ATFM Overview – Thirteenth Workshop/Meeting of ICAO SAM Implementation Group

21st April 2014

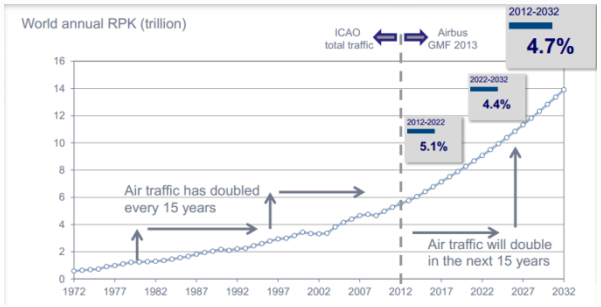
AIRBUS
PRO SKY

Challenges Facing The Aviation Industry

Demand Growth

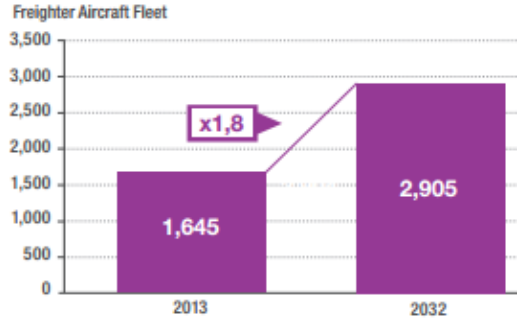
- Air traffic demand growth is the central challenge facing the industry

Passenger Air Traffic to Double by 2027



Source: Airbus GMF 2013

Freighter Fleet to Nearly Double by 2032

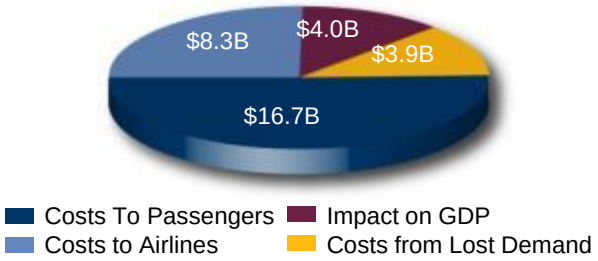


Source: Airbus GMF 2013

Economic Cost of Delay

- Economic cost of delay is enormous and will only get worse as traffic demand grows

Annual Cost of US Delays 2010: $ 32.9B



Source: FAA NEXTOR Delay Impact Study 2010

Cost per Every Minute of Delay: $102

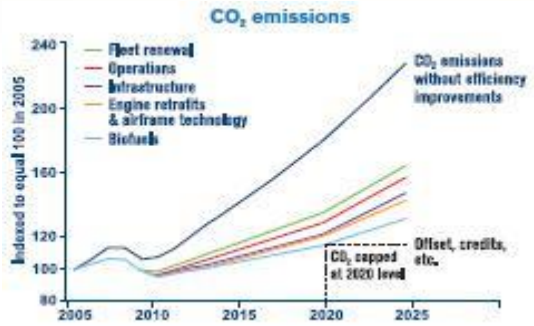
Delay costs per minute (€)	Tactical without network effect		Tactical with network effect		Strategic	
	Ground	Airborne	Ground	Airborne	Ground	Airborne
Fuel costs	1	15	1	15	1	15
Maintenance costs	1	1	1	1	-	12
Crew costs	9	9	11	11	12	12
Ground and passenger handling	-	-	-	-	-	-
Airport charges	0	-9	0	0	-	-
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

Source: EUROCONTROL Westminster Cost of Delay Study

Environmental Cost of Delay

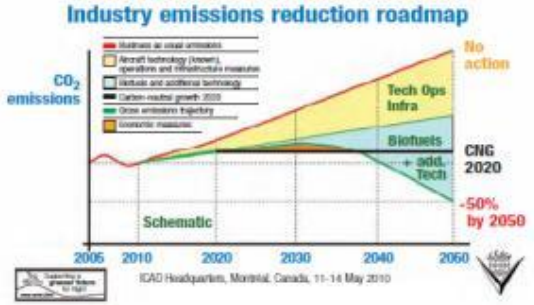
- Carbon footprint of aviation growing with demand while environmental pressures increase

