



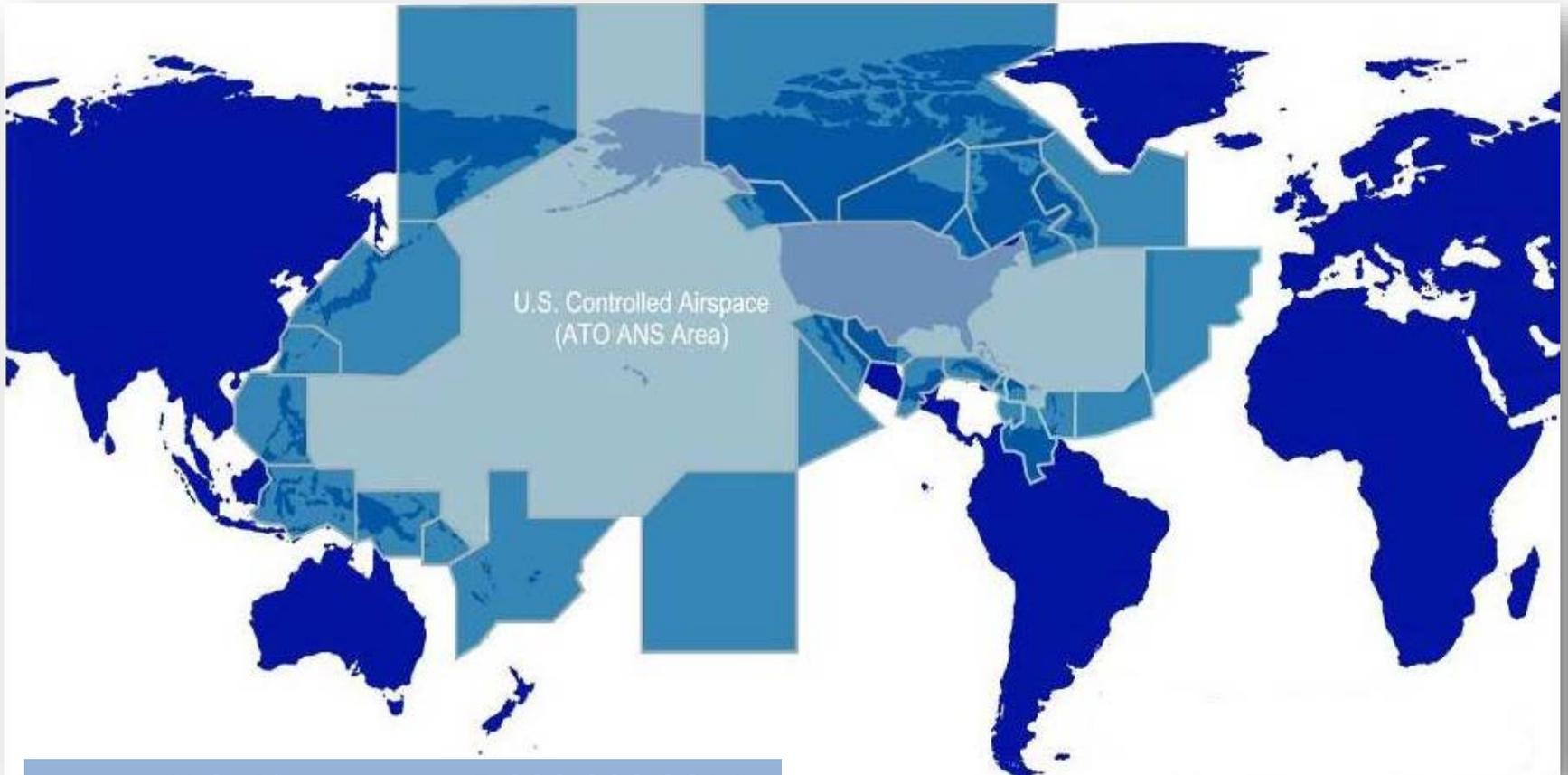
FAA
Air Traffic Organization



FAA Experiences with ATFM

For: MIDANPIRG ATFM TF/2
Prepared by: Midori Tanino, ATO International
Global ATM Program Manager
Date: March 17-18, 2019

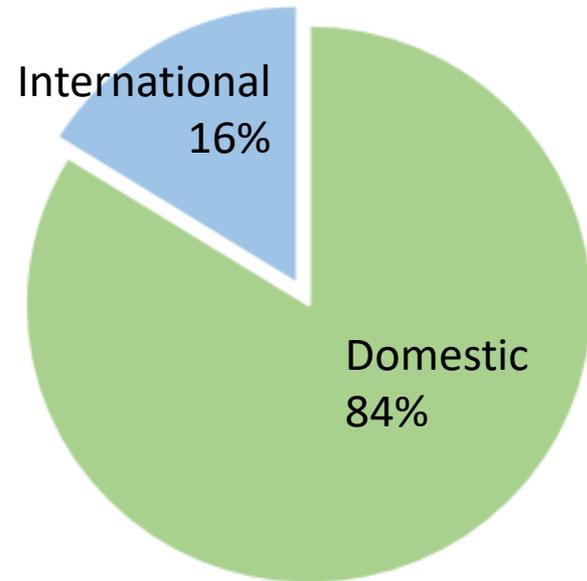
U.S. Airspace



U.S. Airspace	5,000,000 SQM
Oceanic Airspace	26,000,000 SQM
Total Airspace	31,000,000 SQM



