PNRR Project MEET

WP01 - RENEW - stREngthening the National nEtWorks data production

Activity title: strengthening the UNIGE seismic network

Activity description: the continuous seismic network managed by the University of Genoa (Distav) is currently composed of tens of seismic stations located on the North-West part of the Italian peninsula. This network represents an important contribution for the monitoring and the study of the seismicity and the crustal seismic structures in the Western Alps region and a crucial contribution to the overall puzzle of seismological studies at national scale. This seismic network is currently actively involved in a constant data exchange with INGV. In this project, the University of Genoa will propose to completely upgrade some seismic stations with new up-to-date and advanced instrumentation to improve the quality and the reliability of the recorded seismic signals, keeping in mind also the interoperability with all the neighbouring Italian (INGV) and European (France, Switzerland) seismic networks.

Activity budget: 71.916,50 € (58.947,95 € + VAT) - Scientific instrumentation and technological equipment, software licenses and patent

Seismic broad – band instrumentation for the renew of the RSNI networks		
Instrumentation	*Minimum quantity*	*Maximum total cost (+ VAT)*
Integrated acquisition and transmission system (digitizer and 4G cellular modem) coupled with velocimetric low self noise and broad – band (120 s) triaxial seismic sensor.	5	58.947,95 €

Details of the required technical characteristics of the various components:

Integrated acquisition and transmission system	
Risoluzione convertitore A/D (ADC resolution)	≥ 24 bit
Dinamica (dynamic range)	> 136 dB @ 100 Hz
Campionamento (sampling rate)	Selectable (25, 50, 100, 200, 250, 500 Hz)
Connettività (connections)	LAN, WiFi, integrated 4G cellular modem
Autonomia (system autonomy)	> 30 hours
Formato dati (data format)	miniSEED
Compatibilità (compatibility)	Seedlink server, Seiscomp, Earthworm

Numero di canali (input channels)	≥ 6 Channels
Memoria intenal (internal memory)	> 30 Gb
Ring buffer data recording	> 15 Days
Sincronizzazione di tempo (Time synchronization)	GPS-GNSS time sync (accuracy < 1 micro second)
Metadata	Full response file available and updated on official IRIS database (http://ds.iris.edu/NRL/)
VPN	Integrated and OpenVPN compatible
Firewall	Integrated (iptables or similar)
Alimentazione (power supply)	12 – 24 V
Consumo (power consumption)	< 2 W (< 3.5 W with 4G data transmission)
Grado di protezione (Protection grade)	IP67
Compatibilità con sensori sismici in utilizzo presso la rete sismica RSNI (seismic sensor compatibility)	Nanometrics Trillium 40, 240; Guralp CMG 40; Lennartz Le3D5s; Lunitek Tellus 5s; Lunitek Tellus BB; Kinemetrics Episensor; Lunitek LTFB-160.

Velocimetric low self noise and broad – band (120 s) triaxial seismic sensor	
Tipologia (typology)	Force feedback triaxial velocimeter
Dinamica (dynamic range)	≥ 150 dB (between 0.1 to 10 Hz)
Self noise	< USGS NLNM (between 0.02 to 25 Hz)
Alimentazione (power supply)	12 – 24 V
Consumo (power supply)	≤ 0.6 W
Banda passante (bandwidth)	0.01 s – 120 s
Mass locking and centering	Automatic or remotely controllable with coupled acquisition system
Grado di protezione (protection grade)	IP67K