

CGMS-45 Agency Report of IMD

At present, three INSAT satellites are in operation. Kalpana-1 is a meteorological satellite, launched in September 2002 and repositioned in 2016 at 73.2° E. It carries a Very High-Resolution Radiometer (VHRR) capable of imaging the Earth in the visible, thermal infrared and water vapour bands. INSAT-3A, a multipurpose geostationary satellite was launched in April 2003 and was decommissioned in September 2016. INSAT-3D is India's advanced weather satellite located at 82° E and was launched on July 26 2013, from Kourou, French Guiana. It is a dedicated meteorological satellite and carries four payloads: imager (six channels), sounder (19 channels), Data Relay Transponder (DRT) and satellite aided search and rescue (SAS & R). INSAT-3D has the capability of providing vertical profiles of temperature and humidity, along with several products similar to Kalpana-1 and INSAT-3A but with increased resolution. The significant improvements incorporated in INSAT-3D are:

- Imaging in Middle Infrared band to provide night time pictures of low clouds and fog
- Imaging in two Thermal Infrared bands for estimation of Sea Surface Temperature (SST) with better accuracy
- Higher Spatial Resolution in the Visible and Thermal Infrared bands

INSAT-3DR similar to INSAT-3D, is an advanced meteorological satellite of India configured with an imaging System and an Atmospheric Sounder was launched on 08th September 2016 from SDSC SHAR, Sriharikota using GSLV-F05 successfully and placed at 74° East.

DRT payload of INSAT-3DR has 300kHz bandwidth to support more numbers unattended meteorological platforms (AWS) stations network. Thus, INSAT-3DR will provide service continuity to earlier meteorological missions of ISRO and further augment the capability to provide various meteorological as well as search and rescue services.

INSAT-3DR is being used in staggered mode with INSAT-3D in order to reduce temporal resolution to 15 minutes.

Calibration Coefficients are being updated in processing chain of IMDPS system on daily basis by using GSICS corrections of last 30 days dynamically carried out by SAC Ahmedabad.

New webpage (http://satellite.imd.gov.in/joy_insat_final.htm) has been designed by making provision to view last 24 hours channel and product images along with selectable animation utility and Product description on the line of other satellite operators. A web-based tool named "RAPID" for analysing the satellite data and products can be seen at <http://www.rapid.imd.gov.in>. The user manual for the use of RAPID was prepared and is uploaded in RAPID as help. IMD has also carried out a study for using RAPID and RGB imageries for Nowcasting and identification of weather phenomena's by identifying their thresholds values.

The online archival of images is also available at <http://satellite.imd.gov.in/archive/>.

T-phi grams at district level for 709 locations are being generated by using INSAT-3D sounder data.

SCATSAT-1 is a continuity mission for Oceansat-2 Scatterometer to provide wind vector data products for weather forecasting, cyclone detection and tracking services to the users was launched on 26th September 2016. The SCATSAT-1 dataset is available on following link: <ftp://ftp.mosdac.gov.in/>.

IMD is in process to install **Multi-Mission Meteorological Data Receiving & Processing System (MMDRPS)**, for reception, processing and dissemination of meteorological data of INSAT-

3D/3DR/3DS and Kalpana-1. MMDRPS will have very high-end processing system which will cut down the processing time from currently 15 minutes to 5 minutes. MMDRPS will have huge storage capabilities which will make online archival of processed data possible for all meteorological satellites.

IMD is utilising satellite data and products by issuing a satellite bulletin every three hours. Cyclone monitoring is being done by utilising the Dvorak technique. INSAT-3D radiances and winds are being assimilated in NWP models in India. IMD has plans to establish a CAL/VAL site for INSAT-3D, and subsequent satellites, at a suitable location in India and three field campaigns have already been undertaken by Indian scientists. IMD has also joined the SCOPE-CM-06 IOGEO team for calibrating its old archived satellite data from the past 30 years. IMD is also contributing to the WMO's RARS group by providing the direct broadcast of NOAA and Metop data from the Delhi and Chennai receiving stations.

A network of 25 GNSS stations for measurement of Integrated Precipitable Water Vapour (IPWV) was made operational in 2016 and the data is available at <http://gns.imd.gov.in/TrimblePivotWeb/>.

India will launch INSAT-3DS third exclusive meteorological satellite of this series by 2022 and first hyper-spectral satellite GISAT-1 by 2019.