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A high resolution, low power datalogger for multiparametric data acquisition in volcanic environments

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Monitoring of active volcanic areas often requires the use of very low power and multiparametric data acquisition systems. Usually commercial systems do not fit simultaneously these characteristics, so the Istituto Nazionale di Geofisica e Vulcanologia, sezione di Napoli, Osservatorio Vesuviano (INGV-OV) decided to start a new technological research project with the goal of studying, developing, and producing a system featuring low power consumption, modularity, and adaptability. The project was named GILDA, acronym for *Geophysical Instrument for Low-Power Data Acquisition*.

The first milestone in this project was reached with the production of the basic version of the GILDA system. This basic version is a multiboard system made by a 4 channels high-resolution 24-bit ADC board, a CPU board, a timing board for GMT time locking and a GPS receiver unit. Moreover the system is equipped with an 8 channel 12-bit ADC in order to obtain system status information as temperature, power consumption, battery voltage, solar panels current, and so forth. Expansion ports are available to connect a third medium-resolution 16-bit ADC for low-rate data acquisition and some other general purpose electronic cards.

The basic version of GILDA is currently being used in a test site in Campi Flegrei and will soon be used in the transition from analog to digital data acquisition in seismic networks handled by INGV-OV and in research projects where INGV is involved in collaborative activities.

GILDA was entirely projected by INGV-OV researchers following the strategic long-term target of developing autonomously the technology needed for future instrumental applications.

Actually the second version of the GILDA system with up to 16 channels at 24 bit resolution is under development. This will be realized stacking from one up to four of the ADC boards already developed for the basic system. This will minimize the development effort taking advantage from the modular design approach adopted until now.

We introduce the project and present the GILDA basic system giving hardware details and technical characteristic (noise figure, power consumption, etc) of this data acquisition system.