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AIR TRAFFIC FLOW MANAGEMENT REFERENCE GUIDE



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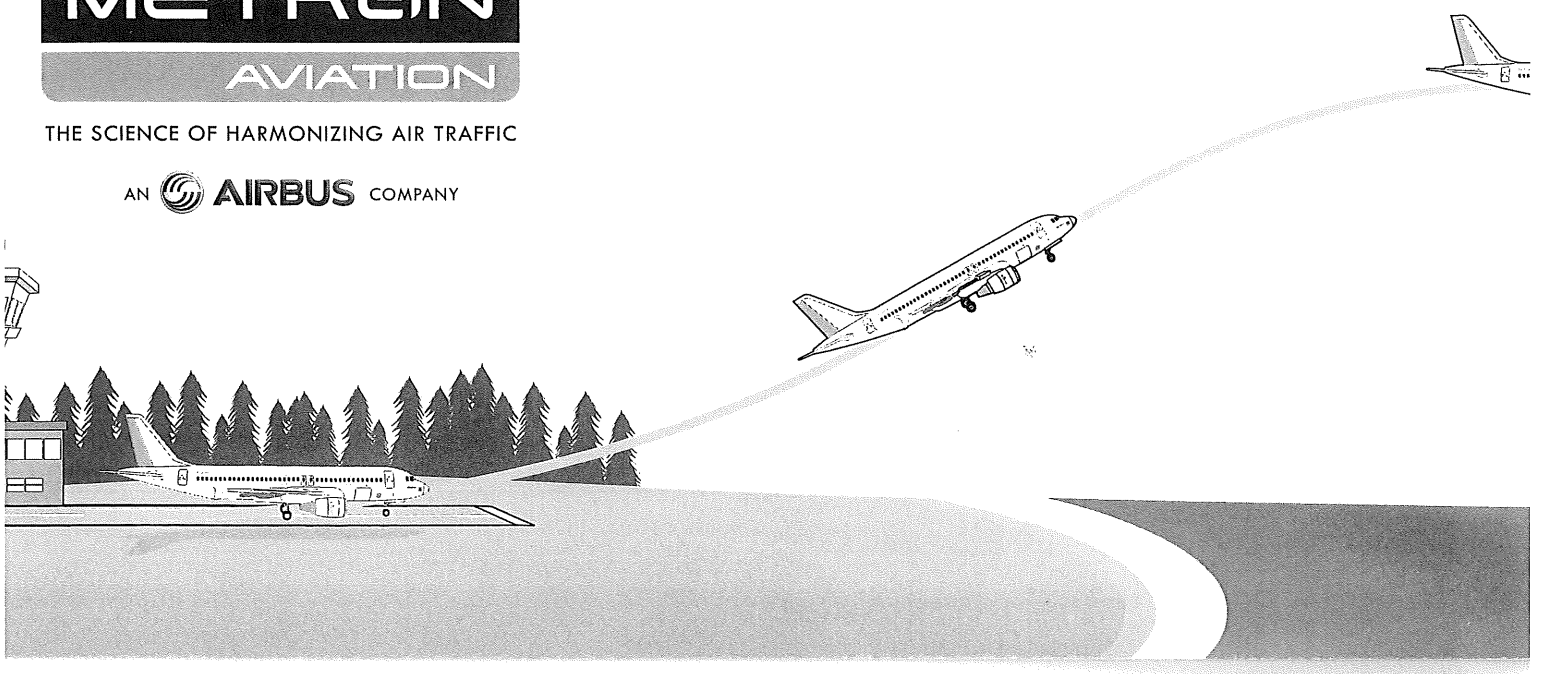
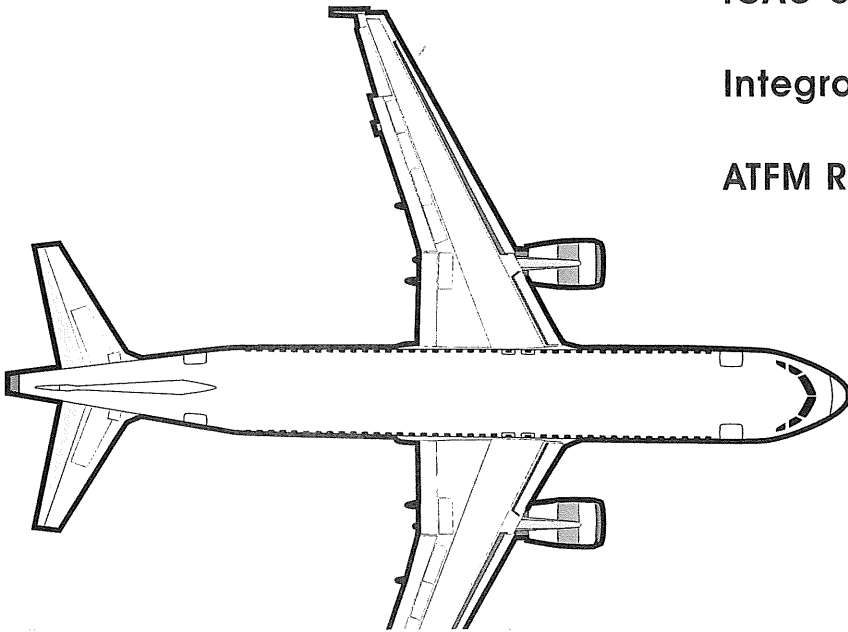