U.S. Air Traffic



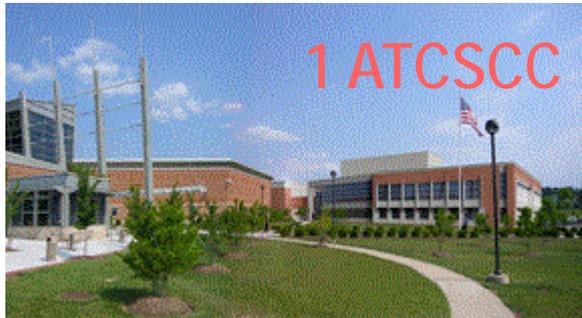
Domestic	8,981,707
International	1,730,913

2017 U.S. Total 10,712,620

Computed from BTS T100Segment Data



U.S. ATM Major Components



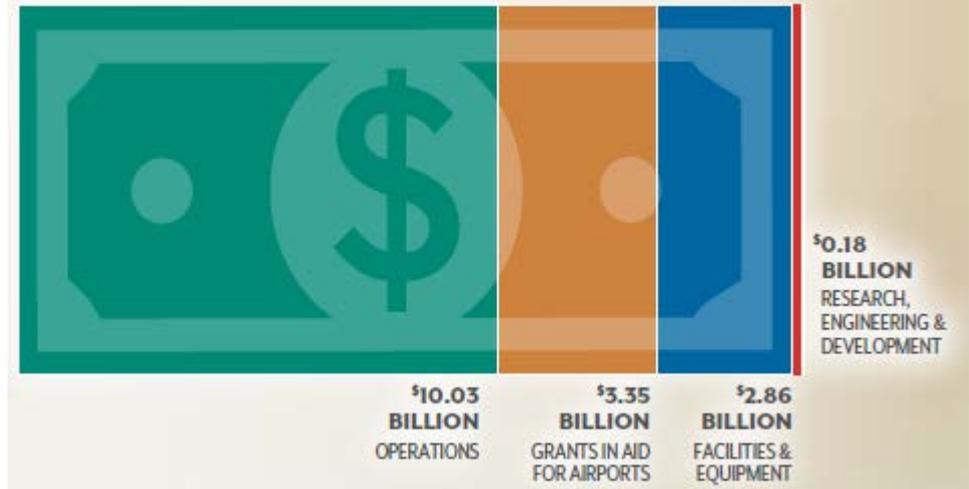
45,711 TOTAL EMPLOYEES

FAA Employees

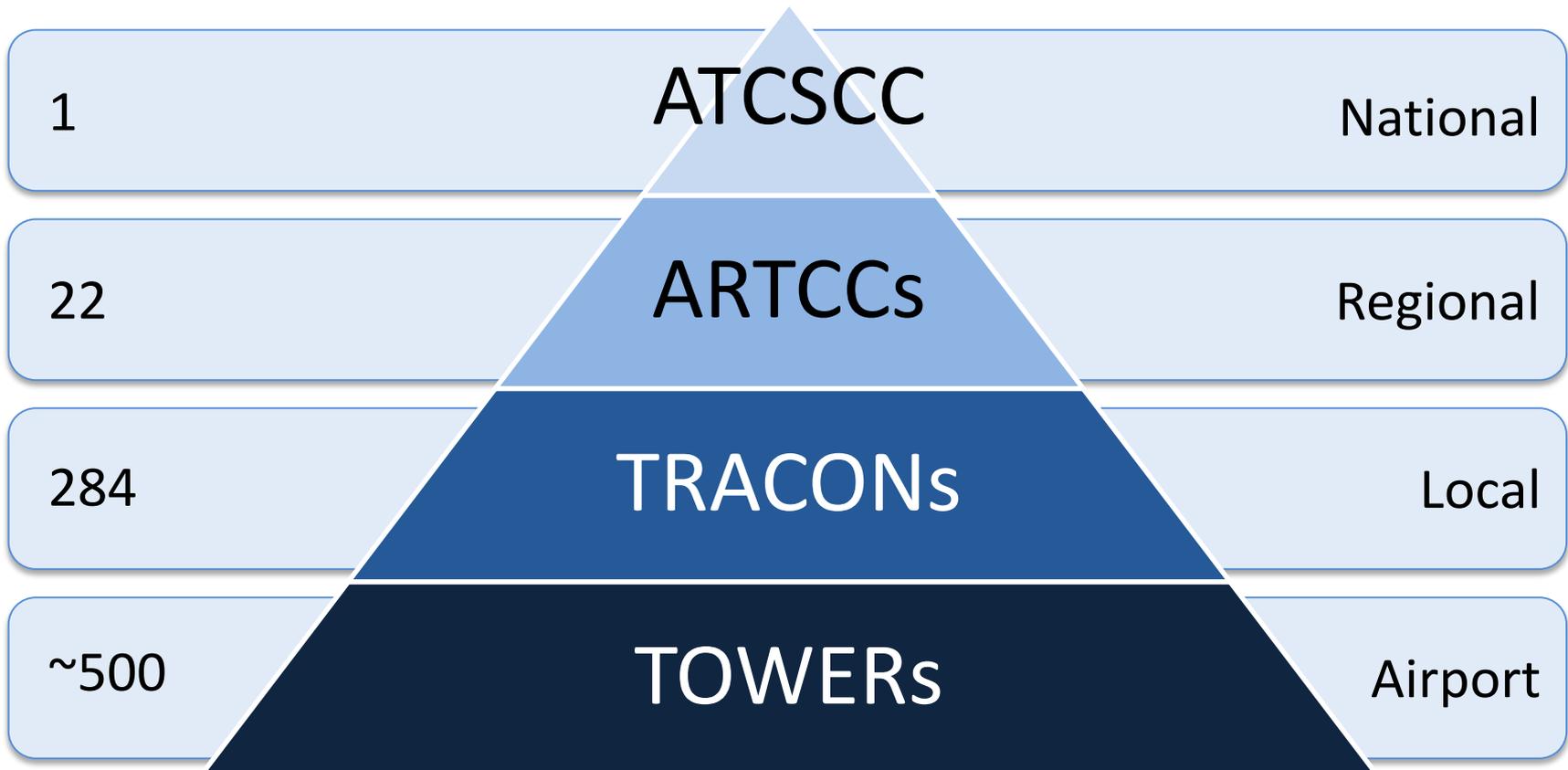


\$16.42 BILLION BUDGET IN FY 2017

FAA Budget



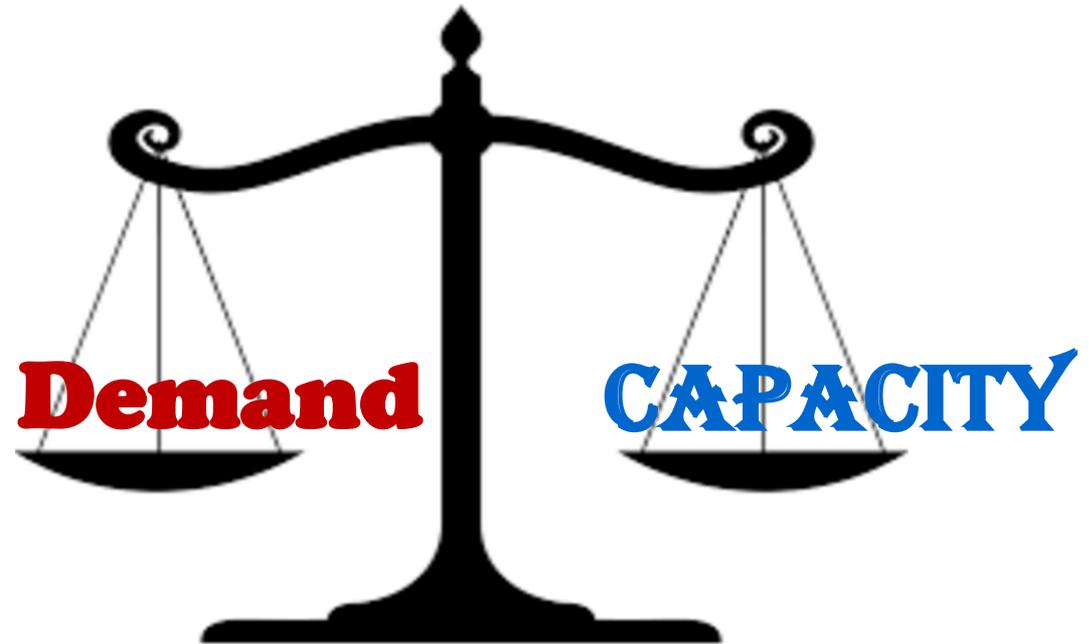
One ATFM Architecture



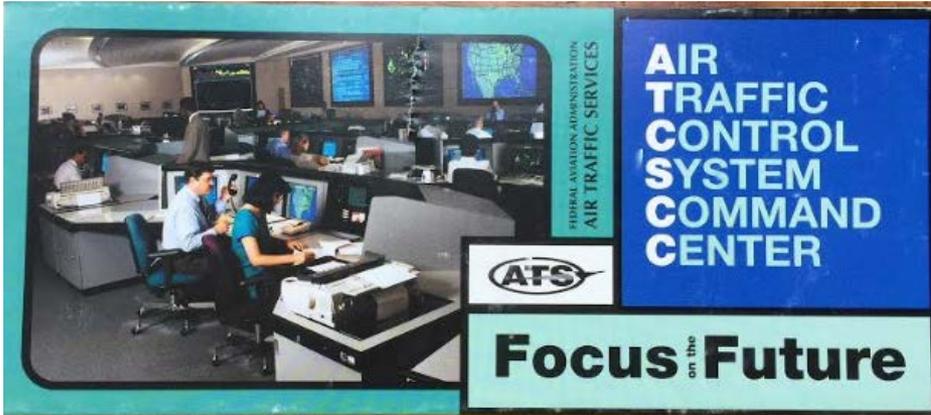
ATFM Implementation Experience

- Domestic solution
- Regional solution

- Advantages and shortcomings
- Overcoming the challenges



Air Traffic Control System Command Center (ATCSCC)



The Command Center became operational in May 1994 and is the largest, most sophisticated facility of its kind in the world.

The 1st ATCSCC Pamphlet

The ATCSCC Traffic Management Specialists plan and regulate the flow of air traffic to minimize delays and congestions while maximizing the overall operation of the NAS.

