

Mag-03 and Spectramag-6 used to Measure Solar Weather from the Ground

Objectives

To protect communications, power and other technological systems from unusual solar activity by monitoring solar weather from ground stations.

Instrumentation

Mag-03MS100 precision three-axis fluxgate magnetic field sensor

Application

Forecasting solar events which may interfere with telecommunications and power networks.

Background

Predicting solar storms is important for protecting communication devices, power transmission networks, radio transmitters, and other space borne and ground based technological systems which can be influenced by the conditions on the Sun and the resultant solar wind. Predictions are made by monitoring the changes in the Earth's magnetic field and the ionosphere.

Method

Mag-03MS sensors are used in conjunction with other types of sensors and integrated into larger modules. These are environmentally sealed with additional electronics for GPS and temperature recording. The module is then

buried inside a sand-filled cylinder below ground level to provide temperature stability. The Mag-03 can also be mounted on a turntable to increase alignment and levelling within the module.

Due to the relatively slow nature of the changes in the magnetic field, the Mag-03 will operate at very low frequencies of <1Hz continuously. Power and data acquisition is provided via cable from a building a short distance from the sensor, so running the sensor all the time is not an issue. The information is digitised and recorded on a control PC. Each control PC is connected to a LAN and regularly sends reports to a central facility, which collates and plots the data from each field station to provide a forecast.

Field stations with Mag-03 sensors can only give readings for that location, so to produce a comprehensive measurement of activity, multiple field stations over large areas are used. For example, the Australian Space Forecast Centre's network of field stations extends from Manila in the Philippines to the Antarctic. In turn, the Australian network is combined with a global network.