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INTRODUCTION TO ATFM

Air Traffic Flow Management (ATFM) is building momentum among the world's leading Air Navigation Service Providers (ANSP) with continued innovation for early adopters and increased deployment by leading ANSPs around the globe. While ATFM is proven to enhance safety and provide measurable efficiency gains, it is also being viewed as a transformational technology that introduces new levels of Collaborative Decision Making (CDM) and offers potential for harmonizing seamless airspace operations. ATFM provides a wide range of benefits to all aviation stakeholders. ATFM improves predictability from gate-to-gate, ensuring fair and equitable use of all airspace and enabling optimization of curb-to-curb operations. ATFM reduces aviation's carbon footprint and supports environmental sustainability goals. Additionally, ATFM decreases fuel burn, lowers airline costs and decreases delays for passengers.

Yet, there is a lack of shared industry consensus on the requirements for ATFM. Who can benefit from deploying ATFM solutions? How can ATFM help harmonize global air traffic operations? In what ways can CDM transform the way air traffic is managed in national and regional airspace? How does ATFM provide aircraft operators the ability to optimize their operations and fly their preferred 4D trajectories?

This reference guide was developed to introduce Air Traffic Management (ATM) professionals to this important capability that holds so much promise for harmonizing air traffic, enabling seamless airspace and accelerating NextGen, SESAR and global ATM benefits.

ATFM BENEFITS

ATFM systems increase capacity, enhance safety, reduce greenhouse gas emissions, decrease fuel burn and lower operational costs. Some industry observers confuse the safety-critical delay programs initiated by traffic management units with the immense efficiency benefits of ATFM systems. In fact, ATFM system benefits provide an astounding return on investment when compared to their deployment costs. ATFM solutions dramatically reduce delays that otherwise would mount and ripple throughout the system if not for the capacity optimization features of these systems.

The efficiency and optimization benefits of ATFM are measurable, verifiable and undeniable. The FAA's ATFM system has saved over 70 million minutes of delays, 191 million liters of fuel, 590 thousand metric tons of CO₂ emissions and approximately U.S. \$7 billion in operating costs, since system-wide deployment in 1999.



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DELAY COSTS PER MINUTE (€)

	Tactical without network effect		Tactical with network effect		Strategic	
	Ground	Airborne	Ground	Airborne	Ground	Airborne
Fuel costs	1	15	1	15	1	15
Maintenance costs	1	1	1	1	-	12
Crew costs	9	9	11	11	12	12
Ground and passenger handling	-	-	-	-	-	-
Airport charges	0	0	0	0	-	-
Aircraft ownership costs (DRL)	-	-	-	-	10	10
Passenger compensation	14	14	26	26	-	-
Direct cost to an airline	25	40	39	54	22	49
Passenger opportunity cost	22	22	39	39	-	-
Overall cost	47	62	78	93	22	49

Simple average: €72 euros per minute or U.S. \$97 dollars per minute

Source: Evaluating the True Cost to Airlines of One Minute of Airborne or Ground Delay, University of Westminster, May 2004, www.eurocontrol.int/prc/gallery/content/public/Docs/cost_of_delay.pdf

