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Vaisala Automatic Weather Station MAWS301

Update of the Hydrometeorological Real-Time Network in North-Eastern Italy

Since the mid 1980's Regione Emilia Romagna has been active in the provision of regional weather forecasts. The existing hydro-meteorological real-time network employs several technologies, ranging from Surface Weather Stations to Weather Radars and Radiosounding system. After several organizational changes over the years, the dedicated organization is today the Regional Hydro-Meteorological Service (SIM). SIM operates within the Regional Agency for Environment Protection (Agenzia Regionale Protezione Ambiente –ARPA). The ARPA SIM headquarter and the Chief Prof. Stefao Tibaldi are located in Bologna and it is from there that the networks of automatic weather stations, the weather radars and the automatic radiosounding system are remotely managed.

ARPA SIM has defined its mission as to:

- Manage networks of automatic weather stations and collect data in real time from the GTS network
- Process and distribute "short notice" weather forecasts, on a high resolution local scale and different time schedules
- Distribute, to a diversified number of users, specialized weather products (i.e. Teleneve and Icecast-Forecaster)
- Carry out climatological data processing to support studies of climatic changes on the regional level

Tender requirements and award

In the late summer of 2003, ARPA Emilia Romagna issued a call for tenders for the turn-key supply of 49 automatic weather stations, to upgrade and expand one of the existing surface observation networks. The automatic weather stations were divided into two types: 9 urban (configured to measure air temperature and humidity, wind speed and direction, rain and net solar radiation) and 40 agrometeorological stations (with different configurations to measure, depending upon the setup, air temperature and humidity, wind speed and direction, rain, globan solar radiation and leaf wetness). All 49 automatic weather stations were specified in the tender with enhanced characteristics such as full data logging configuration, GSM/GPRS data link and solar panel powering.

In the tender it was stated that the contract would be awarded to the supplier able to offer the best equipment based on an evaluation of the price and technical specifications. In order to propose the most competitive offer in terms of a technical, logistical and pricing solution, Vaisala Hydromet bid the tender, as Prime, in co-operation with the Vaisala's long-time Italian representative, Eurelettronica Icas Srl.

In December 2003, as a result of the tender award, Vaisala HydroMet signed a contract with ARPA Emilia Romagna marking the introduction of the Vaisala Automatic Weather Station MAWS301 to the Italian market. The MAWS301 features state-of-the art technology for automatic weather stations in terms of sensor configuration, telecommunication and power supply.

Specifications and installation of the Vaisala Automatic Weather Station MAWS301

The installations started in the early spring of 2004 in Piacenza, Parma, Reggio Emilia, Modena, Ferrara, Ravenna, Forlì, Cesena and Rimini all urban sites, with beautiful views of the downtown area. This posed several challenges in terms of installation constraints and tailor-made system layouts were defined for each site.

The Vaisala Automatic Weather Station MAWS301, as delivered to ARPA Emilia Romagna, include the new Vaisala Data Logger QML201, a complete automatic weather station designed on one printed board. The board contains a 32-bit Motorola CPU for data processing and 10 differential (20 single end-

View from Reggio Emilia site. The urban location of the sites required tailor-made system lay-outs to be carried out for each installation site.

ed) analog sensor inputs (these can also be used as digital inputs). Moreover, there are three frequency sensor interfaces, a maximum of 6 serial ports, a 16 bit A/D converter, 1.7 Megabytes of secure Flash memory for data logging, as well as a power supply and charger for the internal back-up battery. The board uses the latest SMD (Surface Mount Device) technology and is coated for improved protection in conditions of high humidity.

The operation of the MAWS301 can easily be set-up and modified using the MAWS Lizard set-up program. The MAWS Lizard is a software program that instructs the MAWS301 as to what it should measure, log, calculate, and report. Measured data is stored in the daily log files that can be downloaded to a PC and viewed using the MAWS Terminal software. A basic setup is loaded in the MAWS program memory already at the factory. This allows the customer to simply connect the sensors, communication lines, and power supply to the MAWS301 and have the station start operating, making measurements, performing calculations and sending reports. The customer is able to freely reconfigure the setup files or make completely new ones, by using the Vaisala Set-up Software for MAWS.

The MAWS301 is a low-power system and the logger consumes less than 10 mA from a 6 V battery. The system can be powered using a solar panel or optionally using a 110/230 AC power supply, if heated or optical sensors are used. The power consumption of the complete system depends on the sensors, communication devices, and other options included in the delivery. For example, the MAWS301 with a basic set of 5 sensors, each with a 10-minute measuring interval, has an average power consumption of 10 mA.

A data link is provided with the iConnector iC101, a small adapter that enables installed devices to use the Internet for messaging via wireless modems and data-enabled phones that operate over AMPS, CDMA, CDPD, GPRS, GSM, iDEN, and TDMA wireless networks. iConnector provides "Instant Internet™" connectivity by eliminating the need for any hardware modification to a host device when connecting it to an Internet Service Provider (ISP). iConnector supports, for example, FTP client basic features and enables the user to communicate with the server using the FTP protocol.

Vaisala has extensive experience in the design, manufacture, installation, commissioning and servicing of complete networks of automatic weather stations and networks, worldwide. Thanks to this diversified and large installation experience Vaisala has been able to develop the most enhanced technical solutions in terms of data communication, low power consumption and high sensor integration capability. Research and development of the Vaisala Automatic Weather Stations is continuously ongoing. ●