Why ANSP Management Needs to Drive ATFM Implementation
Stuart Ratcliffe, Co-Chair CANSO ATFM Workgroup
Metron Aviation
ATFM and ATM Managers

• Are you, as a manager, supporting ATFM implementation in your ANSP/Region?

• Why managers need to be advocating for ATFM implementation?
  – History proves it is beneficial
  – Look what is coming!
Historical Qualitative Benefits

• More evenly applied ATCO workload
• Enhanced Safety
• Enhanced Situational Awareness
• Timely and informed Collaborative decision making
• Optimized resource allocation
• Increased Capacity
• Post Event Analysis (continued improvement)
ATFM System Implementation Outcomes

North America - 1998

Since commissioning the Collaborative ATFM system, stakeholders have saved more than:
- 70 million minutes of delays
- 191 million liters of fuel
- 590 thousand metric tons of CO2 emissions
Over US$7.0 Billion in operating costs

Australia - 2012

- Net Fuel Savings of AU$18.1M annually
- CO2 Emissions savings of AU$1.5M annually
- Maintenance Cost savings of AU$2.7M annually
“Deliver a positive net return to stakeholders”

South Africa - 2010

Airborne holding has been eliminated at JNB airport
- US$1.2M in savings per annum for every one minute of saving at runway hold cost jet A1 “Jet Fuel Burn”
- US$0.7M reduction in airborne hold due to weather disruption
- US$0.4M in additional fuel burn savings
  = US$2.3M in total savings per annum

Colombia - 2015

- Reduced workload for FMPs in the AEROCIVIL FCMU
- Airspace users have reported quantitative benefits of reduced flight time from major city pairs and reduced taxi-out time out of El Dorado International Airport.
- Non-regular airspace users reported better predictability in their operations and reduction in fuel burn.

Full ATFM System Implementation Ensures Efficient Operations and Benefits for all Stakeholders
# Projected ATFM Benefits

## APAC

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2019</th>
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</thead>
<tbody>
<tr>
<td>Regional ATFM</td>
<td>US$250 – $300M</td>
<td>US$600M – $800M</td>
</tr>
<tr>
<td>Domestic &amp; Regional ATFM</td>
<td>US$660 – 810M</td>
<td>US$1.1B - $1.4B</td>
</tr>
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## Dubai

<table>
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<tr>
<th>Annual Saving</th>
<th>Annual Airborne Holding Reduction (minutes)</th>
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What does the future bring?
A two-speed economic world

Comparison of year-over-year GDP growth

Source: IHS Economics, Airbus

* 54 emerging economies
** 32 advanced economies
Passenger traffic is outperforming GDP growth

ASK = Available seat kilometers
Number seats available X number KM flown
Global Air Traffic Growth greater than GDP

Traffic and GDP Growth (%)

- 2015 Air traffic 6.8%
- 2015 GDP 2.6%

Source: ICAO, IHS Economics, Airbus
Middle Class* Increase in Billions

Middle Class* (millions of people)

Emerging countries
Developing countries
Mature countries

1995e**: 1,297
2005: 1,867
2015: 2,792
2025: 3,776
2035: 4,830

World Population (Bn)

1995: 5.7
2005: 6.5
2015: 7.2
2025: 8.1
2035: 8.8

% of world population

1995: 23%
2005: 29%
2015: 38%
2025: 46%
2035: 55%

* Households with yearly income between $20,000 and $150,000 at PPP in constant 2015 prices
** Estimate for 1995 split by region

Source: Oxford Economics, Airbus
### World Traffic growth - Revenue passenger KM (RPK)

**RPK traffic by airline domicile (billions)**

<table>
<thead>
<tr>
<th>Region</th>
<th>2015 traffic</th>
<th>2016-2035 traffic</th>
<th>% of 2015 world RPK</th>
<th>20-year growth</th>
<th>% of 2035 world RPK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia-Pacific</td>
<td></td>
<td></td>
<td>30%</td>
<td>5.7%</td>
<td>36%</td>
</tr>
<tr>
<td>Europe</td>
<td></td>
<td></td>
<td>25%</td>
<td>3.7%</td>
<td>22%</td>
</tr>
<tr>
<td>North America</td>
<td></td>
<td></td>
<td>24%</td>
<td>2.9%</td>
<td>19%</td>
</tr>
<tr>
<td>Middle East</td>
<td></td>
<td></td>
<td>9%</td>
<td>5.7%</td>
<td>11%</td>
</tr>
<tr>
<td>Latin America</td>
<td></td>
<td></td>
<td>5%</td>
<td>4.8%</td>
<td>5%</td>
</tr>
<tr>
<td>CIS</td>
<td></td>
<td></td>
<td>4%</td>
<td>4.1%</td>
<td>4%</td>
</tr>
<tr>
<td>Africa</td>
<td></td>
<td></td>
<td>3%</td>
<td>4.8%</td>
<td>3%</td>
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20-year world annual traffic growth: **4.5%**