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ICAO ON ATFM

In recognition of the growing importance of ATFM to the global industry, ICAO has developed and will be publishing an ATFM Reference Manual. The existing ICAO references for ATFM are:

- Annex 11
- PANS-ATM (Doc 4444)
- ATS Planning Manual
- CAR/SAM ATFM Manual (approved by GREPECAS)



PROCEDURES FOR AIR NAVIGATION SERVICES

ATM (Doc 4444) Chapter 1: Definitions

Air Traffic Flow Management (ATFM): A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that Air Traffic Control (ATC) capacity is utilized to the maximum extent possible, and that the traffic

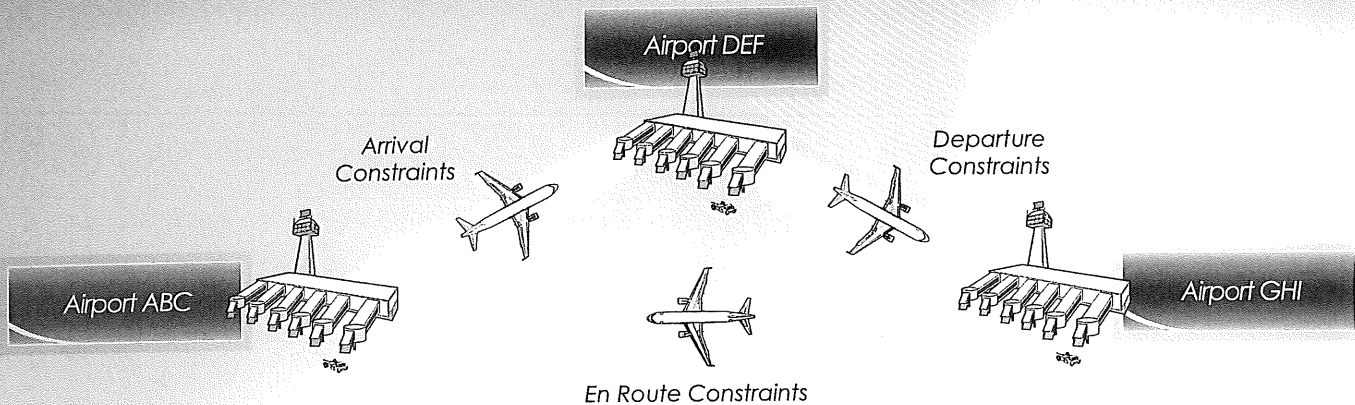
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volume is compatible with the capacities declared by the appropriate Air Traffic Service (ATS) authority.

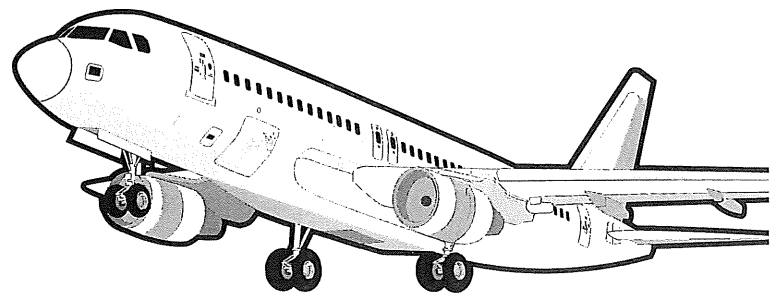
INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

Annex 11, 3.7.5.1 & PANS-ATM Doc 4444, 3.2.1.1
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.

Annex 11, 3.7.5.2 & PANS-ATM Doc 4444, 3.2.1.2
ATFM *should* be implemented on the basis of regional air navigation agreements or, if appropriate, through multilateral agreements. Such agreements should make provision for common procedures and common methods of capacity determination.



