TRAFFIC MANAGEMENT CENTERS
National Operations Centre
Evolution of Traffic Flow Management

• 1960’s
  – Ground stop programs and circling by individual facilities
  – **Central Altitude Reservation Facility (CARF)** established to facilitate the flow of civilian air traffic around military movements

• 1970’s
  – **Central Flow Control Facility (CFCF)** advise facilities on national traffic flow
Evolution of Traffic Flow Management (2)

• 1970’s
  – Traffic Volume increased with deregulation and affordability of private aircraft (business type small jets).
  – The oil crisis made us focus on reducing airborne holding and flight delays.

• Early 1980’s
  – Fuel efficiency became a primary goal
  – Air Traffic Controller strike and associated constraints on National System
  – CFCF played a strong role in maintaining safety and efficiency in aftermath of strike
Evolution of Traffic Flow Management (3)

- **Mid/Late 1980’s**
  - *Traffic Management Units (TMU)* implemented in facilities
  - *Aircraft Situation Display (ASD)* implemented at CFCF for real-time visual displays of air traffic
  - *Monitor Alert* to analyze flight plans and project congestion areas

- **1990’s**
  - *Enhanced Traffic Management System (ETMS)*
  - *Meteorological Weather Processors* installed for real-time data
Similarities between ANSPs

**SAME PRESSURES**
- Maintain Safety
- Accommodate Growth
- Eliminate Restrictions
- Contain Costs

**SAME CUSTOMERS**
- Same Airlines
- Same Aircraft
- Same Avionics
- Same Pilots

**SAME OBLIGATIONS**
- Chicago Convention
- ICAO SARPS

**SAME CONSTRAINTS**
- Political Visibility
- Environmental Pressures
- Financial Constraints
- Security demands

**SAME OPPORTUNITIES**
- High Competence (Technical & Operational)
- Advanced Technology
• The FAA Challenge
Air Traffic Flow Management

• **Mission**
  – To balance air traffic demand with system capacity to ensure safe and efficient utilization of the National Airspace System

• **Operational benefits**
  – Minimizes delay and congestion
  – Increases throughput
  – Increases system safety
  – Lowers cost through fuel savings
  – Provides scheduling predictability
  – Supports the implementation of new technology and procedures that enhance airspace capacity
We don't make a lot of the products you buy.

We make a lot of the products you buy better.®
We don’t directly control Air Traffic

We make that Air Traffic Control Safer and more Efficient
The goal is to use the least restrictive TMI to manage the situation
Collaborative Decision Making
What is Collaborative Decision Making (CDM)

- Traffic Flow Management operational philosophy

- Associated shared technologies and procedures

- Enable Air Navigation Service Providers and Stakeholders to identify and work towards common goals

- Enables Stakeholders to meet business or mission needs within the commonly understood operational constraints

** Maximizes trust, operational efficiency, and safety **
Why Collaborate?

**ATC**

**Goals**

Managing the ATC System

Each stakeholder may have dissimilar goals, different views, varying capabilities. Each makes autonomous strategic and tactical decisions to achieve their individual goals. Sometimes these decisions run counter to ATC decisions. …Affecting the entire system in ways not known to ATC.

**OPERATORS**

**Goals**

Managing the Schedule

Managing the Schedule

**CDM**
Result:
Collaboration can provide Shared Situational Awareness and Collaborative Resolutions for Win-Win Solutions for both ATC and Stakeholders

Collaboration leads to enhanced options resulting in improved decision making, stakeholder acceptance and support, and increased service performance
An operating philosophy

Stakeholders

Communication

Awareness
Airline Transport Association
National Business Aviation Association

• Local representative for member business aircraft operators

• Role and Responsibilities
  – Coordinates the concerns of specific customer groups to the ATCSCC about the impact of specific traffic management issues
  – Provides information to the customers on planned or current traffic initiatives
  – Provides information to ATCSCC on significant unscheduled or unanticipated GA movement
Air Traffic Services Cell

The ATSC is a Civil/Military organization created to resolve DoD/FAA issues while ensuring DoD needs are met in the National Airspace System.
ATCSCC Operational Floor

- WX
- NSST + Terminal
- TCA
  - ARO/STMP

- I/O
- NOM
- TMA

- NOCC
- ETMS
  - Hotline
- CSA
- CDM
- DOTS
- NOTAM

Crisis Management Center

- DOD
- CARF
Communication

INTERNATIONAL

ATC UNITS

TELCON HOST

OPERATORS

WEATHER UNITS

AIRPORT AUTHORITIES
Awareness

COMMON SITUATION AWARENESS

WEATHER DISPLAY
TRAFFIC DISPLAY
COMMUNICATION SYSTEM
CDM Collaborative Tools
- Integrates Data to Enhance Decisions -

Common Situational Awareness between Stakeholders and ATC allows for integration of data from all sources to make a more informed, “Better” decision

• Integration of ATC and Airline Data to provide a “Big Picture”

• Improved Situational Awareness, Enroute & Airport Flow Tools, Real time information & Uniform Reaction to system impacts, Analysis – lessons learned

