



WORKING PAPER

**SEVENTH WORLDWIDE AIR TRANSPORT CONFERENCE
(ATCONF/7)**

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Agenda Item 2: Fostering aviation growth and air connectivity through investments in infrastructure, human capital and partnerships
2.2: Investment for the development and modernization of civil aviation infrastructure

**STRENGTHENING AIRPORT CAPACITY PLANNING AND
INFRASTRUCTURE INVESTMENT FOR FUTURE AIR TRANSPORT
GROWTH**

(Presented by Indonesia)

EXECUTIVE SUMMARY

This paper highlights the importance of strengthening the linkage between airport capacity assessment, future demand forecasting, and infrastructure investment planning to support sustainable air transport growth and connectivity. While existing International Civil Aviation Organization (ICAO) guidance provides a basis for airport planning and capacity assessment, States may benefit from a more integrated and adaptive approach that translates identified capacity gaps into timely and phased investment decisions.

The paper proposes strengthening capacity planning through demand scenarios, capacity gap analysis, capacity development options, investment triggers, phased implementation, and periodic reassessment, while also considering airport capacity within the wider air transport network. Such an approach can assist States in aligning infrastructure development with actual and projected demand, making more efficient use of available investment resources, and responding to changing traffic and operating conditions. The approach is particularly relevant to developing and archipelagic States, where infrastructure investment needs must be balanced with available resources, connectivity requirements, and the socio-economic role of airport networks.

Indonesia therefore proposes that ICAO strengthen relevant guidance and facilitate the exchange of best practices to assist States in developing scenario-based, phased, and adaptive approaches to airport capacity planning and infrastructure investment.

Action: The conference is invited to:

- a) recognize the importance of strategic airport capacity planning in supporting sustainable air transport growth and connectivity;
- b) encourage States to strengthen the linkage between capacity assessment, future demand forecasting, capacity gap identification and infrastructure investment planning;
- c) encourage States to apply scenario-based, phased and adaptive approaches to airport capacity development; and
- d) request the Council to consider, within available resources and the existing work programme, strengthening relevant ICAO guidance and facilitating the sharing of best practices on airport capacity planning and infrastructure investment.

<i>Strategic Goals:</i>	This working paper relates to Strategic Goals: <i>The Economic Development of Air Transport Assures the Delivery of Economic Prosperity and Societal Well-Being for All; and Every Flight Is Safe and Secure.</i>
<i>Financial implications:</i>	None
<i>References:</i>	Doc 9184, <i>Airport Planning Manual, Part 1 – Master Planning</i> , Third Edition, 2023. Doc 9971, <i>Manual on Collaborative Air Traffic Flow Management (ATFM)</i> , Third Edition, 2018. Asia/Pacific Regional Guidance for Assessment of Airport Capacity and Airspace Capacity, Version 1.0, April 2026.

1. INTRODUCTION

1.1 Air transport growth requires airport infrastructure to provide sufficient capacity to accommodate current and future demand. However, airport infrastructure projects generally require significant financial resources and long planning and implementation periods. Timely and appropriate capacity planning is therefore important to support connectivity while ensuring efficient use of investment resources.

1.2 Existing International Civil Aviation Organization (ICAO) guidance provides a basis for airport master planning and capacity assessment. However, there is an opportunity to further strengthen the linkage between capacity assessment and infrastructure investment planning, particularly in determining when additional capacity is required, what capacity enhancement measures are appropriate and how development should be phased.

2. DISCUSSION

2.1 Capacity assessment as the basis for strategic capacity planning

2.1.1 Airport capacity is influenced by a combination of infrastructure, operational procedures, technology, traffic characteristics, airspace, and other system constraints. Capacity assessment therefore provides an important basis for identifying the factors that limit an airport's ability to accommodate additional demand.

2.1.2 Existing ICAO capacity guidance emphasizes the importance of understanding current and expected demand, establishing capacity baselines, identifying future capacity shortfalls and considering measures to address demand-capacity imbalances. *ICAO Manual on Collaborative Air Traffic Flow Management* (Doc 9971) describes capacity planning as an iterative process involving capacity assessment, demand forecasting, planning and subsequent review.

2.1.3 At the airport infrastructure level, however, the results of capacity assessment need to be further translated into a development strategy. A capacity constraint does not automatically determine that a major infrastructure project should immediately be implemented. For example, a capacity constraint may potentially be addressed through:

- optimization of existing infrastructure;
- improvement of operational procedures;

- technological improvements;
- changes in traffic management;
- targeted infrastructure enhancement;
- additional infrastructure; or
- network-level solutions involving other airports.

