

ICAO GUIDELINES FOR ATFM

Seminar on Air Traffic Flow Management (ATFM)
for NAM/CAR Regions

Tegucigalpa, Honduras, 27 to 31 March 2006

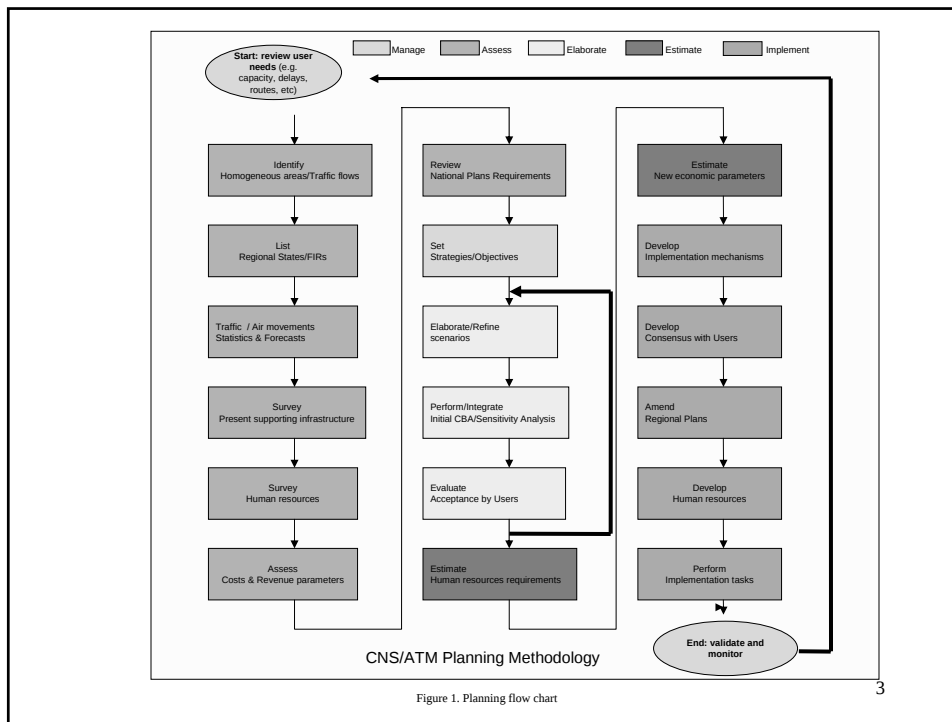
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North American, Caribbean and Central American Office

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ICAO STRATEGIC OBJECTIVES

Adopted on 17 December 2004

- **VISION AND MISSION STATEMENT**
- ICAO works to achieve its vision of safe, secure and sustainable development of civil aviation through cooperation amongst its member States.
- To implement this vision, the Organization has established the following Strategic Objectives for the period 2005-2010:
 - A: Safety - Enhance global civil aviation safety
 - B: Security - Enhance global civil aviation security
 - C: Environmental Protection - Minimize the adverse effect of global civil aviation on the environment
 - D: Efficiency - Enhance the efficiency of aviation operations
 - E: Continuity - Maintain the continuity of aviation operations
 - F: Rule of Law - Strengthen law governing international civil aviation



Annex 11 3.7.5 Air traffic flow management

ATFM shall be implemented for airspace where air traffic demand at times exceeds, or is expected to exceed, the declared capacity of the air traffic control services concerned.

Note.— The capacity of the air traffic control services concerned will normally be declared by the appropriate ATS authority.

ATFM should be implemented on the basis of regional air navigation agreements or through multilateral agreements. Such agreements should make provision for common procedures and common methods of capacity determination.

Annex 11

When it becomes apparent to an ATC unit that traffic additional to that already accepted cannot be accommodated within a given period of time at a particular location or in a particular area, or can only be accommodated at a given rate, that unit shall so advise the ATFM unit, when such is established, as well as ATS units concerned.

Flight crews of aircraft destined to the location or area in question and operators concerned shall also be advised of the delays expected or the restrictions that will be applied.

Note.— Operators concerned will normally be advised, in advance where possible, of restrictions imposed by the air traffic flow management unit when such is established.

