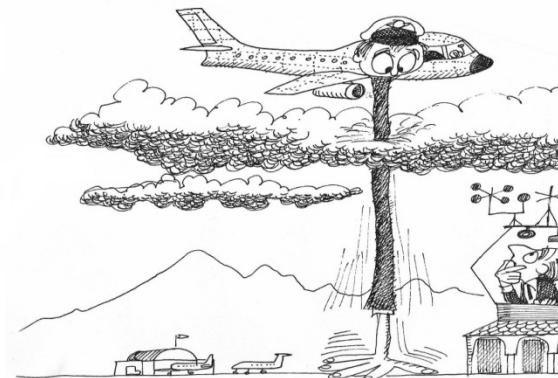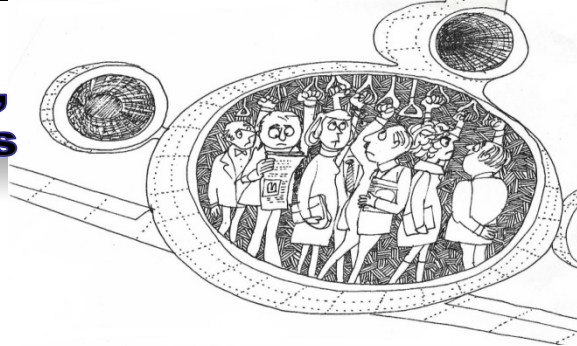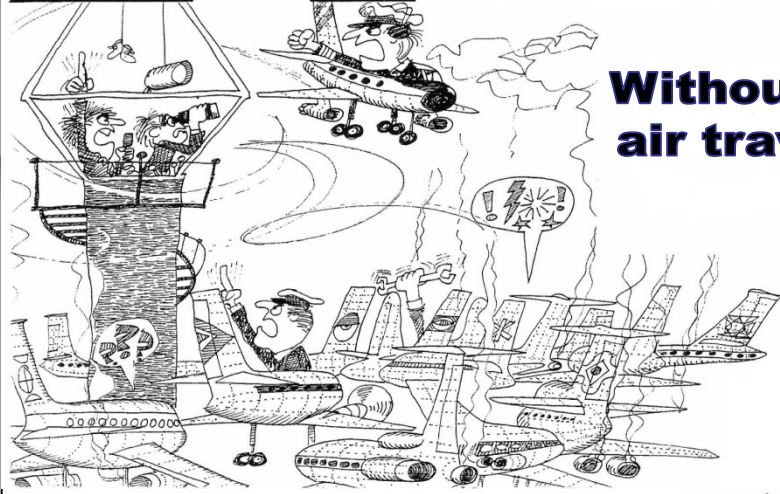# Collaborative Decision Making (CDM)

Víctor Hernández

Regional Officer, Air Traffic and Search and Rescue (ATM/SAR)

Mexico City, Mexico, July 2016

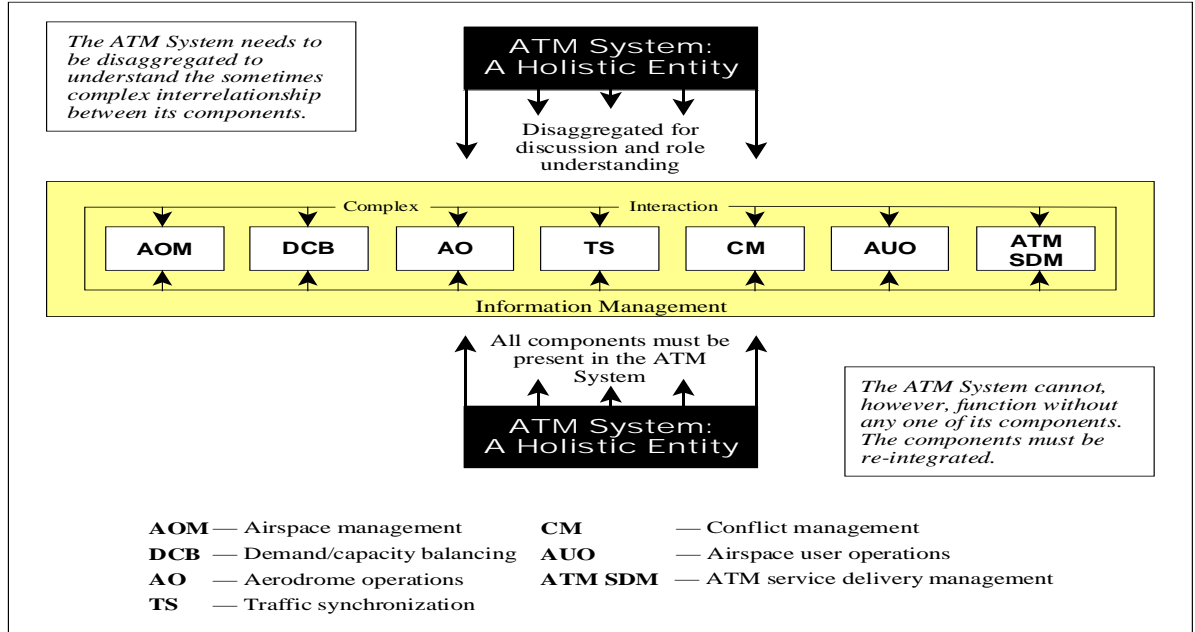Without international rules, air travel would be in chaos