**RPK** = Revenue-paying passengers $\times$ number of KM travelled

Source: Airbus GMF 2016
Chinese Domestic Traffic Growth

Annual traffic per leg flow (billion RPK)

- Domestic PRC: x3.7
- Domestic USA: x1.5
- Western Europe - USA: x1.7
- Intra Western Europe: x1.7
- Western Europe - Middle East: x2.6
- Domestic Asia emerging: x3.5
- Middle East - USA: x4.7
- Indian sub-continent - Middle East: x3.4
- Domestic India: x5.6
- PRC - USA: x3.5
- Asia emerging - Middle East: x3.4
- Asia emerging - PRC: x3.8
- Western Europe - PRC: x2.3
- Western Europe - South America: x2.1
- Central Europe - Western Europe: x2.6
- Domestic Brazil: x2.6
- South America - USA: x2.4
- Asia advanced - Asia emerging: x2.5
- Asia advanced - PRC: x3.0
- Intra Middle East: x3.1

Source: Airbus GMF 2016

Asia Pacific leading growth – 50% of the top twenty traffic flows will involve Asia Pacific.
Outbound tourism from China has surpassed inbound tourism.

In 2013:
- 56 million inbound
- 98 million outbound tourists

Source: World Tourism Organization, Airbus
Domestic traffic in India 5x in 20 years
Network Growth

70% of traffic growth until 2035 will come from existing network

Source: Airbus GMF 2016
47 of 55 Aviation Mega-Cities are schedule-constrained
Air Traffic will double in the next 15 years
Future aircraft demand

Fleet in service evolution: 2016-2035

Source: Airbus GMF 2016
Note: Passenger aircraft ≥100 seats, Freighter aircraft ≥10 tonnes
Implication!

• Air Traffic expected to double every 15 years

• Demand for 33 070 new aircraft by 2035 (currently 19 580)

• 40% of passenger aircraft demand needed for replacement, and 60% for growth

• Single-aisle represents 71% of new aircraft

• There are going to be twice as many aircraft in 2035!
Some tough Questions to be answered!

• Is the ATM community able to grow capacity to meet demand – doubling in 15 years?
• If not, can ATFM manage the increased demand?
• Can ATFM global ATFM be delayed any longer?
• Should it not be a priority and a not “a nice to have”?
• Do we need to manage traffic demand while capacity and efficiency is increased?
Recent Global Regional ATFM Initiatives

- APAC
- Caribbean and Latin America
- Middle East
ATFM Measure Effectiveness: Participation

• Demand Capacity Balancing requires sufficient participation of Aircraft

• 70% participation of flights is necessary to make an ATFM Measure fair and equitable

• Aircraft Participation
  o Domestic flights
  o International/Regional flights – flight duration up to approximately 4 hours
  o International flights – long haul flights
APAC Participation (Domestic)

70% domestic participation is NOT met for most airports
ACAC ATFM Participation (Domestic)

70% domestic participation is NOT met for any airport.
LATAM ATFM Participation (Domestic)

70% domestic participation is NOT met for most airports
Research Collaboration on Regional ATFM Concept 2013

CANSO Whole of flight CDM Pilot Project between BKK-SIN 2011-2012

Multi Nodal Regional ATFM Concept 2014 - ....

