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Warning system on the Island of Luis Vargas Torres in Ecuador

CAE has won the tender for the **supply and installation of the rapid flood warning system on the island of Luis Vargas Torres (Esmeraldas), in Ecuador.**

The project will allow the competent staff of the “*Gobierno Autónomo Descentralizado de Esmeraldas*”, Ecuador, to monitor the main **hydro-meteorological parameters** and, if necessary, to alert the population.

The island is located at the mouth of the **Esmeralda river**, an area where particularly exceptional tidal peaks are very common, which preclude the regular outflow of the waters of the Esmeralda river; moreover, the winds blowing in the area also hinder the outflow of the river, causing flooding and alluvions.

The proposed system consists of 3 main components:

- **monitoring stations:** equipped with the new **CAEtech Compact datalogger**, they are aimed at monitoring the **hydro-climatological parameters** by means of one or more **level sensors**, such as **WLR**, and/or **rainfall sensors**, and regularly transmitting them to the Control Centre;
- **Control Centre:** it receives messages from the monitoring stations, continuously monitoring their status and any approaching or exceeding of the thresholds that cause the activation of the alert status. In these emergency situations, the Centre is also responsible for initiating the required management protocols. As a further guarantee of the correct operation of the system, a backup centre will also be configured, located in a different place than the Control Centre;
- **alarm stations:** they are responsible for the remote switching on and off of the alarms, both automatically, by means of the appropriate alarm management software, and manually. The alarms can be SMS, acoustic or luminous.

At the end of the installation procedures, CAE will give a practical and theoretical course aimed at the staff of the Municipality of Esmeralda, so that at the end of the maintenance period they can be independent in the management of the system,

with the following main objectives:

- knowledge of the integral functioning of the system;
- system maintenance activities;
- station configuration. ■

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Molise Region, Port of Termoli: measurement of meteorological, tidal and sea water quality parameters

Sea water quality, wave measurement and climate change: these themes are intertwined within a virtuous example of collaboration between public Bodies that was developed in the port of Termoli, in the Molise Region, the closest boarding point for the Tremiti Islands that are a tourist destination for people arriving from all over Italy and Europe. In particular, we are talking about two distinct European projects:

1. **ADRIA CLIM** - Interreg Italy – Croatia. *Climate change information, monitoring and management tools for adaptation strategies in Adriatic coastal areas;*

2. **REGLPORTS** – Interreg – IPA CBC Italy – Albania – Montenegro. *Nautical Tourism Development and Promotion of Regional Ports;*

of which the **Molise Region** and the **Municipality of Termoli** are respectively partners; the two Bodies accidentally found themselves collaborating for the construction of 2 stations which then converged on the same monitoring site, with the result of reducing the amount of land occupied and the related environmental impact.

The objectives of **ADRIA CLIM** are: to enhance climate change adaptation capacity in coastal areas;



as by developing homogeneous and comparable data; to improve knowledge, capacity and cooperation on climate change observing and modeling systems; and finally, to develop advanced information system, tools and indicators for optimal climate change adaptation planning.