ATCSCC today in Virginia, USA



ATCSCC Ops Floor

“Balance”



ATCSCC Operating Positions

- National Operations Manager (NOM)
- Planner
- Terminal Area
- National Weather Service
- Sever Weather Area
- Tactical Customer Advocate
- International Operations Position
- National Ops Control Center (NOCC)
- NOTAMS
- Security (Domestic Event Network)

Military

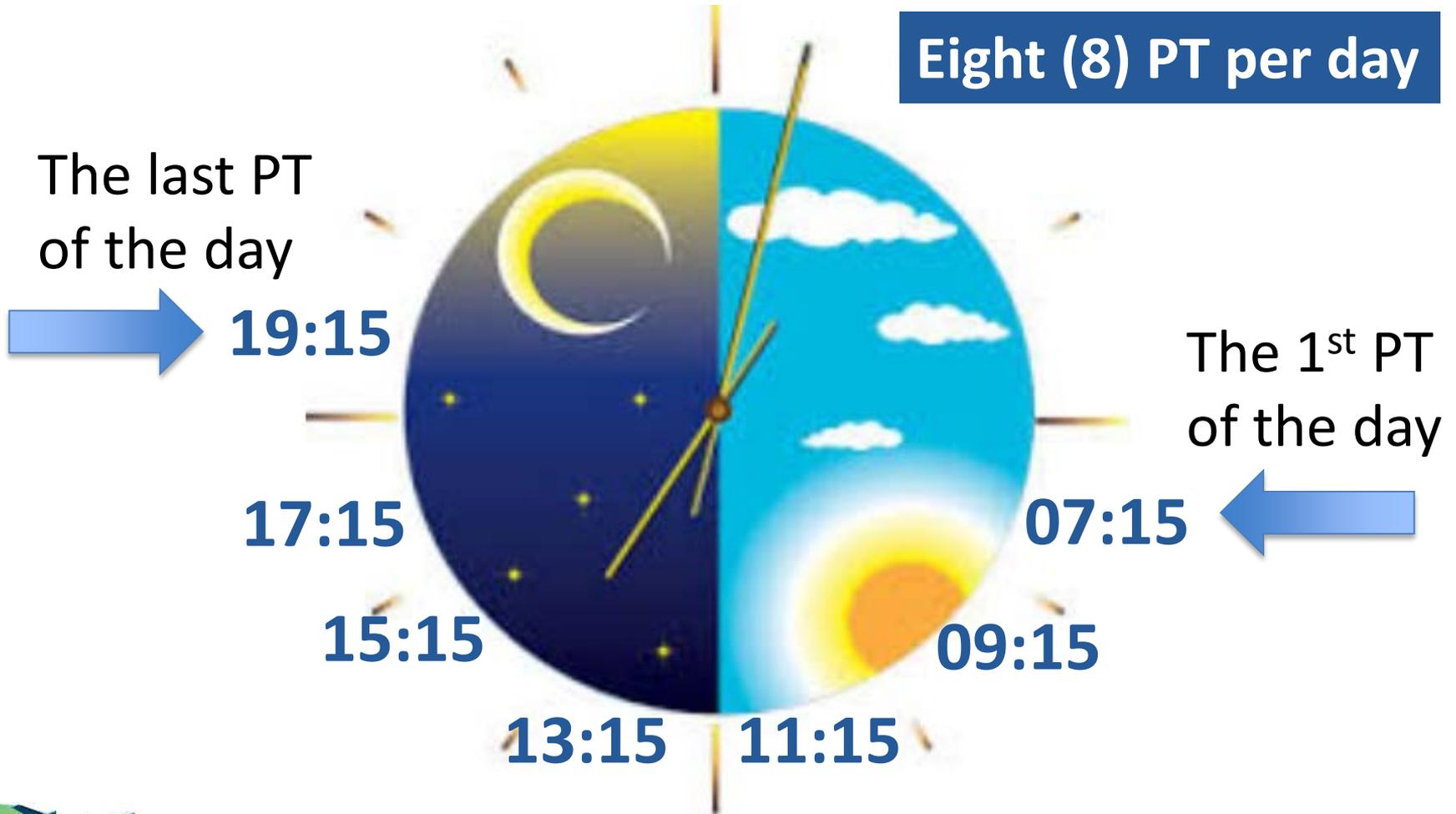


Airlines for America
We Connect the World



ATCSCC Planning Teleconference

Eight (8) PT per day



Traffic Management Initiatives

TMIs are techniques used to balance demand with capacity in the NAS. Traffic Management Specialists employ the least restrictive methods available to minimize delays.

- Altitude
- Mile in Trail (MIT)
- Minutes in Trail (MINIT)
- Reroutes
- Ground Delay Program (GDP)
- Airspace Flow Program (AFP)
- Ground Stop (GS)

- Flow Evaluation Area (FEA)
- Flow Constraint Area (FCA)
- ATCSCC Advisories
- Collaborative Trajectory Options Program (CTOP)



We're looking at how NAS resources, processes and systems are managed and how they can be improved.

