U.S.- INDIA AIR TRAFFIC MANAGEMENT TRAINING PROGRAM

AAI Presentation on the Team Recommendation

CSI Airport, Mumbai

RADAR SEPARATIONS

- The terminal radar separation are
  - 5 NM up to 60 NM from radar head
  - Update rate 4-5 sec.
  - In General minimum radar separation used on final approach is **7 NM**
  - Runway Characteristics
    - Locations and types of **exits**
    - **Inter-dependency** of runways
    - **Infrastructure constraints** on ground
  - Characteristics of demand
    - **Fleet Mix** for Arrivals and departure
    - **Arrival Departure Mix**
  - ATC Rules and procedures
    - Length of final approach
    - Required Arrival/Departure separations, by aircraft type
  - Aircrafts performance
    - Different Standard Operating procedures for Airlines
    - Variation in Arrival/Departure **Runway Occupancy Time**

FACTORS RESPONSIBLE FOR HIGH ROT

- Variation in Pilot response
- Variation in operating procedures of Airlines
- Arrival and departure interactions (required separations for various types of operations)
- Speeds on final approach
- Locations and types of exits

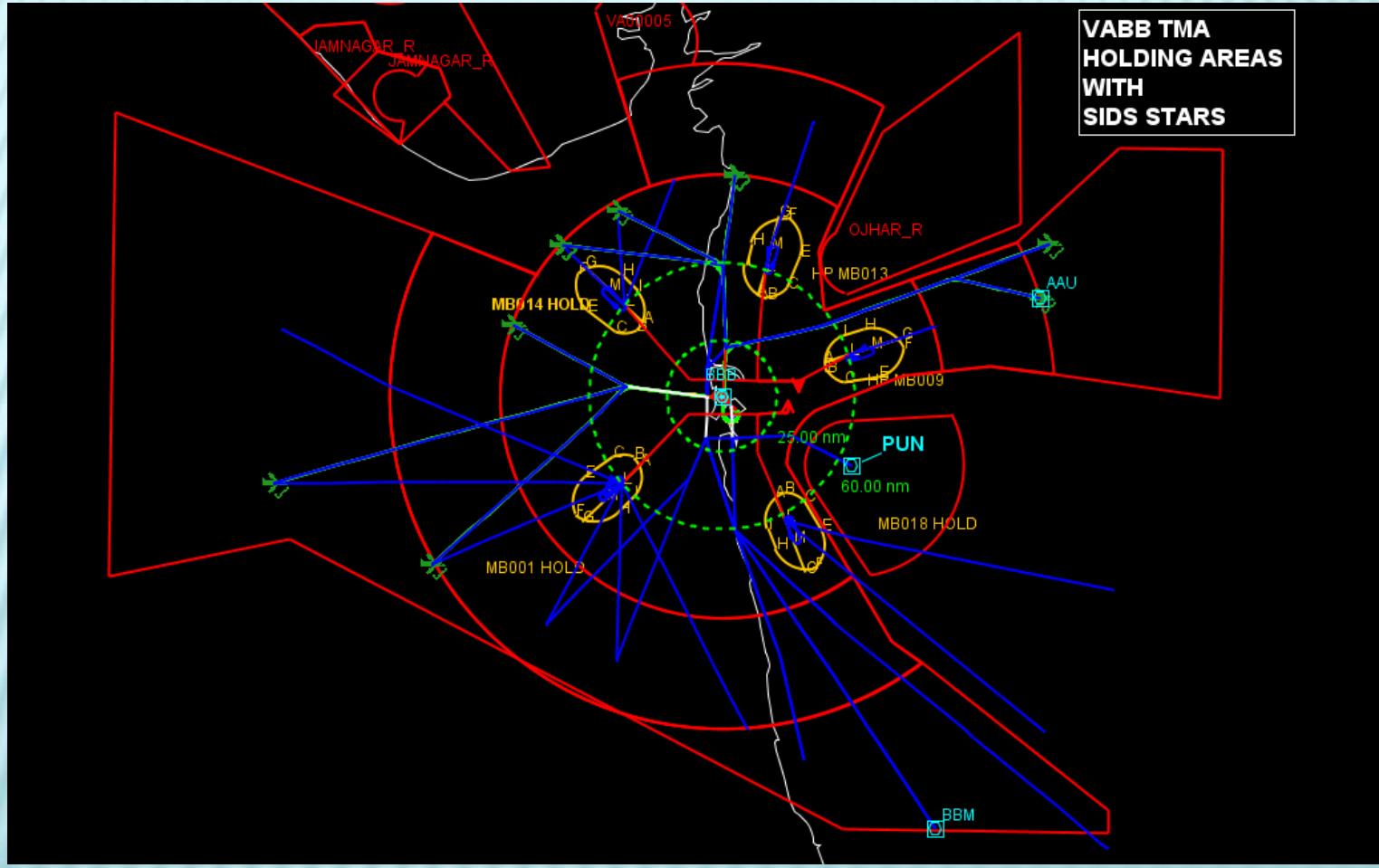
AIRSPACE DESIGN

- Airport and Airspace Capacity Analysis carried out by MITRE Corp
- Immediate, mid term and long term solutions suggested
- PBN based RNAV-1 SID & STAR implemented
  - Five holds to take care of delay requirements
  - Segregated and structured arrival and departure flows
  - Enhance airspace capacity
  - Structured flow of traffic in the TMA
  - Reduce the need for tactical vectoring
  - Reduce communication congestion
  - Enhance safety thru better situational awareness to pilots

MODES OF OPERATIONS

- Following sectorisation plan is followed based on traffic demand-
  - Five Sectors
  - -2 AREA North & South, 1 Stack Controller, 1 APP ARR, 1 APP DEP.
  - Four Sectors
  - -2 AREA North & South, 1 APP ARR, 1 APP DEP
  - Three Sectors
  - -2 ACC, 1 APP
- Automation System Limitation-Estimated Arrival time manually given.
  - Estimated Arrival Time is determined using **Situation Data Display**
  - Unit responsible for Sequencing & Estimated Arrival time during period of high arrivals is the **Stack Control**
- AMAN likely to be operationalised by April 2009 along with AUTOTRAC III ATM system. Training in progress.