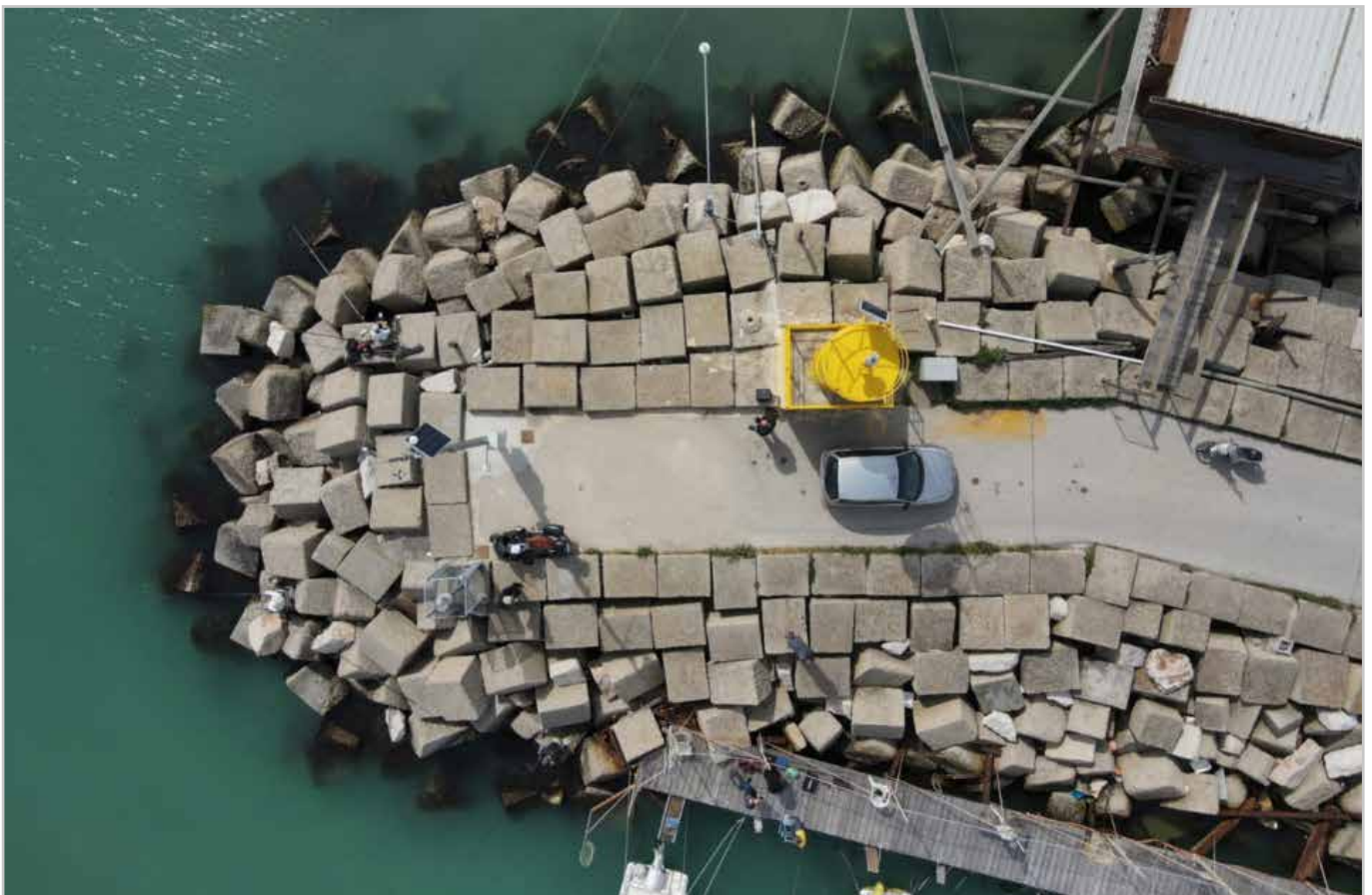
As regards the **REGLPORTS** project, the overall objective is the development of a common model and plans for the enhancement of nautical tourism in the Programme area. In particular, the project wants to develop nautical tourism in 21 small and medium-sized ports and connect them with inland areas, through alternative tourism activities, related to natural assets, sports and leisure activities, archaeological sites and historical monuments, as well as gastronomy, religion and culture. The main expected result is to facilitate smart and sustainable tourism management, thus boost financial growth and reduce unemployment.

In this context, the **Molise Region** and the **Municipality of Termoli** have commissioned **CAE** to

supply, install and activate 1 monitoring station each, which have been positioned as anticipated in a **unique monitoring site**, thus ensuring a useful optimization of space on the port dock. The installation allows to measure the following parameters:

- **meteorological parameters** (rainfall, solar radiation, temperature, humidity, atmospheric pressure, wind speed and direction);
- **parameters relating to the state of the sea** (average sea level, average height of individual waves, average height of the most significant);
- **waves**, average period of the most significant waves, highest wave, average period of the highest wave);
- **parameters relating to water quality** (pH, conductivity, water temperature, dissolved oxygen, Redox potential, turbidity).

