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## Editorial

*The whole Italy, together with CAE, is proud to house the calculation centre of the European Centre for Medium Weather Forecast-ECMWF in the city of Bologna. The project implies the construction of a modern and efficient headquarter from an energetic point of view, within an innovative scientific environment connected to the competitive, stimulating and fascinating research community of Bologna. We will follow with great interest the progress of this project and the construction of the new Tecnopolo (Technology Park), which will give stimulus and new starting points to the city.*

*Moreover, in this issue we will talk about some of the latest successes by CAE, in Italy and abroad, concerning different fields of application. Specifically, CAE is going back to Vietnam as a technology supplier, in order to strengthen the hydrometric and pluviometric network in real time within the “Vietnam Managing Natural Hazards Project” (VN-Haz), funded by the World Bank. This project aims at developing the population’s resilience, as well as allocating economic resources to face natural hazards in some specific river basins. This will be an opportunity for Vietnam to get in touch with the new technologies offered by the Mhas system. Moreover, from the network renovation point of view, we will talk about the modernization sponsored by the Consortium for the Reclamation of the Lands around Parma.*

*Last but not least, CAE is proving to be leader in the landslide monitoring sector, by installing a new system to monitor the landslide in Ponzano (Civitella del Tronto, TE) in Abruzzo. The instability resulted from the effects on the ground of combined actions caused by the earthquake activities of the last months and by the unusual snowfalls occurred in the area during last winter.*

*Enjoy your reading!*



## Excellence in Italy: the new european weather forecast data centre will be built in Bologna

Patrizia Calzolari

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Bologna will host the new ECMWF Data Centre, the news made the city enthusiastic as winning a crucial football match. The selection of Bologna, house of the oldest fully operational University in Europe, became public at the beginning of March.

The European Centre for Medium-Range Weather Forecasts - **ECMWF** is an intergovernmental organization, founded in 1975 and supported by 22 member States of the European Union, which aims at developing numerical methods for medium-range weather forecasts, producing medium-range weather predictions to its Member States, carrying out scientific and technical research to improve the above mentioned predictions and collecting weather forecast data into the biggest forecast numerical data archive in the world.

The existing Centre is based in England, in Reading, but this place, as it is structured at the mo-

ment, does not present the optimal characteristics to perform the extension works as provided in the 2025 ECMWF strategy. As a matter of fact, the European Weather Forecast Centre aims at a constant improvement of its weather predictions. In order to achieve this objective, the next super computers of the data centre will need to guarantee a calculation capacity 10 times higher than the current one: therefore, in addition to a further development of the technologies and the efficiency used at the moment, the centre will also need additional processors and that implies a significant expansion of the infrastructure, which cannot be carried out in the current site. So, an alternative solution had to be found. The competing European cities that presented a project to house and build the new data centre were seven: Exeter (UK), Slough (UK), Luxembourg, Espoo (Finland), Akureyri (Iceland), Reading (UK), which is the current headquarter

of the centre, and Bologna, in Italy.

The Italian government suggested to locate the ECMWF data centre at the Tecnopolo (Technology Park) in Bologna, an area owned by the Region of Emilia-Romagna: a 9.000 square meter area, including the area for the super computers and the office premises at the top floor, would be immediately assigned to the data centre. This space availability may be expanded in the future by further 6.000 square meters, including the possibility to house other connected research activities.

The project implies the construction of a modern and efficient headquarter from an energetic point of view, which will be able to house the ECMWF super computers and the related equipment, with high-level logistic infrastructures, within an innovative scientific environment connected to the competitive, stimulating and fascinating research community of

Bologna. Moreover, Bologna is the main Italian research and knowledge hub as far as weather and climate change are concerned: as a matter of fact, this city is the headquarter of the main research institutes and agencies in the weather and climatic sector (CMCC, CNR, ENEA), as well as of the most important European community for climate research and innovation (European Institute of Technology - Climate-Kic). After several months of evaluation of all the proposed projects, visits and inspections by the ECMWF delegation, on March, 1st, the commission finally came to a decision: Bologna will be the headquarter of the new ECMWF Data Centre.

