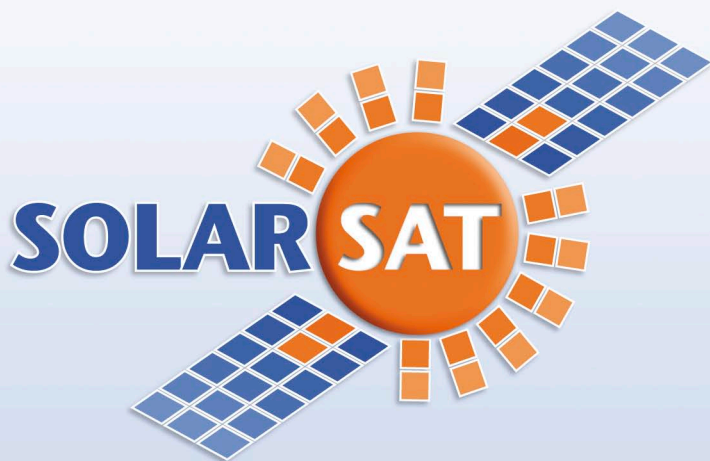




PV-Controller

**Web-satellite integrated system
for the remote control of photovoltaic plants**



PV-Controller



Controlling a photovoltaic plant is essential in keeping the efficiency of energy production as high as possible in the course of years and hence in achieving a fast payback. Moreover, putting in evidence the amount of produced energy gives the customer the perception of investment worthiness. **PV-Controller** springs up from a project carried out by Flyby, in collaboration with the European Space Agency (ESA), with the purpose of providing companies and Bodies devoted to PV plants installation and maintenance with an innovative solution for their clients.

Remote controlling based on satellite technology

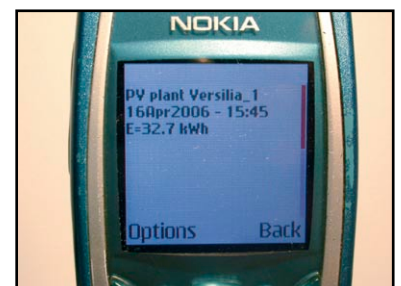
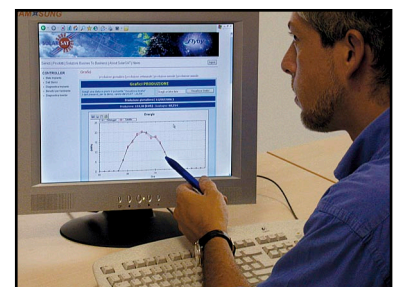
In its basic version, **PV-Controller** allows for remote control of a photovoltaic plant by means of both real time monitoring of solar radiation through satellite and the acquisition of plant production data through a simple data logger (EasyLog), to be installed at the plant. The EasyLog is equipped with memory and with a GPRS modem and sends data regarding hourly energy production to the control station website. Produced energy is sensed locally by a pulse energy counter (S0 standard). In its basic version, **PV-Controller** is then capable to retrieve the plant working status, without any need of interfacing to inverters or meteo sensors, and to present it on the web. Besides this, **PV-Controller** is also capable to acquire data from inverters and then provide PV plant diagnostics. For medium-size and large-size PV plants, **PV-Controller** includes the additional use of irradiance and meteo sensors to be interfaced with the more sophisticated SolarSAT data loggers models, LightLog and SuperLog. The latter one is also equipped with a graphic display to allow for a check of PV plant data directly at the place.

PV plant efficiency is on-line

PV-Controller evaluates the hourly producible energy and compares it to the produced one measured by the counter. It does so by exploiting an accurate opto-electronic model of the PV plant, where plant parameters are those furnished by the installer.

Producible energy is derived from solar irradiance and other parameters like PV module temperature, ambient temperature, wind speed and direction. On the website is then presented the plant efficiency level in terms of energy production and in terms of profitability, together with plant diagnostics (inverters efficiency, malfunction conditions, ...). The installer or maintainer at anytime can obtain the plant diagnostics and receive eventual malfunction alarms. These services can always be accessed on the web portal which can even be customized for the company. **PV-Controller** allows the detection of possible inefficiencies in energy production and hence the estimation of consequent economical losses. Also the risk of false alarms is reduced thanks to satellite measurements.

Thanks to satellite technology, SolarSAT PV-Controller allows to manage the remote control of energy production efficiency and the maintenance services for the set of installed PV plants, with diversified solutions for installers and maintainers.



