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EDITORIAL

Amsterdam: CAE has presented its PG4i, the new stand alone rain gauge



PG4i is a **stand-alone rain gauge** that does not require to be connected to a datalogger; moreover, thanks to the **integrated 3G cellular modem**, it is able to locally measure and record both cumulated rainfall and rain intensity data and to transfer them to an **FTP server**.

Thanks to their **low consumption rate**, the **standard high-capacity batteries** that power it ensure uninterrupted operation for long periods of time, and at the same time they extremely simplify installation operations.

This rain gauge has a resolution of 0.1 mm and an accuracy

of over 3%; these features make it one of the top professional sensors. It also stands out from the other rain gauges on the market as it is equipped with many **diagnostic elements**, typical of the **Zero Breakdown Technology** that is applied to all CAE-tech rain gauges. Therefore, it is an “all in one” system with a class A-certified sensor, according to the stringent UNI standards; on the other hand, the diagnostics are able to signal any possible malfunctions before the interruption of the measurements occurs.

PG4i comes with an integrated SIM, batteries and various forms of warranty on the proper functioning of the product, as well as remote assistance performed by CAE technicians. For those who wish to view, process and download data, this can be done through the **AEGIS web software** platform made available by our company.

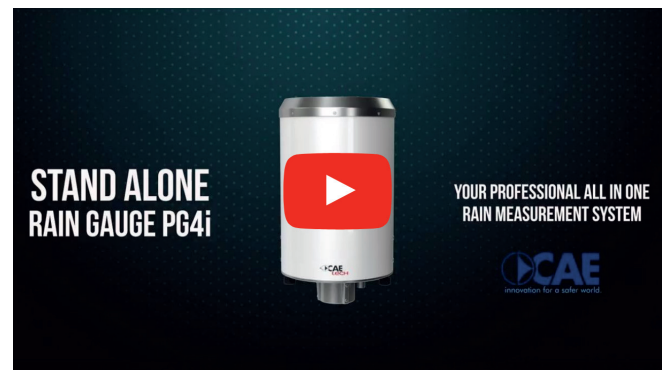
In addition to being **simple, precise, easy to install, configure and maintain**, our product also stands out for being extremely **customizable**. It is in fact possible to choose the mode and frequency of sending data, replace the integrated SIM with another one of any commercial provider or, if desired, configure our product to send data to any FTP server

other than the one provided by CAE.

Moreover, although PG4i is born to be a “stand alone” rain gauge and is supplied by batteries, it can also be powered by a rechargeable battery and a solar panel, or by the main electric system. Its **configuration** can be done **via web**, without any restriction on the choice of the browser or the operating system of the device used. Otherwise, it is possible to load the configuration **locally**, by physically connecting to the instrument.

This solution will undergo the latest tests during the winter, so it will be finally put on the market in the spring.

To learn more, visit our [website](#). ■



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Vietnam: real-time river discharge measurements and new monitoring stations to prevent and manage floods



“Vietnam Managing Natural Hazards Project” (VN-Haz) is a project funded by the World Bank that aims at increasing the resilience of the population and of the local economy to natural hazards in some specific watersheds and the related administrative areas.

One of the main elements of this project is the establishment of specific Centres dedicated to the management of disasters in each target province; this will bring to a strengthening of the ability

to issue weather bulletins and to an improvement of the Early Warning systems. The enhancement of the forecast and early warning systems will be performed by expanding and strengthening the hydro-meteorological monitoring network managed by the provinces of central-southern Vietnam.

The public call for tenders was directed to Vietnamese firms only and the works were let out on contract to a historical partner in Vietnam of our Bolognese firm. The works include the supplying

and installation of 14 new stations equipped with automatic hydrometers and rain gauges, GPRS connected to the Nha Trang Regional Centre.

For 8 of these new 14 installations, a surface speed sensor, a camera and a water temperature sensor will also be implemented. Apart from increasing the number of measurement points, for the first time this implementation will allow us to export to Vietnam some of the latest technologies developed by CAE, after the testing phases. Specifically, a system for calculating real-time river discharges and image monitoring will be implemented in various areas in Vietnam.

