Operational DCS status report and implementation of best practices

Sanjeev Kumar Gupta
Associate Director, SATCOM-PO
ISRO HQ, India

Current GEO Satellites (INSAT-3D, INSAT-3DR, GSAT-17

- The Geostationary Satellites INSAT-3DR, INSAT-3DS and GSAT-17 are carrying Data Relay Transponder (DRT) in UHF x C band. These satellites are operating at 74°E, 82°E and 93.5°E respectively.

- The payloads are operating in the 402 MHz band for uplink and 4.5 GHz band for down link. These help in collecting realtime data for meteorological, hydrological and oceanographic applications, from automatic data collection platforms (DCP)

Current GEO Satellites (INSAT-3DR, INSAT-3DS, GSAT-17)

Operational

- DRTs are supporting about 1200 Automatic Weather Stations and 64 Automatic Tide Gauges, ~600 terminals for Water recourses, ~100 terminals of Snow and Avalanche Study, 50 terminals for environment radiation monitoring, 375 terminals for Moored Buoy data collection, 15 terminals for Tsunameter.
- About 20000 terminals for Distress Alert Transmitter.

Planned

- 350 more AWS terminals is planned for Snow & Avalanche study.
- 50 more terminals also planned for radiation monitoring.

INSAT-3DS

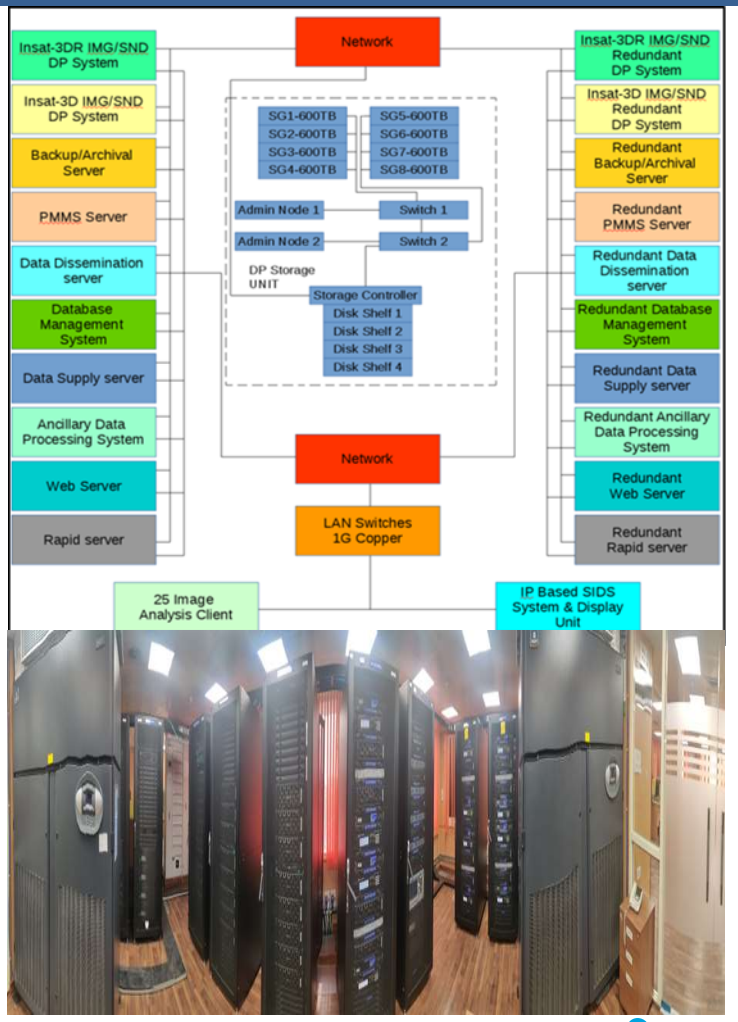
- INSAT-3DS a Satellite is a Third Generation Meteorological Satellite from Geostationary Orbit launch in Feb 2024.

