One (1) sea level station and one (1) hydrometer/meteo installed

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Project Acronym	STREAM
Project ID Number	10249186
Project Title	Strategic Development of Flood Management
Priority Axis	2 – Safety and Resilience
Specific objective	2.2 – Increase the safety of the Programme area from natural and man-made disaster
Work Package	5
Work Package Title	Pilot projects
Activity Number	5.5
Activity Title	Puglia pilot sites
Partner in Charge	LP
Partners involved	PP5, PP7
Status	Final
Distribution	Public

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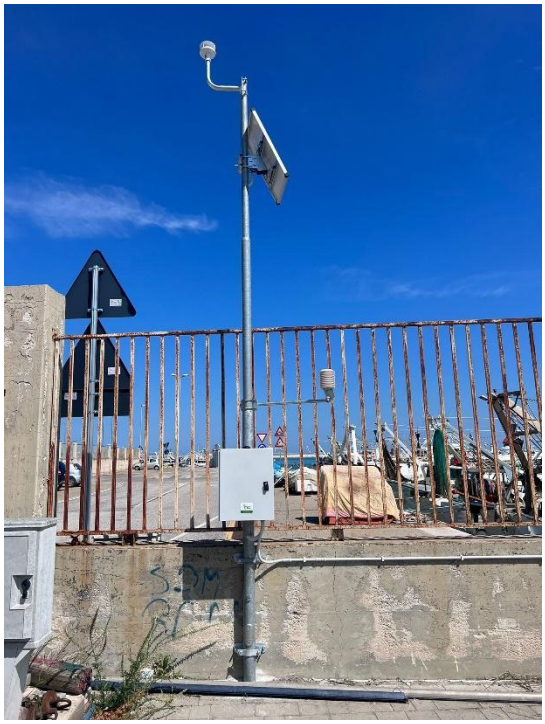
Introduction

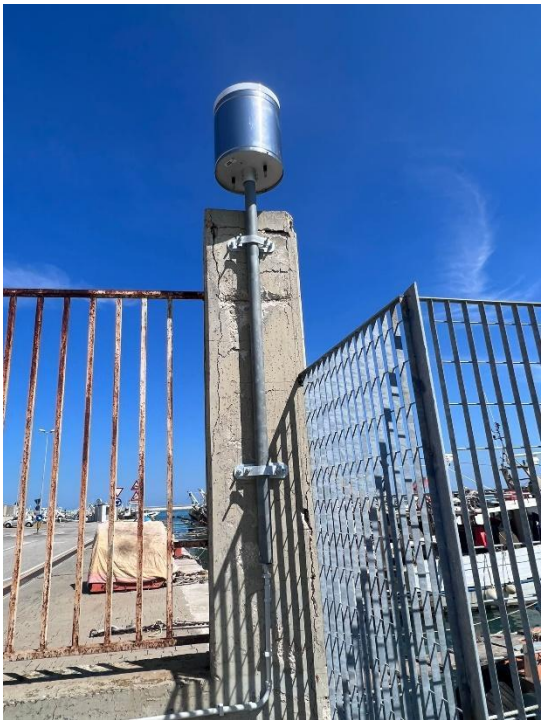
Through the STREAM project, existing monitoring observing systems in Puglia Region such as buoys and hydrometer were integrated. Also, sea level station and hydrometer/meteo were installed in Manfredonia (FG) and in Margherita di Savoia (FG).

The Thematic Equipment of ASSET

On 4th and 5th of **May 2023** ASSET installed n. 2 pilot equipment under the **Deliverable 5.5.3. "One sea level station and one hydrometer/meteo installed"**, as foreseen within WP5, Pilot Projects, in Manfredonia (FG) and in Margherita di Savoia (FG).

In particular, the **first one** is a **meteorological station** for acquiring anemometric data, air temperature and humidity, atmospheric pressure and rain, installed in Manfredonia (FG) as shown in the n. 2 pictures below:





The station consists of the following components and features:

a. Data Logger: the data logger is an essential component in data acquisition systems, as they allow the environmental parameters to be monitored and automatically recorded over time. They manage a variety of measurement sensors, perform programmed calculations, process and store data. Data logger can also transmit data for post-processing, analysis and sharing. Data logger specifications and minimum requirements are:
   - the data logger must be equipped with at least ADC 24-bit;
   - analog inputs 3 differential/6 single-ended;
   - 5 digital IN/OUT;

- Communication ports: RS-232, USB;
- Operating Range -40° to +70° C.

The datalogger is equipped with an industrial 4G LTE cellular gateway providing connectivity to cellular networks, with automatic fallback to 3G and 2G, capable of supporting LTE and GSM/GPRS/EDGE/WCDMA networks via a SIM card. The data logger is programmed to send all data to an ftp server.

b. 2-D Sonic Wind Sensor: two-dimensional ultrasonic anemometer for acquiring wind direction and speed. It provides an alternative solution to traditional mechanical cup and vane or propeller and vane anemometers. Low maintenance and no moving parts significantly reduce maintenance costs and time. Minimum specifications and requirements are:
   - Wind direction range 0-359° (accuracy ±3°, resolution 1°);
   - Wind speed range 0-60 m/s (accuracy ±2%, resolution 0.01 m/s);
   - Operating range for humidity 5-100%;
   - Operating range for Temperature -40° to + 80° C;
   - RS-232 output signal.

c. Barometric pressure sensor: this sensor measures the pressure variations exerted by the atmosphere. Minimum specifications and requirements are:
   - Pressure range 600-1100 hPa;
   - Stability ±0.01 hPa;
   - Operating range for Temperature -40° to + 60° C.