Carbon Reductions Require Efficiencies



Source: IATA Pathway to Carbon Neutral Aviation 2010

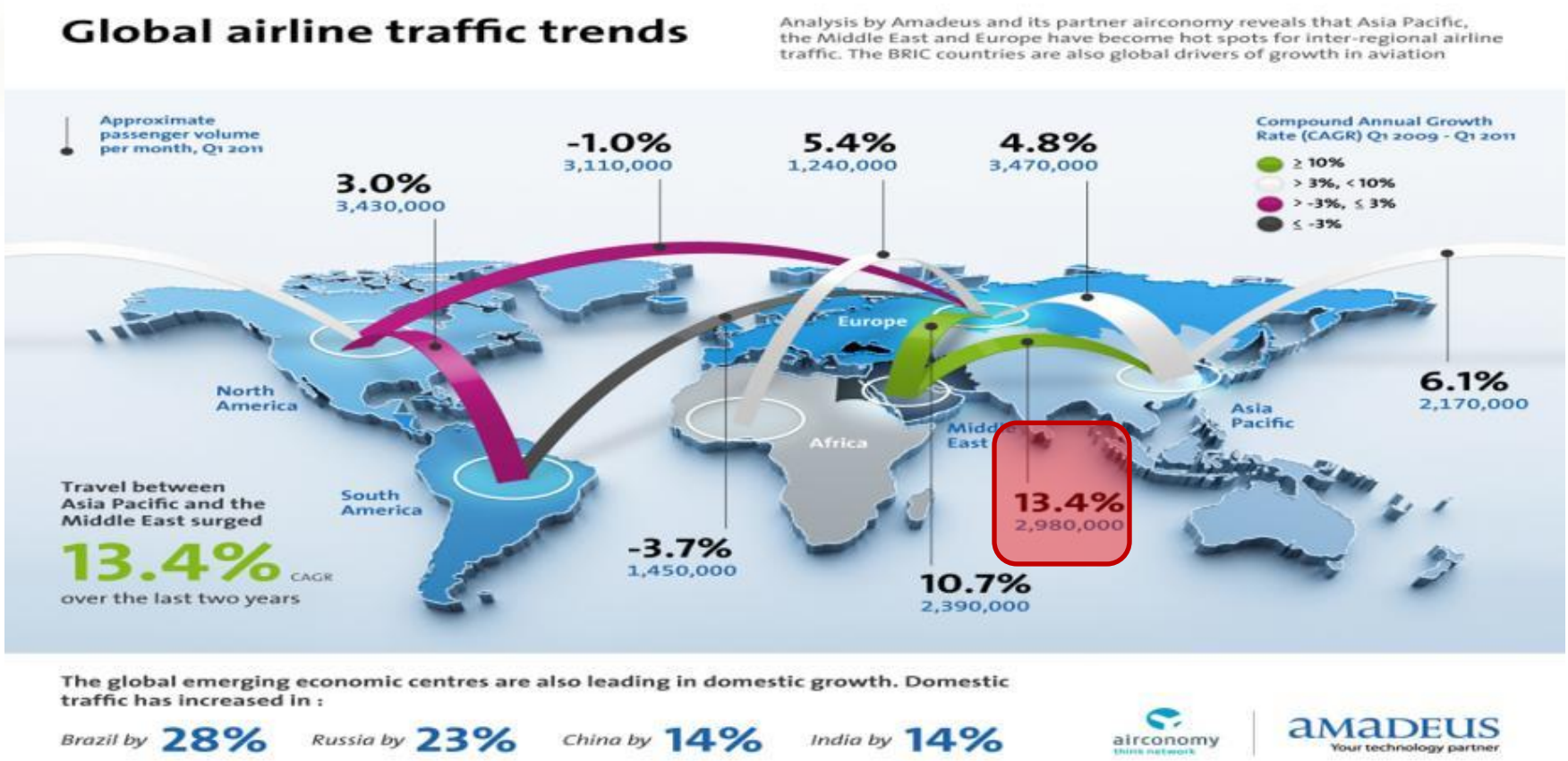
Emissions Reduced 50% by 2050



Source: ICAO Environmental Report 2010

Global Aviation Market Dynamics

Significant growth in the South American Market



Source: IATA

Today's Challenges

- ATM Performance has become a bottleneck for Aviation Stakeholders
- Airspace and airport capacity is not keeping up with the demand

1,461 new aircraft per year from 2012-2032*

+

4.7% annual air traffic growth by 2032*

+

Limited airspace & resources

=

Airborne holding and surface queuing → **Delays**
Cost per Every Minute of Delay: US**$102****
→ **Extra Fuel Consumption**

*: ICAO, Airbus GMF 2013
**: EUROCONTROL Westminster Cost of Delay Study

What are Airlines Saying?

- Major Airlines reported increased sector times in most major routes
