METEOROLOGICAL SERVICES

Your all-in-one provider for Meteorology

Weather is an important part of the natural environment as it directly or indirectly affects many of our activities. Timely and effective management of meteorological information, from observations to delivery of forecasts to the various stakeholders represents a challenge for most organizations whose accomplishments are influenced by weather phenomena.

The benefits of a good meteorological service

It is easy to understand the benefits that could arise thanks to a professional understanding of the meteorological conditions and from the availability of various time scale forecasts (from nowcasting to long range forecasts) in agriculture or where the optimal managing of hydrological resources is pivotal; or the positive impact that could be generated in different business activities, like in the transport and tourism industries or, most importantly, the role that a correct management of meteorological and environmental monitoring plays in the effectiveness and efficiency of early warning systems.
All these competences blended with the fact that we actually deliver on a daily base observation and forecasting services allow us to propose ourselves as a professional consulting partner to all those organizations aiming at improving the quality of their meteorological services.

Our services

Thanks to its know-how and expertise developed in its long-lasting activity in the field of aviation meteorology, ENAV is capable of delivering, to a varied type of end-users, services and solutions all along the Meteorological data management value chain.

ENGINEERING AND SYSTEM INTEGRATION

Engineering and system integration capabilities are used to design, deploy and maintain weather observation networks specifically tailored to meet the customer's needs, acquiring and disseminating meteorological information.

METEOROLOGICAL SOFTWARE DEVELOPMENT

Thanks to our Meteorological Software Development Department, we can enrich observation networks with a software platform, either entirely designed "in-house" or integrating "off the shelf" solutions.

Our team

A team of meteorological experts and professional observers and forecasters can support end-users from requirements definition to the elaboration and delivery of a tailored product suiting their needs of precise and timely meteorological information.

Our capability

We have the capability of delivering professional human resources services, from organization to selection and training, tailored to the needs of operational and managerial staff.
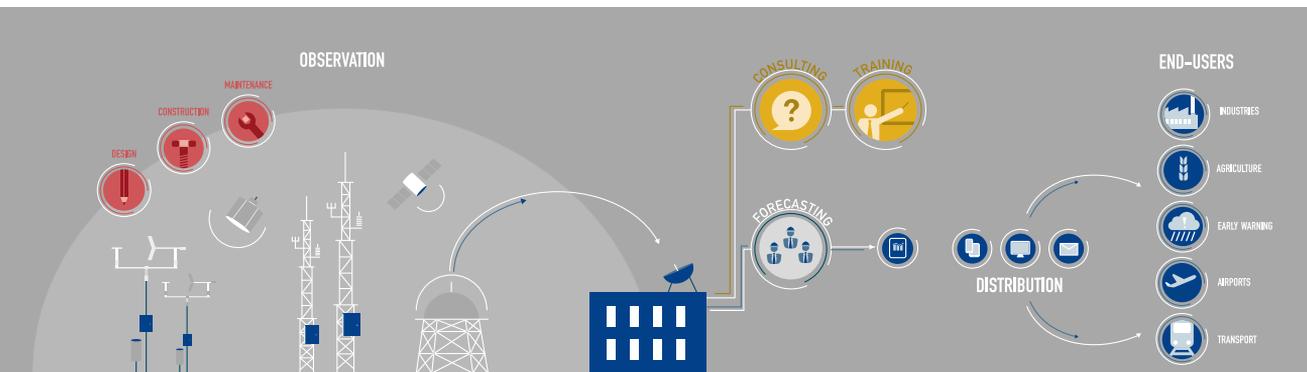
EDAMS Embedded Datalogger for Meteorological Systems

System target

Embedded Datalogger for Meteorological Systems (EDAMS) is an automatic weather station for surface weather measurement, providing field-proven reliability and accuracy. It can be equipped with weather sensors produced by any manufacturer, such as anemometers, barometers, thermometers, hygrometers, rain gauges and other sensors, to perform computing, datalogging and dispatching functionalities. EDAMS system acquires sensor's data, elaborates averages and statistics according to ICAO and WMO international standards and dispatches information to peripheral systems (e.g.: E-AWOS or third party AWOS class systems) via Local Area Network, serial or leased line modems. EDAMS is an excellent choice for applications which require ease of installation, low power consumption, automatic operations and capability to interface with modern telecommunication options such as packet-switched data networks. EDAMS provides a heavy duty rugged waterproof case that allows indoor or outdoor installation in regular or harsh environments.

