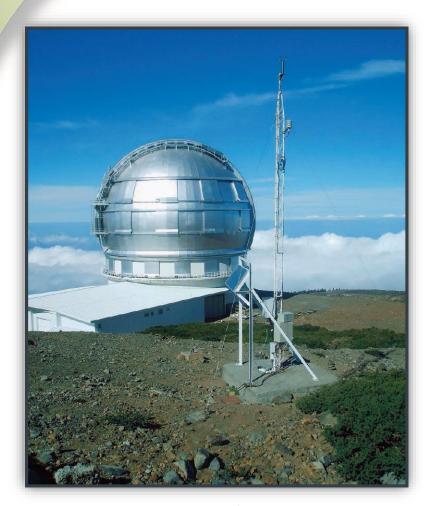
GEÓNICA s.a.

Alejandro Rodríguez 22 28039 Madrid SPAIN

BGEONICA Company Presentation



Environmental Monitoring Meteorology – Hydrology Oceanography – Solar Resource





INNOVATION + DESIGN QUALITY & SERVICE

Since 1974

www.geonica.com

GEONICA Spanish company founded in 1974, designs, manufactures, installs and maintains **Automatic Stations, Systems and Measurement Networks with Data Transmission, Images and Alarms in Real Time for Environmental Monitoring**.

Based on our own line of Automatic Data Acquisition and Transmission Stations, **METEODATA** / **HYDRODATA** Series, and an advanced and flexible software packages, **GEONICA SUITE for** management and **WEBTRANS Internet Platform** for Data Receiving Centre (GEO-DRC), we have integrated a wide variety of sensors to provide complete solutions, systems and measuring networks, intended for different applications on many sectors:

Meteorology, Hydrology, Early Warning (EWS), Water Management and Water Quality, Agriculture, Renewable Energy (Solar and Wind), Coastal Oceanography, Tides, Currents and Waves (VTS), Intelligent Transport (ITS), Road Safety (RWIS), Railways, Ports, Airports and Heliports (AWOS), Air Quality, Ambient Noise, Smart Cities, Civil Protection, Industry and Mining, Military applications, and Environmental Monitoring in general.



SUNTRACKER-2000

Also we design and provide some sensors like **DATARAIN-4000** Electronic Weighing Precipitation Sensor, **PTH / PTHR-4000** Pressure, Temperature, Relative Humidity and Solar Radiation (only PTHR-4000) Smart Multisensor, **SUNTRACKER-2000/3000** as part of our **SEMS** Solar Energy Measurement System for Solar sector, and more.

During our **more than 47 years in the market**, we have carried out hundreds of projects around the World, always in the professional, scientific, industrial and military fields where the highest quality and the strictest technical specifications are required.

Following we present our line of products, classified by sectors, underlining the most important aspects of each of our **SYSTEMS and SOLUTIONS**.



SECTORS, SYSTEMS & SOLUTIONS

CLIMATOLOGY, METEOROLOGY HYDROLOGY, AGROMETEOROLOGY

- HYDROMET
- AGROMET

EARLY WARNING SYSTEMS (EWS) CIVIL PROTECTION

- RAINALERT
- FLASH FLOOD ALERT
- LIGHTNING ALERT
- SISMOALERT

COASTAL OCEANOGRAPHY

- SAFE PORT
- DATAMAR

AIRPORT / HELIPORT SAFETY

• AIRPORT WEATHER

SMART CITIES

• **GEOcityQUAL:** AIR QUALITY, TRAFFIC, AMBIENT NOISE, METEOROLOGY

RENEWABLE ENERGY

- SOLAR ENERGY MEASUREMENT SYSTEM SEMS-PV, SEMS-2000/3000/Spectral
- WINDPOWER

ROAD / RAIL TRAFFIC SAFETY

- SAFE ROAD / TUNNEL
- DATACAR
- ICEFREE
- SAFE RAIL
- WINDALERT

ENVIRONMENTAL MONITORING WATER QUALITY, AIR QUALITY, NOISE

- AQUALERT
- NOISE MAPPER
- GAMMALERT
- AIRcityQUAL
- GASALERT

GEONICA ADVANTAGES

METEODATA / HYDRODATA

- Data & Image Acquisition and Transmission Unit
- 4000C and 3000C Series

SOFTWARE

- GEONICA SUITE 4K Management Software
- WEBTRANS Ubiquitas Internet Platform
- GEO-DATALINK Mobile App