A "plus" for every photovoltaic plant

The main advantages of **PV-Controller** are:

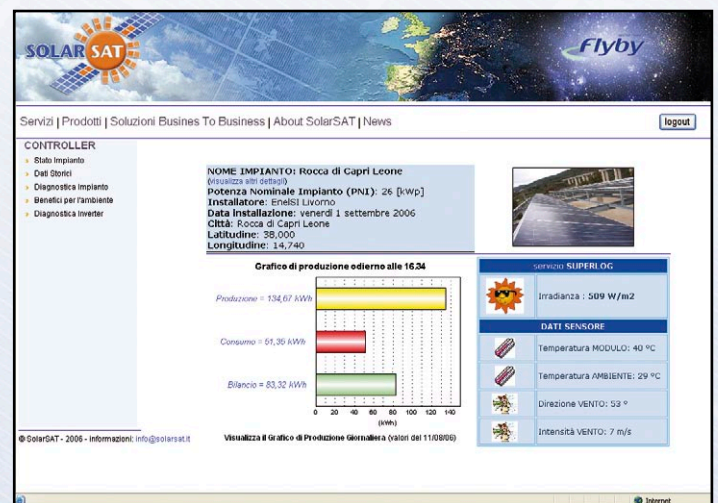
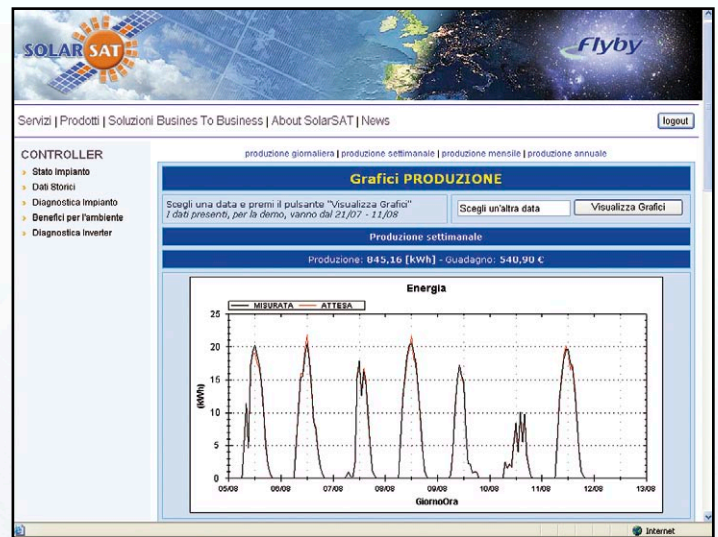
- *affordability and easiness*: the service is available also for small plants, so that even the single end user can verify at any time the value of the investment made. The basic model EasyLog is cheap and easy to install, requiring no interface with the plant, no connection to the Internet, no router configuration: just connect EasyLog to a counter and the data will be automatically transmitted to the website via GPRS link.
- *a single web standard for different PV plants*: the compatibility with the majority of inverter models ensured by SolarSAT data loggers allows to manage PV plants of different sizes and features through a unique web portal shared by the various operators (e.g. maintainers team).
- *reliability with no maintenance*: the monitoring of whole PV plant efficiency is done without the need to install sensors which would require periodical interventions for calibration and maintenance. The satellite data is accurate and its quality is continuously maintained.
- *management of PV plant maintenance*: the company or Body distributing the **PV-Controller** service can also include the management of eventual plant malfunction alarms, thus suggesting specific interventions of maintenance.
- *secure and diversified access to data*: plant diagnostics data are presented on an user-friendly interface, directly accessible by the operator or by the end user through a personal password on the website of the distributor company.

Following the client from design to maintenance

By integrating the **PV-Controller** and **PV-Planner** modules, the SolarSAT system allows to follow the client during the entire PV plant life cycle: from feasibility check to design, cost estimation, test, monitoring of working status, maintenance. Such approach aims at the highest satisfaction of the end user by means of global quality and high added value services.

Highest flexibility of customization

The SolarSAT system is fully customizable for the company or Body which intends to offer such web service to its clients. SolarSAT can be integrated into existing web portals in outsourcing.



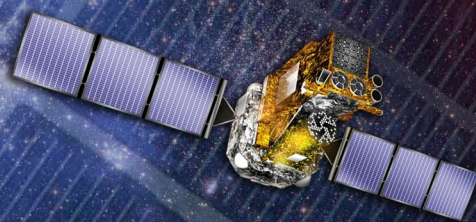
PV-Controller

Web-satellite integrated system for the remote control of photovoltaic plants

SolarSAT PV-Controller

SolarSAT PV-Controller: the integrated system for the control of photovoltaic plants, based on satellite data acquisition:

- remote control of PV plants
- use of real time satellite data and/or solar and meteo in-situ sensors
- single web portal for several types of PV plants
- data loggers family for specific solutions
- satellite remote control kit, easy to install, reliable, without any maintenance
- diagnostics for the check of PV plant working status and efficiency
- management of eventual malfunction alarms via e-mail and/or SMS



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