System description

EDAMS system is an embedded datalogger able to interface analog and digital sensors. The basic sensor suite includes wind speed/direction, pressure, temperature, relative humidity and precipitation sensors. System modularity allows optional smart sensors like transmissometers, ceilometers and visibilimeters to be added as well. EDAMS is based on an embedded x86 single board computer equipped with at most 7 I/O expansion modules, including 16-bit ADC for analog input, Pt100/ Pt1000 interface for temperature sensors, counter and serial ports. The large number of ports and interfaces also allows legacy sensors to be interfaced, supporting reuse and enhanced cost effectiveness. The embedded software performs data acquisition from connected sensors and elaborates meteorological data such as wind (direction and intensity), temperature, humidity, as well as QNH, QFE, dew point and other derived data to be dispatched to peripheral systems. The board computer also includes a Compact Flash slot for data and log storage.

Power Management

The Power supply unit consists of a 120W AC/DC power supply and a 12V Pb Battery. The internal UPS guarantees long term operation during main power failures. Using the default battery, EDAMS system is able to operate seamlessly for 12 hours without main AC Power. An additional 220W AC/DC power supply is also included for sensor heaters and obstruction lights.

Telemetry and Communication

EDAMS system provides redundancy in communication interfaces, allowing data to be transmitted by means of different technologies.

Serial I/O line: EDAMS system has one RS-232 or RS-485 port as standard. Two optional plug-in communication modules can be used for enhancing the number of serial I/O channels up to seven. A serial I/O line can also be used in conjunction with a leased line modem to provide data transmission on copper wire.

Local Area Network (LAN): Edams system has two Gigabit Ethernet interfaces, allowing it to be connected to up to two networks or to a single network with redundant interfaces. Data can be sent over the IP connection, using both UDP and TCP (client or server) protocols.

Mechanical characteristics

The housing is made up of a steel box and an aluminum shelter. They are both made in 1.4301 (AISI 304) stainless material and painted with RAL 9003 color. The whole housing is compliant with IP66 protection rating in accordance with EN 60529/09.200 allowing indoor and outdoor mounting on masts, wall or towers.

Operating environment

EDAMS systems has been especially designed for unattended operation in open-field environments, including harsh ones. EDAMS system has a wide operating temperature of -50° to +60° C. When installed outside, the enclosure is efficiently protected by a white radiation shield against excessive sun radiation. The shield also minimizes temperature differences between day and night, thus preventing internal condensation.

Certifications

EDAMS is certified in conformity with the following standards and other normative documents:

Electromagnetic compatibility: EN 61326-1: 2006
Product safety: EN 60950-1: 2006 +A11:2009 +A1:2010 +A12:2011

The product is compliant with the provisions of the following European Directives:

2004/108/EC: Directive of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC.

2006/95/EC: Directive of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.

EDAMS 4.0

Embedded Datalogger for Meteorological
Systems 4.0

System target

The new Emdedded Datalogger for Meteorological Systems (EDAMS 4.0) is an automatic weather station for surface weather measurement, providing field-proven reliability and accuracy. Like its predecessor EDAM   S, it can be equipped with weather sensors produced by any manufacturer, such as anemometers, barometers, thermometers, hygrometers, rain gauges and other sensors, to perform computing, datalogging and dispatching functionalities. EDAMS 4.0 system acquires sensor's data, elaborates averages and statistics according to ICAO and WMO international standards and dispatches information to peripheral systems (e.g.: E-AWOS or third party AWOS class systems) via Local Area Network or wireless connections. EDAMS is an excellent choice for applications, which require ease of installation, low power consumption, automatic operations and capability to interface with modern telecommunication options such as packet-switched data networks.

EDAMS provides a heavy duty rugged waterproof case that allows indoor or outdoor installations inregular or harsh environments.

System description

EDAMS 4.0 is an embedded datalogger able to interface analog and digital sensors. The basic sensor suite includes wind speed and direction, pressure, temperature, relative humidity and precipitation sensors. System modularity allows optional smart sensors like transmissometers, ceilometers and visibilimeters to be added as well. EDAMS 4.0 is based on an embedded single board computer (SBC), used as the main processing unit for all meteorological data in connected sensors. EDAMS 4.0 also interfaces sensors by means of a wireless connection, using the SBC as a Wi-Fi hotspot. Sensors can themselves be wireless or, in the case of legacy sensors, they can become wireless by means of one or more adaptors, cheap devices designed by Techno Sky to convert any interface to a standard one. In this way, the adapter becomes an integral part of the sensor and makes it wireless, allowing a flexible installation not necessarily close to the main unit. Thanks to the potential and flexibility offered by a wireless interface, it is possible to connect several sensors at the same time and in different places within the wireless network range, without having the inconvenience or cost of purchasing additional expansion cards.

Power Management

The Power supply unity consists of a 120 W AC/DC power supply and a 24V Battery. The internal UPS guarantees long-term operation during main power failures. Using the default battery, EDAMS system is able to operate seamlessly for 6 hours without main AC power. An additional 100W AC/DC power supply is also included for sensors heaters and obstruction lights.

