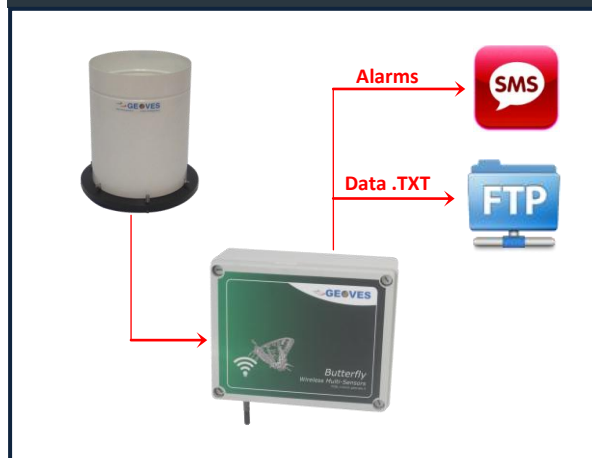


BUTTERFLY-P – CLOUDBURST/RAIN ALARM AND MONITORING SYSTEM (Rev.2 270121)



General description

Butterfly-P is a rain monitoring and alarm system able to transmit the data via GPRS in a protected internet area (**FTP area**) and send alarms in real time via SMS to alert quickly the available personnel.

Working logic

Butterfly-P has a logic of operation managed by a microprocessor that allows to configure both the storage and data transmission rate (**5-10-15-30-60'**), as well as the rain alarm threshold expressed as **mm of rain in the chosen storage period**. As soon as the rain measure overcomes the set threshold, Butterfly-P sends a SMS to the available personnel and in the same time it increases the storage and **transmission rate to 1 minute**, so that the precipitation event can be analyzed especially during its more critical phases.

With this solution it gets a true **RAIN RATE** (not estimate) with a practically "**instantaneous**" rainfall measurement that makes it possible to take more effective action to alert the population.

Furthermore the alarm threshold and the *rain rate* can be reprogrammed, also by remote, to get a more accurate characterization of the microclimatic conditions; in fact, more and more frequent cloudbursts of strong intensity require frequent adjustments of the rain alarm thresholds.

Constructive technology

Thanks to its state-of-the-art technology, Butterfly has a very **low power consumption** that allows it to mount small size batteries and small solar cells, thus achieving a very compact, **low-impact** device. Wireless technology combined with autonomous power allows you to install Butterfly at any point of interest without the need for connections, making it an ideal tool either as a single measuring station or as a multi-point monitoring network spread across the territory. The detected data are all referenced to the same date and time by **NTP (network time protocol) synchronization**. Butterfly is housed in an outdoor pool box so it can be used in any outdoor environment.

Butterfly-P is housed in a water-proof box so it can be used in any outdoor environment. In the "Butterfly" model the device can connect many transducers for environmental and industrial monitoring, making it extremely adaptable to any weather, micro-climate, geotechnical or any other remote monitoring application

Advantages

- ✓ Low power consumption, compact and with low visual impact
- ✓ Data transmission and alarms released from proprietary communication protocol with standard text data (CSV format)
- ✓ Easily installable and reprogrammable at a distance
- ✓ Reliability in time and minimum maintenance required
- ✓ Fully Italian technology



