

# Large Scale Mapping in Schirmacher Oasis in Antarctica

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## INTRODUCTION

The Survey of India has been associated with the Indian Antarctic Research Programme since X Expedition to carry out surveying and mapping in Antarctica. During X Expedition Geodetic control points had been established in Schirmacher Oasis. In XI & XII Expedition the original plane table (PI) survey work had been carried out on 1:5,000 scale with 5m contour interval using the control points established by the SOI team of X Expedition. During these two Expeditions, an area of 3.2 sq. km. was covered by survey teams.

From XIII Expedition onwards (except XVII) SOI teams have been doing original P.T. survey on 1: 5,000 scale with 1 m contour interval.

## OBJECTIVES

Preparing a large scale map on scale 1 :5,000 in the adjacent to the area surveyed during XI Expedition on the same scale. We set the goal of 2.25 sq. km area. But provided the control points for 3.0 sq. km. by E.D.M, keeping provision to extend the survey in case weather permits. Finally in addition to target of 2.25 sq. km. we could cover another 0.25 sq. km of area. So the total area covered was 2.50 sq. km.

## DATA USED

SI. No.	STATION	EASTING (in metres)	NORTHING (in metres)	HEIGHT (in metres)	REMARKS
1.	MAITRI S	1000000.00	500000.00	117.0	-
2.	TRACK S	1000131.92	499530.64	126.1	-

**INSTRUMENTS USED**

- 1) Electronic Distance Measurement Instrument (DI 3000S)
- 2) Theodolite Wild T-2
- 3) Traverse staves and Prismatic Reflector
- 4) Plane- Table with stand & level
- 5) Sight Rule and Clinometer
- 6) Thermometer and Barometer

**RECONNAISSANCE**

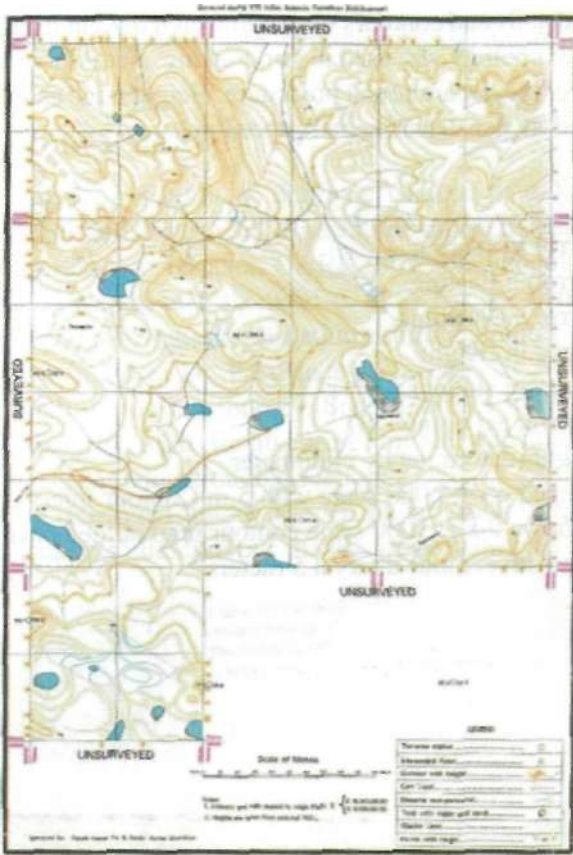
A thorough reconnaissance of the whole area was done to study the terrain. Keeping in view the difficult nature of the terrain, harsh weather conditions and time constraints it was felt that traverse stations and intersected points were selected in such a fashion that whole area could be controlled in minimum time and less labour. For fulfillment the task of traverse and observation in a better way, a Plane Table (P.T) chart reconnaissance was also done in the area. As we know there are no cultural details in the area to recognize the area for good control in all the peripheries, this chart reconnaissance helped us to locate the corners of our proposed area on ground for original Plane Table (P.T) survey. New stations were marked on the ground and some intersected points were selected to fulfill the requirements of Plane Table surveying. Traverse stations were named as RSI, RS2, etc. and some conspicuous tops selected as Intersected Points (IPs) for densification of control.

**E.D.M. TRAVERSE**

A closed traverse line was run from MAITRI V to TRACK 'S'. Traverse Stations and IPs were observed using Theodolite Wild T-2 and distances between stations were measured by calibrated Electronic Distance Measurement (E.D.M) Instrument (DI 3000S) so as to provide a dense mesh of planimetric and height control. Horizontal Angles to the stations were observed on both the faces at two different zeros. Vertical angles were also observed on both the faces.

**COMPUTATIONS**

In angular observation both for horizontal and vertical, mean of both faces was accepted for computations. But in linear measurement mean of ten measurements was accepted. Mutual computed known bearing of starting and closing stations were used for computing co-ordinates of stations.



*Fig. 1: Shows the traverse chart of the survey area carried in this work*

Computations were carried out in the field itself on appropriate departmental forms using scientific calculator.

### CONTOUR SURVEY

An arbitrary grid mesh of 5 cm x 5 cm was projected on a cloth mounted blank P.T. section. Coordinates of all traverse stations and IPs were plotted on this P.T. section. The positional accuracy of all traverse stations and IPs, plotted on PT was confirmed before commencing the details survey. The control points were used to make the fixings by resection method and heights were thrown to the different intersected points and existing details for contouring at 5 metre interval. The contours were chased on the ground with the help of clinometer. Height of 212 points had been computed for this purpose.

## FAIR DRAWING

Inking of details and contours were completed in field itself. Survey of India standard symbology was used in fair drawing. Necessary records were maintained as per the departmental procedure. Height trace and colour trace were maintained as per departmental procedure.

## RESULTS

- 1) Closing error in bearing
- 2) Closing error in Easting
- 3) Closing error in Northing
- 4) Closing error in Height
- 5) No. of Traverse stations : 07
- 6) No. of Intersected points : 07
- 7) No. of heights determine by clinometer
- 8) Area surveyed on 1:5,000 scale with 5 m Contour Interval (C.I.)

Figure 2 shows the 1: 5000 scale contour map of area covered during XXII expedition with contour interval 5 meters.

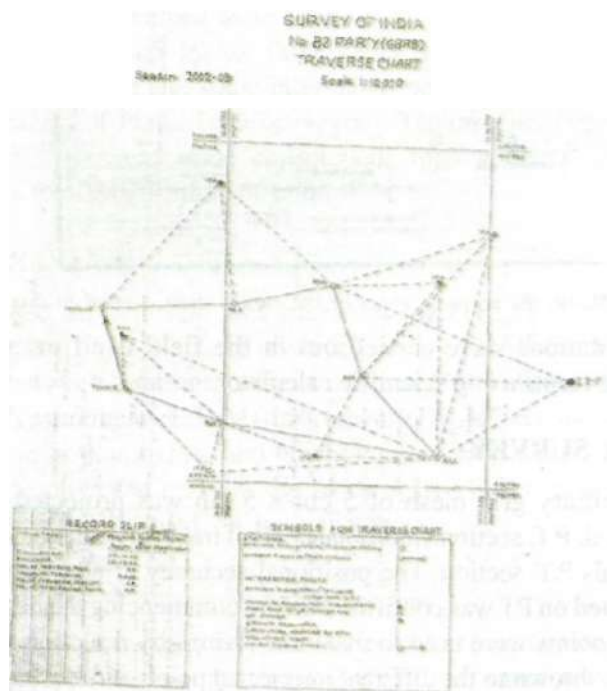


Fig. 2

## **CONCLUSION**

2.5 sq.km was covered in 28 working days and mapped on the scale of 1:5000.

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