PERTTI

Plan

Execute

Review

Train

Improve



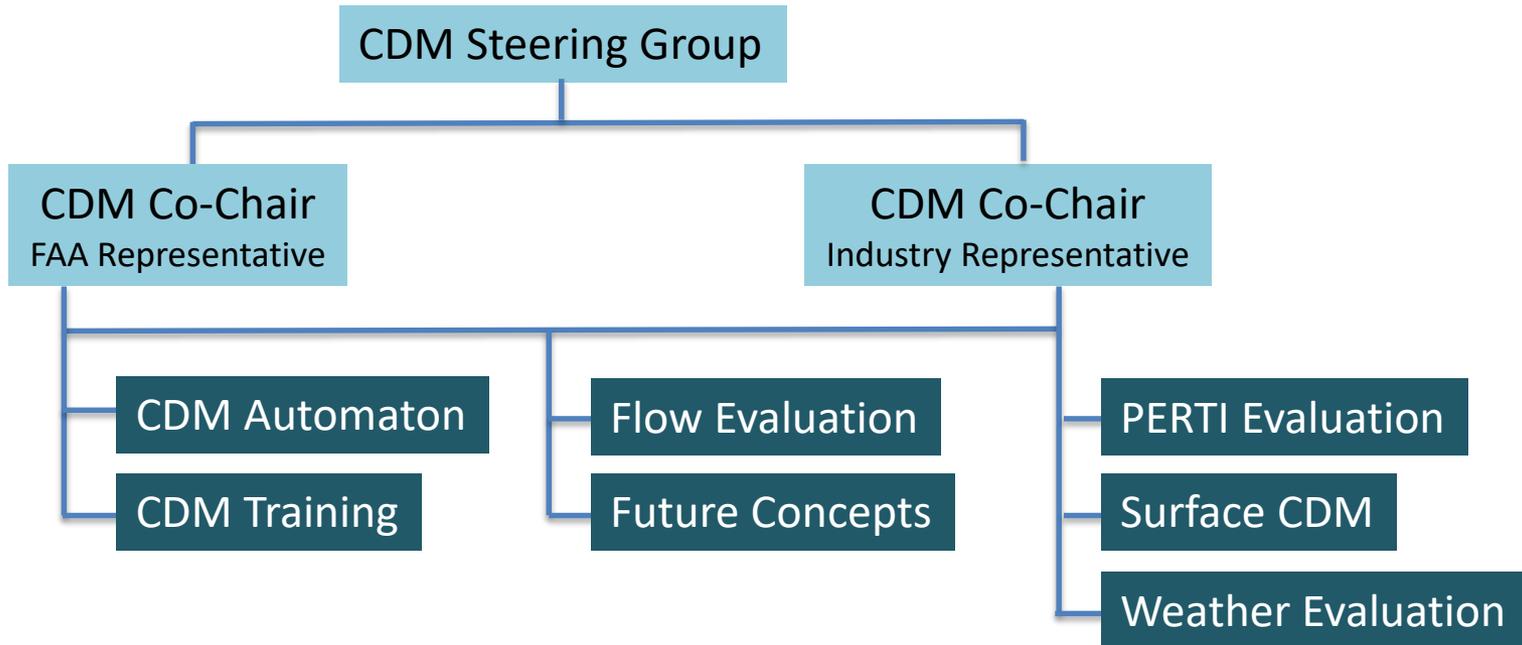
Applying CDM with Stakeholders

Application	Frequency
Operational Planning Telecoms (OPT) Pre – Tactical - Tactical	Daily
National System Reviews (NSR) Post Event Analysis	Daily
CDM Steering Group (CSG) and Sub-Teams Strategic	Monthly
National Customer Forum (NCF) Strategic	Monthly
CDM Review Strategic – Post Event Analysis	Annually
End of Season Review Post Event Analysis	Annually



CDM

CDM is a joint government/industry initiative aimed at improving ATFM through increased information exchange among aviation community stakeholders.



FAA History of CDM



- CDM traces its origins to September 1993, when the Federal Aviation Administration (FAA)/Airline Data Exchange (FADE) experiment highlighted the benefits of NAS users providing updated schedule information, allowing for improved decision making by Traffic Flow Managers.

www.cdm.fly.faa.gov



FAA History of CDM



- Started as collaboration between FAA and Airlines
- Focused on FAA and Airline Data Exchange and GDP
- Significant improvement in Air Traffic Flow Management
 - August 1994: Human-in-the-loop exercises result in a total reduction of 10-40% of assigned airline delay.
 - December 1994: Total delay reduction is 10-35% depending on the airport and scenario.
- AOCnet Implementation in 1996-1997
- ATFM with enhanced data and CDM/GDPE starting in 1998
- New capabilities are introduced:
 - Collaborative Routing
 - Slot Credit Substitution
 - Playbook
 - CTOP
 - AFP
 - Compression



