

Global experiences with ATFM

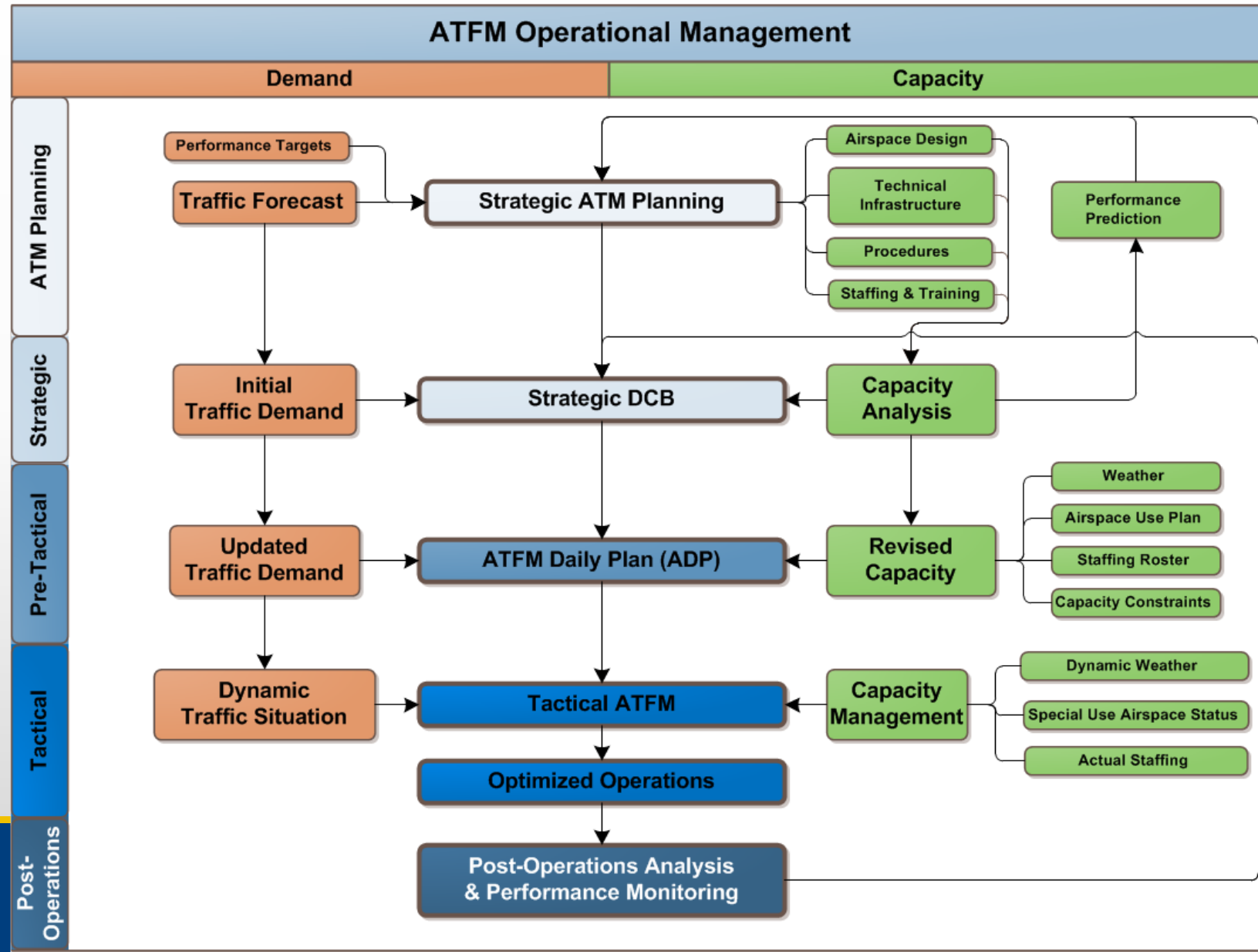


Organizational structures and cross border examples



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ATFM flow chart regardless of size of organization or sophistication of cross-border capabilities



ATFM Measures by planning stage and type

ATFM Organization type and cross-border ATFM capabilities influence effectiveness of each type of Measure

