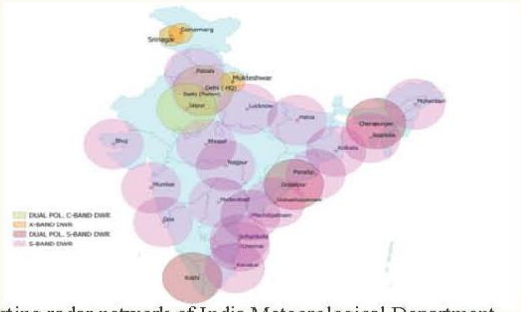
HISTORICAL BACKGROUND

India Meteorological Department adopted radar technology for meteorological applications in the early 50s. The first indigenously designed and manufactured X-bandstorm detection radar was installed in 1970 at New Delhi.

The first S-Bandcyclone detection radar became operational at Visakhapatnam in 1970 andthe first indigenous S-Band cyclone detection radar was commissioned in Mumbai in 1980.



Existing radar network of India Meteorological Department.

RADAR NETWORK

IMD's network consists of 26 DWR radars comprising of 21 S-band Radars (DWRs), 02 C-band Radars and three X-band DWRs.

Out of 26 Doppler Weather Radars in the network, IMD has S-band DWRs at Chennai, Kolkata, Machilipatnam, Visakhapatnam, Paradip, Hyderabad, Nagpur, Patna, Lucknow, Patiala, Karaikal, Bhopal, Agartala, Mohanbari, Delhi (Palam), Bhuj, Mumbai, Gopalpur,Kochi,Sriharikota (SHAR), Goa, C-band DWRs installed at Delhi (HQ), Jaipur, and X-band DWRs at Srinagar, Mukteshwar and Sonamarg

Among the above IMD hasindigenous Doppler Weather Radar at Sriharikota (AP) Bhuj& Mumbai, threedualpolarised S-band DWRs at Kochi,Gopalpur, SHAR and two X band dual polarized DWRs at Mukteshwar and Sonamarg.

In the network, twenty S Band radars are with single polarisation technology.

There are three S band, two C band, three X band radars operating with dual polarization technology.

Radars operating in the X band are having Solid State Power Amplifier (SSPA) technology for power amplifier in the transmitter.

भारत मौसम विज्ञान विभाग

India Meteorological Department

1875में स्थापित

(Established in 1875)

पृथ्वी विज्ञान मंत्रालय

Ministry of Earth Sciences

भारत सरकार

Government of India

Upper Air Instrument Division

Main units of Upper Air Instrument Division are:

1. *RadarLab*
2. *Upper Air Lab (UAL)*
3. *Workshop*
4. *Supply Section*
5. *Hydrogen Factory (HF) Agra*

UPCOMING RADARS OF IMD

RADAR is the essential tool for weather surveillance in IMD which provides in depth information about clouds, spatial distribution of rainfall, gusts and associated phenomena in severe weather events due to thunderstorms, hailstorms and tropical cyclones.

The radar network of IMD includes various S-band, X-band and C-band Doppler weather radars for providing weather forecasts and climate services resulting in public safety & socio economic benefits also support to various agencies

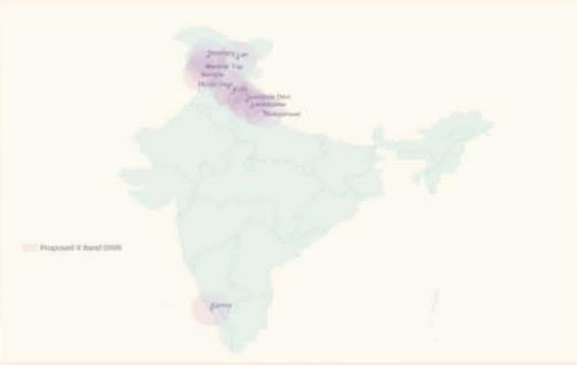


Fig.1: X- Band DWRs

Under Integrated Himalayan Meteorology Project ,IMD has planned to install ten X-band DWRs in Northwest and central region of Himalayas to cover the hilly range of J&K, Ladakh, H.P. and Uttarakhand at ten locations as in Fig.1.

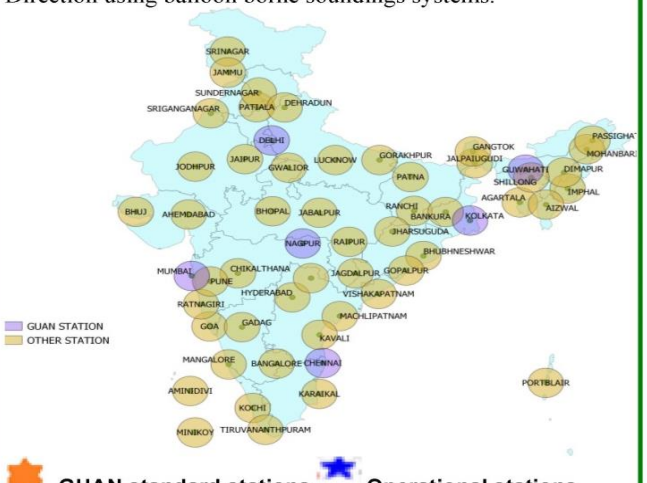
Out of ten two DWRs have already been installed at Mukteshwar and Sonamarg in 2020.