- Key airport capacity challenged and largely underutilizing potential capacity
- Major air routes busier
- Airlines costs increasing

What is Happening at International Hubs?

Systemic delays at international hubs can result in

- Higher aircraft operator costs through increased fuel burn
  - Airborne holding
  - Taxi in/out delays
- Environmental impacts of increased fuel burn
- Passenger impacts
  - Missed connections

Aircraft operators and passengers avoid delay prone international hub airports

What is the Solution?

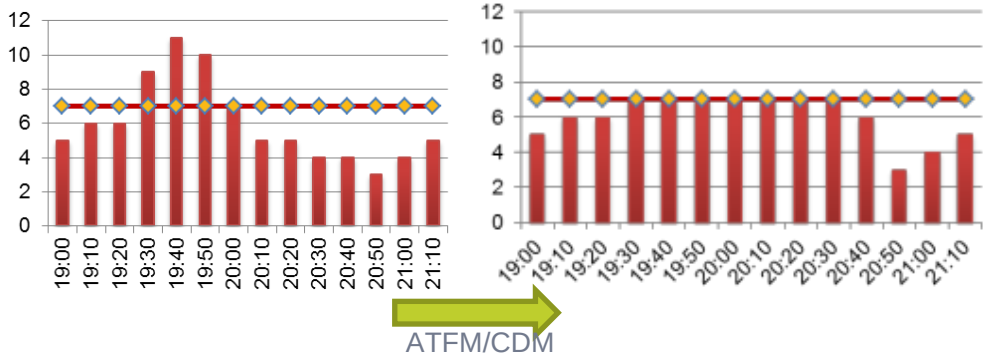
Continually Grow Airspace and Airport Capacity

Not always easy:

- Major infrastructure development takes time
- Can be expensive
- Airspace restrictions don't always allow capacity growth (e.g., military, geographical and political boundaries)

Implement Air Traffic Flow Management/Collaborative Decision Making (ATFM/CDM)