GLOBAL COMMUNICATIONS

- 5G / 4G / 3G / GPRS, INMARSAT BGAN
- INSAT

SENSORS

- DATARAIN-4000 Electronic Weighing Precipitation Sensor
- **PTH / PTHR-4000** Smart Multisensor for Barometric Pressure, Temperature, Relative Humidity, and Solar Radiation

SOLAR TRACKERS

• SUNTRACKER-2000 and 3000

NOISE PROCESSOR

Noise Processor NP-2000

OTHER

• DIGICAM-3K Low-Power Still Image Digital Colour Camera



METEODATA / HYDRODATA ADVANTAGES

DATA ACQUISITION UNIT - DATALOGGER

- Very High Resolution by means of a **24-bit A/D Converter** delta-sigma technology
- 16 Single-Ended or 8 Differential Analogue Inputs or mix
- 4 Digital Inputs with 4000V galvanic isolation
- 4 Digital Outputs with 4000V galvanic isolation
- 5 Digital Pulse Counters (32 bits)
- 3 Serial Buses for Smart Sensors (RS232 / 422 / 485 / SDI-12)
- Real Time Clock (GPS is not required for synchronization)
- 1 or 2 Ethernet, USB, GNSS / GPS, Bluetooth, Wi-Fi
- Ultra low power consumption: 37 mA working and 1 μA idle

COMPACT UNIT, INTEGRATING:

- Datalogger with 32 Channels
- All types of Communication Modules: 5G/4G/3G/GPRS, Ethernet, MODBUS, etc.
- Dual Input Redundant Charge Controller and Internal Batteries (18 or 27 Ah)
- ESD Protection for all Supply Lines (Transzorb, high current chokes and varistor)
- ESD Protection of two Types for all Inputs and Outputs:
 - Gas arrester, serial resistance and transzorb in parallel
 - Varistor, high current choke and transzorb in parallel
- EMI Protection for all Analogue Inputs (RC low pass EMI filter)

METEODATA / HYDRODATA ADVANTAGES

SENSORS

 All types of sensors can be connected, with analogue or digital outputs, intelligent sensors using special protocols, etc.

COMMUNICATIONS

- Satellites: INMARSAT BGAN, THURAYA, IRIDIUM, METEOSAT, VSAT, GOES, INSAT
- Cellular: 5G / 4G / 3G / GPRS / GSM / CDMA
- Radio, AIS AtoN (Aids to Navigation)
- Ethernet, Fibre Optic, Line, PSTN
- TCP/IP, MODBUS, NTCIP, DGT (roads)

WEATHERPROOF ENCLOSURE

• IP66 or IP67 Protection



OTHER

- Memory-Display LCD QVGA 4.4", Keyboard, Graphs & Values
- Alphanumeric Display (LCD) 4x20 characters + 18-key Membrane Keyboard
- Memory: 32 MB to 32 GB
- microSD Memory Card: 2 to 128 Gbytes
- GNSS / GPS Receiver with Antenna

EGEONICA Software: GEONICA Suite & WEBTRANS

GEONICA Suite 4K is the last generation package of applications for the communication between remote stations based on our **METEODATA** datalogger and a Data Receiving Centre for storing, processing, presentation and monitoring of collected data.



WEBTRANS *Ubiquitas* is the Internet Platform developed by **GEONICA** to allow users with only a web browser and from everywhere to access data from **METEODATA** stations in realtime, configure graphical presentation, show pictures obtained with **DIGICAM-3K** camera, setup a FTP server and other features.



DATARAIN-4000 WEIGHING RAIN GAUGE

MAIN FEATURES

- Electronic Weighing Digital Rain Gauge
- Automatic Emptying System
- High Accuracy and Resolution at both High & Low Rain Intensities
- Ultra-Low Power Consumption



SPECIFICATIONS

Collecting Area	Range	Accuracy in the whole Range	Resolution Quantity of Rain	Resolution Intensity of Rain
200 cm ²	2000 mm/h	0.02%	0.001 mm	0.001 mm/h
400 cm ²	2000 mm/h	0.02%	0.001 mm	0.001 mm/h

