MAGDAS INSTALLATION AT TIRUNELVELI-INDIA

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Abstract. Poster presentation of the Installation and discussion on the maintenance of the real-time Magnetic Data Acquisition System of Circum-pan Pacific Magnetometer Network, i.e. MAGDAS/CPMN, installed at the Equatorial geophysical research lab (8º 44´ N and 77º 44´ E) Tirunelveli India, during October 2007.

Introduction. The **Indian Institute of Geomagnetism (IIG)** is a leading institute of the country actively engaged in basic and applied research in Geomagnetism and allied areas of Atmospheric and Space Physics, and Plasma Physics. It started out as a successor to the Colaba observatory, Set up in 1826, where the first regular magnetic observatory in the country was established in 1841. IIG became an autonomous research institute in 1971, and is now under the Department of Science and Technology, Government of India.

Main campus of IIG

The **Equatorial Geophysical Research Laboratory (EGRL)**, the regional centre of IIG, started its activities in 1991. Situated close to the magnetic equator (the dip angle being 1.75oN) (8.7oN, 77.8oE geographic) over an area of more than 35 acres near the village, Krishnapuram, the Centre was intended to house multi-disciplinary experiments for the measurements of electric and magnetic fields originating in the near-Earth environment.

FUNCTIONAL BUILDING

One of the main functions of EGRL is to obtain continuous records of geomagnetic data – variations in three components of the Earth's total geomagnetic field (the horizontal (H) and vertical (Z) components and the Declination (D)) recorded with sensitive magnetic instruments called variometers. These are supplemented by regular observations of absolute field components carried out with the Declination Inclination Magnetometer (DIM) and the Proton Precession Magnetometer (PPM). After processing, the data are sent periodically to the Headquarters at Navi Mumbai. A separate digital fluxgate magnetometer is operational at EGRL that yields high resolution data in digital form. With the standard magnetic observatory and a medium frequency radar providing data on upper mesospheric dynamical parameters, the Centre supports one of a very few locations in the world ideally suited to the study of equatorial electrojet, an enhanced east-west current system in the ionosphere flowing at ~110 km in a narrow latitudinal belt of $\pm 3^{o}$ centred around the magnetic equator.

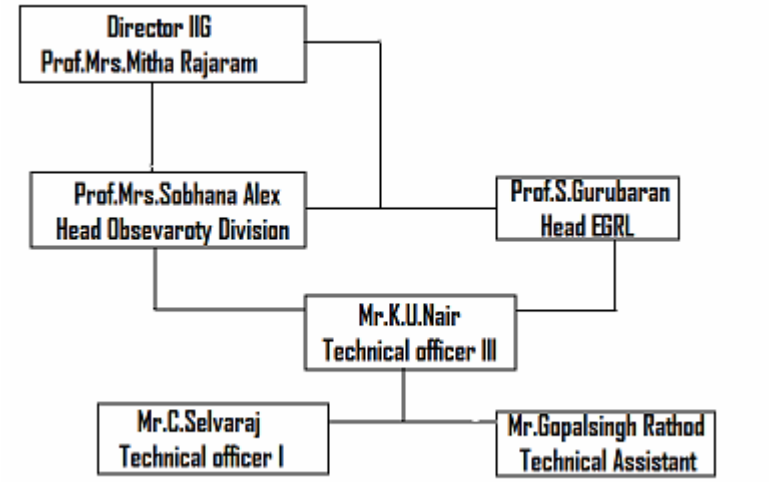
The scientific programmes of IIG pursued at EGRL are in the following areas:

(i) Middle atmospheric dynamics, energetics and coupling to other regions

(ii) Ionospheric phenomena – studies of equatorial electrojet and ionospheric irregularities

(iii) Near-surface atmospheric electricity and electrodynamics of the Earth-ionosphere waveguide

MAGDAS unit started functioning in October 2007.
Scientific and Technical Team set up for MAGDAS project