The news has been welcomed with enthusiasm on every institutional level, by the Prime Minister Gentiloni, the Minister of Education Valeria Fedeli ("this is a great success for our scientific community, and a challenge for the future"), the President

of the Region Stefano Bonaccini (“an extraordinary achievement for everybody”), the Major of the city Virginio Merola (“Once again, Bologna is proving to be a reference point for our country and for

Europe”), and by all the involved organizations and the whole scientific community.

Obviously, we share the same enthusiasm and we will follow with great

interest the progress of this project and the construction of the new Tecnopolo, which will give stimulus to the city, offer new starting points and, especially, represent a milestone for our country

in the development and study of a fascinating and not so well-known science, as it is meteorology. ■



## Post-earthquake landslides in Abruzzo: Ponzano has got a new real time monitoring system

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Once again, CAE is proving to be leader in the landslide monitoring sector, by installing a new system to monitor the landslide in Ponzano (Civitella del Tronto, TE), where on February, 12th, 2017, significant landslide activities took place. This system has been suggested by the Centro Operativo della Regione Abruzzo (C.O.R. - Operative Centre of the Region of Abruzzo) in collaboration with the Direzione Comando e Controllo del Dipartimento della Protezione Civile Nazionale (Di.Coma.C. - Main Direction for Coordination and Control of Earthquake Intervention of the Civil Protection Department), which are managing the current emergency in

Abruzzo. The system will guarantee the monitoring of the areas around the landslide, that are currently stable and inhabited, in order to immediately evacuate them in case of expansion of the landslide. The instability resulted from the effects on the ground of combined actions caused by the earthquake activities of the last months and by the unusual snowfalls occurred in the area during

last winter.

The landslide caused many fractures in the ground, as well as many deformations to the buildings in the affected area, which have been immediately evacuated. However, the instability is still active, and it is therefore threatening the buildings at the edge of the “red zone”. The implemented monitoring system mainly aims at evaluating

in time the need to evacuate further areas or, on the contrary, the possibility to let the evacuated population come back to their houses safely.

As we have already mentioned, the landslide activity is still developing, making it impossible to intervene with structural works or with an in-depth monitoring, as the equipment would turn unusable in a few days. Therefore, in this phase the system is monitoring 24h/day the status of the buildings located near the landslide area, as well as the rainfalls, as rain is actually the main priming phenomenon for landslides.

Once again, for this project too we used the





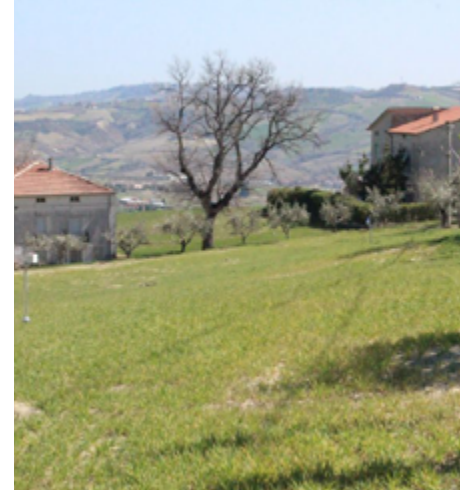
already consolidated Wireless Sensor Network technology (WSN), in order to create Mesh networks and reduce the use of cables in the landslide area. The sensor networks aim at collecting data

that will be transmitted to the Functional Centre of the Regional Civil Protection Department and to the Municipal Operative Centre, through a redundancy radio and GPRS system.