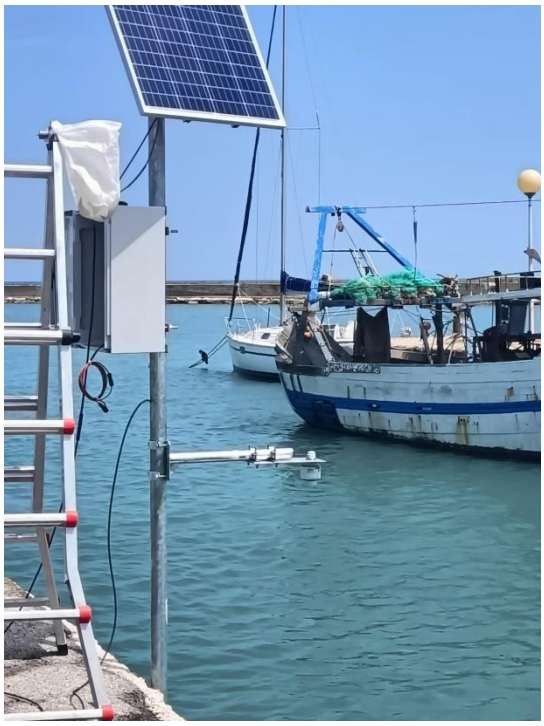
d. Air temperature and humidity sensor: it is a combined sensor capable of measuring both humidity and temperature. The sensor must be equipped with a shield that prevents solar radiation from heating the sensor and creating measurement errors. Minimum specifications and requirements:
   - Humidity range 0-100%;
   - Humidity stability ±0.5% per year;
   - Temperature range -40° to +70°C;
   - Temperature accuracy ±0.2°C;
   - Operating range for temperature -40° to +70°C.

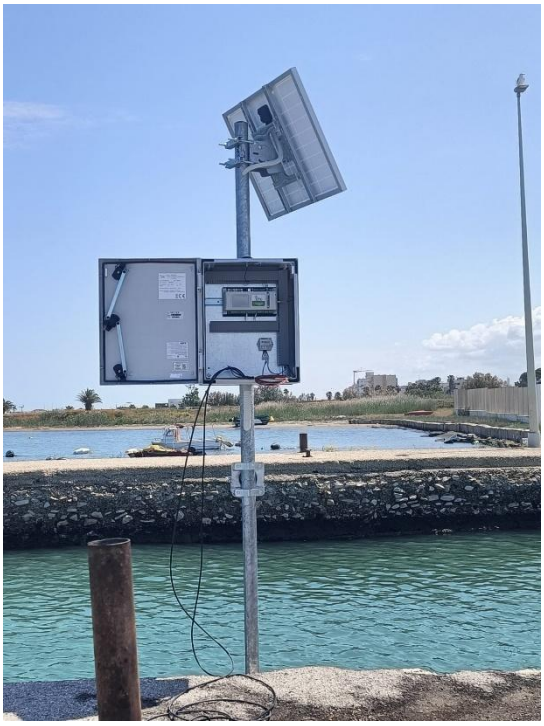
e. Precipitation sensor: this sensor is important for meteorological applications and flood warning systems. Minimum specifications and requirements are:
    - Precipitation intensity 1000 mm/h (39.4 in./h);
    - Operating range for Temperature 1 to 70°C;
    - Accuracy +1%.

The station is equipped with:

- Power system including solar panel, battery (maintenance-free, non-pourable), and solar charge controller.
- Lockable box/cabinet including mounting, connectors, grounding conductor lug for sensor mounting plate, and shields.
- Mechanical components, Rod, and Consumables which include a set of standard hardware and items work or used during installation.
- Full system installation service on site.

The **second pilot thematic equipment** consists of a **Sea level station** for studying sea height variations at the installation site. It has been installed in Margherita di Savoia (FG) as shown in the n. 2 pictures below:





The station consists of the following components and features:

a. Data Logger: the data logger is an essential component in data acquisition systems, as they allow the environmental parameters to be monitored and automatically recorded over time. They manage a variety of measurement sensors, perform programmed calculations, process and store data. Data loggers can also transmit data for post-processing, analysis and sharing. Data logger specifications and minimum requirements:
    - ADC 24-bit;
    - analog inputs 3 differential/6 single-ended;
    - 5 digital IN/OUT;
    - Communication ports: RS-232, USB;
    - Operating range -40° to +70°C.

The datalogger is equipped with an industrial 4G LTE cellular gateway providing connectivity to cellular networks, with automatic fallback to 3G and 2G, capabe of supporting LTE and GSM/GSPR/EDGE/WCDMA networks via a SIM card. The data logger is programmed to send all data to an ftp server.

b. Radar Water-level sensor: it is an autonomous sensor for measuring vertical distance. It emits short microwave pulses and then measures the time between the emission and return of the pulses. The elapsed time measurement is used to calculate the distance between the sensor and the target. Minimum specifications and requirements:

- Range 0.5 - 30m;
- Accuracy ±2mm;
- Resolution 1mm;
- Radar frequency K band (26 GHz).

The station is equipped with:

- Power system including solar panel, battery (maintenance free, non-pourable), solar charge controller;
- Lockable box/cabinet including mounting, connectors, grounding conductor lug for sensor mounting plate, and shields;
- Mechanical components, Rod and Consumables which include a set of standard hardware and items worn or used during installation.

Conclusion

The first installed thematic equipment is a meteorological station for acquiring anemometric data, air temperature and humidity, atmospheric pressure and rain, installed in Manfredonia (FG), and the second thematic equipment consists of a Sea level station for studying sea height variations at the installation site, installed in Margherita di Savoia (FG). The acquired thematic equipment allows the environmental parameters to be monitored and automatically recorded over time.