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BY AIR MAIL

भारतीय सर्वेक्षण विभाग
SURVEY OF INDIA

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E82-10293

CR-168914

ज्यामितीय एवं अनुसंधान शाखा

GEODETTIC & RESEARCH BRANCH

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तारीख Dated 18 AUGUST 1981.

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14-C(Magsat)
तार : सर्वेज्योडीय
Telegram : SURSEARCH

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LOCKE M STUART CODE 902 NASA,
GODDARD Space Flight Centre,
Greenbelt MARYLAND 20771, U.S.A.

Sub: MAGSAT INVESTIGATORS' MEETING IN EDINBURG U.K.
JULY 30, AUGUST 3, 1981.

Dear Sir,

In continuation of our letter No.T-19573/14-C(Magsat)
dated 25.6.1981 I am to enclose, herewith, "STATUS REPORT OF
MAGSAT PROJECT BY SURVEY OF INDIA" for inclusion in the
report.

In this connection I regret to inform you that
Lt.Genl. K.L. Khosla could not attend the Investigator's
Meeting due to some unavoidable circumstances.

RECEIVED

OCT 9, 1981

SIS/902.6

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TYPE II

Yours faithfully,

(M.G. ARUR)

COL.(DR.)

DIRECTOR

GEODETTIC & RESEARCH BRANCH

Copy alongwith a copy of the abstract to Dr. RHEMERT LANGEL,
Geophysics Branch, (Code 922), NASA, GODDARD SPACE FLIGHT
CENTRE, GREENBELT, MARYLAND 20771, U.S.A.

Copy to Lt. Genl. K.L. Khosla, Surveyor General of India
for information.

(E82-10293) REPORT OF MAGSAT PROJECT BY
SURVEY OF INDIA Status Report (Survey of
India) 4 p HC A02/MF A01 CSCL 08G

N82-24570

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STATUS REPORT OF MAGSAT PROJECT BY SURVEY OF INDIA

Abstract.- A regional mathematical model of main geomagnetic field over the Indian subcontinent using expression by Dawson and Newitt for drawing isomagnetic charts is to be produced by using

- (i) Magsat data down continued to plane surface and
- (ii) observatories data.

The data has been recently received and the progress made so far is indicated.

1. Introduction.- A Survey of India proposal entitled "Analysis of Magsat data of the Indian Region" was submitted to NASA in August 1979 which was accepted by it in April 1980. As per this proposal, Magsat data will be utilised for producing regional field model of the main geomagnetic field at the epoch of the acquired data. The main field model will describe the field cartographically precisely since the coverage of the area including adjoining sea masses of India is covered by Magsat data. Apart from the development of main geomagnetic field model, broad-scale anomaly maps would be produced of the region which would be useful for geological and geophysical studies.

2. Regional field model of main geomagnetic field.- The Magsat data set received by us for quiet days for the period 4.11.79, 17.11.79 to 24.11.79. The data pertains to 44 passes. This data has been screened to exclude the data between 09:00 and 15:00 hrs, the period of maximum diurnal variation. As a result of this data screening process, we are left with a data set that has the effect, or atleast the major part of the effect, of the external field, removed from it. Such a data set is the basis for further analysis which is in hand. The data set is now being reduced to horizontal plane as suggested by Henderson and Cordell (1971). This technique reduces the potential field data obtained at differing altitudes to a common plane. The mathematical technique uses a finite harmonic series representation of the three dimensional data, combined with least squares approach for the solution of coefficients. It has also been successfully used in the reduction of satellite magnetic data by Regan and Davis (1975). A computer programme has been developed for the reduction of satellite data

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to a common elevation. The satellite trajectory has been reduced to a common elevation. Efforts are now in hand to down continue from the common elevation to surface, by the software provided by NASA. The surface values so obtained will be fitted to the equation given by Dawson and Newitt (1977) for producing the main field model. The observatory data of the Indian magnetic observatories will be included in the equations to have a check between the model values and actual values.

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3. Secular variation model.- For updating the regional models, the secular variation studies are essential. Indian functioning observatories will play crucial role in the description of the secular variation in their vicinity. A regional secular model is being developed.

4. Study of multilevel data.- The multilevel data at different altitudes is being studied to develop a model for variation of geomagnetic anomaly with altitude. These studies are being done by the National Geophysical Research Institute, Hyderabad, who are coinvestigators in the project.

5. Magnetic Anomalies Charts.- The anomaly field obtained from Magsat data will be continued downward to produce a regional anomaly map and analysed for elucidating tectonic features of the Indian subcontinent. The gravity anomaly maps of the region are also available which would be used in correlative studies.

6. Data received so far.- Two magnetic tapes containing almost identical data have been received so far from NASA. One tape has been decoded and extraction of data for the reduction of varying height data to a common elevation is being done. Software for the reduction to common elevation has been developed for one dimensional data set (profile) as given by HENDERSON and CORDELL with the help of Dr. B.N.P. Agarwal, of Indian School of Mines, Dhanbad. Only one profile has been reduced to a common elevation for testing the programme. The computer programme UPCON received from NASA has been tested on this profile but it seems that though the programme works, the results are not correct. Probably some other strategy has to be developed to down-continue the field values.

7. Meetings of Magsat Working Group. - Three meetings of the Magsat Working group of Indian Scientists from concerned departments/ Institutions of India have been held so far, two in Bombay and one in New Delhi, for co-ordinating their activities.

J.V.SAWHNEY/
28.7.1981

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"THE REDUCTION AND ANALYSIS OF SATELLITE MAGNETOMETER DATA" published in Geophysical surveys 3(1979) pages 331-349.

Roland G. Henderson
and Lindrith Cordell

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