Telemetry and Communication

EDAMS 4.0 systems provides redundancy in communication interfaces, allowing data to be transmitted by means of different technologies.

Serial I/O line: EDAMS 4.0 system has a serial I/O line (USB and RS232/422/485) that can be used to connect sensors or in conjunction with a leased line modem to provide data transmission on copper wire.

Local Area Network (LAN): EDAMS 4.0 system has one Gigabit Ethernet interface, allowing it to be connected to a single network. Data can be sent over the IP connection, using both UDP and TCP (client or server) protocols.

Mechanical characteristics

The housing is made up of a low-halogen thermoplastic material and 100% recyclable. The case is colored with RAL 7035 color. The whole housing is compliant with IP66 protection rating in accordance with EN 60529/09.200 allowing indoor and outdoor mounting on masts, wall or towers.

Operating environment

EDAMS 4.0 systems has been especially designed for unattended operation in open-field environments, including harsh ones. EDAMS system has a wide operating temperature of -20° to +60° C.

Certifications

EDAMS 4.0 is certified in conformity with the following standards and other normative documents:

Electromagnetic compatibility for radio equipment: EN 301 489-17 V2.2.1

Wideband transmission systems in 2.4 GHZ: EN 300 328 V2.1.1

Product safety: EN 62368-1:2014/AC:2015

The product is compliant with the provisions of the following European Directives:

DIRECTIVE 2014/53/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC

DIRECTIVE 2014/35/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits

DIRECTIVE 2011/65/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

E-AWOS ENAV - Automatic Weather Observation System

Meteorological information is a critical factor for air traffic control. Starting from this evidence, we developed a new meteorological standard system for pertinent airports, designed by meteorologists together with ATC experts, for a better managing of the observed meteorological data in TWR and APP operations.

E-AWOS (ENAV Automatic Weather Observing System) consists of four integrated subsystems, such as the AWOS system, which is the main application, the RVR (Runway Visual Range) system, the ATIS (Automated Terminal Information Service), and the TRAINING system. The AWOS manages and collects meteorological data from weather sensors and allows operators to monitor weather data and compile meteorological reports. The RVR, whose data are usually integrated into the AWOS system, manages visibility data along the runways. The ATIS, where required, offers a solution to broadcast meteorological and aeronautical information to pilots by means of a radio channel. At last, the TRAINING system is capable of simulating different meteorological scenarios, customized on local aerodrome, for training purpose.

System description

The E-AWOS system is based on a client-server architecture, with automatic failover management (a fault tolerant cluster system which consists of two servers organized in a master/standby redundancy). A modular design approach makes it versatile for any required customization, in order to create a system suitable for any customer's need. The system has, of course, the required flexibility for being upgraded according to the ICAO amendments or local operational needs, and it can be easily interfaced with any other meteorological existing system or sensor.

The E-AWOS system generally performs:
- Data acquisition from any field sensors, dataloggers and/or external systems
- Data validation and processing, in accordance with ICAO Annex 3 rules
- Meteorological data viewing in MET observers, ATC operators and maintenance working positions
- Sensors status monitoring and management
- System supervisioning and alerts management
- Aeronautical and synoptic weather report compilation and emission through national networks
- Data dispatching to external peripheral systems
- Data storage and archive consultation

Client presentation

The E-AWOS system provides different layouts customized for each user's operational needs. All the GUIs are adaptable to screen size and fully configurable. If required a predefined data layout can be easily modified according to specific needs.

The TWR/APP client provides an innovative user friendly HMI for ATCOs, in a way that ensures the view of data useful for TWR and APP operations. It displays the overview of the airport meteorological situation, showing real time data from field sensors and local meteorological reports, and it allows the management of RWY(s) operative status.

The MET client provides a geo-referenced overview of real time data from field sensors and external systems, allowing both the setting of alarms thresholds and a direct field sensors managements. Specific tools allow the compiling and emissions of aeronautical and synoptic weather reports, both in a manned and unmanned way. A historical archive for browsing and managing meteorological data is also available.

A MAINT CLIENT is also available, providing alerts to technical operators and allowing maintenance staff to easily monitor and manage the overall system status, the connections and the sensors operation, and to quickly resolve any occurred failure.

ATIS Automatic Terminal Information Service

The Automatic Terminal Information Service (ATIS) is the Enav Group's solution to reduce the tower contacts in the busiest terminal areas by means of a continuous broadcast of meteorological and aeronautical information. According to ICAO last SARPs, the ATIS system has been developed acknowledging the overall standard updates.

The ATIS system can be either integrated as a subsystem of the E-AWOS developed by Enav Group, or coupled with any third party AWOS system. It receives airport weather real time data provided by the local MET system and processes them in order to create an ATIS message, that can be extended with aeronautical additional information or also substituted by ATCOs with an emergency message. Eventually, ATIS message is broadcasted over a VHF radio channel as an audio stream towards the landing/taking off aircraft in the terminal area. The provided service is fully automated but the ATCOs can manually perform operations to manage conditions of unavailability of upstream systems or meteorological sensors.