The technologies used by CAE for the construction of the stations include: **CompactPlus datalogger**, **Thermo-hygrometer**, **PG10 rain gauge**, **ultrasonic wave meter**, **wind speed and direction sensors**,



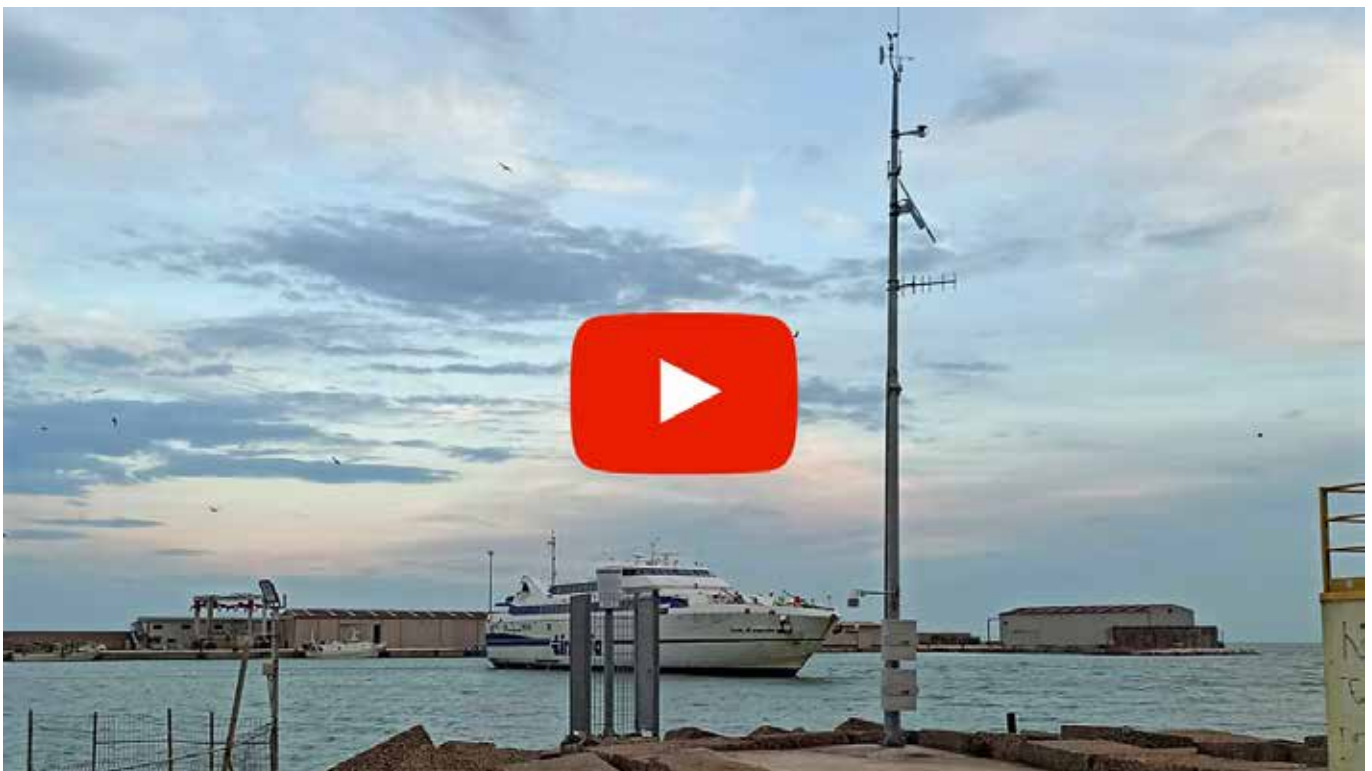


pyranometer and a water quality probe, such as the one installed at the Po River in Pontelagoscuro for ADBPO and ARPAE (please, find [here](#) the related links).

Specifically, the measurement of rainfall and solar radiation are related to the Municipality station, while the other measurements refer to the station developed by the Region.