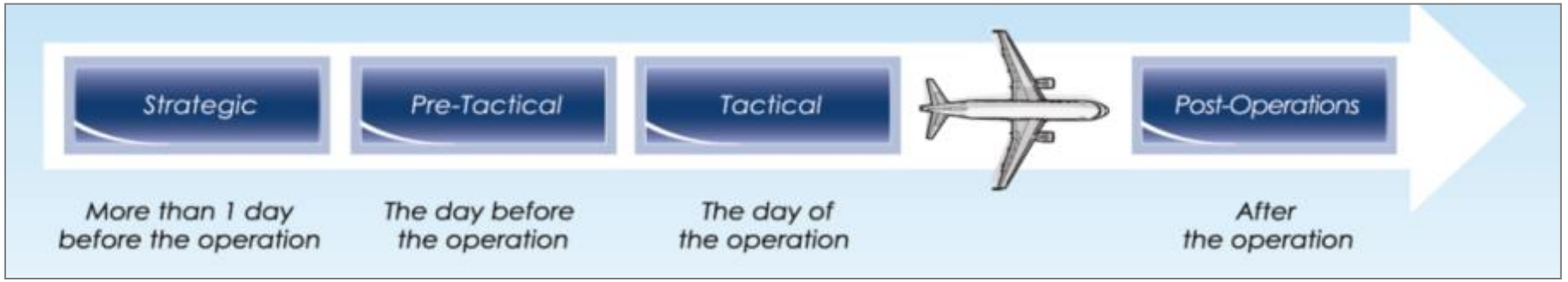
- The regulation of air traffic in order to avoid exceeding airport or airspace capacity and ensuring that available capacity is used efficiently.



What is ATFM/CDM?

Balancing resource (e.g. Airport, Airspace) demand with capacity, enabling seamless airspace, and harmonizing gate-to-gate operations - worldwide:

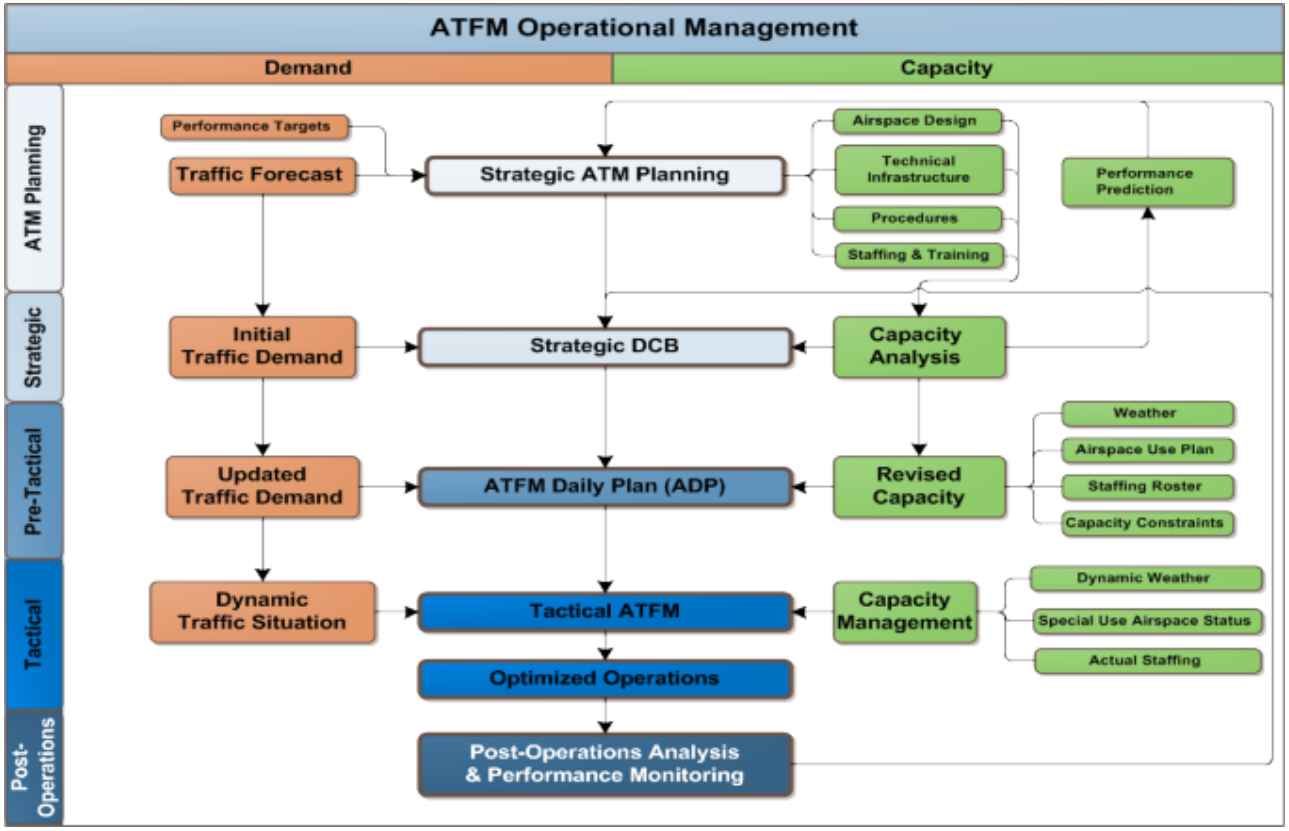
- across operational domains **– surface, departure, en route and arrival**
- across FIR and country boundaries **– data exchange**
- across planning time frames **– strategic, pre-tactical, tactical and post-operations**
- inclusive of all stakeholders (Collaborative Decision Making (CDM)): ANSP, Airport Authority, and Aircraft Operator **– coordinating efforts and aligning objectives for mutual benefit**



