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Acoustic data acquisition systems (AcouDAQ) for the SMO, KM3NeT and SN1 experiments

The SMO team has successfully deployed two deep-sea acoustic antennas, permanently connected to shore by means of electro-optical cables. Both observatories are real-time operating since their deployment. The first one is hosted aboard the NEMO-SN1 multiparameter observatory (managed by INGV and INFN) installed at the INFN-LNS "Catania Test Site" located ~25km off the Catania harbour at a depth of ~2100m. The other one is aboard the KM3NeT-SMO detector, mainly devoted to neutrino detection, deployed at ~100km off the Portopalo di Capo Passero (SR) at a depth of ~3500m. The two antennas are equipped with arrays of hydrophones, 4 on the NEMO-SN1 and 14 on KM3NeT-SMO, that are acquired in real time using a common clock derived from the GPS. All data are GPS-time stamped underwater: thus forming the first sparse underwater hydrophones array (the distance between the two installations is about 200km) synchronous and phased with the GPS.

Data collected by the two acoustic arrays are sampled and digitized in EBU/AES audio standard data format (24bit - 96 or 192kHz) by the off-shore electronics and sent, through optical cable, to the shore laboratories of Catania and Portopalo. In each on-shore laboratory an Acoustic Data Acquisition system was installed, running on a dedicated computer farm. The system installed on the farms permits to run parallel real-time data analysis software, which can be remotely controlled at run-time, over the whole data flow. The data acquisition architecture will be presented and its scalability to the expected size of the future KM3NeT acoustic array will be discussed.

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