

EARLY WARNING SYSTEMS (EWS)

QUALITY THROUGH INNOVATION AND DESIGN

March 2017



Energy, Water, Environment.
Global Sustainable Solutions.

08 Early Warning Systems (EWS)

An Early Warning System (EWS) is a major element of disaster risk reduction. It prevents loss of life and reduces the economic and material impact of disasters. To be effective, Early Warning Systems need to effectively disseminate alerts, and warnings. A complete and effective Early Warning System supports four main functions:

- Data collection by continuous monitoring and event detection
- Data Transmission to a Central Receiving Station
- Risk assessment based on data analysis by the Authorities
- Warning and Alerts dissemination



Risk analysis involves systematically collecting data and undertaking risk assessments of predefined hazards and vulnerabilities. Monitoring and warning involves a study of the factors that indicate a disaster is imminent, as well as the methods used to detect these factors. Dissemination and communication concern communicating the risk information and warnings to reach those in danger, in a way that is clear and understandable. Finally, an adequate response capability requires the building of national and community response plan, testing of the plan, and the promotion of readiness to ensure

that people know how to respond to warnings.

ENEAA Grupo® implements advanced early warning systems focused in the three following areas of risk:

- Flash Floods and Heavy Rains
- Lightning and Thunderstorms
- Environmental Gamma Radiation

Find below a brief description of three areas in which our Early Warning System is used.

8.1 Flash Floods and Heavy Rains



Flash floods are typically caused by torrential rainfall, but can also occur from a dam break, a levee break, or even ice jams in rivers during the winter and spring months. Urban flash flooding is a serious and increasingly common problem as cities grow and sprawl. Impervious surfaces like concrete or compacted bare soils, along with alterations to the natural drainages, create instant

high energy runoff from heavy rainfall that can inundate roads and buildings very quickly.

ENEA Grupo® offers advanced Early Warning Systems (EWS) for Flash Floods alert to allow Civil Protection Authorities to take precautionary actions. The combination of new computer modelling, precipitation sensing and GPRS/3G / SATELLITE communication technology improvements, are making flash flood EWS increasingly affordable, effective and sustainable.

ENEA Grupo® designs affordable flash flood early warning systems for heavy rain event detection via dense rainfall / stream flow gauge networks with data transmission in near real-time such as our RainAlert System, with the ability to pinpoint the location and timing of small-scale heavy rain.

This solution can be combined with sophisticated forecasting schemes, employing dense rain gauge networks, radar coverage, satellite algorithms, high resolution computer models of atmospheric processes and distributed hydrologic models, but it is obvious that , it is beyond the state of the science to accurately forecast with effective lead time where flash flooding will occur from convective storms in some situations.

But now, flash-flood prone countries with vulnerable populations do have a range of options from ENEA Grupo® for creating local or regional early warning systems in base of our RainAlert System, capable of providing a first level of protection from flash floods. This basic RainAlert System can be complemented with Forecast Management, integrating in the solution a generation module forecasts based on the models MIKE RR (Rain Runoff - Hydrology), MIKE HD (Hydro Dynamic - Hydraulic) and MIKE DA (Data Assimilation), which through CUSTOMIZED MIKE Manager, help generate automatically forecasts and information from the network.



8.2 Lightning Alert

It is important to note that our Lightning Alert System can be also integrated as a part of the RainAlert System. The lightning Alert System is based on a device which measures the strength of electrostatic fields (high voltage gradients measured in Volt/m) produced in nature by the accumulation of electric charges in thunderclouds. When the voltage detector is installed outdoors connected to our METEODATA logger/Transmitter, the system warn when sufficient electric charge has accumulated in an overhead cloud to create a lightning hazard, even before the first lightning occurs.



User defined thresholds can be established and monitored 24 hours/day 7 days/week automatically with values updated from the system virtually every second. Should alarm thresholds be attained, an alert message will be transmitted by SMS messages to a number of identified users.

Our Lightning Alert System is not working as a Lightning Detectors: but rather, it has been designed to determine when conditions exist where lightning is likely to occur in the local area. While using a “detector” is an ideal method to confirm that lightning has already occurred, it is often too late to be of real operational value especially if the first event occurs either nearby or at the place that is most vulnerable.

Main applications of our Lightning Alert System are:

- DOD / DOE Facilities
- Blasting Operations
- Aero Space
- Hazardous Materials Management
- Atmospheric Research

- Oil & Gas Storage and Handling Facilities
- Military/Commercial Ordnance & Munitions
- Airport FBO and Ground Operations
- Golf Courses and Swimming Pools
- Crane/Heavy Equipment Operations
- Construction Sites
- Public Events and Outdoor Recreation

8.3 Environmental Gamma Radiation Monitoring and Alert System -GammALERT System

Our GammALERT System measures radiation levels in the environment. It has been developed having in mind the importance of counting on a first quality early warning Gamma Ray Environmental Radioactivity Monitoring Solution with an extensive range of applications, such as in monitoring networks for early warning civil protection, with coverage of wide areas; hospital surveillance at radiation therapy wards; supervision at borders, airports, railway stations; accidental radiation generated by Nuclear Power Plants, storage and truck/train transportation of fusionable materials, etc.



The basic element of the GammALERT System is the remote measuring station Model GammaDATA-3000, a smart and low power consumption data logger and data transmitter. This unit allows the connection of different gamma sensors or detectors as the Model GammaMETER-RS04 or Model GammaMETER-GSP02 Gamma Spectrum Probe which permits In-situ isotope identification.

The GammaDATA-3000 unit accepts the connection of additional meteorological sensors for the measurement of precipitation, wind, ambient temperature, relative humidity, solar radiation, etc. in order to give a complete picture of the environmental conditions.

Data and alerts are transmitted to a Central Receiving Station in real-time via, cable, GPRS, Radio-Link or Satellite. Dissemination of data and alerts can be carried out by our WEBTRANS Ubiquitas Internet Platform (WEB Posting). Also SMS messages can be transmitted in real-time to a number of mobile phones, as well as warning emails to Authorities and population.