INMARSAT BGAN M2M SATELLITE COMMUNICATIONS

MAIN FEATURES / INMARSAT vs GOES COMPARISON

FEATURE	GOES	INMARSAT
Bidirectional Communication	NO	YES
IP Network	NO	YES
Remote programming /configuration of field stations	NO	YES
Average power consumption (typical)	Very Low	Very Low
Always-ON Communication	NO (*)	YES
Alarm Reception	YES, very limited	<mark>YES, unlimited</mark>
Need for an expensive Satellite Earth Station required for data reception at Data Receiving Center (1)	YES	NO
Connection and services from NOAA network	YES	NO
Communication Cost (typical)	Free, but (1)	Similar to GPRS
Remote diagnostic, support, and configuration. Firmware download / update	NO	YES
Bandwidth (typical)	300 bps (v1) / 1200 bps (v2) only transmission (*)	464 Kbps reception & 448 Kbps transmission
Capacity to transmit images from remote stations	NO	YES
Real-Time Monitoring from Data Receiving Center	NO (**)	YES
Global Satellite Coverage	Only America	YES
Need for development of an application to process received data	YES	NO
Valid for Early Warning Systems (EWS) Application	NO	YES

INMARSAT BGAN M2M SATELLITE COMMUNICATIONS

INMARSAT vs GOES COMPARISON (cont.)

INMARSAT is a **bidirectional** satellite communication system that allows for **real-time** control, supervision, and reception of information of a Hydro-Meteorology Stations Network. INMARSAT is an advanced technology system that leaves obsolete GOES system as shown in comparison table.

INMARSAT is ideal to implement **Early Warning Systems (EWS)** for alerting of Flash Flood, Rainfall, Lightning, Tsunamis, etc.

(*) INMARSAT bandwidth is near 400 times GOES v2 (1200 bps) and near 1600 times GOES v1 (300 bps), and GOES is only for transmission because it does not allow reception.

(**) In GOES assigned period by NOAA for transmission is 1 hour with a standard window of 10 seconds for each transmitter. Only in special cases NOAA grants shorter periods, but it is very limited because it has to share the low capacity of GOES system for a huge number of transmitters. This restriction does not exist with INMARSAT because it works in Always ON mode and real-time without limitations of period between transmissions or windows for data transmission.

OWN TECHNOLOGY AND FOCUS ON R&D&i

- Electronics Design and Development
- Software / Firmware Design and Development
- Application Software Design and Development
- Mechanical Design, Prototyping and Testing
- International Standards: WMO, ISO, ETSI, ANSI, IEC, CE, and National Regulations
- Latest Generation Technologies Integration

DESIGN AND INTEGRATION OF SENSORS

- Ours and from many other Manufacturers in the World
- From / For all Sectors and Applications: Meteorology, Hydrology, Water Quality, Roads, Traffic, Railways, Airports, Oceanography, Solar Radiation, Environmental Noise, Air Quality, Gamma Radiation, Geophysics, Industrial, Smart Cities, etc.
- We select the most suitable set of sensors for every Project and Application

INTEGRATION OF COMMUNICATIONS

PTHR-4000 • 5G/4G/3G/GPRS, INMARSAT BGAN, Radio, Optical Fibre, Ethernet, AIS AtoN, NTCIP

ENGINEERING AND FLEXIBILITY

- We provide our Project Engineering to supply Turn-Key Solutions
- We are Flexible adapting to Customer requirements
- Experience since 1974

More than 6,200 Stations in > 75 countries around the World as Complete Solutions from GEONICA

EXPERIENCE / REFERENCES

BGEONICA

GENERAL

 More than 6,200 Stations exceeding 75 countries as part of hundreds of Complete System Solutions that GEONICA has been delivering since 1974.

HYDRO-METEOROLOGY / EARLY WARNING SYSTEM (EWS)

- **GRAFCAN Regional Government of Canarias (Spain)** [2021 2018]
 - > 59 Weather Stations (EWS) with Ethernet, 3G/GPRS and INMARSAT
- EPA-EP Empresa Pública del Agua (Ecuador) [2017]
 - > 36 Hydro-Meteorology Stations with GPRS and INMARSAT
- CAR Corporación Autónoma Regional de Cundinamarca Colombia [2015 2013]
 - 55 Hydro-Meteorology Stations with INMARSAT BGAN
- Vietnam Hydro-Met Services (VHMS) [2013]
 - > 29 Rainfall Stations with GSM and INMARSAT BGAN (redundancy)
- Uttar Pradesh Water Sector Restructuring Project Irrigation Dept. (India) [2010]
 - 26 Automatic Weather Stations with GSM