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Doc 4444, PANS-ATM: ATFM

- **The capacity of an ATS system depends:**
 - ATS route structure,
 - the navigation accuracy of the aircraft using the airspace,
 - weather related,
 - and controller workload.
- **Efforts should be made to provide sufficient capacity to cater to both normal and peak traffic levels;**
- **To increase capacity, the responsible ATS authority shall ensure that safety levels are not jeopardized.**

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Doc 4444, ATFM

- The number of controlled aircraft shall not exceed that which can be safely handled by the ATC unit concerned.
- The appropriate ATS authority should assess and declare the ATC capacity for control areas, for control sectors within a control area and for aerodromes.
- ATC capacity should be expressed as the maximum number of aircraft which can be accepted over a given period of time within the airspace or at the aerodrome concerned.
 - *Hourly capacities can be converted into daily, monthly or annual values.*

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Doc 4444, Strategic planning

- Carried out in conjunction with ATC and the aircraft operators, examining the demand for the forthcoming season, assessing where and when demand is likely to exceed the available ATC capacity and taking steps to resolve the imbalance by:
 - a) providing adequate ATC capacity at the required place and time;
 - b) re-routing certain traffic flows (traffic orientation);
 - c) scheduling or rescheduling flights as appropriate; and
 - d) identifying the need for tactical ATFM measures.
- Where a traffic orientation scheme (TOS) is to be introduced, the routes should, as far as practicable, minimize the time and distance penalties for the flights concerned, and allow some degree of flexibility in the choice of routes, particularly for long-range flights.
- When a TOS has been agreed, details should be published by all States concerned in a common format.

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Doc 4444, Pre-tactical planning

- **Pre-tactical planning should entail fine tuning of the strategic plan in the light of updated demand data. During this phase:**

- a) certain traffic flows may be re-routed;
- b) off-load routes may be coordinated;
- c) tactical measures will be decided upon; and
- d) details for the ATFM plan for the following day should be published and made available to all concerned.

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Doc 4444, Tactical operations

- a) executing the agreed tactical measures in order to provide a reduced and even flow of traffic where demand would otherwise have exceeded capacity;
- b) monitoring the evolution of the air traffic situation to ensure that the ATFM measures applied are having the desired effect and to take or initiate remedial action when long delays are reported, including re-routing of traffic and flight level allocation, in order to utilize the available ATC capacity to the maximum extent.
- When the traffic demand exceeds, or is foreseen to exceed, the capacity of a particular sector or aerodrome, the responsible ATC unit shall advise the responsible ATFM unit, and other ATC units concerned.
- Flight crews of aircraft planned to fly in the affected area and operators should be advised, as soon as practicable, of the delays expected or the restrictions which will be applied.

Operators will normally be advised by the regional air traffic flow management service.

Liaison

- During all phases of ATFM the responsible units should liaise closely with ATC and the aircraft operators in order to ensure an effective and equitable service.

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Global Air Traffic Management Operational Concept – Doc. 9854

- **Provides regional guidelines to States and industry with clearer objectives for designing and implementing Global ATM system, supporting by CNS systems**
- **describes how an integrated global ATM system should operate**

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The Global ATM Operational Concept

- **The Global ATM operational concept is a vision**
- **describes what is envisaged on the basis of services**
- **These services form an integrated whole**
- **an rich environment of information, that solves most problems strategically, through a collaborative process**

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ATM community (Doc 9854)

- *Aerodrome community*
- *Airspace providers*
- *Airspace users*
- *ATM service providers*
 - a) State agencies;
 - b) State-owned self-financing corporations;
 - c) privatised ATM service providers;
 - d) regional ATM service providers; and
 - e) independent private sector ATM service providers of ground and space-based CNS/ATM services
- *ATM support industry*
- *International Civil Aviation Organization (ICAO)*
- *Regulatory authorities*
- *States*

