

**India Meteorological Department Item No. 4 REPORTS ON NEW DEVELOPMENTS AND PROGRAMMES BY
MEMBERS SINCE CGMS-46**

Plenary day 1

Thursday 23 May 2018, 08:30-17:45 Room: Ballroom

IMD Agency Report

Virendra Singh

ACTION (and/or recommendation) PROPOSED:

- i) ...
- ii) ...

Abstract/Executive summary:

At present, two INSAT Meteorological satellites are in operation i.e. INSAT-3D and INSAT-3DR. INSAT-3D is India's advanced weather satellite located at 82°E and was launched on 26 July 2013 from Kourou, French Guiana and INSAT-3DR was launched on 8 September 2016 from SDSC SHAR, Sriharikota using GSLV-F05 and positioned at 74°E. They are dedicated meteorological satellites and carries four payloads: imager (six channels), sounder (19 channels), Data Relay Transponder (DRT) and satellite aided search and rescue (SAS & R). The DRT payload of INSAT-3DR has 300 kHz bandwidth to support a higher number of unattended meteorological platforms (AWS) of the stations network while INSAT-3d DRT payload have 200 Khz bandwidth.INSAT-3D/3DR have 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.

Imager payload of INSAT-3D & INSAT-3DR are used in a staggered mode to achieve 15-minute temporal resolution for getting cloud imaging. An integrated scan strategy of the sounder payload of INSAT-3D & 3DR satellites has been implemented to get data of the Indian region on an hourly basis and the ocean region data every 1.5 hours. Standard Operating Procedure (SOP) has been finalized by ISRO and IMD for conducting the Rapid scan from the INSAT-3DR Imager payload and rapid scans have been successfully operated during four Tropical Cyclones namely: VSCS Luban, VSCS Titli, VSCS Gaja and Fani. Each Rapid scan cover up 3degree in N-S direction (6 Blocks/234 scan lines) in 4.5 minutes. Rapid scan data has been used to track these cyclones in real time basis.

The satellite data is assimilated in numerical weather prediction models and the outputs are further used to issue short range and medium range weather forecast. T-phi grams at district level for 709 locations are generated using INSAT-3D sounder data for nowcasting. Cloud product such as CTT, CTP, cloud fraction, clear-sky-BT from the imager payload are generated and assimilated in NWP models. Calibration coefficients are updated in the processing chain of the IMDPS system by SAC, Ahmedabad, on a monthly basis using GSICS corrections from the last 30 days.

IMD uses satellite data and products by issuing a satellite bulletin every three hours. Cyclone monitoring is made by using the Dvorak technique. IMD also validates some INSAT-3D products such as OLR, SST, Wind products and rainfall product on a regular basis and improvements in product accuracy after applying GSICS corrections in the operational processing chain have been noticed. There is a new webpage (<http://satmet.imd.gov.in/insat3d.htm>) designed with user name and password protection by making provision to view last 24 hours channel and product images along with selectable animation utility and product description similar to other satellite operators. The online archive of satellite images for the past six months is available at <http://satellite.imd.gov.in/archive/>. A web-based tool named "RAPID" for analyzing the satellite data and products can be viewed at <http://www.rapid.imd.gov.in> and the related user manual is available at http://satellite.imd.gov.in/desc/RAPID_User_Guide.pdf. IMD has also carried out a study for using RAPID and RGB imageries for nowcasting and identification of weather phenomena by identifying their threshold values.

Recently IMD has developed a tool to visualized the exiting lighting network data superimposed on satellite and RADAR Images in real time basis for nowcasting the thunder storm events.

Scatsat-1 wind data and Radio-occultation data from the ROSA payload of Megha-Tropiques are being disseminated on the GTS by IMD. IMD is also contributing to the WMO's DBNet group by providing direct broadcast of NOAA and Metop data from Chennai receiving stations. 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 also joined the SCOPE-CM-06 IOGEO team for calibrating its old archived satellite data from the past 30 years. IMD currently works on two calibration and validation activities: • IOGEO Project with Kalpana-1/INSAT-3D [IMD-EUMETSAT]. • Lunar Calibration using INSAT-3D/3DR [IMD-EUMETSAT].

A network of 25 GNSS stations for measurements of Integrated Precipitable Water Vapour (IPWV) was made operational in 2016 and the data is available at <http://gnss.imd.gov.in/TrimblePivotWeb/>. Furthermore, the implementation of Multi-Mission Meteorological Data Receiving & Processing System (MMDRPS) at IMD is in final stage. The system will be used to receive, process and dissemination of meteorological data from INSAT-3D, INSAT-3DR and INSAT-3DS satellites. This system will have the following advantages compared to the present processing system (IMDPS): MMDRPS will have a very high-end processing system which will cut down the processing time from currently 15 minutes to 5 minutes, MMDRPS will have a storage capacity of the order of 320 Tb flash drive and 2PB Netapp storage which will facilitate online sharing of processed data for all Indian meteorological satellites to the registered users as per IMD data policy. MMDRPS will be commissioned in July 2019. India will launch INSAT-3DS, the third exclusive meteorological satellite of this series, by 2022 and the first hyper-spectral satellite GISAT-1 by 2019.