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The Telemetric System of Zante station for measuring the Electromagnetic Variations.

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Nowadays, one of the most important applications of digital communications is digital Telemetry. Telemetry is the science that deals with the remote data collection of either environmental or other kind of signals from field stations to a central one. The purpose of this project is to study and implement a telemetric system based on the recent technology regarding remote instrumentation devices and high level programming languages. In this project the Central station is located at the Physics Department of the University of Athens, while the remote electromagnetic field station is located at Zante Island, and specifically, at Agios Leontas vicinity, 35 km far away from Zakynthos town.

The communication between the field station and the Central station has been established via dial up modems. ADSL was not utilised because such facility is not available at the location of the field station, which is quite remote (and thus clear of electrical noise), and GPRS Technology could produce noise at the electromagnetic measurements. The alternative of using dedicated digital leased lines was considered extremely expensive. The system adopted for measuring and recording electromagnetic variations (EMV signals) in the field station is the datalogging technique. A Powerful Server has been installed in the Central station, in order to collect the appropriate data from the field station.

The data of the measurements collected at the field station through the datalogger system is first stored in ASCII format, in files of one-hour duration. Then the files are packed as zip files and moved into a directory, ready to be sent to the Central station. The transfer procedure is implemented via special commercial backup software which is ideal for synchronizing files in almost any possible way. In our configuration, the backup software has been scripted to transfer the files to the Central station using dial-up connection. The backup software establishes the connection to the Central station with the use of a command line scripting and then it recognizes the Central station as a local network computer.

As soon as the connection is active, the computer's clock is synchronized with the clock of the Central station, which is constantly synchronized over the internet. The next step following the time synchronization is the transfer of the data. The data is sent as files - with different filenames from the originals- to a shared directory of the Central station. If each transfer is successful, the files on the Central station are renamed back to their original name and are deleted from their source at the field station. If a data file name already exists on the Central station, the backup software renames the older files accordingly, so that all versions are stored. The transfer is implemented using shares, but ftp could also be used for this purpose. When the transfer has been completed, the modem connection is terminated.

This circle of data transfer is repeated every hour. This means that the field station clock is also synchronised every hour. Just after midnight, the datalogger clock is checked against the computer clock. If a time shift of 2 or more seconds is observed, then the datalogger clock is automatically adjusted.

If a transfer fails for any reason - most probably due to an unsuccessful modem connection- the full procedure is retried for several times, every few minutes. The exact hour and minute of each successful file transfer to the Central station is an indicator of the quality of the line that affects the communication.

After a transfer is completed (or not) and the modem is disconnected, the modem is automatically set to auto answer mode, thus allowing for the administrator to dial- up and connect to the field station for maintenance or change of configuration. The screen of the field station can be remotely observed.