

Capacity

Factors to consider

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ATFM and Capacity

*The objective of ATFM is to ensure an optimum flow of air traffic to or through areas during times when demand exceeds or is expected to exceed available capacity of the ATC system**

*Doc 9426, Part 2



ATFM and Capacity

*ATFM is used to achieve the most efficient utilization of available airspace and airport capacity**

*Doc 9426, Part 2

Capacity - Factors to Consider



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Why talk about capacity?

The most efficient utilization of available airspace and airport capacity can be achieved only if all relevant elements of the air traffic system had been considered during the planning stage, applying a systems approach.

The flow of traffic is hampered by bottlenecks in the system; a constraint anywhere in the system will contribute to capacity limitations.

Neither the airport system nor the air navigation system should be considered separately in planning system improvements.

Capacity - Factors to Consider



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What is capacity and how is it measured?

- Airport
- Terminal
- En route
- System
- Effective Capacity
- Average Capacity
- Future Capacity
- Predictable Capacity

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Capacity by Phase of Flight

- Airport – arrival rate
- Terminal – maximum # of flights in TMA
- En route – maximum # of flights in sector/FIR
- System – maximum # of flights which can be handled from gate to gate

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Capacity Measures

- **Effective Airport Capacity**

- modeled estimate that calculates # of arrivals that can be handled at a fixed level of delay for an individual or set of airports
- brings together demand and performance in the calculation

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Capacity Measures

- **Average Daily Airport Capacity**

- an actual measure that calculates the amount of capacity made available to the system through use of recorded arrival and departure rates
- can be tracked daily, monthly, annually
- is an accepted measure to track performance in FAA

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Capacity Measures

- **Future Airport Capacity**

- same model as Effective Capacity, with future ATS capability added
- brings together demand and performance in the calculation

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Capacity Measures

- **Predictable Capacity**

- captures variance between “good” and “bad” days
- measures performance of historical conditions at the airports, en route (Wx) and demand
- capacity may be calculated by selecting an acceptable level of delay then adjusting demand levels (up or down) until the criteria is satisfied
- demand and performance can be related to each other

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Baseline Capacity

- **Determine maximum number of flights currently being handled**
 - Airport
 - Terminal Area
 - En Route
 - System-wide

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Methods to Increase Capacity Airport

- Evaluate time for each segment of operation
 - Threshold to touchdown
 - Touchdown to turn off
 - Taxi, etc
- Can times be reduced by adding
 - High-speed turn offs
 - Additional turn offs
 - Additional taxiways

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Methods to Increase Capacity Terminal

- Evaluate routes flown by segment
 - Separation standards for aircraft type
 - Surveillance capability
- Can routes be made more efficient?
 - RNAV procedures
 - RNP SAAAR procedures
- Is additional infrastructure necessary?
 - ILS
 - Radar

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Methods to Increase Capacity En Route

- Evaluate number and location of routes
- Evaluate number of flights ATC can handle
 - Number of necessary communications/clearances
 - Number of interventions to establish/maintain separation
 - Number of additional ATC functions
- Can parallel routes be implemented?
- Can random/direct routes be used?
- Can routine communications be reduced?
- Can ATC functions be merged (automation tools)?

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Methods to Increase Capacity System

- Evaluate airport impacts on terminal area
- Evaluate terminal impacts on en route sectors
- Are there defined peak periods?
- Is weather a factor?
- Do airport authority, ATS provider and operators discuss JOINTLY potential solutions?
 - Airport improvements
 - ATC improvements
 - Scheduling changes
 - New routings

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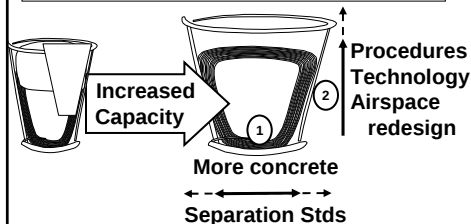
Proposed FAA CAPACITY DEFINITION clarification

Definition 1: Increase Capacity

"Size of the glass"

- **CAPACITY DEFINITION:** "Maximum number of flights that can safely operate in the NAS".
- **True capacity is not a function of weather or other system constraints.**

"Building the right amount of capacity where and when needed"



"Make the glass bigger"

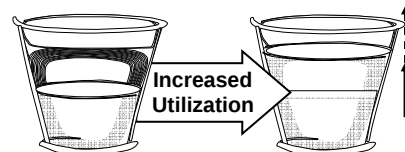
Definition 2: Operational Excellence

"Safe, managed throughput"

- **Operational Excellence:** Safe and efficient movement of flights throughout the NAS under various system constraints:

- Given the weather conditions.
- Considering customer actions.
- Using approved procedures due to various system constraints.

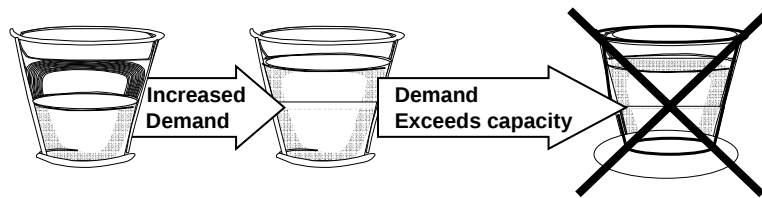
"Achieving maximum safe throughput for the conditions"



"Put more water in the glass"

ATFM and Capacity

- ATFM prevents the “overflow”



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Gracias

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