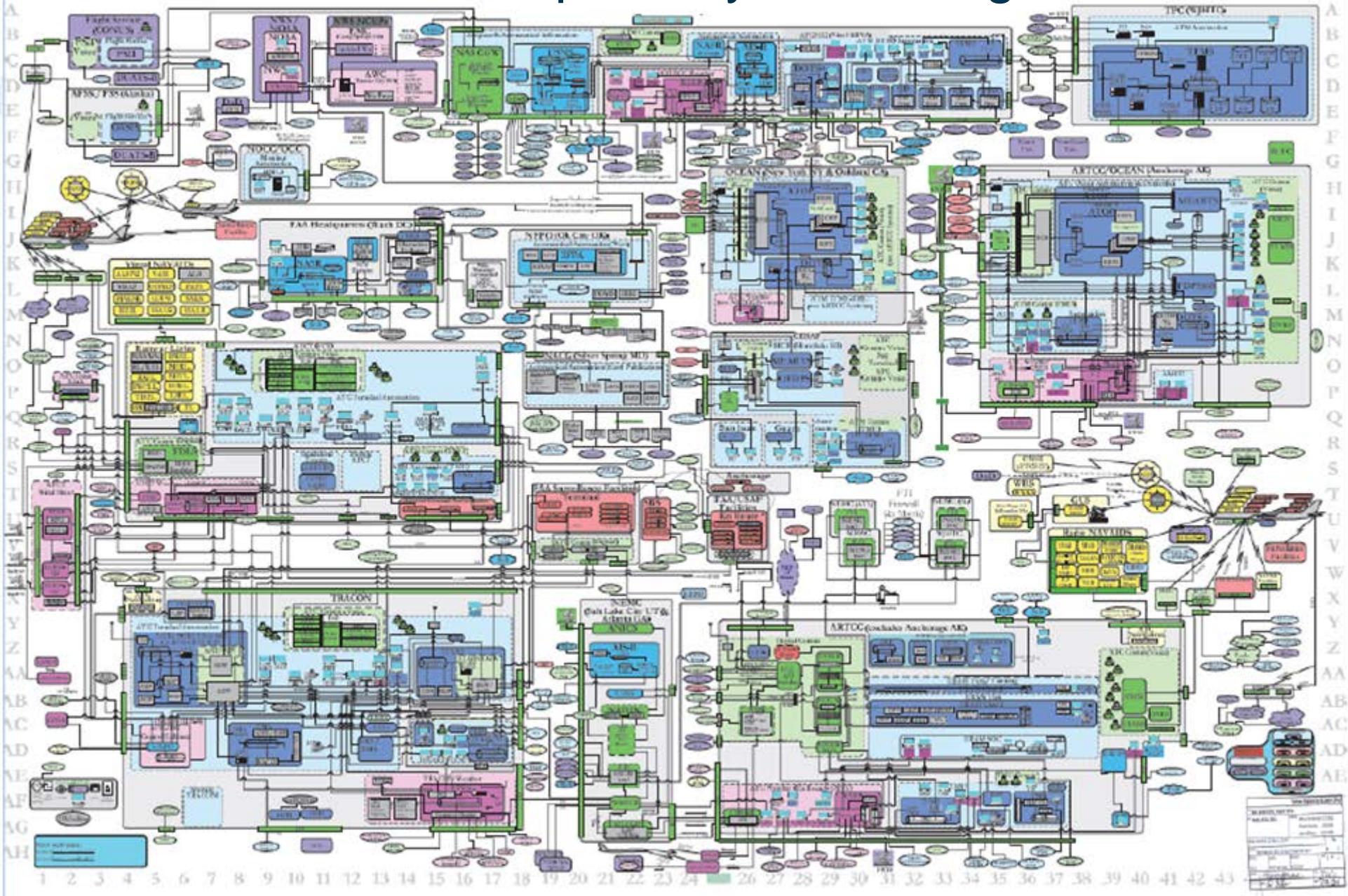


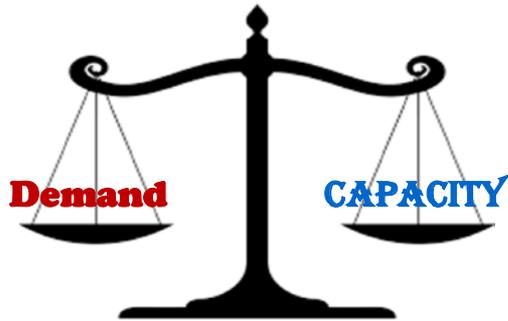
ATFM expanded to include Latin America and Caribbean





US National Airspace System - Engineered





CAPACITY

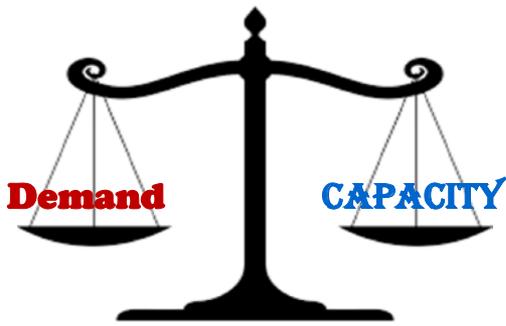
Airport Capacity

- Airport Acceptance Rate (AAR)
- Airport Departure Rate (ADR)

Sector Capacity

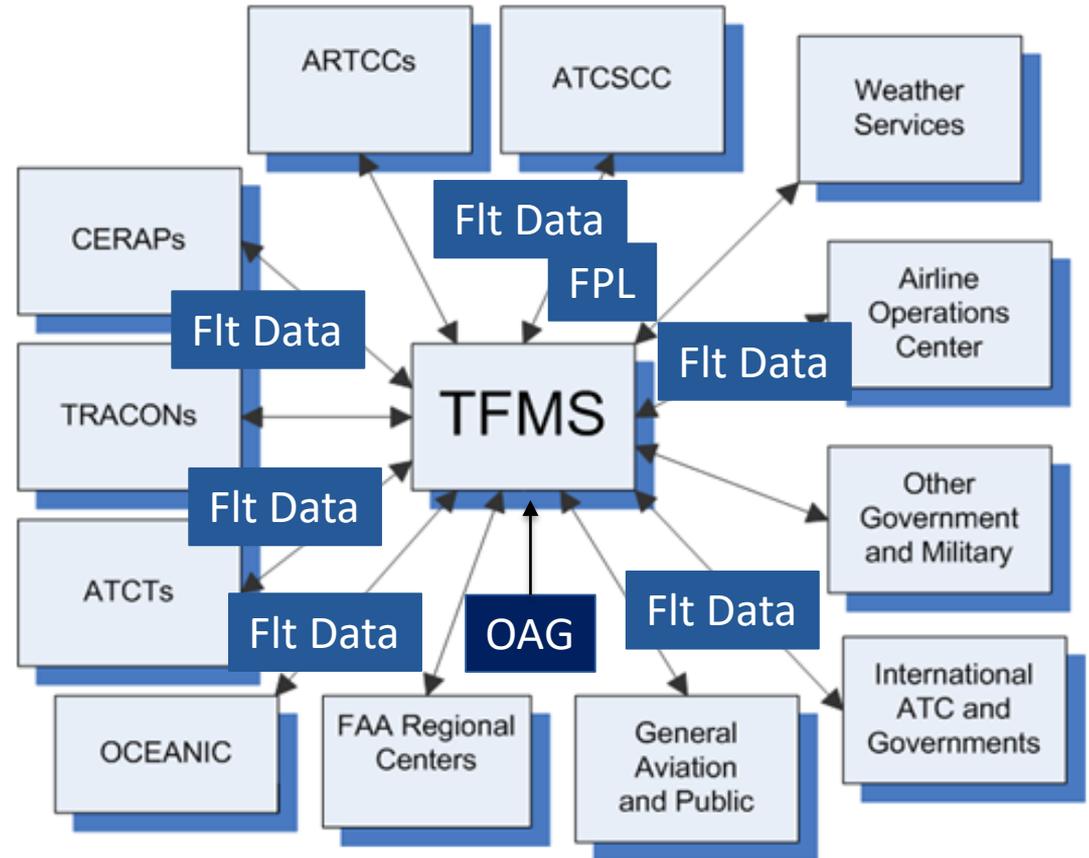
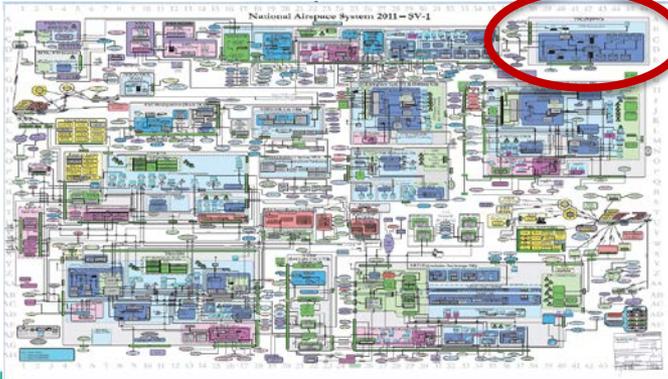
- Monitor Alert Parameter (MAP)





