

A Summary of the Communication Tasks Carried Out During the Wintering of the 19th Expedition

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Objectives

1. Operation of communication links through following modes:
 - a) Satellite communication
 - b) HF communication
 - c) Mobile radio communication
2. Installation of: Antennas for HF and Mobile radio communication.
3. Maintenance of:
 - a) INMARSAT 'A', INMARSAT 'M' terminals.
 - b) HF and Mobile Radio communication

Work Done

1. Daily Routine Jobs:

- a) Operation and maintenance of INMARSAT 'A' terminal round the clock.
- b) HF Contact with Novolazarevskaya (Russian Station)
- c) Receiving weather fax transmitted by Cape Naval Radio, Cape Town (South Africa).
- d) VHF communication within Maitri complex such as between workshop, summer huts, generator room, pump house round the clock.
- e) HF Contact with DEAL, Dehradun.
- f) Record keeping for various activities such as telephone, fax, weather fax.
- g) Operation and maintenance of a xerox machine.

2. Installations:

- (a) Installed YA 30 wide band HF dipole antenna (two Nos) in the month of March 2000 for communication with Novolazarevskaya (Russian Station) daily at 2.525, 4.030 and 6.100 MHz USB. Also made contact with BLUE 1 Polar Logistics team (UK) in the month of December 2000.
- (b) Installed two VHF(GM 300) 25w sets and four VHF (GP 340) 4w sets with battery charger (GP 680) in vehicles, in the month of March 2000 for communication with Maitri and for intra-convoy communication.
- (c) Installed Repeater at Veteheia hill in the month of September 2000 for communication with convoys.
- (d) Installed a ground plane antenna at Veteheia hill for the repeater. The old antenna was damaged in a blizzard in the month of November 2000. Now it is working satisfactorily.
- (e) Installation of Trumpled Winsock (dialing software) for e-mail, once in every 30 days, from March to May 2000.
- (f) Installed solar panel with battery charger at "Sankalp Point" for the automatic weather station of Snow & Avalanche Study Establishment (SASE).

3. Maintenance:

- (a) Log periodic antenna, which is used for HF communication and receiving weather faxes, was handed over to us with the problem of high VSWE (the VSWR of LPA was 4.5:1 where as the specific value is 2:1). We have repaired it in the month of April 2000. This log periodic antenna was damaged due to a blizzard in the month of November 2000. It was immediately repaired with the help of a crane. Now it is working satisfactorily.
- (b) The INMARSAT 'A'- terminal started malfunctioning and became nonfunctional from 12th May 2000. As this was the only terminal available for telephone, fax and e-mail communications for the expedition, the morale of the entire team could have been affected, had this condition lasted for a long period. We started working on it immediately. According to the LED indications on the R/T (Receive Transmit) board, changed the 5 MHz crystal oscillator. Then the LED indication were correct and the SELF TEST was showing the fault in TDM receiver. We changed processor board and also R/T board one by one but could not get any result. The third step was that the signal was not coming from RF processor unit but since this unit

is housed within an enclosed SATCOM Dome, there was no access to it. We discussed this problem with the Station Commander and he gave the instructions to the Station Engineer to cut through the roof of the station, to make an access passage to the hatch of the dome. Finally, we changed the RF processor board and got the results as the terminal started getting SATLOCK. This means that:

- i. The antenna power supply was outputting the required voltage.
- ii. The receiver down conversion path in the RF processor was working.
- iii. The diplexer and feed horn were working.
- iv. The TDM receiver was working.
- v. The 5 MHz oscillator was working.

We initiated the phone call but could not succeed. Then we changed the HPA (high power amplifier) and got success in restoring the communication. Thus, the terminal was repaired successfully. Now it is fully functional and working satisfactorily.

- (c) Rectified the problem of the mobile SATCOM terminal (INMARSAT M). Reactivation of this terminal every month (within 30 days) is absolutely necessary, Because if a terminal is not used or switched off for more than 30 days, the stored Bulletin Board information is no longer valid and the data is automatically erased from the memory. If this condition exists, a call release code 1777 will be displayed on the LCD display. Then it becomes necessary to re-acquire the Bulletin and update Satellite and Land Earth Station data. This task was successfully completed in July 2000. After that, a new site has been located, tested and marked within the summer camp ("Nanda Devi" hut), where the mobile terminal easily gets SATLOCK. This site proved to be of great help during blizzards and bad weather conditions.
- (d) We started working on the old SATCOM terminal (INMARSAT 'A' terminal) at "Girnar" hut, which was handed over to us in non-working condition. After inspection the terminal was switched on and we observed following symptoms:
 - i. No SATLOCK.
 - ii. No DIAL TONE.

iii. Self test gave the following results:

TDM	FMR	TRA	PRO	ANT
0001	0	10	1111	11

Here 0 indicates self-test failed and 1 indicates self-test passed. The above result indicates that the problem lies in TDM (Receiver), FM Receiver and TRA (Transmitter). After replacing R/T board and self-testing, we obtained following results:

TDM	FMR	TRA	PRO	ANT
0001	1	10	1111	11

After replacing main processor board and self-testing:

TDM	FMR	TRA	PRO	ANT
0001	1	11	1111	11

Now the terminal got SATLOCK. After self-testing:

TDM	FMR	TRA	PRO	ANT
1111	1	11	1111	11

This result shows that the system status was normal but could not initiate a phone call. The problems has been identified and it lies in the transmit path. This terminal can be repaired with required spares and measuring instruments.

- (e) Fortnightly maintenance of repeater station at Veteheia hill. During the winter season the repeater was uninstalled (because it wouldn't have been possible to maintain it during that season) and brought back to the station. It was re-installed again before the convoys started after the winter.

Constraints

At Maitri, it is very difficult to work with electronic equipment because of static charge. Every time one must ground oneself properly and then only touch any equipment. Also, we do not have any measuring instruments like power meter, spectrum analyzer, frequency counter, signal generator etc. The precise measurement of power, frequency, signal level, signal to noise ratio can only be determined by such instruments.

Highlights

- a) Repaired the main SATCOM TERMINAL (INMATSAT 'A'), by testing and changing the sub-systems.

- b) Repaired the mobile SATCOM TERMINAL (INMARSAT 'M') by re-acquiring the bulletin board information.
- c) Repaired log periodic antenna of HF radio. It was the only system available for communication with India, when both the SATCOM terminals were down.
- d) Provided uninterrupted VHF communication to all the convoys.

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