SOLAR - METEOROLOGY

- DEWA FASE V 900MW PV, IV 950MW CSP+PV, III 800MW PV, II 200MW PV -Dubai [2022 - 2016]
 - > 85 Solar Radiation & Weather Stations with FO and 3G/GPRS
- NIWE National Institute of Wind Energy India [2021 2011]
 - 137 Solar Radiation and Weather Stations with 3G/GPRS

COASTAL OCEANOGRAPHY

- Suez Canal Authority (Egypt) Vessel Traffic Service (VTS) [2017 2016]
 - > 22 Visibility, Meteorology and Water Level with Ethernet and Wi-Fi
- Navy of Peru (MGP DHN) [2015, 2014, 2010]
 - > 12 Radar Tidal Stations with INMARSAT BGAN and GPRS / 3G
- Department of Mineral Resources (DMR) Thailand [2015, 2013]
 - 8 Radar Tidal Stations with GPRS / 3G
- Izmir Waterworks Authority (IZSU) Turkey [2015, 2012]
 - ▶ 8 Meteorology, Tide, Sea Currents and Water Quality Stations with GPRS / 3G
- Universidade Federal do Rio Grande (FURG) Brazil [2014]
 - > 14 Radar Tidal & Meteorology Stations with GPRS / 3G
- Indian National Centre for Ocean Information Services (INCOIS) India [2010]
 - > 21 Radar Tidal Stations with GPRS, VSAT and INSAT (simultaneously)

AMBIENT NOISE

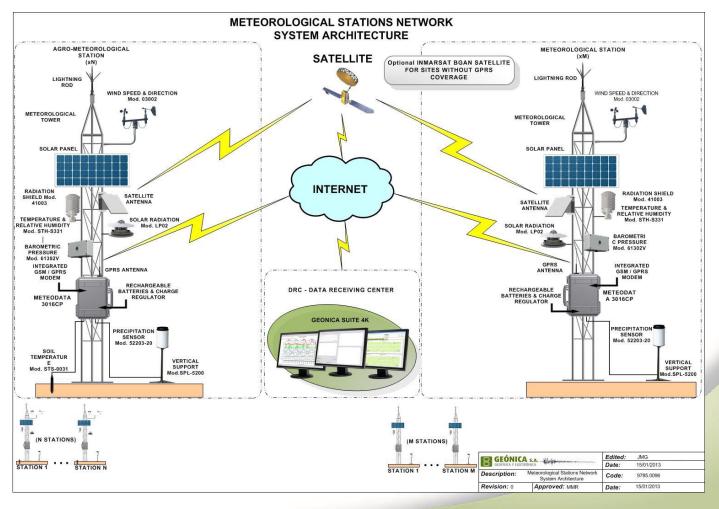
- Central Pollution Control Board (CPCB) India [2014 2011]
 - > 70 Ambient Noise Monitoring Stations with GPRS / 3G (Phase 1 and Phase 2)

AND MORE

See Document 9993 0017 GEONICA List of References

HYDROMET System

HYDROMET has been designed for measuring all sorts of meteorological and hydrological parameters, as stand-alone stations or networks with data transmission via 4G / 3G / GPRS, direct radio link or satellite, such as the **INMARSAT** network, with its global coverage and advanced performance (with two-way communications and IP addressing) that harness the whole power and universality of the Internet.



14

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.

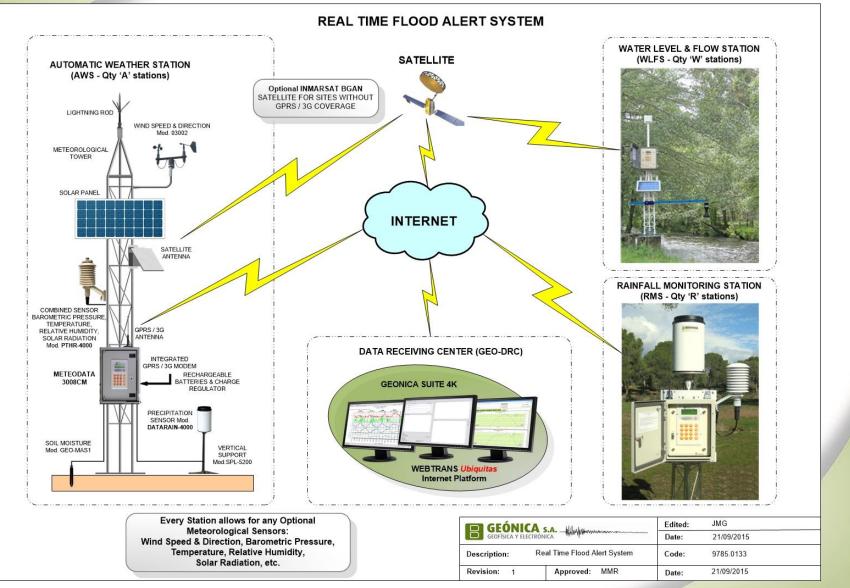
A complete and effective Early Warning System supports four main functions:

- 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

GEONICA implements advanced Early Warning Systems (EWS) focused in the following areas of risk:

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

Early Warning Systems (EWS)



RAINALERT System Rain and Flood Alert



The typical configuration of a **Rain and Flooding Alert Network** is made up by a series of remote rainfall stations located at different parts of the river basin being monitored, completed with other river level measurement stations.

Both types of remote stations provide the appropriate data and alarm transmission systems via 4G / 3G / GPRS, Radio Link, or satellite (preferably **INMARSAT**, given the enormous technological advantages it provides), towards a Central Receiving Station.

This central station will be managed by the Civil Protection Authorities, who will be in charge of alerting the population depending on the risk of flooding for each rural or urban area.

This system operates in real-time, since in case of heavy and prolonged rains, the pluviometric stations located at different points of the catchment basin, as well as the river level measurement stations, will immediately send the appropriate warnings to the Central Receiving Station.

RAINALERT System's Management Software can be complemented with mathematical models that use time as a variable for calculating water volumes collected by the river basin, along with the topographic data of the area received via satellite using SAR (Synthetic Aperture Radar) Interferometry, in order to estimate the height of a possible flood.

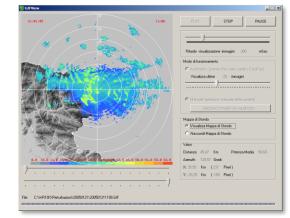
DATARAIN-4000 Electronic Weighing Digital Rain Gauge is particularly suitable for EWS due to its High Accuracy and Resolution at both High & Low Rain Intensities.

Weather Radars

RAINALERT System can be extended by means of **X-BAND WEATHER RADARS** providing information in Zones with Special Risk due to Local Meteorological Phenomena in Ares of 50 to 120 Km.

Applications of X-Band Weather Radars

- □ Real Time Monitoring covering a wide area
- Gap Filling for Existing Networks
- Classification of Rain, Hail and Snow
- Monitoring of Severe Weather Conditions
- □ Nowcasting and Forecasting
- Support to Authorities in charge of Early Warning to protect population and infrastructures
- Support Civil Protection for Alerting and take Preventive Actions in case of severe and immediate meteorological phenomena: storms, heavy rain, snow, fog, hail, flash flood





Weather Radars

X-BAND WEATHER RADARS are the reasonable alternative to classic, big and expensive long-range C-S Radars, at a lower price for acquisition, installation and operation.

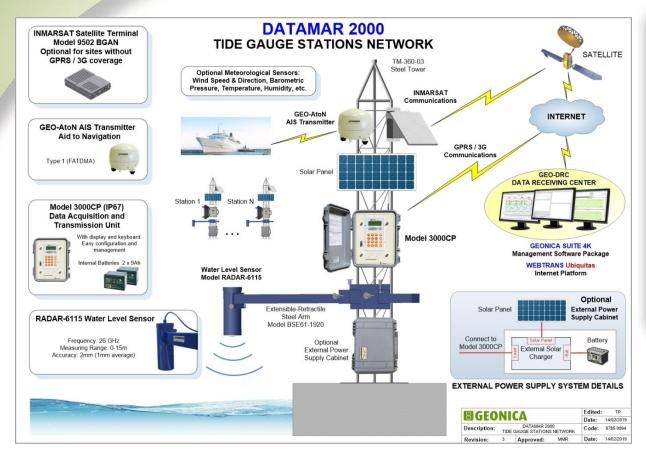
Main Advantages

- Network Operation of several Radars to generate a Cluster to transmit data to Control Centre for Mosaic images generation
- Compact Antenna and Hardware
- Can be installed in a Mobile Platform to be placed where and when it is required
- □ Very high resolution both Time and Spatial
- □ Good short-to-medium range of Sensitivity Detection (50-120Km)
- Remote Control of Main Functions
- Data is stored in standard formats to be used directly for later processing
- Ease to use





SAFE PORT and DATAMAR Systems





For Ports and Coast sector, we offer our **SAFE PORT** System which transmits the information to the Port Authorities, and to ships by means of **AIS AtoN** Transponder. Optionally, it can also upload the data to the Internet, making them available to any ship with Internet access, by means of 4G / 3G / GPRS, **INMARSAT** satellite, or other communication systems.