Tripartite CDM Project between BKK-HKG-SIN 2012-2013
Multi-Nodal Cross Border Regional ATFM

- Domestic/Regional/International flights
- No Central Management
- Connected via virtual network
- Each State responsible for ATFM within own state
- All participating states adhere to common operational procedures
- Could include Airborne flights
- Aircraft Operators choose where to take delay:
  - Gate
  - Surface
  - En-Route
Status of Operational Trial

Level 3 ATFM Nodes
Generate, Distribute, Comply to CTOT
- China, Hong Kong China, Singapore, Thailand

Level 2 ATFM Nodes
Receive and Comply to CTOT
- Cambodia, Indonesia, Malaysia, Philippines

Level 1 ATFM Nodes
Observers
- Lao PDR, Vietnam, Japan, Republic of Korea, New Zealand

Advisory ATFM Node
- Australia

March 2017 Multi-Nodal Briefing
Process of Implementation in APAC

Phased Approach to the Operational Trial

**Phase 1**
2015 - 2016
- Ground Delay Program supporting Airport Congestions

**Phase 2**
2017 - TBD
- Ground Delay Program supporting Airspace Congestion
- Interconnectivity among ATFM systems

**Phase X**
Vision
- Fully interconnected Global ATFM Service
- Integration with SWIM and 4D-Trajectory Management

March 2017
CADENA

CADENA = CANSO ATFM Data Exchange Network for the Americas “Cadena” is also the Spanish for “chain”.

- 1st Meeting - CUBA August 2016
- 2nd Meeting - Argentina October 2016
- 3rd Meeting - Dutch Caribbean February 2017
CADENA Progress

• Progress thus far
  o Terms of reference, roles and responsibilities set
  o FAA has made SWIM Platform available for all participating countries (Trinidad and Tobago already connected, others in progress)
  o Discussion on ATFM information to be shared regionally
  o Organizational Structure of ATFMU being proposed
  o Letters of Agreement signed
  o Job descriptions of ATFM personnel agreed upon
  o CDM Teleconference instruction
  o ATFM Telecons ongoing with all stakeholders being included
CDM Telecons

- Objectives
  - All stakeholders gain insight into ATM conditions in region, pre-tactical and tactical
  - Common interpretation of weather conditions
  - Sharing constraints in FIRs and in region
  - Explain any ATFM measures to be implemented
  - Post Event Analysis
CADENA going forward

• Review existing national plans for ATFM
• Identify Resources
  o Declaring airport and airspace capacities
  o Facilities
  o Equipment
  o Staffing
• Procedure Development
  o Internal and Regional
  o Documentation
  o Development of a Regional OIS
• Education and Training
• Ensure implementation is harmonized within the region and between regions.
Middle East

- ATFM Trial completed in UAE
- ICAO ATFM Workshop
Stakeholders in UAE ATFM Trial

- Primary Stakeholders Involved
  - **ANSPs**
    - SZC, DANS, ADAC, Sharjah
  - **Airport Operators**
    - DAC, ADAC
  - **Airlines**
    - Emirates, Etihad, FlyDubai, AirArabia
UAE ATFM Trial Outcomes

Quantitative

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Operational Benefits

Continued ATFM Implementation will result in:

- Increased Common situational awareness
- Increased predictability
- Modelling of ATFM measures before implementation
- Improved special event and FUA planning
- Reduced sector flying times
- Reduced workloads on pilots and ATCOs
- Automated Solution required
Outcomes of Workshop

- Establishment of a MID ATFM TF/WG under the ATM SG;
- Development of ATFM Concept of Operations taking into consideration Asia Pacific and Europe experiences;
- Need to raise awareness about ATFM;
- Conduct training courses related to ATFM;
- States to consider the establishment of ATFM Cell or National Operation Centre composed of all concerned Stakeholders;
- Carry out a survey to determine airspace and sector capacity, hotspots, ATFM
- Expedite MID IFPS project implementation;
- Continue working on airspace improvements.
Middle East Cross Border Multi-Nodal ATFM?
Lesson Learnt

- Executive and senior management support
- Develop a comprehensive ConOps for region
- Include all stakeholders from the outset of ATFM Implementation
- Include external stakeholders
- Follow the ICAO ATFM Implementation process
- Allocate staff dedicated to ATFM implementation and operations
- Ensure the ATFM staff are qualified for the tasks

- Ensure specific requirements are identified for the local requirements
- Ensure system supplier is completely compliant with requirements
- ATFM system should be stand alone and not integrated with ATM automation system
- Common operating procedures should be same as regional procedures
- Undertake comprehensive training of all stakeholders
- Continually review procedures and amend as required
Conclusion

• History has shown that ATFM has been beneficial
• Significant traffic growth in Air Traffic Movements
• Many Airports and airspaces are already congested
• Aircraft numbers to double by 2035
• ATFM needs to be implemented to manage demand
• ATFM can manage traffic flows while capacity is increased
• ATFM implementation needs to become a priority

Management needs to drive ATFM
Implementation
Global ATFM

Thank you