Architecture

DESIGN
ATIS system is based on a client-server architecture, ensuring significant software quality factors such as reliability, scalability and availability. The system has been designed with the intent of achieving a high level of modularity. Each software module has a specific task and interacts with the other in order to generate the final ATIS message. This high degree of modularity allows an easy tailoring of ATIS system to better suit customer's needs.

RELIABILITY AND AVAILABILITY
ATIS system is based on a fault tolerant architecture that relies on a cluster of two servers organized as a master server and a hot standby one. Whenever a fault occurs on the master server, the hot-standby one is able to take full control with minimum or no loss of data. ATIS system provides 99,995% time availability and supports online operational changes, in particular cutover or hot swapping.

FLEXIBILITY
To face the continuous innovation of ICAO regulations, Enav Group has designed an ATIS System than can be easily updated, allowing to support any future customer needs with no infrastructure or architectural modification.

Services and features

AUTOMATED SERVICES

ATIS system autonomously manages the whole workflow of data acquisition, data processing and radio transmission of airport information. It performs the acquisition of the local meteorological reports and the weather real time data provided by the AWOS system. The most used airport weather and ATC information are supported: they are semantically and syntactically validated according to the ICAO rules. During the elaboration of a new ATIS message, all valid data are retrieved and grouped according to the appropriate syntax, fully reconfigurable in accordance with local needs.

Eventually the created message is converted, through an automated TTS (text-to-speech) engine, into a high quality audio stream ready to be broadcasted. Furthermore, ATIS messages are displayed to ATCOs by means of a graphical user interface. This GUI also allows the users to include additional information not directly managed by the AWOS system (e.g. the conditions of the runway surface or the type of approach). Input and output data can be optionally stored into a database in order to keep a historical archive. In contingency conditions (such as data source missing) ATIS system provides also ATCOs with manual data entry features, in order to perform the creation and the broadcasting of ATIS messages always updated. In emergency conditions, the system allows users to manage emergency messages to be broadcasted replacing actual ATIS messages.

D-ATIS

When applicable, the ATIS system can provide pilots with the D-ATIS functionality: it offers an easy interface to any datalink provider, in order to send both ATIS messages and real time meteorological data directly on the pilots' cockpit displays as digital information.

MAG.HUN The Magnetic-North Hunter is an ENAV Group solution for measurement of the magnetic orientation of the anemometric sensors

System description

MAG.HUN is a portable instrument used for the measurement of the magnetic orientation of the anemometric sensors. All the equipment is stored in a waterproof and dustproof carrying case, easy to transport everywhere. The equipment includes:

- Electronic magnetic orientation indicator device
- Smartphone included with charger and cable
- User and maintenance manual
- Manual goniometer (optional auxiliary accessory)

The Goniometer can be used to apply the correction of the angle required for the mechanical support of the sensors, necessary in case there is no graduated ferrule.

Measurement device and Smartphone unit

A commercial smartphone, configured with App Chrome is able to connect to the measurement device, set as Wi-Fi hotspot, therefore no need for a Sim card. The measurements are presented to the Operator through an intuitive and adaptable Web server interface.

The Smartphone unit, with WiFi enabled, is connected to the hotspot (named MAG.HUN) via an Internet browser that periodically presents to the Operator the measurement results and the required orientation correction.

The result of the measurement can be archived as a screenshot, or even in a file format (e.g. pdf).

Power management

The Power supply unity consists of a 5V DC power supply and a 3.7V, 2000mAH Li-Po Battery. MAG.HUN has a USB charging socket, connectable to the supplied charger or to any USB socket able to supply at least 500 mA of current. Using the default battery, MAG. HUN device is able to operate seamlessly up to 3 hours without DC power.

Telemetry and Communication

MAG.HUN has one Wireless interface, allowing it to be connected to a single private network. Data can be seen over the IP connection in a Web Server interface that periodically sends (frequency of 1 sec) a web page with the measurement of the North magnetic heading.

Mechanical characteristics

The storage carrying case is waterproof and dustproof compliant with the standard IP67. The housing of the measurement unit is made of thermoplastic material (ABS), dark grey colour, heat resistant high-impact plastic. Provides protection against dust and moisture according to the standard IP54 allowing indoor and outdoor mounting on masts or towers. The upper panel has a stamped reference to the North. The lower panel has a USB charging socket, an ON/Off switch and a LED indicating the status of switching on or charging when switched on.

Operating environment

MAG.HUN has been especially designed for operation in open-field environments. MAG.HUN has a wide operating temperature of -20° to +60° C.