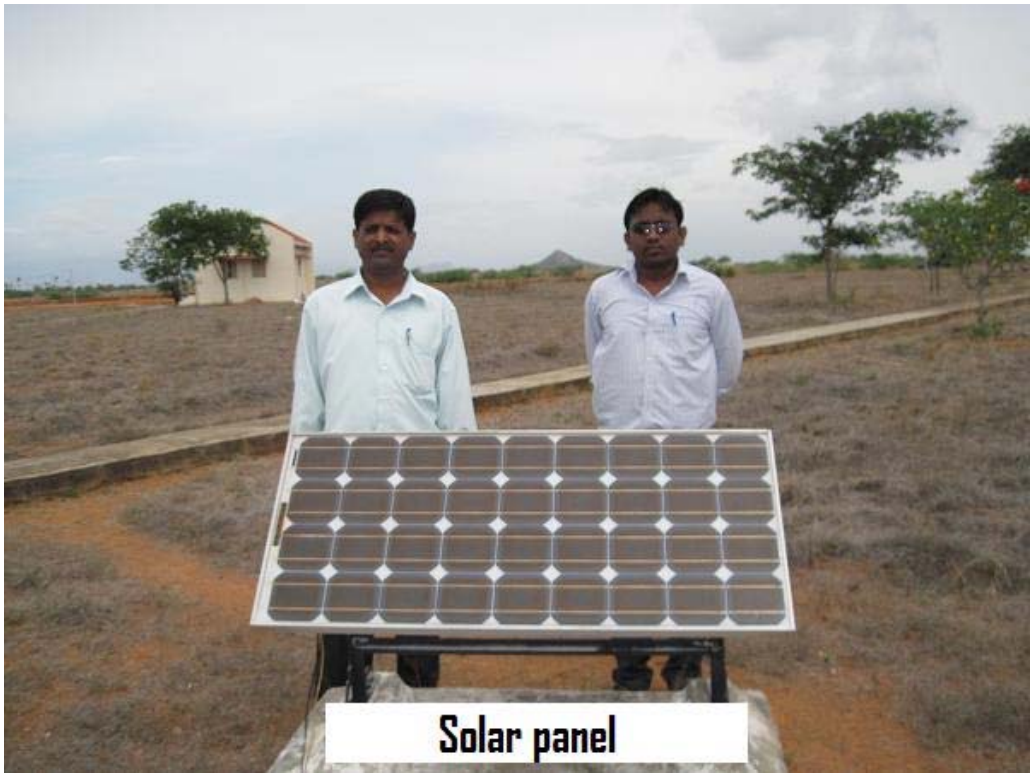
Photos of MAGDAS Set up

Full set up of MAGDAS data logging unit at Tirunelveli-INDIA

UPS, Isolation transformer and the Data logger

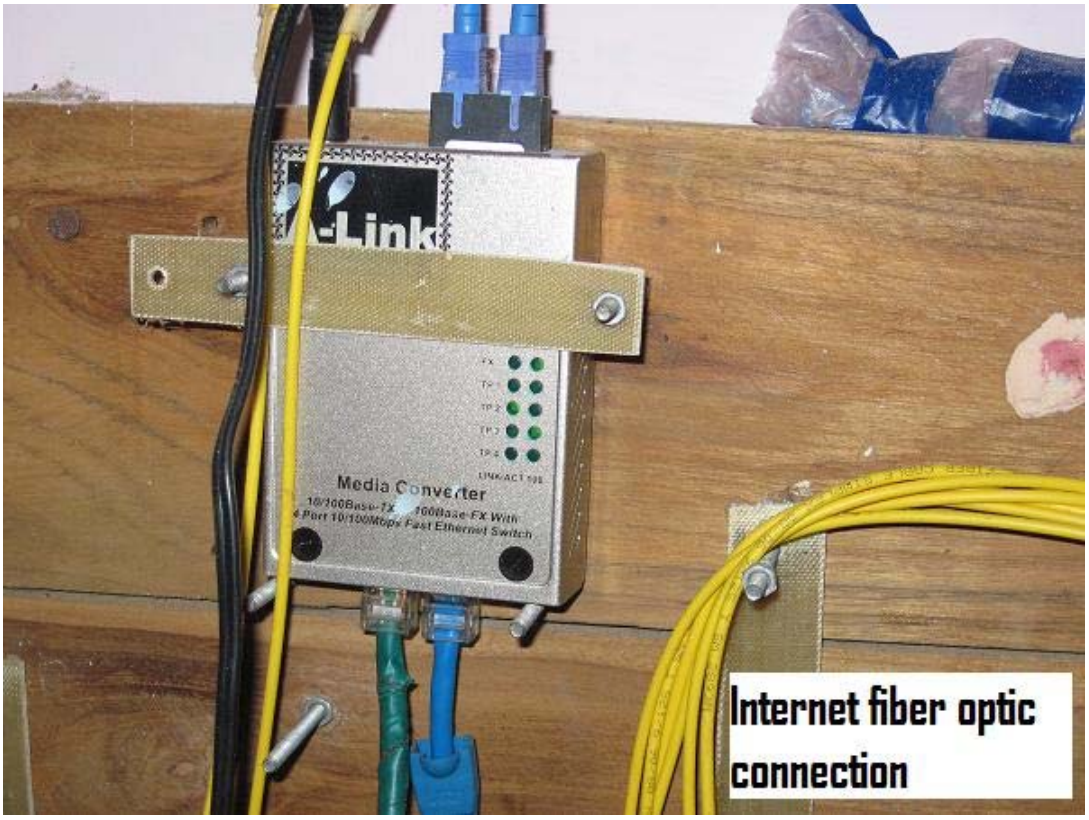
MAGDAS Notice board

MAGDAS SENSOR HUT



Solar panel


Solar charge indicator


Media Converter
Internet fiber optic connection

The sensor hut has a double wall, and the gaps between the walls are filled with thermo coal and the inner wall is lined with poly urethane form sheet. This arrangement gives a moderately stable temperature. To enhance the temperature stability, PVC cans filled with water are placed in between the sensor and the inner wall and in the inner wooden top cover. Rigid PVC pipes are used to run the sensor cable to the MAGDAS data logger.

The data logger is installed in an a/c room. Two types of power are provided to the system. One is the standard mains a/c (230volts) and two 48Ah batteries. The mains a/c is drawn through an isolation transformer with EMI & RFI suppression (a standard procedure we follow to operate all A/C powered equipments) and through an off line UPS. One 125W solar panel is used to charge the batteries of the UPS. This arrangement gives a smooth power supply to the system.

The MAGDAS system is connected to a dedicated chemical grounding system for proper ground contact.

At first the internet link was given through STP cable, but later on changed to Optic fibre for safety reasons (including lightning).

A permanent lightning arrester installed in the building will protect the MAGDAS unit.

The unit was working perfectly during the first six months and developed a technical snag in the data logging unit. The faulty unit is replaced by a new unit and working smoothly till date. There where minor problems due to the flash card which contains the software. This problem is solved by formatting the flash card and loading the software supplied by SERC-MAGDAS.

The back up data card will be changed according to the schedule given by SERC, and will be despatched to SERC.

As a precaution the MAGDAS unit gets isolated from the mains A/C line during lightning activities in and around the site. This is achieved by a warning signal from the Electric field mill (EFM-100) installed near the site, which gives a warning on lightning activities at a radius of 30 kms.

Acknowledgement: The author is thankful to the organizing committee of UN-NASA- ISWI work shop, SERC-MAGDAS- Kyushu University and the Faculty of Science Helwan University Egypt, for giving the opportunity to participate in the workshop.