Flight Following, Weather, & Decision Support Tools

Enroute & Airport Flow Tools for flow management

Monitor flows, predict delays, optimize response to impacts

Flight Planning changes, OIS & NTML Mgmt. Tools

Optimized plans

Shared info & responses to System impacts

Event Analysis Tools for Real-time & historical performance

Data & Analysis
Airline benefits (WP7)

- Environmental benefits of reduction in noxious gas emissions
  - 12 million kilograms of fuel savings annually, associated with
  - 50 million kilograms of reduction in carbon dioxide emissions per year

- $12,000,000 Airline cost savings

- Substantial reduction in ground delays
ATFM BOBCAT  July 2007

ANSPs benefits

• immediate ATC workload reduction together with safety and capacity enhancements
  – Kabul FIR- were better regulated more evenly spread, enabling safer air traffic control
  – Enroute ANSP- immediate ATC workload reduction together with safety and capacity enhancements

• substantial reduction in ground delays
Planning Process

Who Participates?

- ATCSCC
- Facility TMUs
- Facility Ops
- Domestic Airlines
- International Airlines
- Business/General Aviation
- Military Ops
- International Command Centers
Traffic Management Modeling for Safety: Determining Aerodrome Acceptance Rate (AAR)

The number of arrival aircraft that an aerodrome -- in conjunction with weather conditions, terminal airspace, ramp space, parking space, and facilities -- can accept per hour
The Before and After
Traffic Management Modeling for Safety: Determining Sector Capacity

• Sector capacity:
  – The optimum number of flights, in a given sector, for a specified period of time, that can be managed safely and efficiently
Traffic Complexity, Controller Workload, and Sector Capacity

Traffic flow characteristics create different levels of complexity for a sector:

- Cruise Traffic
- Altitude Transitioning and Crossing Traffic
- Arrival and Crossing Traffic

Different levels of complexity
Different levels of workload
Different levels of capacity
Sector Alerts

Federal Aviation Administration
Traffic Situation Display

Common Situational awareness
• Provides National Airspace System (NAS) and foreign-source information
• Distinguishes civil & military aircraft
• Displays all flights or flights sorted by origin, destination, airline, type of aircraft, and/or NAS element: sophisticated data filters
• Once per minute updates
• Weather information
• Customizable display and queries
• User selectable views via zoom, move, and projection features

• Interoperable with airlines to form common situation awareness
Global Reach

ATO Responsibility
- Approx. 77 million sq. km of total airspace
- 15.15% of earth’s surface
- Largest area of all ANSPs (Australia 2nd (9.2%) at 47 million sq. km)

ATO Collaboration
- Daily interaction with 18 international ANSPs
- 29 adjacent Flight Information Regions (FIR)

* Our ATO ANS service delivery responsibility includes the entire United States, adjacent oceanic areas, and collaboration with other international ANS service providers.
International Operations

• DATA Sharing Agreements
  – Canada
  – United Kingdom
  – Mexico
  – EUROCONTROL
  – Dominican Republic, Trinidad & Tobago
  – COCESNA, Panama, Colombia, Chile
  – Japan
  – Future (Brazil)
International ATFM Telephone Conferences

- NAV CANADA – twice per day
- EUROCONTROL – twice per day
- MEXICO – twice per day
- CARIBBEAN – once per day
- COLOMBIA – once per day
- BRAZIL – once per day
- JAPAN – twice per week (three in 2011)
- Russia - monthly
- Ad Hoc
  Hurricane - as needed
ANSP State Leadership

Must Collaborate to:

• Ensure global standards of safety and service in all systems
• Ensure common standards and procedures
• Enable air transportation growth and competition in all state markets
• Minimize ASP costs by sharing information, results & efforts
3.2.2 Flow management procedures
ATFM should be carried out in three phases:

- a) **strategic planning**, if the action is carried out more than one day before the day on which it will take effect. Strategic planning is normally carried out well in advance, typically two to six months ahead

- b) **pre-tactical planning**, if the action is to be taken on the day before the day on which it will take effect

- c) **tactical operations**, if the action is taken on the day on which it will take effect
Traffic Flow Management Process

Key Activities
- Identify long-term system demands and choke points
- Analyze and implement needed policy and procedure changes
- Define and implement new decision support tools
- Predict near-term traffic loads
- Assess potential effects of forecasted weather and historical/predicted traffic loads
- Refine procedures
- Analyze impact of real-time system constraints on the NAS
- Implement CDM planning and execution of flow initiatives
- Analyze archived traffic and staffing data
- Generate and distribute performance metrics
- Identify support tool shortfalls

Results
- Airspace redesign
- Procedure or policy changes
- Priorities for research and development
- Examine impact areas for next day of operations
- Develop strategies for balancing traffic forecasts against assumed capacity
- Collaborative resolution of demand/capacity imbalances
- Minimization of disruption to User plans
- Assessment of effectiveness of specific flow initiatives
- Potential procedure or policy changes
With No Order Comes Chaos
Enhancing Efficiencies Means
Make A Greener World by increasing Efficiencies and thereby reducing Green House Gases
Collaborative Decision Making

cdm.fly.faa.gov