This system is based on a modular structure that will allow us to expand or modify it any time, without interfering with the general functioning of the network, in order to adapt it to any possible future

needs that may occur after the landslide stabilization. ■

## Photogallery





## Ongoing works in southern Vietnam: italian technology for the expansion of the hydrometric and pluviometric network in real time

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The “Vietnam Managing Natural Hazards Project” (VN-Haz) is a very wide project funded by the World Bank that aims at

developing the population’s resilience, as well as allocating economic resources to face natural hazards in some specific

river basins.

This project aims at increasing the efficacy in the disaster risk manage-

ment and it is composed of 5 different elements. The second element is to strengthen hydro meteorological forecasting



and alerting systems. On the whole, the purpose is to help in reaching the goals established by the “National Strategy for Natural Disaster Prevention, Response and Mitigation Towards 2020”, approved by the Government of Vietnam.

Strengthening the forecasting and alerting systems is possible through the expansion and development of the hydro meteorological monitoring network run by the Southern Regional Hydro Meteorological Center. A significant part of this

project was carried out by CAE in 2012.

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 CAE. The works include the supplying and installation of 43 new stations equipped with automatic hydrometers and rain gauges, GPRS connected to the Ho Chi Minh City Regional Centre. In these departments, that share data with the relevant Provincial Centres, it will be possible to get to

know the evolution of natural phenomena in real time.

Thanks to this project, the “Made in Italy” automatic hydrometric and pluviometric stations installed in the Mekong Delta will increase from the current 101 to 144, as it is provided in the original project. In order to give a complete picture of the situation, it is right to add the 12 meteorological stations installed in the same geographic area that have been operating in as many Provincial Centres since 2012.

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. For example, these technologies include Mhaster dataloggers - with an “OpenLog” configuration setting, as it is required for this project - and LPR radar hydrometers. All the above mentioned solutions are in the van as far as their precision, interoperability, open access and robustness. ■

## Photogallery





## Consortium for the Reclamation of the Lands around Parma: the new MHAS system is now operating

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The Consortium for the Reclamation of the Lands around Parma, which has been CAE's customer for more than fifteen years, was the first consortium that adopted the new and innovatory MHAS technology. The modernization affected all the software components inside the plant and implied an upgrade to DATALIFE, allowing the data acquisition and management, as well as to MAPSme, allowing the graphic and cartographic visualization of survey measurements. Moreover, two new hydrometric stations have been installed in the field. One of the two stations, which are equipped with Mhaster dataloggers, has been installed on the brand new expansion chamber of the Burla Channel. A third intervention will be carried out at the hydro-

pluviometric station of Cantonale, where a technological upgrade from SP200 to Mhaster will be performed, as well as the addition of a further sensor allowing the measurement of the channel water level.

The new stations were installed from October 2016 to January 2017 and became an integral part of the Consortium radio network. They have been equipped with Mhaster acquisition units, a data communication radio module, a solar panel power supply unit and ultrasonic hydrometers.

With these new software and Mhaster technologies, based on the Linux Embedded Operating System, the Consortium can now rely on 'open' technologies. As a matter of fact, the new stations

are not only completely configurable by the user, but also programmable according to standard languages. Moreover, they are in the van as far as their interoperability, being natively able to interface with the majority of the equipment on the market. Though preserving our usual CAE style on one hand, on the other hand these new technologies can guarantee the reliability of electronics and the robustness of the supporting structures, which assure us an efficient and constant monitoring in real time of water levels and flow.

The monitoring network of the Consortium is made of equipment and sensors characterized by a high level of robustness, measurement precision and quality. This is why it assures maximum

reliability as far as the data reception is concerned, using an efficient radio infrastructure that guarantees a constant functioning, even during the most critical emergency phases.

In order to perform its duty at its best, the Consortium for the Reclamation of the Lands around Parma makes use of a solid radio network formed by 33 stations distributed over the main water-scoping plants and on some expansion chambers, operated through 2 main power plants: one in Parma and one in Colorno. Finally, the Consortium collaborates and exchanges data with ARP-AE, that runs the regional hydro meteorological monitoring network. ■

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