ICAO Doc 9971

ICAO Doc 9971: Manual on Collaborative Air Traffic Flow Management

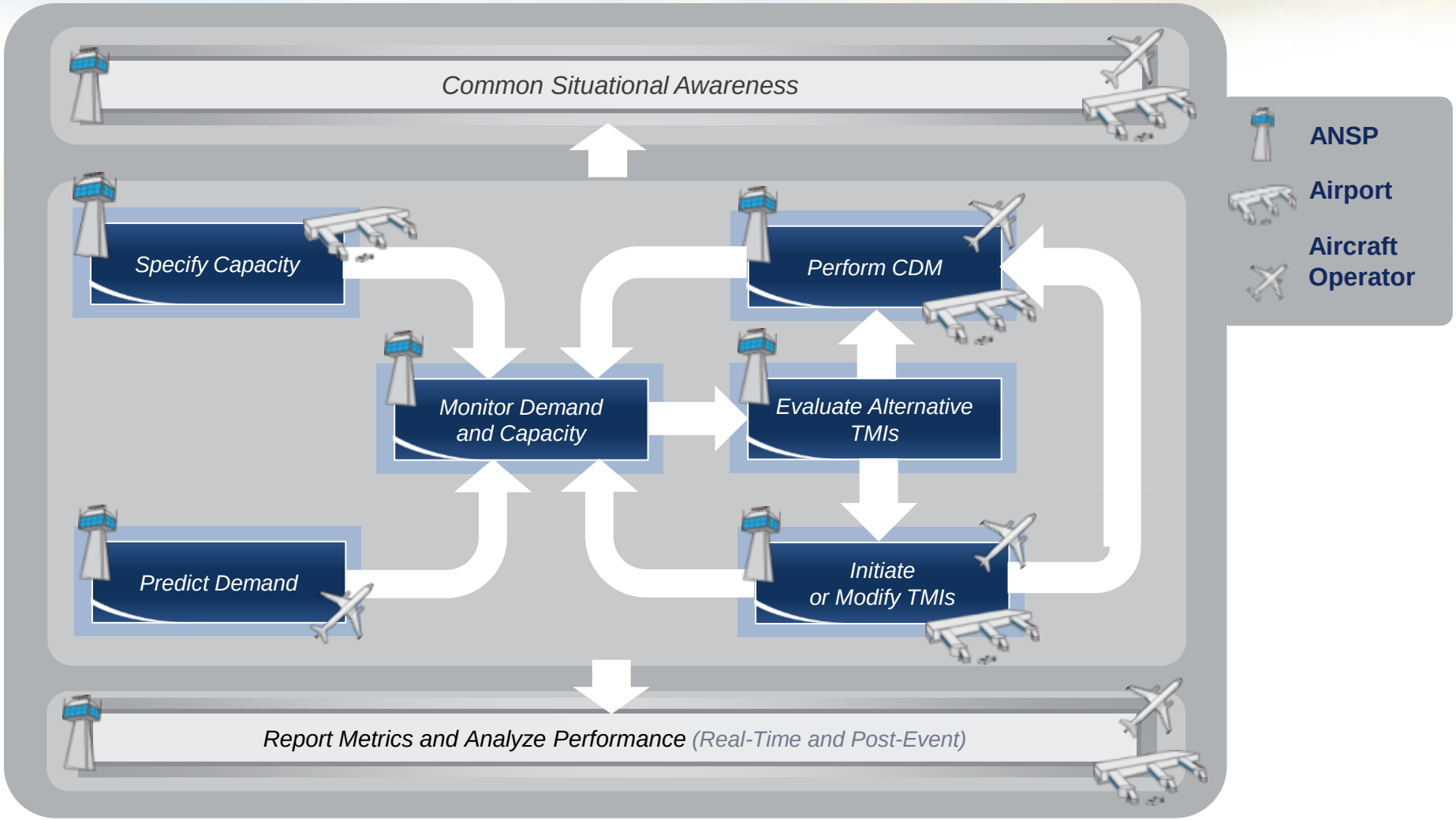
- Part 1:Collaborative Decision Making
- Part 2: Air Traffic Flow Management