Doc 9854
AN/458

**Global
Air Traffic Management
Operational Concept**

Approved by the Secretary General
and published under his authority

First Edition — 2005

International Civil Aviation Organization

The ATM System needs to be disaggregated to understand the sometimes complex interrelationship between its components.

**ATM System:
A Holistic Entity**

Disaggregated for discussion and role understanding

| AOM | DCB | AO | TS | CM | AUO | ATM SDM |

Complex — Interaction

Information Management

All components must be present in the ATM System

**ATM System:
A Holistic Entity**

The ATM System cannot, however, function without any one of its components. The components must be re-integrated.

AOM	— Airspace management	**CM**	— Conflict management
DCB	— Demand/capacity balancing	**AUO**	— Airspace user operations
AO	— Aerodrome operations	**ATM SDM**	— ATM service delivery management
TS	— Traffic synchronization		

ATM Community (Doc 9854)

- ✈ *Aerodrome Community*
- ✈ *Airspace providers*
- ✈ *Airspace users*
- ✈ *ATM service providers*
  - *a) State agencies;*
  - *b) State-owned self-financing corporations;*
  - *c) privatized 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*
- ✈ *ICAO*
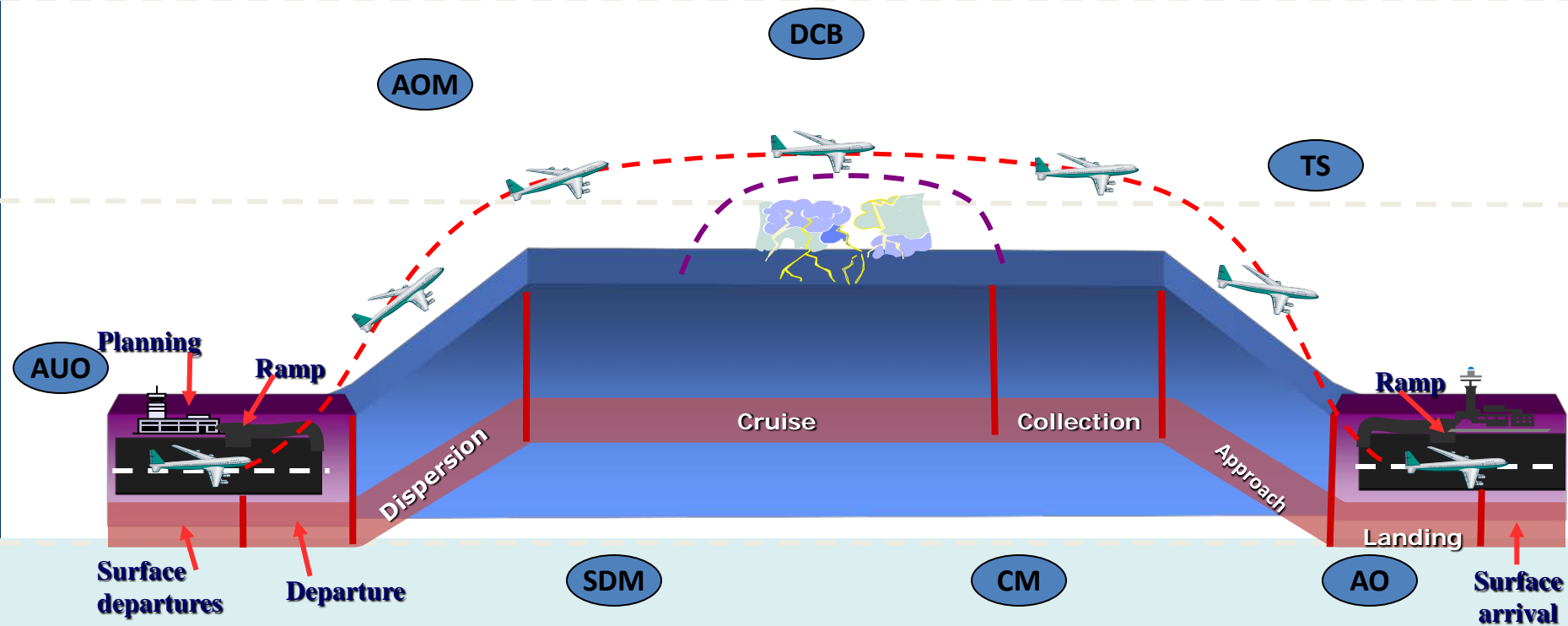- ✈ *Regulatory authorities*
- ✈ *States*

