

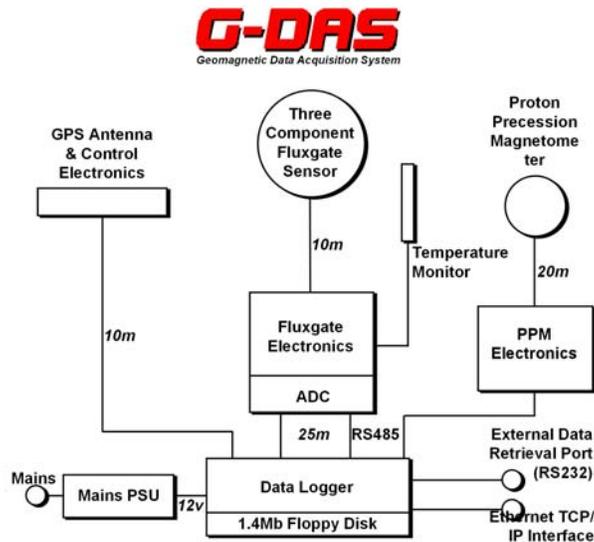
## *British Geological Survey Updates Magnetic Observatory Equipment*

The Earthquake, Forensic Seismology and Geomagnetism program of the British Geological survey operate 6 magnetic observatories world-wide. Three of these observatories are in the UK in Lerwick, Shetland Islands, Eskdalemuir in the South of Scotland and Hartland in Devon, England. Overseas they are responsible for magnetic observatories on Ascension Island, the Falkland Islands and Sable Island.

Since January 1986, all the UK observatories have been recording digitally and since that time the equipment has been updated and the resolution of the data quality gradually improved from 10 second sampling at 1 nT resolution to the current standard of 1 second sampling at 0.1 nT resolution. This improvement has been achieved through the installation of their Geomagnetic Data Acquisition Systems (GDAS) which became operational at their observatories from 1 January 2003.

The GDAS installation has brought together all the technological advances learned during the preceding 16 years of digital/automatic observatory operation. The following block diagram shows an overview of the complete GDAS system.

### GEOMAGNETIC DATA ACQUISITION SYSTEM



**G-DAS**<sup>®</sup> includes a 3 component fluxgate magnetometer, a proton magnetometer, a GPS receiver and an embedded PC-based data logger with all electronics built into an integrated package. Daily files of minute-mean data are logged to disk together with accurate timing information, obtained from the GPS receiver.

## Vector and Scalar Magnetic Data

Vector data are provided by a Danish Meteorological Institute, 3 component suspended fluxgate magnetometer sampled every second as shown in the image below. The system has 0.2 nT resolution and long term stability of  $<0.3$  nT / year.



Total field (F) data are derived from a GEM Systems, GSM-90 Overhauser magnetometer in situ at Eskdalemuir. The GSM-90 has 0.01 nT resolution, 0.2 nT absolute accuracy and long-term stability of 0.05 nT / year. Dynamic range is from 20,000 to 120,000 nT.



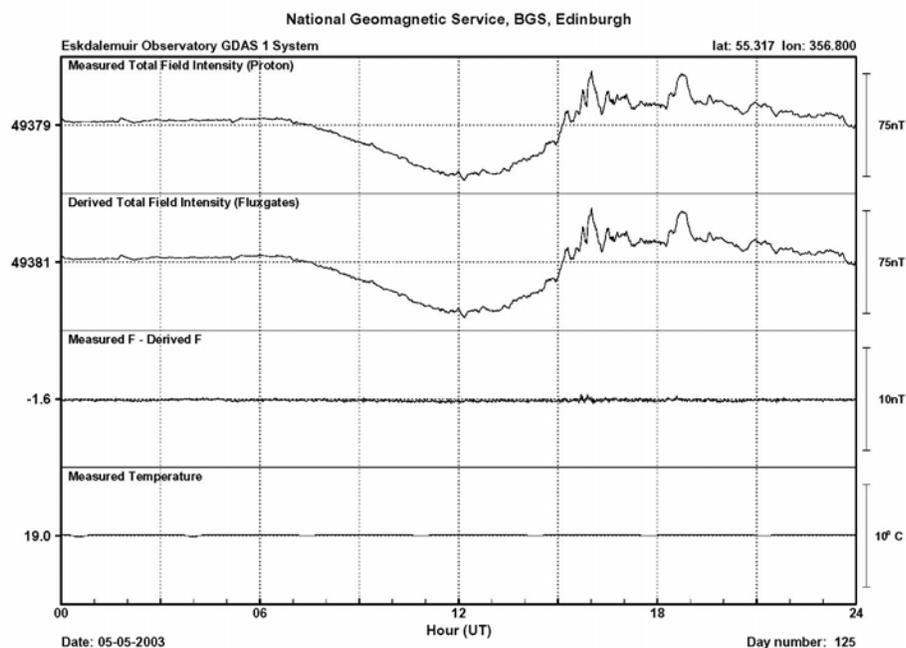
Controlling all sampling, logging and data communications is an embedded PC running under a Unix based operating system with all timing controlled using a GPS receiver.



To prevent loss of data due to interruptions in the mains supply the complete system operates from a single 12 volt battery which gives several hours autonomy in the event of failure of the mains supply.

## Data Communications and Quality Control

The data from the GDAS systems in all observatories are continuously transmitted to BGS Edinburgh through the INTERNET. The quality and stability of the data are continuously checked by comparing the total field (F) calculated from the fluxgate horizontal (H) and vertical (Z) components against the value of F measured by the GEM Overhauser magnetometer. An example of a typical 24 hours of comparison data is shown below.



## Commercial Availability

The British Geological Survey G-DAS system is available commercially and is in use in different sites around the world. For more information, please contact:

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