Disaster Management Communications Plans for India - The Role of INSAT System

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By M.Y.S. Prasad
Director-MCF, ISRO
On behalf of Antrix Corporation
Damage due to earthquake in Bhuj - 26 Jan 2001
Major earthquake in Bhuj-Gujarat - 26 Jan 2001
Damage during super-cyclone in Orissa - Oct 1999
Super-cyclone in Orissa during 28-30 Oct 1999

Meteorological imagery from INSAT-2E
Considerations for Disaster Communication Strategy

**TYPES OF DISASTERS**
- Cyclone
- Earthquake
- Flood
- Man made Disaster

**PHASES OF DISASTERS**
- Pre-Disaster
- During Disaster
- Post-Disaster

**DISASTER MANAGEMENT ACTION TEAMS**
- People in General
- Voluntary Organisation
- Govt. Officials Army/ Police
- Decision Makers
- Scientists

Continued
Considerations for Disaster Communication Strategy (Contd..)

COMMUNICATION NEEDS

- Long term
- Immediate

COMMUNICATION MEDIA

- TV
- Radio
- Telephone
- Print
- Internet
- Loudspeaker

IDENTIFICATION OF INFORMATION NEEDS

COMMUNICATION STRATEGY
India’s GSO Satellites & Orbital Locations

Collocated
Coverage of INSAT-3C S-band MSS Payload
Coverage of INSAT-2E in C-band

Zonal beam coverage

Wide beam coverage
Coverage of INSAT-3E in Extended C-band
The experience so far..

- Cyclone Warning Dissemination System (CWDS) is operational.
- One SNG terminal was deployed for communications during Bhuj earthquake relief operations. The digital carrier of one of the regional TV channels vacated to provide the satellite bandwidth temporarily.
- International aid/relief teams provided satellite-based direct voice communications during Bhuj earthquake relief operations.
- INSAT MSS Type-C terminals deployed during Orissa super-cyclone.
Communications from disaster site to the Control / Support Centres

- State Emergency Control Room
- National Emergency Control Room
- Decision Support Centre
- Site of Disaster Relief Operations

Communication Network Within the Cell: WLL
Cell to Emergency Control Rooms: VSATs
Between Control Rooms: Backbone Communications
Affected area to anywhere: Hybrid
National plans for Disaster Management Communications

- Disaster Management Division created in the Ministry of Home Affairs.
- National Emergency Communication plan is being evolved.
- Disaster communications is also covered by ISRO’s Disaster Management Support mechanism.
- In the long term a three-tier system is being planned with National Control Room, State Control Rooms, and ISRO’s Decision Support Center.
- National and State Control Rooms will be equipped with 3.8 m fixed satellite communication ground terminals.
- The full disaster communication network, after commissioning, will have ground systems compatible with INSAT & others’ satellites with India coverage.
- Department of Telecommunications procured INMARSAT Mini-M terminals for disaster communications.
Cyclone Warning Dissemination System (CWDS)

- 250 analog CWDS Receive Stations deployed all along Indian coasts. Uplink from Chennai / Mumbai / Kolkata.
- 100 digital CWDS Receive Stations deployed in Andhra Pradesh under World Bank aided project.
- The system is operated by Indian Meteorological Department.
Elements of ISRO’s Disaster Communication Support Mechanism

- Communications in Ext. C-band through INSAT System
- A dedicated transponder in INSAT-3E is identified for exclusive use for disaster communications.
- The links between deployable VSAT and National and State Control Rooms will be in PAMA mode.
- Deployment of communication terminals at disaster site:
  - A WLL VSAT with 10 to 20 hand-held communication terminals.
  - Communications between hand-held terminals and VSAT are in VHF band. License obtained for one channel.
  - The communication to Control Rooms / Hub Station through VSAT utilizing INSAT transponder.
  - INMARSAT Mini-M terminals also planned for communications.
- ISRO-developed ground terminals to be used along with INSAT MSS.
Elements of ISRO’s Disaster Communication Support Mechanism (contd..)

- Deployment of one VSAT and a few INSAT MSS Type-C / Type-D terminals, and a few INMARSAT Mini-M terminals at five ISRO Centers. Those systems will be deployed to the disaster site in their regions without any delay.

- ISRO Centres are chosen to cover Northern Region, North-East & Eastern Region, Central Region, Southern Region, & Western Region.

- Teams are identified at each of the Centres who are trained with the actual systems to be deployed.

- These teams are delegated complete authority to act independently in the first 24 / 48 hours after disaster for efficient operation.
Training the teams on Disaster Communications
Training the teams on Disaster Communications
Configuration of MSS in GSAT-2 & INSAT-3C

MOBILE REMOTE TERMINAL

S-BAND

UL 2670 – 2690 MHz

DL 2500 – 2520 MHz

HUB EQUIPMENTS

2.1 M S-BAND

11 M C-BAND

HUB NETWORK

MOBILE REMOTE TERMINAL

PSTN / DATA / FAX
INSAT MSS Ground Terminals

**Type-C terminal**
- Hand-held, Battery operated.
- One-way reporting system with 40 character long messages, transmission at 300 bps.
- Transmit to the satellite in S-band.
- 650 gms weight & 20 x 10 x 5 cm size.

**Type-D terminal**
- Briefcase terminal with solar panel on the cover, and battery back-up.
- Two-way voice link capability.
- Uplink and downlink work in S-band.
- Development & evaluation completed, units under field trial.
- Serviced by a central Hub with DAMA NMS.
Antrix & INSAT System

- Antrix handles all commercial lease contracts of transponder capacity of INSAT system.
- Antrix will commercialize the onboard and ground technologies developed by ISRO.
- Antrix can provide end-to-end solutions for disaster management communications using:
  - I-1000 class satellites & launch into GTO by PSLV.
  - I-2000 class satellites & launch into GTO by GSLV.
  - Suitable design & realization of communication payload.
  - Supply / licensing of ground systems (MSS Type-C & Type-D) for disaster communication.
Thank you