AIRSPACE DESIGN



PBN PROCEDURES

- Video Clippings

CROSS RUNWAY OPERATIONS

- Cross Runway Operation due infrastructure constraints
- Arrival Departure RW27 and dedicated departure RW14
- Restrictions due to
  - Infrastructure constraints
  - Local Met conditions
- Cross runway departure from RW32 will be considered due to operational advantages
  - proper entry/exit and parallel taxiways are available (construction in progress)
  - Runway interdependencies are taken care of in Airport up-gradation plan

FUTURE PLANS

- Projects being implemented
  - ATFM being considered
    - Up-gradation of Automation systems at Major Airports
    - Gaps in radar coverage to be filled
    - Integration of automation systems
    - Airspace design to meet the requirements
  - AIDC likely to be operational with AUTOTRAC III
  - RCAG for wide communication coverage
  - ASMGCS to be installed by 2010

AIR TRAFFIC CONTROLLERS

- Local Met conditions do not always permit the use of VFR separation in Aerodrome
  - Tower Controller use Situation Data Display for judging the spacing requirements
  - Additional SMC position in Aerodrome control being worked out with AUTOTRAC III
- PBN based RNAV 1 procedures implemented
  - One Stack Controller and two Approach Controllers during arrivals peak
  - Altitude coding for separation between standard arrivals and departure route
- Speed Control published vide AIP

Aircraft Cat.	A	B	C	D/E
Within 15NM excluding final App. Track	110 Kt	140Kt	170Kt	185Kt
10NM to 4NM on final app. track	90Kt	120Kt	150Kt	160Kt

EQUIPMENT AND PHYSICAL SPACE

- Improvement in radar coverage including gap filling
- User preferred routes and flexi tracks
- Simulator being used extensively for training
- Windows in Aerodrome control are being cleaned regularly

HELICOPTER OPERATIONS

- Draft procedures for helicopter operations segregating them from fixed wing made
- Separate Arrival and Departure route for helicopters
- Draft procedures discussed with operators
- Safety Assessment conducted
- Pending Approval from Regulatory Authority

THANK YOU.

For coming together for making
Indian Aviation Industry
Professional
and
helping us in finding
better ways of doing things.

Thanks for all the nice little things you have extended for this program.