Image repertoire of effects caused by cloudbursts



Butterfly-P
Typical installation on the pole

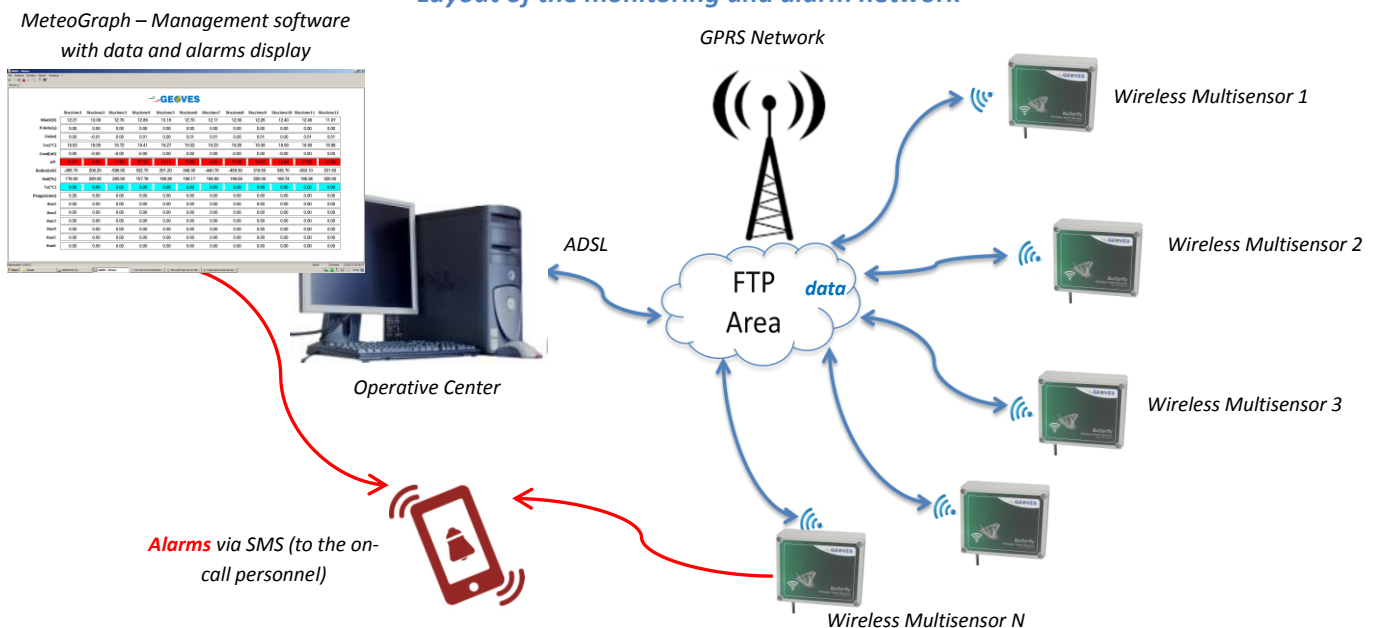
Typical applications and main customers

- 1) **Meteorology** with reference to the **WMO Annex 8** (World Meteorological Organization)
- 2) Civil Protection and Local Societies
- 3) Water Agencies
- 4) Land reclamation consortia and engineering firms
- 5) **Geological offices** for the monitoring and forecasting of **landslide** and **debris flow**
- 6) **Monitoring of Road construction sites to alert** men at work in the areas with high risk of flooding

Technical data

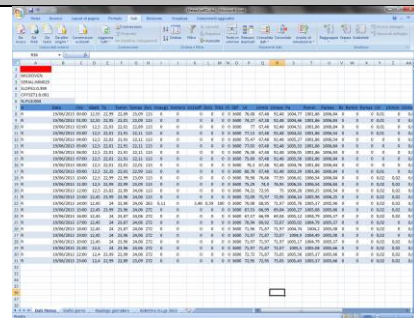
Model	Butterfly-P – Rain monitoring and alarm system
I/O Channels	5 analog inputs (voltage or current) + 1 diagnostic input for battery monitor 2 digital input used as pulse counter for rain gauge and as frequency meter
Power supply	Rechargeable 12Vdc battery with >10W photovoltaic panel, integrated recharger with intelligent battery management (11,5Vdc: battery safe threshold; 12,5Vdc: threshold of power restore to the load)
Data communication	via GPRS on FTP area
Alarms transmission	via SMS with change of data transmission rate until 1 minute
Programming	On site: setting of text file in the SD Card memory By remote: by sending of setting file on FTP area
Settable parameters	• Alarm threshold for every measure (settable as rising or falling overflows) • Storage rate (5, 10, 15, 30 or 60') • Transmission rate (5, 10, 15, 30 or 60') • Date and time with NTP synchronization (network time protocol)
Measuring	Elaborated data in the data storage period
Data storage	Backup of 500 days data with circular storage
Data format	.TXT standard text with CSV format (Comma Separated Value)
Conformity	Annex 8 – WMO (World Meteorological Organization)
Working temperature	-30...+70°C
IP56 Enclosure	Plastic material Dim.(LxHxP): 240x190x100mm, screw closure and universal brackets for mounting on the pole. Metallic bands with several diameters on request.