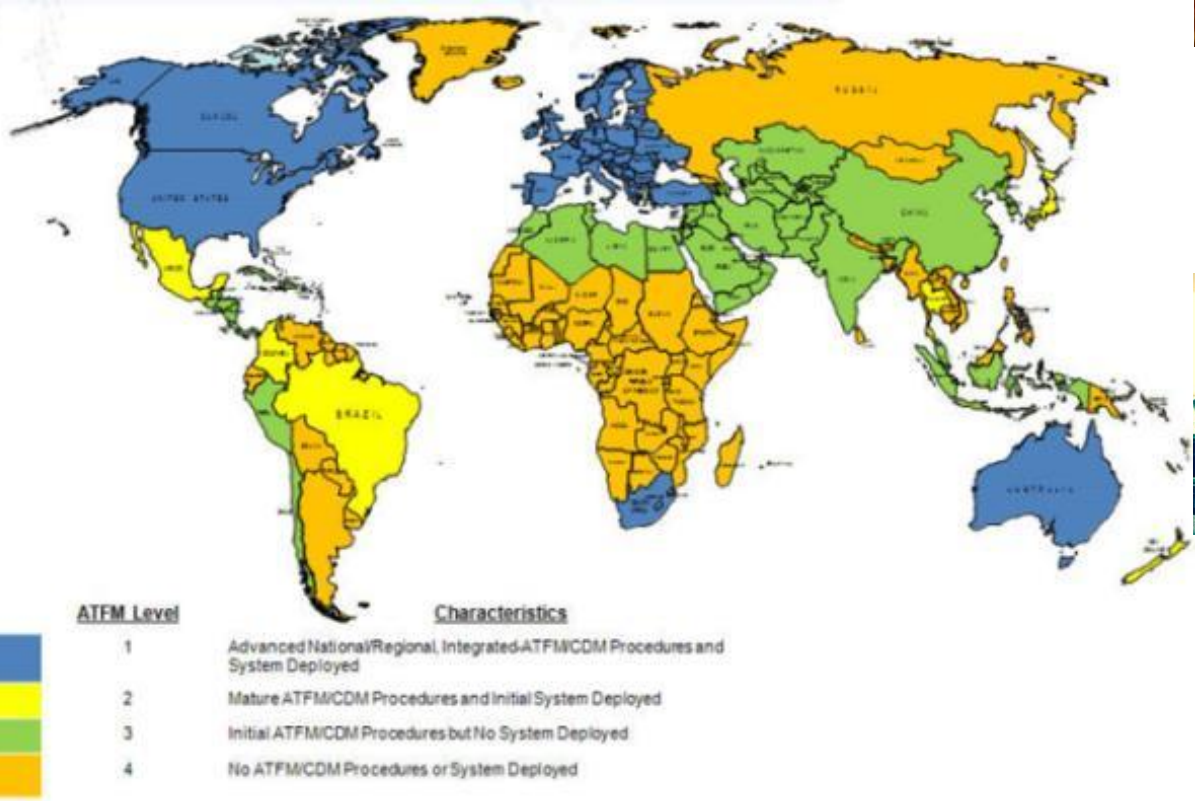
ATFM Measures

- Miles in Trail / Minutes in Trail
- Re-Routing
- Level Capping
- Ground Delay Programs
- Ground Stop Programs
- Airspace Flow Programs
- Flexible Airspace Usage (FUA)

Generalized ATFM/CDM Flow



Where has ATFM/CDM been Implemented?



Case Study: Airservices Australia

Operational Scenario:

- Airservices Australia chose Metron Aviation to replace their existing ATFM system with Metron Harmony ATFM/CDM to improve operational efficiency and provide advanced CDM functionality to their stakeholders

ATFM/CDM Implementation:

- Phased Implementation of ATFM functionality
- Commissioned for Operational Use in March, 2012
- Airport programs at Sydney (YSSY), Perth (YPPH)
- Brisbane (YBBN) and Melbourne (YMML)

Realized Benefits:

- Airborne holding into Sydney has been reduced by approximately 33 percent
- Fuel savings of US$6.5 million in the first two months of operations in Sydney alone
- Reduced flying time from Sydney-Melbourne by 5 minutes per flight reducing CO_2 emissions by 40,000 metric tonnes annually

Airservices Australia Comments:

"Our ATFM system provides Airservices, airlines and all stakeholders with powerful capabilities to collaborate and optimize the capacity and safety of the Australian airspace, while also contributing to our environmental sustainability goals“ – Jason Harfield, Former Executive General Manager, Air Traffic Control Group

Recent ATFM/CDM Initiatives

- Australia (Long Range ATFM Research)
- People's Republic of China (Regional/National ATFM integration)