Both stations are integrated into the **Civil Protection network of the Molise Region**: through a

UMTS/GPRS connection and UHF radio, they send data to the regional network **control centre** located at the headquarters of the **Regional Functional Centre**, in Campochiaro (CB) where they can be analysed and managed with the same methods and procedures as all other regional data. At the same time, a **data displaying platform** allows access to all information regarding stations and data in real time, through any **web** browser, even with **mobile** devices. ■



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Campania: update of the Civil Protection network to monitor hydro-meteorological and hydraulic risk

In 2021 Campania Region announced the first functional and autonomous tender allotment for the updating and technological adaptation of the systems, equipment and IT/telematic infrastructures functional to the regional **monitoring** and **alert** for **hydro-meteorological and hydraulic** risk, operated at the **Civil Protection Multi-risk Functional Centre of the Region**. Last January, CAE stood out among the participants and won the contract, which aims at **overcoming lock-in situations** and using systems based on **open communication protocols**, as well as updating **tools** (dataloggers, sensors, power supply systems, UHF radio transmission systems) and **improving performance**

and radio polling times.

These goals will be achieved in the first place thanks to the CAEtech **Compact Plus** datalogger and the **UHF RÆVO radio modem**, which are characterized by **maximum interoperability and openness**, while ensuring **full and native compatibility with the existing system**. These new technologies can be easily integrated into the existing network, while **also preserving all the current support infrastructures**.

We have already spoken about the potential of Compact dataloggers, so we will focus on the other central component of this project: the RÆVO radio modem.



RÆVO is a **multi-protocol** radio modem and guarantees the highest level of standardization as it can use the following protocols on the port, in addition to the one currently in use to guarantee the absolute compatibility of the intervention: **RS485, RS232, PPP, IP, UDP, CoAP, Modbus RTU**, therefore it allows to implement a network based on the **IP Internet Protocol**, capable of addressing and routing heterogeneous subnets, which instead use their own addressing on a local basis.

CAE's proposal to use protocols from the **IoT** (Internet of Things) world guarantees a system **openness** that will continue to allow the **interchangeability** of individual **components** in the future. Therefore the Administration will have the possibility to maximize its investment, that will provide **a forward-looking system**, which communicates not only with devices within the same network, but also with any kind of device through the logic of the Internet.

The system is composed by **over 250 distinct devi-**

ces including **stations, repeaters** and **control centre devices**, and as always the hardware update is accompanied by all the necessary services: design, installation, training, field and remote maintenance which also includes a **H24 continuous assistance service**: this service ensures the real-time meteorological-hydro-pluviometric monitoring activities of the regional alert system for civil protection purposes. The first functional allotment concerns: the updating and technological adaptation of **n. 70 stations** equipped with an old SP200 technology; the adaptation of the entire radio transmission infrastructure with the implementation of the equipment updated at the Control Centre; and the technological adaptation of the already existing equipment (**n. 22 hydrometric sensors, n. 25 thermometric sensors, n. 13 hygrometric sensors, n. 3 obsolete barometric and radiometric sensors**) in order to align their performance with those of the most recently supplied sensors already used in the system and having an adequate level of performance. ■



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The RÆVO radio modem used to overcome technological lock-in situations

The **RÆVO** radio modem is an innovative **CAEtech** product, which for some years has already proved to be important in **overcoming** the **technological lock-in** situations that occur in older monitoring networks. **RÆVO** is the newest radio developed by CAE specifically for updates to hydro-meteorological monitoring networks, in order to increase interoperability, standardization and transmission speed, while maintaining the traditional reliability that radio networks have always guaranteed. The various regional networks that have already chosen this solution include:

- **Region of Campania**, which is discussed in this issue of the CAE Magazine, to know more [click here](#);
- **ARPA Piemonte**, to know more [click here](#);



- **Region of Umbria**, to know more [click here](#).

The **RÆVO** product is extremely popular on the market. Suffice it to say, over 1,300 devices have already been ordered to date, the largest part has already been installed with excellent results.

The RÆVO radio apparatus is a radio modem operating in the **UHF** range, designed to be used in the creation of networks distributed throughout the territory, and can be used both as a terminal and as a repeater. The operating mode of the single radio modem can be configured both with pairs of frequencies (Tx/Rx) and with a single frequency, in the UHF band.

