCH INFRASTRUCTURES IN SICILY

An ambitious project for the creation of a distributed multidisciplinary underwater laboratory off the coast of Sicily, for scientific and technological research in the marine environment that is connected to a land laboratory through submarine cables equipped with electrical conductors and optical fibre. This project is called IDMAR and it is co-funded by the Region of Sicily with the action 1.5.1 (development of research infrastructure) of the European Regional Development Fund. Operational Programme 2014-2020, Regional Business Department, and the Ministry of Education, Universities and Research included it among the infrastructure works deemed priorities by the National Roadmap for Research Infrastructure. INFN, as leader, INGV the National Institute for Geophysics and Volcanology and CNR the National Research Council are all collaborating in setting it up.

Launched in 2018, IDMAR is keeping to the work schedule and has already obtained significant results. The most recent, announced at the beginning of November, is the completion of works for expanding the land station of INFN Southern National Laboratories in Portopalo di Capo Passero. The station hosts the technological equipment to support the two large European research infrastructures, KM3NET, the underwater neutrino telescope under construction at a depth of 3500 metres, off the coast of Capo Passero, and the EMSO-ERIC, a distributed network of sensors dedicated to studying the Mediterranean in terms of geophysics, volcanology, and the marine environment.

Thanks to IDMAR, the underwater infrastructures will be expanded, to allow the management and acquisition of data from the large KM3NeT telescope, and to put into operation the largest cabled underwater laboratory in the Mediterranean. The laboratories of the Portopalo station are now expanded and completed thanks to the funding for the upgrade of the IDMAR research infrastructure. They will host the ground termination of two electro-optical cables (one already installed and one almost installed) that will enable the management of data from underwater detection structures (KM3NeT and EMSO in the

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first place) and the progress of the FOCUS research project, thanks to a new computation centre already connected through the 20-Gbps GARR network, but already ready to go to 100 Gbps

Funded with an ERC Advanced Grant in 2018, for a total of 3.5 million Euros over 5 years, the FOCUS experiment went into operation this October and uses the additional 28 km long electro-optical submarine cable of the IDMAR network, installed by the LNS-INFN off the coast of Catania.

The project aims to validate a new, fibre-optic technology based on laser reflectometry, commonly used for monitoring engineering structures to detect small seismic movements on the submarine fault of Mount Alfeo, recently mapped.

The data taken by FOCUS can be correlated with those coming from the submarine acoustic station SMO, of the Southern Laboratories, and from the observatories of the Catania node of the EMSO-ERIC infrastructure. Therefore, this provides a single pole of observatories in the Mediterranean to study the evolution of Earth's crust in correspondence with one of the most active and interesting geological areas in the world, that of the volcanic complex of Etna

Once the techniques for monitoring the fault lines has been verified and calibrated in Sicily, the aim is to extend it to other fibre-optic cable networks, like the already existing research networks. ■