

AIR SPACE MANAGEMENT

India has approximately 54,000 nautical miles of Very High Frequency Omni-directional Range (VOR) and Non-directional Beacon (NDB) airways, as well as standard Air Traffic Control (ATC) services. There is very close co-ordination between civil and military ATC services. The 5 Flight Information Regions (FIR) at Bombay, Calcutta, Delhi, Madras and the North East, along with 9 Area Control Centres (ACC), cover the whole country and the adjoining air space for which India has ATC and Search and Rescue (SAR) responsibility. Currently, civil radar coverage is limited to four Airport Surveillance Radars (ASR) in terminal areas and 5 Air Route Surveillance Radars (ARSR) associated with the 4 ASRs and an additional one at Nagpur in Central India. Air to ground communications are based on Very High Frequency (VHF) and Extended Range VHF (ER VHF) radio in terminal areas and HF for en route services. Thirteen message switches connect with all ATC facilities and adjacent international stations to process required ATC and meteorological data.

Works Completed

a) Navigation Aids:

- 1) Doppler VOR has been installed at Bombay, Madras, Hyderabad, Calcutta, Ahmedabad, Guwahati, Lucknow and Khajuraho;
- 2) Conventional VOR has been installed at Gulbarga, Rajkot, Udaipur, Sikandarabad, Dibrugarh, Jammu, Indore and Bagdogra; and
- 3) Instrument Landing System (ILS) has been installed and commissioned at eighteen airports including Bhopal, Lucknow, Guwahati, Calcutta (Reciprocal), Patna, Ahmedabad, Jammu, Nagpur, Imphal, Dibrugarh, Aizawal, Jaipur, Lucknow, Varanasi and Agartala.

(b) Communication Aids:

- 1) Fully computerised Automatic Message Switching System (AMSS) has been provided at Delhi, Bombay, Hyderabad, Trivandrum, Lucknow, Bangalore, Nagpur, Varanasi, Patna, Calcutta, Madras, Guwahati, Ahmedabad and Allahabad;
- 2) Single Side Band (SSB) operation of air to ground communication; and
- 3) Commissioning of land line teleprinter circuits and direct speech circuits between airport pairs.

c) Radar Aids:

- 1) For effective and reliable Air Traffic Control, Bombay, Delhi, Calcutta and Madras have been equipped with airport surveillance and air route surveillance radars, while Nagpur has been equipped with an air route surveillance radar.

Works in Hand

- a) On March 19, 1993, Raytheon signed a Rs. 3.5 billion contract to modernize the air traffic control systems at the Delhi and Bombay international airports. This is a turn-key project to be completed in 30 months. The Project involves automation of the Air Traffic Control (ATC) systems with the installation, integration, testing and commissioning of: Airport Surveillance Radar (ASR) and Air Route Surveillance Radar (ARSR), both with co-located Monopulse Secondary Surveillance Radars (MSSR); Very High Frequency Omni-directional Ranges (VORs) with co-located Distance Measuring Equipment (DME); Instrument Landing Systems (ILS) for three runways at each of these airports; flight data and radar data processing systems (FDPS & RDPS); voice communication control systems; and automatic self-briefing systems. The controller work stations will be user friendly, fail-safe systems with multi-colour raster scan displays with built in provisions for continuation of control functions even in the unlikely event of catastrophic failures of the RDPS or FDPS. The MSSRs will have the capability to handle Mode-S data transfer thereby complying with the Future Air Navigation Systems (FANS) recommendations. Surface Detection