IMD has planned to install eleven C-band DWRs atMalda, Bangalore, Mangalore, Port Blair, Kavaratti, Sambalpur, Balasore, Raipur, Ranchi, Ratnagiri and Ahmedabad as in Fig.2

Upper Air Observational Network

A. Radiosounding Radiowind (RS/RW) network:-

As a part of global observing system (GOS) network of WMO, India Meteorological Department (IMD) has 56 operational Radiosonderadiowind stations in their upper airnetwork. These stations are engaged in taking the radiosounding observations twice a day at 0000 UTC and 1200 UTC hours. Upper Air Observations are used to measure the vertical profile of the Atmosphere vizTemperature , Pressure , Humidity, Wind Speed and Direction using balloon borne soundings systems.

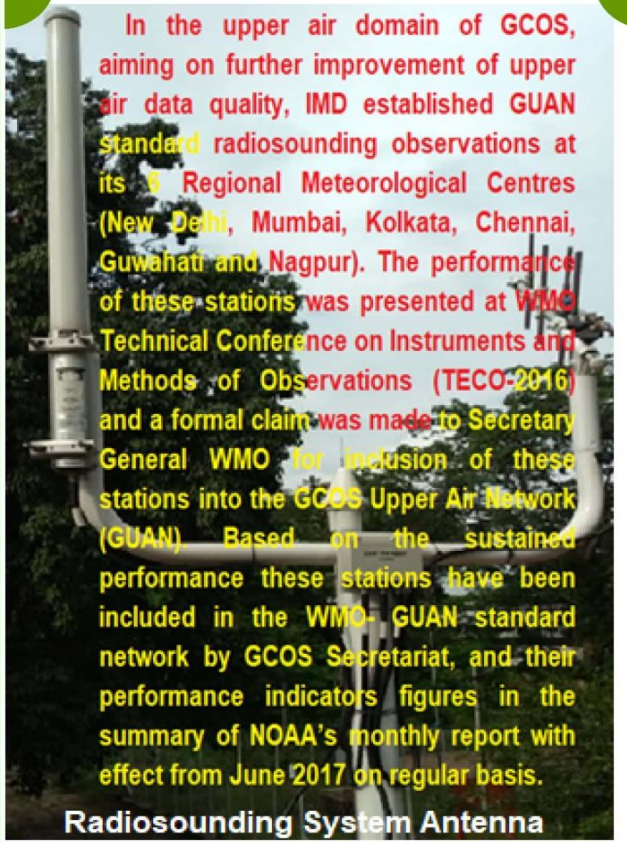


GUAN standard stations Operational stations

These data sets are basis for the preparation of the upper air climatology, short period averages and climatological research to draw normals of the seasons. The data collected is used on real time basis for operational forecasting, and research and development of forecasting. These data sets are required for defining the initial conditions for NWP modeling, hence the backbone of the weather forecasting system. The data also shared with Indian Navy, Indian Air Force & DRDO etc.

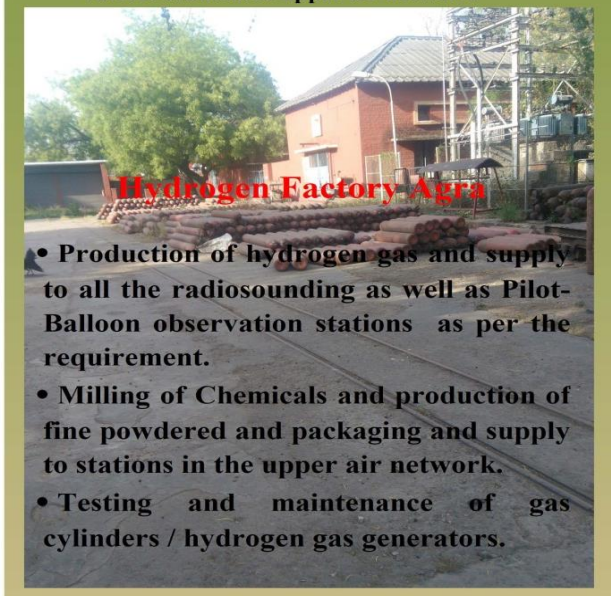
B. Pilot Balloon (PB) network:-

62 stations in the upper air network of IMD having pilot balloon observations. Pilot Balloon Observations are used to measure the upper air wind speed and direction. The balloon is tracked using an optical theodolite. These observations are made every synoptic hour.



Supply Section

- Logistic support to all the radiosounding as well as Pilot-Balloon observation stations .
- Procurement of Chemicals for HF Agra.
- Arrangement of transport of chemicals and Hydrogen gas cylinders from HF Agra to various stations in upper air network.



C. Projects:-

- Continuation of operational upper air radisounding network to its optimum level.
- Sustenance of WMO GUAN standard upper air network, and further expansion from 6 to 12.
- Production of GPS based pilot-sondes in IMD workshop,
- Up-gradation of pilot balloon (PB) stations by using state of the art fully automatic pilot sonde system.
- Further densification of operational upper air network.