The radio modem is suited to the creation of Point-to-Point and Point-to-Multipoint connections, even with very complex networks that require very low power consumption: its use in environmental monitoring and warning systems implies the need to guarantee operation in extreme conditions and give up the power supply from mains. Consequently, RÆVO is developed to ensure functionality even when powered by a solar panel and buffer battery.

Regarding **interoperability with commercial data-loggers** and implementation into mixed technology systems, RÆVO allows interfacing with external devices via 3 ports: RS485, RS232 and Ethernet. Being

a CAEtech product, RÆVO can interact with devices and applications of different nature, as it is able to support modern standard **UDP/IP** protocols while maintaining the setting for the old Modbus RTU.

Therefore, thanks to CAE's investments, the RÆVO radio combines a transmission speed of 14,400 bps with the possibility of using standard UDP/IP protocols, while ensuring low energy consumption.

About interoperability "in the air" of this radio, RÆVO is compatible with the protocols of various manufacturers and with all the main UHF radios produced by the SATEL company.

Like all CAEtech products, it also implements the logic of **Zero Breakdown Technology**, which is why it can also be configured to send diagnostic information to the central control unit, as well as implement the use of **Forward Error Correction** (FEC), a mechanism for the detection and subsequent correction of errors.

The radio is compliant with RED Directives 2014/53/UE and 2011/65/UE (ETSI EN 300 113, ETSI EN 301 489-1, ETSI EN 301 489-5, EN 62368-1, EN 62368-1/AC, EN 62368-1/A11, EN 62368-1/AC, EN 50385, EN 50581).

To know more about the product [click here](#). ■



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Overcoming lock-in situations: the open hydro-meteorological network of the Aosta Valley Region



The **hydro-meteorological network** of the **Aosta Valley Autonomous Region** was completely renovated in 2018/2019 with **open** and **latest generation technologies** to make the 4 pre-existing networks homogeneous, both as far as field installations and operations centre, and to guarantee that, at the end of the project, all the components of the system could be replaced, both for maintenance and for future expansions, with interchangeable components from other manufacturers, which can implement the same standard protocols and dialogue methods. The project developed by CAE for the Aosta Valley Autonomous Region is ambitious and it outlines a possible innovative horizon for our Public Administration on a national scale.



Today the network has about 100 installations, including stations and repeaters, of which **28** are **stations installed above 2000 m above sea level**. Working in these sites, which are difficult to reach, requires highly **qualified staff** and **specific work te-**

chniques to guarantee the **correct maintenance** of the equipment.

The **extreme conditions** and the very harsh **temperatures, which can even reach -35°C**, require sturdy materials. As anticipated, the technologies installed are also open and interoperable: in particular, the installed equipment includes the **Mhaster datalogger**, with **Linux** operating system, and the **RCS UHF/IP radio** that uses standard and open protocols, such as **CoAP**, which can be interchangeable in any time with components from other manufacturers. To read the complete **case history**, [click here](#).

The data collected include: **wind** direction and speed, **temperature, solar radiation, rain, level of watercourses** and **snow**, a precious data for the prevention of **avalanches**, aiming at **managing the water resource** and the water supplied to river floods downstream. As Igor Chiambretti of AINEVA stated in an interview with CAE Magazine, “snow is a precious reserve of water that we can use in the driest months to drink, irrigate crops and raise livestock or to produce hydroelectric energy. This resource will become increasingly strategic and



crucial soon for the populations of the entire Mediterranean basin and Europe based on the recent climate evolution (regardless of its origin). It will





therefore become a priority to further enhance the quality of our forecasts and our ability to correctly estimate the quantities of snow accumulated on the ground, allowing us to better manage the use of the most precious substance in the world: water and, especially, drinking water” (to read the com-

plete interview [click here](#)).

For further information on the subject, CAE Magazine interviewed by Hervé Stevenin, of the Functional Centre of the Aosta Valley Autonomous Region, who tell us how last winter was in terms of rain and snow fall in the Region, to learn more [click here](#). ■



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