DATAMAR System allows for an advanced RADAR Tide Network.

SAFE ROAD and DATACAR Systems



GEONICA offers the **SAFE ROAD** System as a response to the pressing need for improving safety on roads and motorways, since traffic can be affected by the most diverse and extreme weather conditions, such as lack of visibility, ice on the road, the presence of snow or heavy rains, etc. Application in **Road Weather Information Systems (RWIS)**.

This sector is of great importance, especially in countries where roads cross cold or mountainous areas with frequent fog banks that reduce visibility, as well as shady areas where ice is likely to form on the surface, or simply those that are prone to suffer adverse weather conditions, such as wind, rain, etc., representing an important risk to the safety of vehicular traffic.

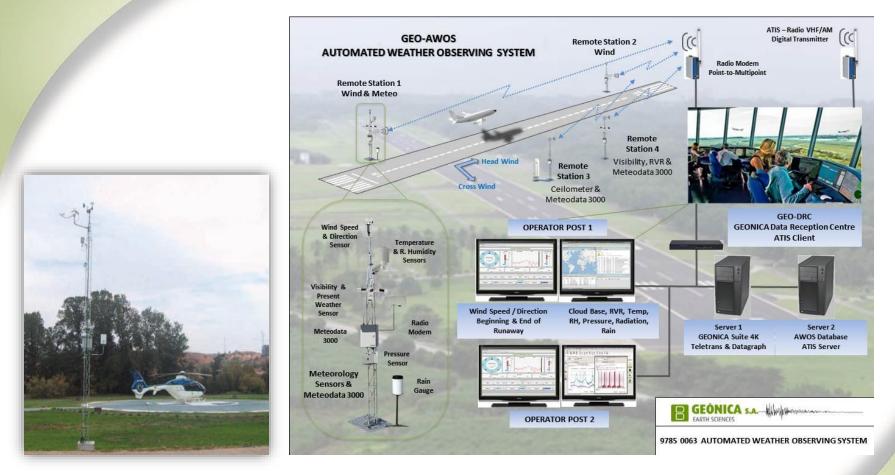
DATACAR System has been designed by **GEONICA** to assist on the number of vehicles traveling through different sections of roads and motorways, while classifying them according to their size or length. Application in **Intelligent Transport Systems (ITS)**.

Depending on the type of sensors used, it is also possible to detect queues and traffic jams. These data complete the information required for preparing vehicular traffic studies.

The vehicle sensors or detectors are connected to one of our **METEODATA** Remote Data Collection Units, which logs all the traffic measurements, transmitting the information in real time to a Central Receiving Station or SCADA, usually via fiber optic or using 3G / GPRS cellular network, if the road does not provide its own communications network.

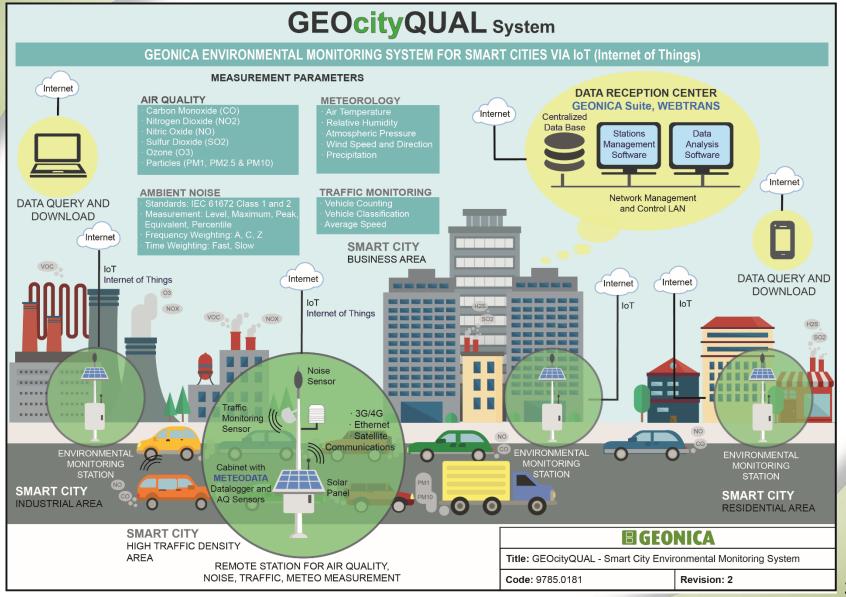


Airport Weather System (AWOS)



The **Airport Weather System (AWOS)** deals with measuring all the meteorological parameters of airports, aerodromes, heliports, etc., providing data already processed to the Meteorology Center for distributing them to the aircraft pilots and Authorities responsible for air traffic safety, using different communication systems.