Layout of the monitoring and alarm network



SOFTWARE

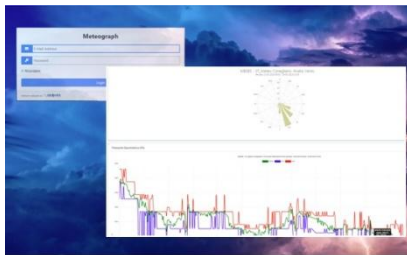
Model



Geodesk & MeteoGraph - Setup software for Geoves datalogger and web service for data management

Geodesk is a basic service software, free supplied with all Geoves datalogger, that can import data recorded (on SD card or sent via GPRS or transmitted by cable from the datalogger) and generate a single data file in Excel format. In this way it's possible to create data aggregation of desired period (eg. Monthly) and then derive the tabular and graphical reports.

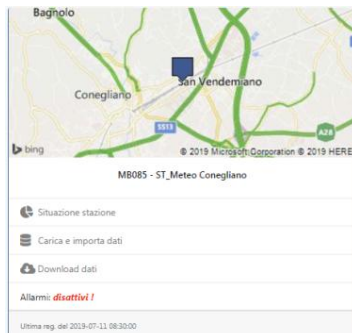
Besides Geodesk creates the setup configuration for the functioning of Butterfly, Micro3 and LPDL Geoves dataloggers



MeteoGraph is a web application for the numerical and graphic display of data transmitted via GPRS on FTP area from environmental monitoring stations with Geoves datalogger.

The software relies on an FTP Geoves area where data is sent autonomously by the control units at fixed times and are available in **standard text format** with fields separated by commas (**CSV format**).

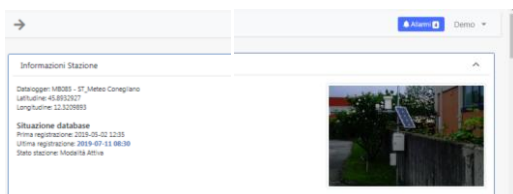
The data is therefore **always usable without the need to use proprietary communication protocols or specific programs for data decoding**; furthermore, the software **does not require any installation** as Internet access is sufficient and a username and password must be entered to enter the dedicated web page and display the measurements from a PC, tablet or smartphone. The data in text format are processed by MeteoGraph to obtain on the web page both the measurement in numeric format (eg average minimum maximum trend, etc.) and in graphic format that can be downloaded in jpg bitmap format.



Station dashboard

The available functions are:

- **Station situation:** access to the graphic processing page and to the station's synoptic
- **Load and import data:** the data saved on the datalogger SD card are imported, or on a PC folder (or other support)
- **Data download:** data are downloaded in text format with fields separated by commas for simple backups or subsequent processing with other applications (eg Excel, Access, external databases or other commercially available software)
- **Alarms:** access to the station alarm management menu (optional on request)



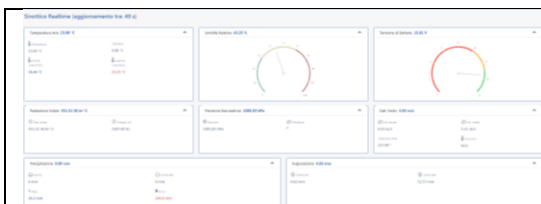
Station situation - Station information

The parameters displayed are:

- Station unique identifier (ID)
- Name of the station
- Geographic coordinates (Latitude and Longitude)
- Data base status:
 - Date and time of Start data storage
 - Date and time Last data storage
 - Operation status of the station
- Photos of the station

Real-time synoptic of the station

The synoptic is a very useful tool for assessing the situation of the latest measurements taken by the monitoring station and assessing the meteorological or environmental situation of the site. For each



measurement it is possible to associate one or more dedicated processes. For example, for the temperature it is possible to indicate the minimum and maximum value and the time in which it occurred in addition to other calculated measures such as the dew point.

The synoptic also shows:

- calculated measures
- Diagnostic data (eg battery voltage)
- Significant data for the interpretation of the measure (eg barometric tendency, wind chill, monthly precipitation, etc.)

Selezionare il periodo di osservazione

Intervallo dati

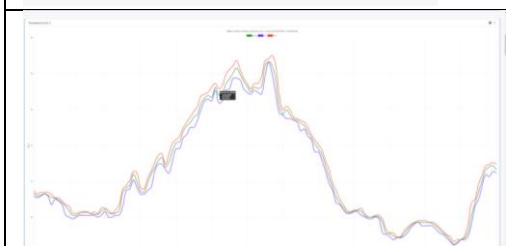
Da 10/07/2019 00:00

A 11/07/2019 23:59

Aggiorna

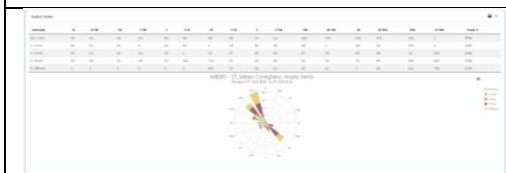
Observation period

It is possible to select the observation period in which to carry out all the elaborations that are displayed by MeteoGraph



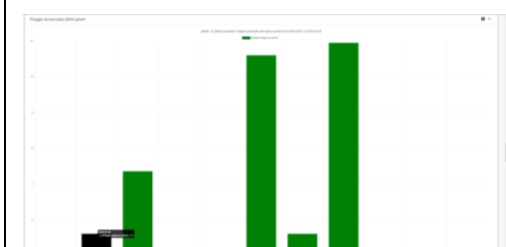
Graphic elaborations

- **Linear multi-line** for measurements where the arithmetic average is applied (eg temperature, humidity, pressure, etc.) with representation of the minimum and maximum value



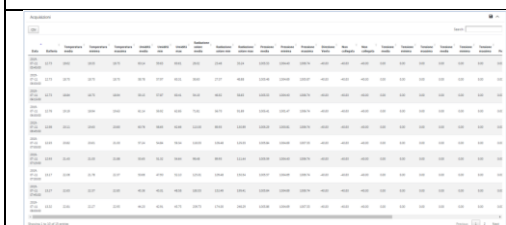
Graphic elaborations

- **Wind-rose** for the anemometer measurements



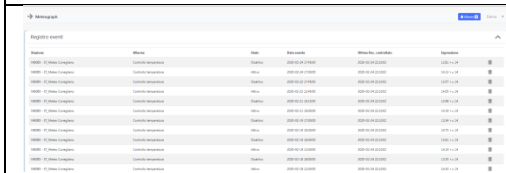
Graphic elaborations for precipitation

- Graph with hourly summation
- Monthly or annual precipitation histogram
- Other graphs are available on request or can be customized with simple filters



Tabular elaborations

Daily data table can be downloaded both in text and in .png image format



Alarm management

To manage alarms, the software allows you to set upward (> value) or downward (<value) intervention thresholds, after which alert emails are sent to the personnel in charge.

The alarms are then represented on the screen with adequate effects and colors to attract the attention of the operator