- INSAT 3DS has been successfully incorporated in the existing Multi-Mission Meteorological Data Receiving and Processing System (MMDRPS) facility of the India Meteorological Department (IMD)

- Satellite has enhance meteorological observations and monitoring of land and ocean surfaces for weather forecasting and disaster warning.
- Satellite has two meteorological payloads namely
  - Six channel Imager & Nineteen channel Sounder.
- Imager generates images of the Earth and its environment in various spectral channels of Meteorological importance.
- Sounder provides the meteorological data with vertical profile of the various meteorological parameters of importance.

INSAT-3DR & INSAT-3DS- Geostationary Meteorological Satellites

- IMD has established MMDRPS to receive the data from metrological satellites.
- Three numbers new earth stations have been setup under MMDRPS Project.
- MMDRPS systems has advanced servers capable to process the complete set of data within 7 minutes after completion of scan.
- The system has the storage capacity of order PBs which facilitates online sharing of processed data for all Indian meteorological satellites to the registered users as per IMD data policy.
- The processed data is shared through Web-based secured satellite Data Supply System.



INSAT-3D, 3DR & 3DS- Operational Products

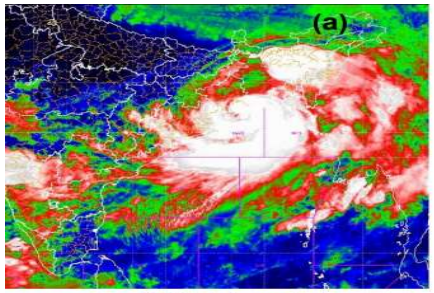
- Cloud images in the Visible, Short wave Infra-red, Mid Infra-red, Thermal Infra-red, Water Vapor Channels
- Atmospheric Motion Vectors (IR Wind, Water Vapor Winds, MIR/Visible Winds)
- Sea Surface temperature
- Outgoing Long-wave radiation
- Land Surface Temperature (LST), Insolation, Quantitative Precipitation Estimates
- Nighttime Fog, Smoke, Fire, Snow Cover, Aerosol Optical Depth
- Upper Tropospheric Humidity, Cloud top Temperature, Cloud top Pressure, Temperature & Humidity profiles, Total ozone, Total/Layer Precipitable Water Vapour, Stability Indices.
- Wind derived products such as Vorticity (at 850mb,700mb,500mb, 200mb levels), Wind Shear, Mid-level Wind Shear, Shear Tendency, Low-level Convergence, and Upper-Level Divergence using Imager Wind product.

All these images and products are disseminated on a real-time basis through a dedicated IMD website.

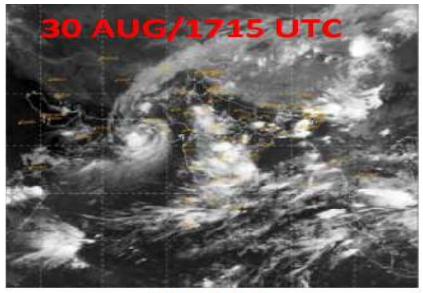
INSAT-3D, 3DR & 3DS- Satellite Based Cyclone Monitoring

- During the year 2024, tropical cyclones Remal and Dana were monitored with INSAT 3DR & INSAT-3DS
- Advanced Dvorak Technique (ADT) software was implemented to determine the intensity of Tropical Cyclones.
- During extreme weather events, rapid scans were conducted during major cyclonic events like Mocha, Biparjoy, Tej, Hamoon etc. The imageries of rapid scan conducted during cyclonic events are being disseminated through web page (http://satmet.imd.gov.in/rapid/rapid_scan.htm).

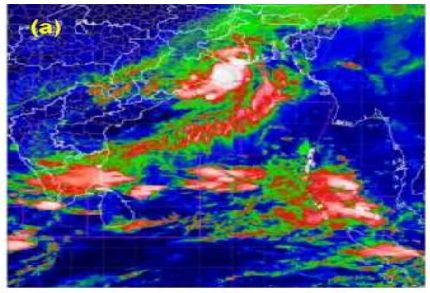
Sl. No.	Name of Cyclone	Duration	Total no. of Rapid Scans
1.	SCS – Remal	24th to 28th May 2024	572
2.	SCS – Dana	22nd to 26th Oct 2024	508



SCS - Remal



CS - Asna



SCS - Dana

Thank You