2.1.4 Therefore, a strategic capacity planning process can provide the necessary link between the assessment of capacity and the selection and timing of capacity development measures.

2.2 Linking future demand with capacity requirements

2.2.1 Airport capacity planning needs to consider both existing capacity and future demand. Long-term demand forecasts, however, are subject to uncertainty due to economic conditions, airline network strategies, tourism, technological developments, regulatory changes and other factors.

2.2.2 For this reason, relying on a single demand forecast may create challenges when actual traffic develops differently from the expected scenario. A scenario-based approach can provide States with a more flexible basis for planning. States may consider a range of plausible demand scenarios, such as lower-growth, baseline and higher-growth scenarios. For each scenario, the planning process could identify:

- projected demand;
- available capacity;
- expected timing of capacity constraints;
- magnitude of the capacity gap;
- potential capacity enhancement measures;
- indicative investment requirements; and
- consequences of delaying or accelerating capacity development.

2.2.3 The use of scenarios would not require States to commit to a particular infrastructure investment solely on the basis of a forecast. Rather, it would allow States to identify measures appropriate to different demand conditions and determine which actions need to be initiated in advance because of their long implementation lead times.

2.3 Capacity development triggers and phased investment

2.3.1 One of the challenges in airport infrastructure planning is determining the appropriate timing for investment. Major infrastructure projects may require many years from initial planning to operational implementation, while actual traffic demand may change more rapidly.

2.3.2 A capacity planning framework could therefore include clearly defined capacity and investment triggers. Such triggers could be based on measurable indicators, including:

- projected demand approaching available capacity;
- sustained utilization of airport capacity;
- increasing congestion or delays;
- declining operational performance;
- constraints affecting connectivity;
- limitations in runway, terminal, apron or landside capacity; and
- the lead time required to implement the proposed infrastructure.

2.3.3 Investment triggers could support timely preparation of projects without requiring all planned infrastructure to be implemented at the same time. Where feasible, capacity development could be implemented progressively, for example through the optimization of existing capacity, followed by targeted improvements, incremental infrastructure expansion, and where necessary, major capacity expansion. This approach would allow infrastructure development to respond to actual demand and system performance while retaining sufficient time for major projects that require long preparation periods.

2.3.4 Such an approach is consistent with the iterative nature of capacity planning described in ICAO guidance, in which capacity plans and requirements are periodically reviewed and updated.

2.4 **Considering airport capacity within the wider air transport network**

2.4.1 Airport capacity should not be considered independently from the wider air transport system. Runway, terminal, apron, landside, and airspace capacity are interconnected, and constraints in one component may affect the performance of other components. The Asia/Pacific Regional Guidance for Assessment of Airport Capacity and Airspace Capacity recognizes the need to consider these interdependencies when assessing capacity and developing capacity enhancement measures.

2.4.2 Similarly, a capacity constraint at one airport may not always require expansion of that airport. Depending on national and regional circumstances, States may consider:

- optimizing existing airport capacity;
- operational or technological improvements;
- improved airspace and air traffic flow management (ATFM) arrangements;
- complementary airports;
- redistribution of traffic; or
- development of alternative connectivity arrangements.

2.4.3 A network perspective can therefore support more efficient investment decisions, particularly where several airports serve the same region or where geographical, environmental or other constraints limit expansion at an existing airport.

2.5 **Considerations for developing and archipelagic States**

2.5.1 The approach to airport capacity planning needs to reflect the circumstances of individual States. Developing States may face challenges related to limited financial resources, varying traffic levels and competing infrastructure priorities.

2.5.2 For archipelagic States, airports can also play an important role in connecting geographically dispersed communities and regions. Consequently, airport planning considerations may extend beyond traffic volume to include connectivity, accessibility and the wider socio-economic role of the airport network.

2.5.3 A flexible and phased capacity planning approach can assist such States in balancing infrastructure requirements with available resources and changing demand conditions.

3. **CONCLUSION**

3.1 Existing ICAO guidance provides an important foundation for airport master planning and capacity assessment. Further strengthening the linkage between capacity assessment, future demand

forecasting, and infrastructure investment planning could assist States in determining when, where, how much, and how to develop additional airport capacity.

3.2 A scenario-based and adaptive approach, incorporating capacity gap analysis, investment triggers, phased development and periodic reassessment, can support timely and proportionate infrastructure investment while responding to changes in traffic demand and operating conditions.

3.3 Indonesia therefore proposes that ICAO strengthen relevant guidance and facilitate the exchange of best practices to assist States in developing scenario-based, phased and adaptive airport capacity planning and infrastructure investment strategies, taking into account the wider air transport network and the circumstances of individual States.

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