Demand

Traffic Flow Management System (TFMS)



FAA TFMS History

- Early 1970: concept and practice of ATM using growing body of prediction, planning, optimization, and management techniques
- 1985 and 1987: Enhanced Traffic Flow Management System (ETMS) demonstrated and deployed
- 1991: Aircraft Situation Display to Industry
- 1995: CDM Initiative
- 1998: FAA and Airlines to share data
- 2006: Traffic Flow Management System (TFMS)

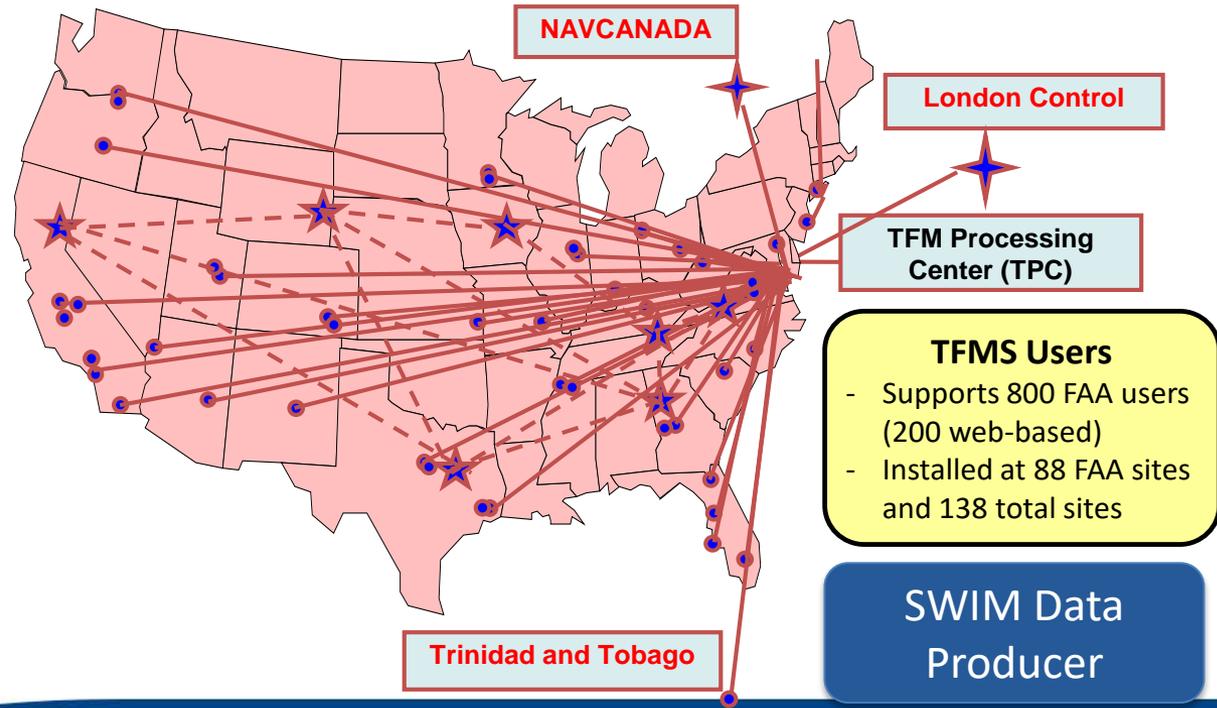


TFMS Infrastructure



TFMS Operational Locations and Service Delivery Points

ATCSCC – Vint Hill, VA
 TFM TPC – Technical Center – FAA
 Disaster Recovery Center (DRC)
 FAA HQ and Academy
 Contractor Sites (1)
 R&D (4)
 Traffic Management Units at:
 ARTCCs (21)
 TRACONs (35)
 CERAPs (3)
 Regional Offices (5)
 Towers (19)
 Airlines (24) & AOCs
 Military (9)
 International Sites (17)
 U.S. Government Locations (7)



TFMS – Collection of Systems and Interfaces

Display: Maps Flights Alerts Weather Routes FEAFCA Tools

TIME RANGE
Start Time: 08:07:06 18:00
End Time: 08:07:06 21:00
Look Ahead: 30 min
ALTIMETER RANGE
Ceiling: 500 Floor: 0
MOVING PARAMETERS
Heading: 0 Speed: 0
CHARACTERISTICS
Domain: Type: FSA
FSA: Public FCA
FMS: Reason: VOLUME
DRAWING CONTROL
Color: (Unk) (Dred)

Traffic Situation Display

Flight Schedule Monitor interface showing a graph and flight data.