ATFM Measures			
Vertical	Strategic	Pre-Tactical	Tactical
			Rerouting (Level Capping Scenarios)
Lateral			Fix Balancing Rerouting (Rerouting Scenarios) Rerouting (Alternative Rerouting Scenarios)
	Playbook Routes	Playbook Routes	Playbook Routes
Longitudinal			Miles-In-Trial Minutes-In-Trial Minimum Departure Intervals
Time	Ground Delay Program	Ground Delay Program	Slot Swapping Ground Delay Program Ground Stop
	Airborne Holding		Airborne Holding

Other Tactical ATFM Tools and Measures

- ≧ Arrival Manager (AMAN)
- ≧ Departure Manager (DMAN)
- ≧ ≧ Extended use of AMAN for scheduling short-haul flight



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Following slides explore the details of:

Types of ATFM Organization

- Hierarchical
- Centralized
- Collaborative

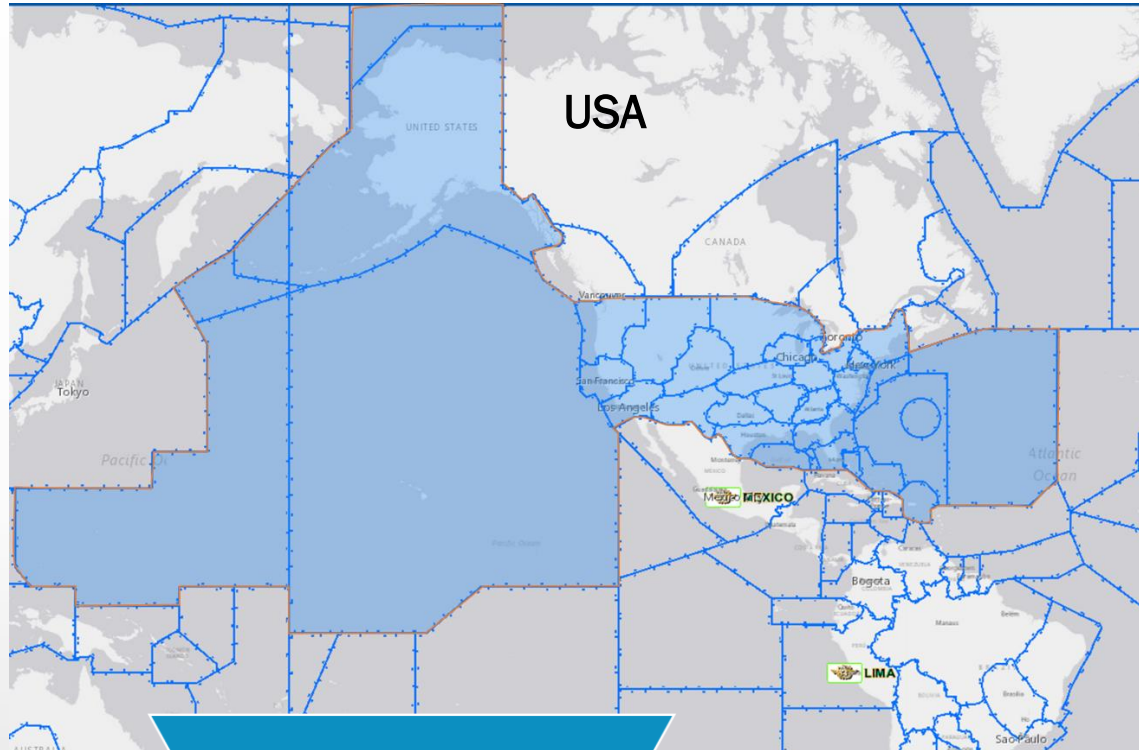
Cross-border ATFM Capabilities

- Shared Automation System
- ATFM as a service
- Standards based data exchange
- Shared TMMs via AFTN messaging
- Asymmetrical Data Exchange
- Regional ATFM with limited data exchange, but with effective planning

Hierarchical ATFM Organization

- Typically implemented when multiple FIRs are under the jurisdiction of a single ANSP (USA) or the jurisdiction of a single overlying ATFM entity (Europe)
- Multiple layers of management for large and complex airspace situations