ATFM PROVIDES ALL USERS WITH A SYSTEM-WIDE VIEW OF OPERATIONS



INTEGRATED **ATFM** (I-ATFM)

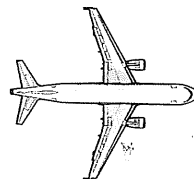
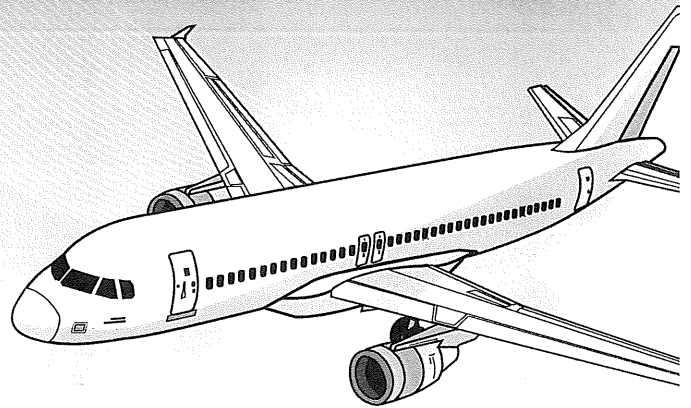
The next generation of ATFM is forward-thinking and enables the harmonization of a global system of systems. Integrated ATFM, or I-ATFM, represents a future state for the safe, efficient, predictable and collaborative flow of the aircraft through the air traffic system, from gate-to-gate:

- **across operational domains** – surface, departure, en route and on arrival;
- **across planning time frames** – scheduling, strategic planning, pre-tactical, tactical and post-operations;
- **between service provider and flight operator** – coordinating efforts and aligning objectives for mutual benefit;
- **across international boundaries** – data exchange and strategic control.

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I-ATFM is a system-wide, full spectrum approach to addressing the complex operational issues facing air transportation service providers and users. The I-ATFM system encompasses the organizations, individuals, processes, data and tools associated with the safe and efficient flow of air traffic from gate-to-gate. This includes ANSP authorities with regional/multi-national, national, en route, terminal/approach, and/or ATC tower responsibilities, as well as aircraft operators, including commercial, military and general aviation, and airport operators. I-ATFM fully covers all planning, operations and post-operations phases of air transportation and air traffic management.

ATFM SUPPORTS ALL PHASES OF OPERATIONAL PLANNING



More than 1 day
before the operation

The day before
the operation

The day of
the operation

After
the operation

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ATFM RESOURCES



**FEDERAL AVIATION
ADMINISTRATION (FAA)
AIR TRAFFIC CONTROL SYSTEM
COMMAND CENTER**

www.fly.faa.gov



**AIR TRAFFIC AND
NAVIGATION SERVICES (ATNS)**

www.atns.co.za



EUROCONTROL

www.cfm.eurocontrol.int



**INTERNATIONAL CIVIL AVIATION
ORGANIZATION (ICAO)**

www.icao.int

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canso
civil air navigation services organisation

**CANSO OPERATIONS
STANDING COMMITTEE**

www.canso.org/operations



AIRBUS PRO SKY

www.airbusprosky.com



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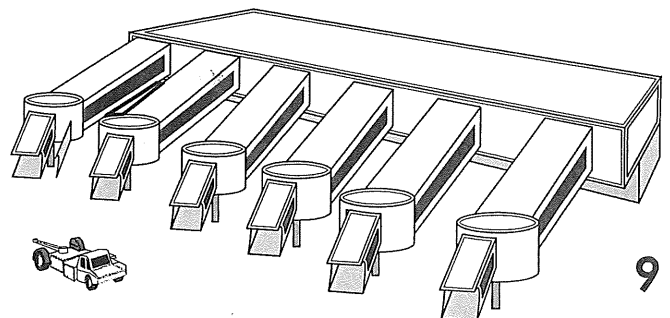
JOIN THE ATFM
CONFERENCE

ATFM INDUSTRY GROUP

The ATFM industry group convenes at the Global ATFM Conference to focus on the evolution of ATFM and the steps that need to be taken, globally, to make a significant change in the safety, capacity and efficiency of the airspace. The conference series also serves as a place for leading ATFM minds and organizations to continually exchange ideas on how to increase the awareness and understanding of ATFM.

AEROTHAI hosted the most recent Global ATFM Conference, Global 6, in Phuket, Thailand, from February 28th through March 2nd, 2011. Please visit http://www.aerothai.co.th/eng/even_en.php for details about the past conference.

The next Global ATFM Conference, Global 7, will be hosted by Indonesia in 2013. For more information, please contact info@metronaviation.com.



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