CNS/ATM SYSTEMS

IN

INDIA

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Over Indian Airspace

Airports Authority of India (AAI) provides

➢Air navigation services (ANS) infrastructure

➢Air traffic Services (ATS)

➢ATS at Green field airports

➢Limited navigation services at defence airfields

Air Traffic Management

Indian airspace comprises of 2.2 million sq. km of continental air space and 3.8 million sq. km of oceanic airspace

4 FIR's and 11 Enroute Control Centre each equipped with Enroute Radars

Air Traffic Management

89 international and 110 domestic ATS routes with 31 routes as RNP-10

Entire Indian air space is RVSM airspace and all international routes are direct routes with short distances

ATM

Initiatives proposed for Integrated ATM System:

11 ACCs will be integrated into 4 or 2 main enroute control centers

24 radars (PSR and MSSR) will be networked

Additional radars will be installed to cover the gaps

ATM

Initiatives proposed for Integrated ATM System:

VHF & HF Tx /Rx will be networked to facilitate single center operation

ATC centers will be established with integrated ATS automation system

Sectorisation will be done based on the traffic flow and route structure

ATM

Initiatives proposed for Integrated ATM System:

Sectorisation will include ACC, OCC and APP control requirements

Adequate number of controller workstation to meet the current and future traffic demand will be provided in each center

ATM

Initiatives proposed for Integrated ATM System:

All control towers will be connected with main ATC center through data link and voice capability

Flight data will be exchanged automatically between Control tower and ACC Centre with least manual inputs

Aerodrome Simulator under implementation

Communication

Initiatives taken for more efficient Communication System:

12 more locations for VHF - RCAG to augment existing en-route VHF coverage

Dedicated Satellite Communication Network (DSCN) based on VSAT technology, connecting 80 airports for voice and data communication is under implementation

Aeronautical Message Handling System (AMHS) at Mumbai to handle ground sub-network of Aeronautical Telecommunication Network (ATN) under implementation as per ICAO Regional Plan

Communication

Initiatives taken for more efficient Communication System:

Additional VCCS (3), DATIS (12) & DVTR (31) being installed

AIDC for Delhi and Mumbai under implementation

Networking of all DATIS (28) to enable download of terminal information of any airport through data communication

Data link for clearance delivery is under implementation at Mumbai, Delhi and also planned for Kolkata and Chennai

Navigation

Initiatives taken for seamless navigation in Indian Airspace:

DVOR / DME as new facility at 20 airports under implementation

Additional ILS (14) (with low power DME) under implementation

Cat-II ILS –Planned up-gradation for Amritsar, Jaipur , Jammu & Lucknow

Cat-III ILS – Planned at Delhi for the new runway under construction

Navigation

Initiatives taken for seamless navigation in Indian Airspace:

Extensive use of R-NAV/RNP procedures

Under GNSS Programme, Indian SBAS named 'GAGAN'
(GPS Aided GEO Augmented Navigation) is under implementation

Technology Demonstration System (TDS) has been completed and
Final Operational Phase (FOP) will be completed by 2009

Ground Based Augmentation System (GBAS) under implementation
at Delhi and Mumbai airport

Surveillance

Initiatives taken for providing seamless surveillance:

New ASR/MSSR (5) under implementation at
Cochin, Amritsar, Delhi (2nd system) and green-field airports at
Bangalore & Hyderabad

New MSSRs (7) Jodhpur, Bhopal, Porbandar, Bellary, Vizag,
Jharsuguda & Katihar/ Kishanganj to fill up radar gaps at
25,000 feet under implementation

ASMGCS under implementation for Chennai, Kolkata,
Mumbai, Bangalore & Hyderabad

Flight Inspection System

AAI is responsible for calibrating the CNS facilities in India

Three aircrafts are available and fitted with Automatic Flight Inspection System (AFIS)

AFIS in all aircrafts are being upgraded for future requirements

Futuristic Air Navigation Services Master Plan

A High Level Committee is examining the following aspects for Futuristic Air Navigation Services Master Plan:

Assessment of Air Navigation Services (ANS) in the country based on the requirements specified by ICAO in the Global and Regional Air Navigational Plans

Assessment of the weather work stations based on the standards and recommended practices prescribed by ICAO

Futuristic Air Navigation Services
Master Plan

Recommend a futuristic Master Plan of Air Navigation Services based on the latest technologies in the field and the forecast of the future requirements

Recommend ways and means of harmonization of ANS in the country with the ANS systems of other countries/regions

GAGAN CERTIFICATION PLANS

The fundamental objective is to demonstrate to the certification authority that the ICAO requirement for 10-7 integrity has been satisfied

The key requirement is to identify, document, and analyze all likely failure modes for the end-to-end system which could place the aircraft at risk due to a failure of the system to miss the detection of hazardous, misleading information within the required time for a given flight operation

GAGAN CERTIFICATION PLANS

DGCA (India) officials are involved in the training process for certification of the system.. The certification documents are under preparation.

Flight Inspection of GAGAN

Three AAI aircrafts fitted with Automatic Flight Inspection System(AFIS) are capable to flight inspect SBAS system

PDGPS is used to establish flight truth system

AFIS calculates the real time position error (vertical and horizontal)

Flight Inspection of GAGAN SIS is in progress

RNAV RNP Procedures

ATS procedures are needed for use in air space utilizing RNAV and RNP applications

GAGAN system provides independent navigation for en-route through precision approach over the Indian Region

GAGAN SIS is used to establish RNAV/RNP procedures

RNAV RNP Procedures

AAI and MITRE,USA are jointly developing RNAV/RNP procedures for Indian Airspace

1. Validation of current runway capacity at the airports in Delhi and Mumbai, including projection of future demand and identification of required airspace capacity under various future scenarios

2. Identification and recommendations of airspace design alternatives that provide increased capacity to meet the demand for the scenarios identified during the capacity analysis. (Results from the analysis of these design alternatives will be used to support AAI decision-making on airspace modifications, which are need prior to the start of the next task)

3. Design of RNAV arrival and departure procedures that minimize noise impacts and improves efficiency based on the selected airspace design alternative

4. Provide technology transfer of methodologies and training on the Software tools used to support the analysis and design requirements during the project

Benefits of GAGAN

GAGAN system provides independent navigation for enroute through precision approach over the Indian Region

GAGAN improves the efficiency of aviation operations due to:

Greater runway capability

Reduced separation standards which allow increased capacity in a given airspace without increased risk

More direct en-route flight paths.

New precision approach services

Reduced and simplified equipment on board aircraft

Significant government cost savings due to the elimination of maintenance costs associated with older, more expensive ground-based navigation aids (to include NDBs, VORs, DMEs, and most Category 1 ILS's)

Conclusion

With the implementation of various new CNS/ATM systems, India will be able to provide safe and efficient air traffic services while keeping pace with the growing air traffic requirements as per ICAO plan

Thank You