ATM Performance and expectations

- *Safety*
- *Security*
- *Cost-effectiveness*
- *Access and equity*
- *Capacity*
- *Environment*

- *Predictability*
- *Participation by the ATM community*
- *Flexibility*
- *Efficiency*
- *Global interoperability*

Gate to Gate Concept
Phases of Flight (Doc 9854)

DCB

AOM

TS

Planning

AUO

Ramp

Cruise

Collection

Ramp

Dispersion

Approach

Landing

Surface departures

Departure

SDM

CM

AO

Surface arrival

COMMUNICATION (COM) - NAVIGATION (NAV) - SURVEILLANCE (SUR)

Gate to gate phases of flight

- ✈ *Planning:* where the objective is integration into the ATM environment to achieve a close match between the user-preferred trajectory and the system-delivered trajectory;

- ✈ *ramp:* where the objective is to move the flights in and out of the parking locations;

- ✈ *surface departures:* where the objective is to move the aircraft from the ramp to the departure queue;

- ✈ *departure:* where the departure queue and the runway are managed to launch aircraft from the queue into the airspace;

- ✈ *dispersion:* where the objective is to get aircraft up and out of the terminal into the en-route structure;

- ✈ *cruise:* in which aircraft are at altitude and moving towards their destination, but are not yet subject to actions related to the arrival phase;

- ✈ *collection:* the state in which aircraft are sequenced and spaced to bring them into the terminal area for arrival;

- ✈ *approach:* the phase in which aircraft are assigned to runways and onto the surface;

- ✈ *surface arrival:* where aircraft are moved off runways and to the ramp and, once again;

- ✈ *ramp:* where aircraft are manoeuvred into the parking location.

Objetive

✈ ATM community collaboration to reach a service demand/capacity balance, while meeting agreed levels of **SAFETY AND EFFICIENCY**

✈ Acceptable solution that takes into account the needs and expectations of the ATM community, through a spirit of cooperation.

✈ Foresee conflicting situations

✈ Use CDM process to determine a solution

✈ The participation level will correspond to the level of involvement

Objective

- ✈ Allow all members of the ATM community, especially airspace users, to participate in the ATM decision making that affects them.
- ✈ Decision making from planning long term operations (strategy) to real time operations (tactic), until completion of operation in the arriving parking location during gate-to-gate

Process

- Collaboration agreement to determine rule and priorities
- Application of active or passive procedures
- Direct coordination between airspace users without intervention of service provider
- Effective information management and sharing to enable each member of the ATM community to be aware of the needs, constraints and priorities of other members
- The time available for achieving a collaborative decision decreases from the strategic to the tactical stages. In the most tactical of situations, there may be no time to consider options
- Any member of the ATM community can propose a solution

Process...

- ✈ Air Navigation Provider (ANSP) and users may propose a solution for the airspace user because the service provider will be aware of the requirements of other users and service providers

- ✈ ATM services functions on demand, according to traffic flow characteristics, dynamic re-sectorization in ATM service centres, changes in the Airspace Organization Management (AOM) or changes in conflict management

- ✈ ATM service delivery management will be responsible for ensuring that flights can get to the runway in time for their take-off slot and, at the same time, for integrating them with all the other departing and arriving flights in order to ensure safety and to optimize the use of the parking locations, ramps, taxiways and runways.

- ✈ ATM service delivery management will ensure that ANSPs are given access to real-time data on projected arrivals and departures, runway loading, airport congestion, parking locations and environmental considerations, in order to reduce inefficiencies in aircraft and vehicle movements.

Information Management

- ✈ The aim is to integrate the information network in order to enhance the system
- ✈ Evolve towards an information distribution model
- ✈ Many geographically dispersed sources collaboratively updating the same piece of information, with many geographically dispersed destinations
- ✈ Ensure information needs of stakeholders
- ✈ Maintain updated the picture of the past, present and future state
- ✈ Successfully managing the Quality, integrity and immediate accessibility of this complex, growing information web

Conclusion

- ✈ CDM is a normal operational process so that decisions may be of a better quality and engender greater confidence among the ATM community

- ✈ Have accurate and validated information available in the right form and place and at the right time to make better solutions

- ✈ An open systems environment and better information management allow information sharing on a much wider basis and support a permanent dialogue between community members throughout all phases of flight.

- ✈ Automated systems are an important support for CDM; the aim is achieving <u>ATM safety compliance and monitoring</u>