GEOcityQUAL for Smart Cities

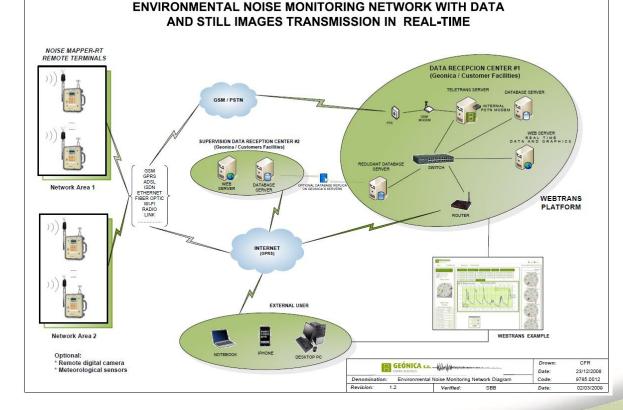


NOISE MAPPER System

European regulations and those of other countries, force Municipal Authorities of urban centers exceeding a certain number of inhabitants to establish preventive measurements for controlling and limiting the levels of ambient noise. For this purpose, so-called noise maps need to be generated, which in turn require a series of precise measurements and the appropriate mathematical models.

Our **NOISE MAPPER** System provides an advanced solution for continuous measurement of ambient noise in urban areas, roads, airports, etc. Data is transmitted in real time to a Central Receiving Station, usually via 3G / GPRS, which is integrated in the Remote Station itself.

Our ambient noise monitoring system is made up of outdoor fixed or mobile Remote Stations with stand-alone operation based on internal batteries charged by a solar panel, and provided with a weather-resistant microphone.







AQUALERT System

The continuous measurement and monitoring of the quality of both surface and underground water represents an unavoidable requirement for knowing its condition and helping to take the necessary measures to preserve both the environment and a resource as valuable and increasingly scarce as water.

For this purpose, **GEONICA** has developed the **AQUALERT** system for the continuous measurement of all parameters of water:

- **Physicochemical**: Conductivity, Temperature, pH, Dissolved Oxygen, REDOX Potential, Turbidity, Ammonia, Ammonium, Nitrates, Nitrites, Chloride, Rhodamine, Chlorophyll a, BGA, etc.
- **Biochemical**: Total Organic Carbon (TOC), Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), SAC254, and even Nitrites and Nitrates using submersible probes based on UV-VIS spectrometric technology.
- **Hydrocarbons**: PAH (Polycyclic Aromatic Hydrocarbons), BTX aromatic hydrocarbons (Benzene, Toluene and Xylenes), Crude Oils, Refined Fuels. Other: Consult.

WINDPOWER System

This system is oriented to assessing the sites for installation of wind turbines as well as for measuring wind speed and weather conditions in wind farms during their operation.

For such purpose **GEONICA** offers the provision of meteorological towers over 100 meters height, including the necessary wind and meteorological sensors mounted at different measuring levels, as well as the suitable **METEODATA** datalogger which also allows data transmission via 3G / GPRS communications for remote configuration, maintenance and diagnosis.

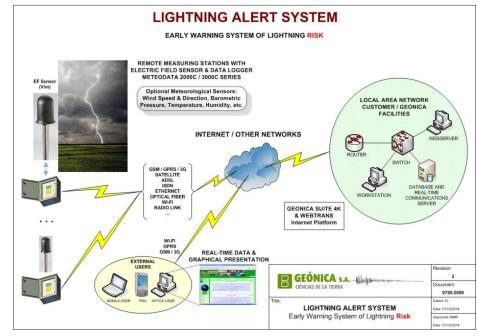


LIGHTNING ALERT System

LIGHTNING ALERT System has been designed to measure the risk of a specific location being hit by lightning or atmospheric discharge under specific or certain weather conditions.

