

Vaisala HydroMet System MAWS301 in ARPA Emilia-Romagna Mesoscale Network

SYSTEM DESCRIPTION

MM210105-A
MAY 2005



PUBLISHED BY

Vaisala Oyj
P.O. Box 26
FIN-00421 Helsinki
Finland

Phone (int.): (+358 9) 894 91
Fax: (+358 9) 8949 2227

Visit our Internet pages at <http://www.vaisala.com/>

© Vaisala 2005

The contents are subject to change without prior notice.

Table of Contents

MESOSCALE NETWORK	2
Agenzia Regionale Protezione Ambiente (ARPA) Emilia Romagna, Italy	2
MAWS301 SYSTEM	5
Sensors	6
CNR 1	6
Telemetry	7
INSTALLATION	9
NETWORK EXPANSION	11

CHAPTER 1

MESOSCALE NETWORK

Agenzia Regionale Protezione Ambiente (ARPA) Emilia Romagna, Italy

ARPA (Agenzia Regionale per la Prevenzione e l'Ambiente) is the Agency appointed in each Italian region for health prevention and environmental protection. ARPA Emilia-Romagna was fully operational as of May 1st 1996. Its creation was made possible by gathering all precious experiences and skilled personnel previously working in many different regional bodies and offices in the field of the health and the environment since 1970.



Since the mid 1980's Emilia Romagna region has been active and successful in the provision of regional weather forecasts. After several organizational changes over the years, the dedicated organization is today the Regional Hydro-Meteorological Service (SIM). ARPA SIM nowadays also carries out civil protection functions, in support of the National Civil Protection Agency, for prevention and alert in case of natural disasters. The ARPA SIM headquarter is 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



Locations of surface weather monitoring stations

In December 2003 Vaisala won an international tender to supply and install 49 new automatic weather stations MAWS301. The contract also included sensor upgrades to many existing stations.

The contract was successfully executed as a joint venture with Vaisala's long-term distributor Eurelettronica ICAS in Italy.

CHAPTER 2

MAWS301 SYSTEM

In this project Vaisala delivered the standard Vaisala HydroMet Systems MAWS301 configured according to the project specifications. The automatic weather stations were divided into two types:

- 9 urban stations configured to measure air temperature and humidity, wind speed and direction, precipitation and net solar radiation
- 40 agrometeorological stations in various configurations to measure air temperature and humidity, wind speed and direction, rain, global solar radiation and leaf wetness.

All 49 automatic weather stations have enhanced characteristics such as full data logging configuration, solar panel powering and real-time telemetry via GSM/GPRS (General Package Radio System) data link using FTP protocol.



Sensors

The following sensors are included in the project:

Air temperature:	QMH102
Relative Humidity:	QMH102
Pressure:	PMT16A
Wind speed & direction:	QMW110
Precipitation:	RG13-1000 (1000 cm ²)
Global solar radiation:	CM6B
NET radiation:	CNR 1

The description and specifications of the standard Vaisala sensors can be found at the Vaisala web-site (www.vaisala.com) and on the MAWS-CD.

CNR 1

The Net Radiometer, CNR1, is intended for the analysis of the radiation balance of solar and far infrared radiation. The most common application is the measurement of Net (total) Radiation at the earth's surface.

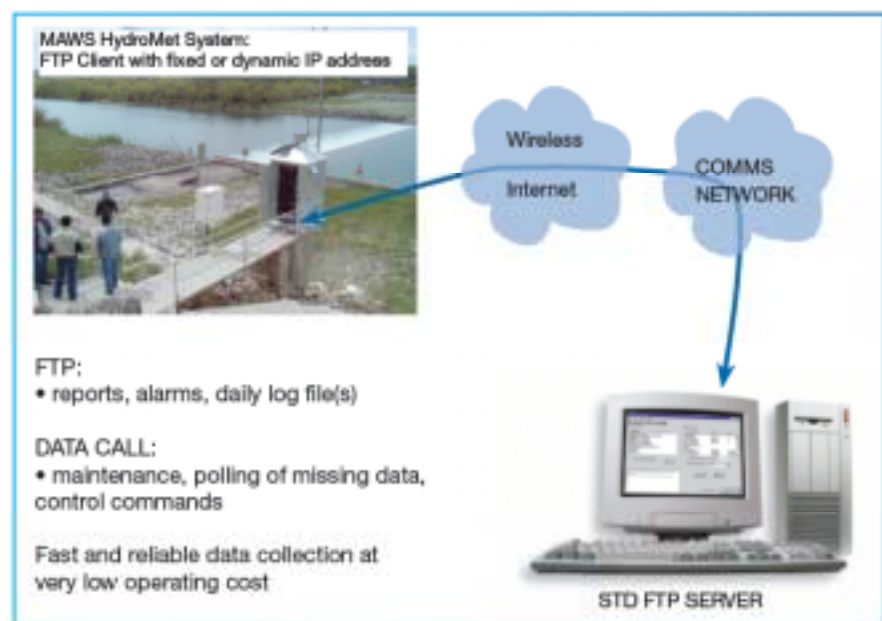
The CNR 1 combines four sensors and consists of a pyranometer and pyrgeometer pair that faces upwards and a complementary pair that faces downwards. The pyranometers and pyrgeometers measure short wave and far infrared radiation, respectively. It also includes an RTD temperature sensor to measure CNR1's internal temperature for compensation purposes. All the required calculations are user configurable in the MAWS.



The CNR1 is highly reliable due to its incorporated heating, even under conditions where other instruments would be covered by dew or frost. The CNR1 can be used in two ways: measuring the four components separately, the Separate Components Mode or measuring only Net Radiation, the Net Radiation Mode.

Telemetry

The data collection is done using the GPRS (General Packet Radio Systems) high-speed data service via the GSM network. Utilising the FTP (File Transfer Protocol) protocol, the MAWS301 offers economical and easy way for collecting data in the GPRS network. The MAWS301 acts as an FTP Client for the data collection software. Each time when it is the time to send a data report or an alarm message, or the data logging is completed, the MAWS301 will automatically place the corresponding file on the FTP Server's hard disk. There is no need for polling routines, alarm monitoring or other scheduling tasks.



The GPRS service in the GSM network offers a convenient and economical way of collecting data in mesoscale networks.

CHAPTER3

INSTALLATION

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

Vaisala HydroMet Systems MAWS301 installed in the cities of Emilia-Romagna are a landmark, since they represent the first urban AWS network in Italy.



Some of the installations took place in picturesque downtown areas, which posed several challenges for installation. Tailor-made system layouts had to be made for each site separately.



Installation of an agrometeorological station



Installation of an urban station

CHAPTER 4

NETWORK EXPANSION

ARPA Emilia-Romagna continues to upgrade the existing network by adding Vaisala MAWS301 AWS both in urban and agrometeorological locations.

As shown on the map in the Chapter 1, additional four (4) MAWS301 agrometeorological stations were installed during the spring 2005.

In the near future, one (1) MAWS301 urban station and one (1) MAWS301 agrometeorological station will be installed.

In the summer 2005, an additional order will be made for other four (4) MAWS301 agrometeorological stations.