After an initial calibration of site-specific parameters, this will allow us to estimate the average speed of the water flow inside the measurement section, starting from the surface speed data, obtained by using radar sensors, as well as to combine them with the wet area for each hydrometric level measured; the result will be a reliable real-time river discharge measurement at the site of installation.

This system allows us to:

- measure river discharges in real time with an improvement in the precision in determining them;
- recognize the loop rating curve;
- measure speed as a forerunner of the flood peak;
- highlight any substantial changes in the geometry of the riverbed in the measurement section;
- perform a correct measurement even in case of solid debris on the bottom of the riverbed;
- monitor the watercourse through the use of images in order to identify any obstructions,
- by using a technology which is not immersed in water, in order to greatly reduce the risk of failure and maintenance needs.

The main objective of this system is to allow us to perform complex activities and procedures to support the risk mitigation and to allow maximum sharing of information among all those who are involved in carrying out monitoring and prevention activities. ■

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The municipality of Ottone invests in prevention: green light to the new early warning system



In 2017, following the damage caused by the flood of 2015, various preventive measures were carried out in the Municipality of Ottone in the hydrogeological field. Mr. Beccia, Mayor of Ottone, declared himself satisfied with the results obtained thanks to the collaboration between different bodies, and publicly thanked Councilor Gazzolo and the Consortium for the Land Reclamation of Piacenza. In 2018, the Municipality has reconfirmed its atten-

tion towards the topic of "Prevention" by investing in the installation of a monitoring and early warning system.

CAE was responsible for the supply, installation, testing and activation of this system. In the area which presents the greater propensity to hydrogeological instability, a pluviometric station with a **Mhaster datalogger** has been installed; when predefined critical thresholds are exceeded, the station activa-

tes wireless warning devices in order to signal the risk of instability on a local basis. Particularly, these are acoustic and visual alarm devices, located near the town square and along the main roads that connect it to the area which presents the greater risk. Every time a configurable condition occurs, the pluviometric station, which is equipped with a GPRS communication module, allows us to send an alarm and early warning SMS to the operators of the Municipal Administration. Moreover, the GPRS module allows remote viewing of data by accessing the unit via the Internet using any standard web browser or, in addition to that, via the DroidMhas App for Android systems, a mobile application supplied by CAE.

According to CAE standards, the station is completely autonomous from an energetic point of view, thanks to the use of solar cells and a buffer battery, which allow it to operate for over a month, even in case of total absence of insolation.

This is not just an isolated system: the station is part of the regional monitoring network run by Arpae, which is part of the Civil Protection trustee network. Therefore, the pluviometric data collected by the station are acquired via UHF radio from the control centre of the regional network of Arpae Emilia Romagna located in Parma, as well as from the Regional Functional Centre.

This is another virtuous example of collaboration between different bodies. ■

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Autonomous region of Valle d'Aosta: CAE systems are the most “open”

The remote measuring network of the Autonomous Region of Valle d'Aosta is currently made up of approximately one hundred automatic stations and was created by putting together four pre-existing networks, which are supplied by four different companies at different times. The tender, for which four different offers were taken into consideration, was called in order to adapt the entire weather-hydrographic monitoring network to the most advanced technologies used for data acquisition and transmission.

In the last years, the technicians of this Region had repeatedly assessed that the situation was discouraging the assignment of all maintenance activities to a single body and therefore not allowing to implement an open tender procedure. As a consequence, it was impossible to implement these and other measures which could have led to administrative simplification and to a possible reduction in costs for the Public Administration itself. Therefore, this project needed to be adjusted in order to make the maintenance of the entire network easier and more rational, by introducing open latest-generation technologies.

This is why we included in the project the complete replacement of dataloggers, radio transmission systems and mobile connections, as well as the complete renewal of the operational centre. Moreover, we added all the activities related to the implementation of the network, as well as those necessary to ensure the coexistence and proper functioning of the already existing networks during the transition and those related to field and remote maintenance

at the end of the adaptation works.

One of the preconditions is that, at the end of the project, all the proposed system components could be replaced, both for maintenance and future expansion, with interchangeable components supplied by other manufacturers, which could implement the same standard protocols and dialogue modes, exceeding therefore the closing limit of already existing systems.