The system is made up by a precise meter that measures the Electric Field in the air, that is, the positive or negative gradient present in a range of $\pm 20,000$ volts/meter. It's value will determine the risk of lightning falling in a range of around 6-8 Km from the point of measurement.

The electric field meter is connected to one of the **METEODATA** stations, which records the measurements and transmits the data and warnings to a local SCADA system or remote computer using what ever means possible, 3G / GPRS cellular telephony or direct cable connection.



The warning thresholds are programmable at the **METEODATA** station, depending on the electric field value, which is what determines the risk conditions. Note that this system is not designed for detecting actual lightning strikes, as is the case of lightning detector systems. That is, it is designed to alert about the risk of lightning in order to prevent its consequences.

The **LIGHTNING ALERT** System should be used, for example, at Airport facilities, basically for risk assessment during fuel loading operations in planes, as well as in fuel storage areas, gas and petrol transfer areas, etc., golf courses, recreational areas, swimming pools and open-air events, operations with big cranes in sea ports, blasting works, electric substations, wind farms, etc.

SEMS Solar Energy Measurement System

SEMS-2000 / 3000 and SEMS-PV SYSTEMS FOR SOLAR ENERGY RESOURCE APPLICATION



Remote Diagnostic Monitoring and Efficiency Analysis in Real-Time via Internet

SEMS-PV for Photovoltaic Plants Soiling measurement Module Temperature, Calibrated Cells

SEMS-2000/3000 for Thermosolar Plants SUNTRACKER-2000/3000 Very low power Active Tracking

SEMS-2000/3000 Spectral Solar Spectrum Aerosols (AOD), Ozone, Water Vapor

SEMS Solar Energy Measurement System

Solar Energy Assessment

SEMS has been designed to evaluate the location of major thermal and photovoltaic solar plants that, due to the investments worth millions they require, need high quality professional measurement equipment providing reliable data. These are essential requirements for the promoters / investors that need to guarantee the return on investments.

Likewise, mid- to small-sized solar plants require information on solar radiation and other weather parameter such as wind, precipitation, atmospheric pressure, humidity and ambient temperature, or even the surface temperature of the solar panels themselves, since their performance is affected by all weather conditions.

This is one of the flagship lines of our company, with a solidly consolidated position in the national and international markets offering comprehensive systems for assessing the energy resources of the sun, as well as for monitoring **photovoltaic (PV) solar Energy**, **Concentrating Solar Power (CSP)**, and **Concentrated Photovoltaic (CPV) plants**, since during the operation of a Solar Plant, it is essential to be aware at all times of its performance based on the available energy source; in this case, global, direct and diffuse solar radiation, depending on the type of technology used.

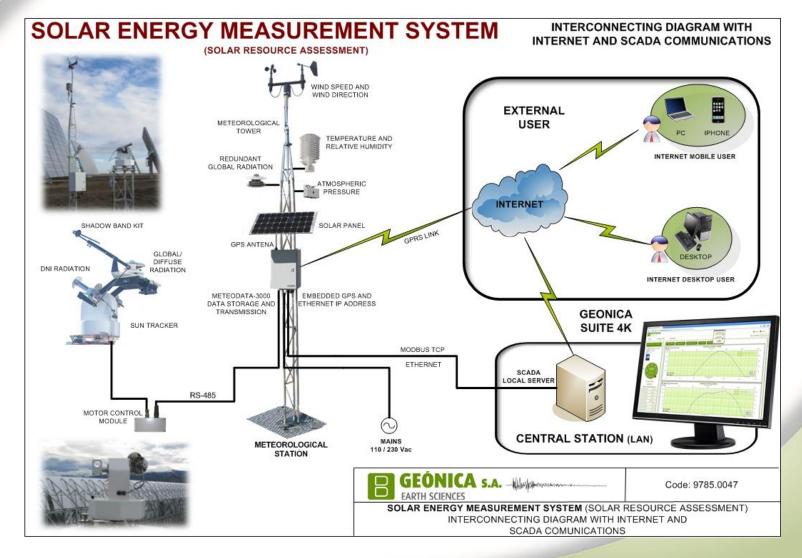


SUNTRACKER-2000



SUNTRACKER-3000

- Very high accuracy
- Integrated GPS
- Fully automatic
- Unattended operation
- Position control and remote communication by associated METEODATA Datalogger
- Optimized power requirements of less than 2 W
- Automatic operating diagnosis



THANK YOU FOR YOUR ATTENTION



Supplying Solutions and providing Service to our Customers

www.geonica.com