- Hong Kong, China (ATFM/CDM Operational Trial (ongoing))
- Mexico (ATFM/CDM Proof of Concept (ongoing))
- Philippines (ATFM Operational Trial (ongoing))
- Singapore (Regional ATFM Research)
- United States (New ATFM Measure: CACR/CTOP)
- Thailand, Malaysia, Indonesia (APEC Emissions Reduction Study)
- Singapore, Thailand, and Hong Kong, China (Tri-Partite)
- Colombia (ATFM/CDM Deployment (ongoing)

Keys For Successful ATFM/CDM

- Strong leadership at multiple levels and across stakeholder groups
- Engagement with stakeholders to drive cultural change
- Trust among stakeholders through transparent processes
  - Common situational awareness
  - Equitable allocation of delay
  - Resource capacity determination
- Core requirements for Demand Capacity Balancing
  - Data availability for network-wide demand projection
  - ANSP flow control authority
- Flexibility to adapt the plan
  - Capacity can change, the plan must be able to change as well
  - Aircraft operators can modify flight priorities and schedules
- Continuous improvement through performance assessment
  - Post event operational analysis
  - Aircraft operator compliance measurement and reporting

Conclusion

- ATFM/CDM is a proven, mature set of processes and technologies that improve the efficiency of operations across all stakeholders
- A seamless, integrated, networked Air Traffic Management solution is required to contribute to the APEC goal of sustainable growth and prosperity for member economies
- Implementation of ATFM/CDM, a key ATM component, will manage and optimize traffic flows during this period of rapid growth and into the future