Within the tender, CAE offered its innovative **Mhaster Datalogger** which, as requested, allows to achieve a level of standardization and flexibility of use that today is still unequalled on the Italian and international market. The Mhaster datalogger uses an open and standard Linux operating system, which allows the customer to easily and quickly implement any procedures and/or customized solutions directly.

As for the transmission system, the UHF/IP radio, in addition to responding to speed requirements, uses standard and open protocols such as the **CoAP**, which are perfectly adaptable to the meteorological monitoring sector.

The Operational Centre will be equipped with a single data acquisition and supervision system for the measurement stations located throughout the territory. Among the software for system management, operators will have AEGIS at their disposal: this is a web platform developed by CAE that allows to display the current status of data and diagnostic and operational information related to the monitoring network and to the transmission equipment in GIS mode, on 2D and 3D maps, allowing us to identify

critical and alarm conditions, in order to promptly diagnose any possible malfunction and maintain their efficiency.

Finally, as a complementary service supporting maintenance activities, a web portal will be made available to trace development and maintenance operations throughout the duration of the contract.

The project for the Autonomous Region of the Valle d'Aosta is ambitious and it outlines a possible innovative horizon for our Public Administration on a national scale. Once again, CAE proves to be a leader in the technology field and wants to thank the authorities for their trust by stating that it will work as always for maximum customer satisfaction. ■

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Defence works and new real time monitoring technologies in the Parma river detention basin



The stream Parma is a resource, but also a danger for the hydraulic safety of the town of Parma and the territories downstream of it. In order to reduce the risk of floods and alluvial phenomena as much as possible, a river detention basin has been built approximately 8 km south of the town, in Marano. The maximum capacity of this basin is approximately 14 million cubic meters of water and 12 million at the level of the “dam.” Since 2005, this chamber has been working and the territory downstream of it has benefited from it in several flood events.

After carefully checking the functional status of the already existing piezometric sensors along the perimeter of the river detention basin, CAE is ready to carry out the integration interventions and their systematisation, in order to allow their acquisition by the AIPo plant in Parma by means of the integrated monitoring network of the Po basin. To this end, a network of wireless connections between the working sensors and the remote measuring station on the dam body that detects its hydrometric level will be implemented.

This hydrometric station, which is installed on the

top of the chamber, is equipped with MHAS (Multi Hazard System) technology and will be integrated with 2 wireless radio communication modules with a different technology, for short/medium-range communication. The first **W-Mhaster** module, with a 2.4 GHz communication frequency, will be used for short-range data transmissions between the station towards the knots near the chamber, while the second **ACTI-Link**, with a 868 MHz communication frequency, will be used for medium-range data transmissions to the most distant knots. Both wireless modules will be installed on the pole of the existing station and powered by the battery already supplied to the station. Then, the piezometric data will be collected from the hydrometric station, with programmable deadlines, together with the hydrometric level data of the dam, and subsequently transmitted via the radio network to the Parma Control Centre by means of the UHF radio device already functioning on the station, without the need to implement further centralized hardware and software. The data will also be transmitted, in backup to the radio system, via the existing GRPS/

UMTS communication module, which will be able to operate in parallel with the existing radio module. For each existing knot, equipped with functioning piezometric sensors, it will be possible to implement a wireless acquisition and transmission system for piezometric data, equipped with a different technology as far as the distance between the single knot and the existing hydrometric station is concerned. Each acquisition and transmission system will be integrated inside the already existing container and will be equipped with a buffer battery in order to guarantee its operation by means of the

already existing solar cell.

Therefore, the proposed “turnkey” interventions will include detailed checks on radio connections, installations, the central configuration and the operation of the entire system.

This project will allow to optimize the investment made by the Administration in the construction of the **river detention basin**, by using already installed materials and structures, but also by centralizing the control and analysis of data in a single operating room, allowing therefore a more efficient monitoring of the state of the work over time. ■

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Managing Editor: Guido Bernardi

Editor-in-Chief: Enrico Paolini

Editorial Staff: Virginia Samorini, Alberto Bertocco, Simone Colonnelli, Mirco Bartolini

Editorial Assistant: Virginia Samorini

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