Flight Schedule Monitor

Options Edit View Tools Information Print Reports Link Search Help

Misc: Paul Hawkins
RSTIN
MRSTIN
GStop
APROD

Delay	Aprt	Time	Type	Fac	Message	Status
					EVR Arr via WHITE 15 MI	ZAU:Y
					1748-1900, WX:SNOWICE, ZDC:ZAU,ZNY,ZTL,RSTN:APVD	ZNY:Y
						ZTL:Y
					DISAPPROVED: CLE Arr via WHITE 12 MI	ZAU:Y
					1800-2100, WX:SNOWICE, ZDC:ZAU,ZOR,RSTN:	ZOB:Y

National Traffic Mgmt Log

ESIS Display - Connected IPCOPS at: [ZDC_ARIAS] 07 Aug 2007 1728

Restrictions
BOS WHITE 6MIT JETS SPD: 210 ALT: AOA333 1900-2100 ZDC:ZBW
SEA WHITE 12MIT 2100-2200 ZDC:ZSE
MSP WHITE 5MIT 1939-1942 ZDC:ZMP

Ground Stops
GS All ARR BWI 1941-1945 WX:SNOWICE
GS All ARR DTW 2100-2200 WX:SNOWICE

MISC Entries
Blank spaces can be added before entries.

Outages
DCC ARTS 111-A OTS 1941-UFA

Hard returns may be added to ESIS entries.

Enhanced Status Info System

ATCSCC OIS SYSTEM ADTN 7/12/2012

CONTROL ELEMENT	START	END	SCOPE	REASON	AVG AAR	PR	ADVZY	DA
IAH	1159	1959	ALL	WEATHER TRENDS/TORUS	75	36	36	021 DA

Operational Info System

fly.faa.gov

fly.faa.gov

Playbook interface showing a map with flight paths and airport locations.

Playbook

Airport Monitor EWR

ACID/CID	Type	Rwy	DSP	St	CS	Fk	Fk	Dest	Delay	
KEWR 011	DES	41	1835	C	BRZZY	GREAT	ETD	0		
COA279 138		12 3B	H 41	1921	P	DEXIE	MARTA	MOSD	0	
COA279 042		17 00	10 41	1224	3 10	E	CAI	DTXIE	MATLZ	0 20

Departure Spacing Pgm

Monitor Alert interface showing a map with alert locations and a text box.

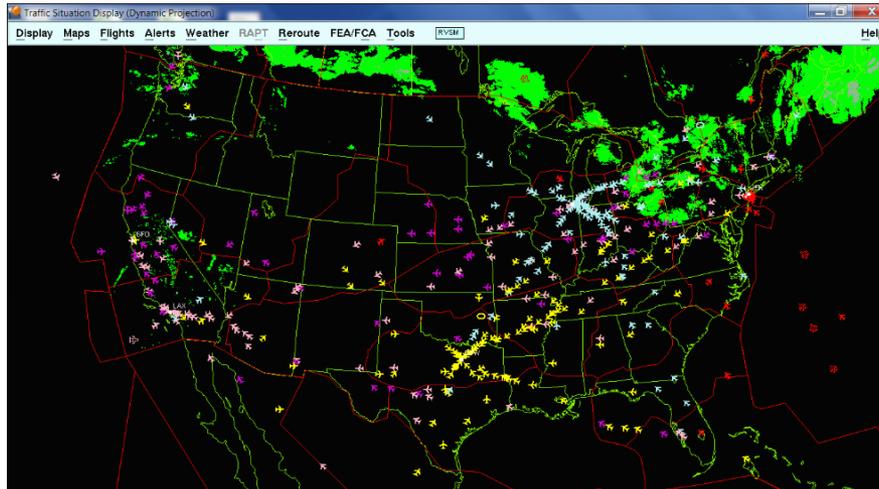
Examine Alerts allows you to obtain more details about traffic demands on a particular airport, sector, or fix.

Click Examine Alerts to display the Examine Alerts dialog box.

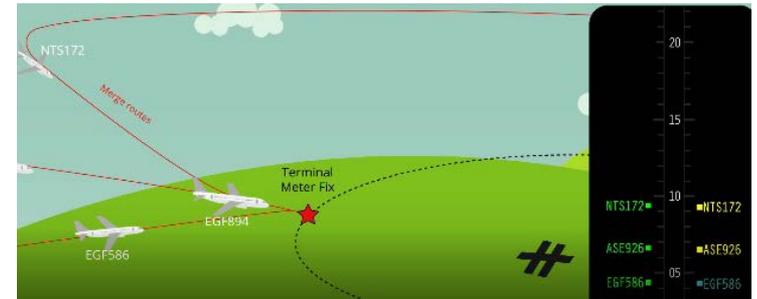
Monitor Alert



Three T's Automation Programs



TFMS (Traffic Flow Management System)



TBFM (Time Based Flow Management)



TFDM (Terminal Flight Data Manager)





Local and regional ATFM implementations, conducted worldwide, will shape a global ATFM.





Questions?

Thank you!

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