Hierarchical ATFM examples



ATCSCC

National/International Perspective

22 ACCs,
27 FIRs

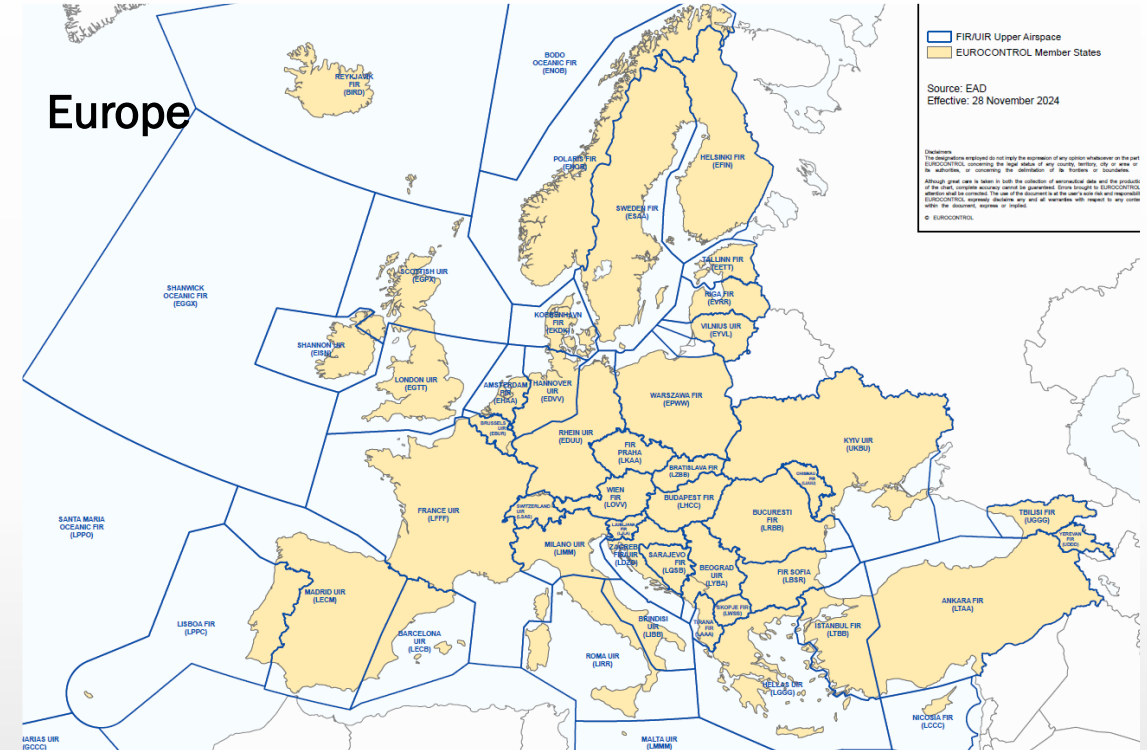
Regional Perspective

284 TMAs

Local Perspective

500+
ATCTs

Aerodrome Perspective



Network Manager (NM) oversees coordination with all member states and ANSPs



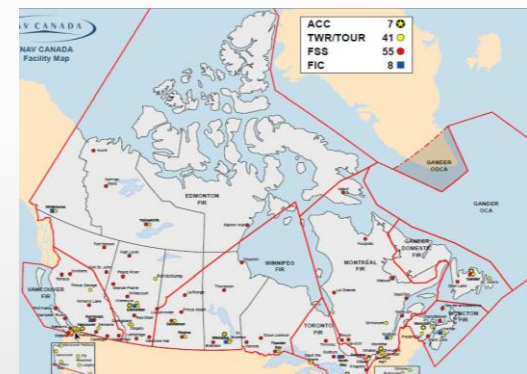
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Hierarchical ATFM examples - Notes