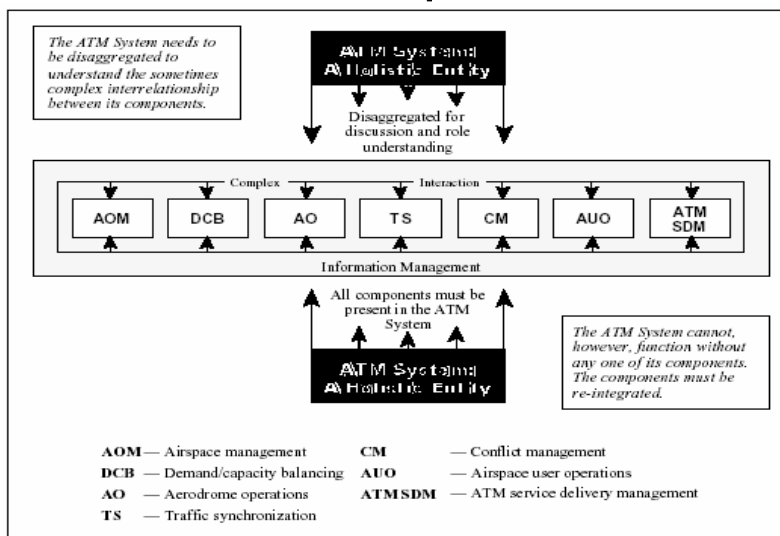
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Expectations

- Safety
- Capacity
- Equity and access
- Efficiency
- Flexibility
- Predictability

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ATM components



Airspace Organization and Management (AOM)

- All airspace will be the concern of ATM and will be a useable resource
- Any restriction on the use of any particular volume of airspace will be considered transitory
- Airspace management will be dynamic and flexible

Aerodrome Operations (AO)

- **Runway occupancy time will be reduced**
- **The ability to safely manoeuvre in all weather conditions**
- **Precise surface guidance to and from a runway**
- **The position and intent of all vehicles and aircraft operating on the manoeuvring and movement areas will be known**

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Demand and Capacity Balancing (DCB)

- **Through CDM at the STRATEGIC stage, assets will be optimized; assets for predictable scheduling**
- **Through CDM at the PRE-TACTICAL stage, adjustments will be made to assets, resource allocations, projected trajectories, airspace organization, and allocation of entry/exit times**
- **At the TACTICAL stage, dynamic adjustments to the organization of airspace to balance capacity; dynamic changes to the entry/exit times; adjustments to users schedules**

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Demand .. (DCB), principles

- user-requested trajectories and actual trajectories will be optimised as small as possible
- recognition of deficiencies and optimization of assets will ensure maximum capacity through the balancing of operations against available assets;
- balancing techniques will be generally based on system predictability; manage unplanned situations
- the balancing of demand and capacity will be performed from gate to gate;

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Demand ... (DCB), principles

- use of system-wide balancing techniques to resolve local demand and capacity balancing problems;
- strategic initiatives, tactical flexibility to provide optimal airspace availability; and
- taking into account information about current and predicted airspace conditions and projected demand as well as past performance.
- Tools to strategically identify areas and times of higher density will also be available.

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Traffic Synchronization (TS)

- **Dynamic 4-D trajectory control and negotiated conflict-free trajectories**
- **Choke points will be eliminated**
- **Optimisation of traffic sequencing will achieve maximization of runway throughput.**

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Airspace User Operations (UO)

- **ATM data will be fused for an airspace user's situational awareness and conflict management**
- **Airspace user operational information will be made available to the ATM system**
- **Individual aircraft performance, flight conditions, and available ATM resources will allow dynamically-optimised 4-D trajectory planning**
- **Collaborative decision making**
- **Aircraft should be designed with the ATM system as a key consideration**

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Conflict Management (CM)

- **Strategic conflict management will reduce the need for separation provision**
- **Pre-determined separator will be the airspace user**
- **The role of separator may be delegated**
- **The conflict horizon will be extended**

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ATFM developments

- **Operational agreements**
- **To establish ATS capacity procedures (Doc 9426)**
- **To establish airport capacity procedures (Doc 9426)**
- **ATFM operational handbook**
- **CDM process**

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ATFM developments

- **CDM Process to disseminate in a systemic way information for:**
 - Air operations forecast in airspace and airports, Flight Plan data, exchange of ATFM messages, weather, NOTAMs, airspace restrictions / constraints, Special use airspace;
 - Procedures and measures to obtain a balance between the management and demand of the ATS capacity in determined airspaces and airports;
 - ATFM and ATC procedures;
 - Use of electronic tools for coordination and dissemination of ATFM measures to the ATS and airspace users;
 - Review ATFM route network so as to encourage improvements for trajectories preferred by users, fixed ATS routes, RNAV and random routes
 - Contingency Plan
 - Safety management for ATFM aspects.

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Thank you
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