ICAO ASIA / PACIFIC

CAPACITY ASSESSMENT WORKSHOP

YOGYAKARTA - INDONESIA

Highlights of the Workshop

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Role of CDM

CDM planning horizon is flexible	CDM process can extend cross border	Post Ops Analysis helps in refining the CDM process
CDM process with active stakeholders' participation results into short-, medium- and long-term plans	CDM process takes into account impact of planned events on capacity (FIFA World cup)	Better capacity planning leads to better network management

Role of A-CDM

- A-CDM improves airport efficiency and performance of overall ATM network
- A-CDM helps in optimizing airport departures and reduces fuel burn
- A-CDM elements need to be designed carefully to yield optimal solutions

Note: Asia/Pacific Seamless ANS Plan V4.0 – ACDM-B0/1 implementation is Priority 1

Models to Determine Airport Capacity

- **Contributing factors to airport capacity – Doc 9971**
- **Capacity values are specific to airport runway configurations and weather conditions**
- **Mathematical models provide a good assessment of capacity related to infrastructure**
- **ATCO workload assessment also should be done to get a complete picture**
- **References**
  - Doc 9971 –Appendix B
  - FAA order 7210.3EE

Airport Capacity Assessment

- Data for assessment (quantitative and qualitative)
- Time horizon (historical, future)
- Scope (airside, landside, terminal ....)
- Process
- Presenting the results – runway throughput, arrival spacing, departure spacing, etc
- KPI – Taxi-In time, Taxi-Out time
- Human Factors
- Capacity enhancement measures

Singapore Experience

- Monte Carlo simulation method for airport capacity assessment
- 15- and 60-minute interval sampling
- Further validation through FTS and HITL
- Planned firebreaks in scheduling
- Playbook scenarios to assess impact on capacity during disruptions
- POA
- Implementing WTG

CCPM

- Tool by Eurocontrol for Capacity and Performance Monitoring
- Airport Surveillance Data and NM data combined
- User defined metrics in addition to default KPIs

How to Reduce ROT ?

- Use of Rapid Exit Taxiways (RETs)
- Final approach spacing – distance vs time
- Runway Vacated Vs Clear of runway in use – PANS ATM
- RRSM – PANS ATM
- MRS – PANS ATM

Capacity Balancing

- **Determine the limiting factor**
  - Runway constrained
  - Surface movement constrained
- **Large scale weather management**

Runway Throughput Enhancements

- TBS
- RECAT
- ROCAT (Runway Occupancy Time spacing on final approach) – ICAO Guidance under development
- Tools – ORD (Optimized Runway Delivery), OSD (Optimized Spacing on Departures), FASI (FTDI)
- RSSM and ROT (to reduce FAS to 2.5 NM) – PANS ATM

Airspace Capacity

- Airspace Capacity depends on CNS and Automation
- Optimum separation standards (as recommended in ICAO /APAC Documents)
- Determining sector capacity – FAA Models (Time and Sector / Workload assessment model)
- The benchmark is used for ATFM application, resource augmentation
- Brazil Model, Saudi Arabia Model
- Difference in workload threshold in FAA (90%) vs Brazil and Saudi Arabia Model (60%) vs EUROCONTROL (70%)
- Human Factors an important consideration

Ways to Increase Airspace Capacity

- Vertical sectorization
- Capping and tunneling
- PBN and FRA – Optimizing a single aircraft trajectory vs the system as a whole
- Civil-Military Cooperation critical to optimize airspace utilization

Data for Airspace Sector Capacity Assessment

- Historical flight data
- Surveillance
- ATFM systems
- ATM automation systems
- Post Ops Analysis

Airspace Sector Capacity using CAPAN

- Simulation methodology for ATC sector capacity assessment
- Data – flight plan data, aircraft performance data, airspace structure, simulation parameters, ATC team composition, controller task list
- Validation – important part of the exercise

Airspace Capacity Planning and Enhancement

- Macroscopic and microscopic analysis
- CDM essential part of the process
- Overall system improvement vis-à-vis individual resource optimization
- Extensive use of data analysis (historical and projected)

Summary

- 87 participants from 12 Asia/Pacific States/Administrations and four international organizations
- Assessment of strategic and operational capacity a fundamental enabler for delivering an effective ATFM service
- Benefits of integrating Airport Collaborative Decision Making (A-CDM) into ATFM implementation
- Importance of optimizing the airspace to enhance efficiency and increase capacity through the implementation of more efficient longitudinal separation, enhanced civil-military cooperation and FUA, FRA, PBN, sectorization
- Human factors should be carefully considered
- Start with simple empirical models, refine gradually with more data

Next Steps

- ICAO Asia/Pacific Regional Office to develop a draft regional guidance document to support States/Administrations in conducting airport and airspace capacity assessments
- Electronic consultation with ATFM POC
- Initial draft to be presented in the ATM/SG/13 meeting, in August 2025
- Final draft to be reviewed by ATFM/SG/16, then to ATM/SG/14 for approval and adoption

Thank you

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