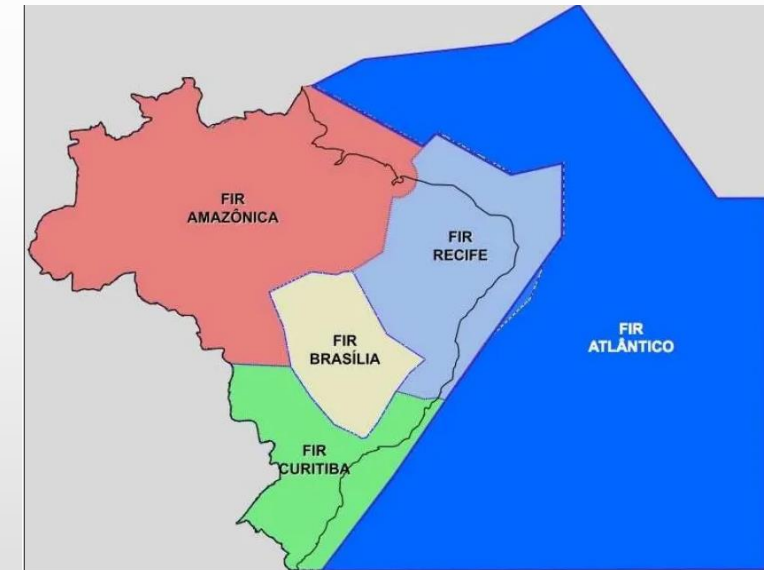
Function	Eurocontrol	ATCSCC
Distributes flight plans to underlying FIRs	Yes – through standards-based messaging	No – the ATC system performs that role
Decision Making Authority	Must reach consensus with all ANSPs/FIRs	Has the authority to implement measures when consensus is not reached
Planning timeframes	Due to the complexity of coordination, long timeframes are needed to coordinate/collaborate capacities, plans and mitigations	Being a single ANSP, much shorter planning timeframes are needed
Convective Weather Constraints	Significant impacts in Southeast Europe. Impact is increasing, typically have convective impact for roughly 30 days a year	Significant impacts everywhere except the Pacific Northwest. Typically have 300+ days a year with convection
Flexibility in the ATFM daily execution	Very limited	Highly flexible
ATFM plan is geared towards	Predictability	Efficiency
IATA Level 3 Slot Controlled Airports	110	3

Centralized ATFM Organization

Typically implemented by ANSPs with several ACCs or FIRs and a centralized ATFM unit implementing measures for the member FIRs. There tends to be enough internal traffic to effectively implement TMMs within the airspace overseen by the ATFM organization, though cross-border ATFM needs are greater than in large organizations.



ANSP	FIRs	ACCs
Nav Canada	7	7
SENEAM (Mexico)	2	4
Airservices Australia	2	2
DECEA (Brazil)	5	5
EANA (Argentina)	9	5



Collaborative ATFM Organization

Typically implemented by ANSPs with a single FIR, or ANSPs with multiple FIRs, but with a need for regional coordination for effective ATFM.

A Collaborative ATFM Organization focuses on collaboration with neighboring FIRs to coordinate ATFM on a regional basis because they do not regularly encounter enough controllable flights for effective TMMs on their own.



ANSP	FIRs	ACCs
Aero Thai (Thailand)	1	1
ATMB (China)	9	10
Cambodia ATS Company	1	1
CAAS (Singapore)	1	1
CAD Hong Kong	1	1
Office of Civil Aviation (Korea)	1	1
VATM (Vietnam)	2	2



Major examples of Cross-Border ATFM

Type	Example/Notes
Shared automation platform	North America – Nav Canada, SENEAM and FAA all share the same hardware and software. Other ANSPs provide flight plan and position updates
ATFM as a service, shared by multiple ANSPs	Better Skies for Asia Trial
Separate automation system, but shared data through standards-based data exchange	EUROCONTROL Network Manager and underlying ANSPs
Shared TMMs through AFTN Messaging	APAC Multi-Nodal ATFM
Asymmetrical Data Exchange	Regional ANSP shares demand data with less robust ANSPs. FAA – Caribbean demand emails – 3 times a day
Regional ATFM through communication channels with limited data (using commercial tools such as Flight Radar 24)	CADENA, CADENCE – focused on weather, contingency events, special event planning, space launches