

Federal Aviation Administration

Air Traffic Organization

"System Operations"

Air Traffic Flow Management:

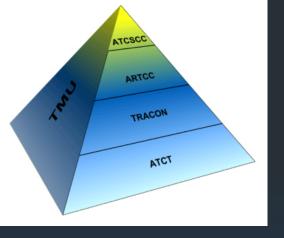
The United States Model





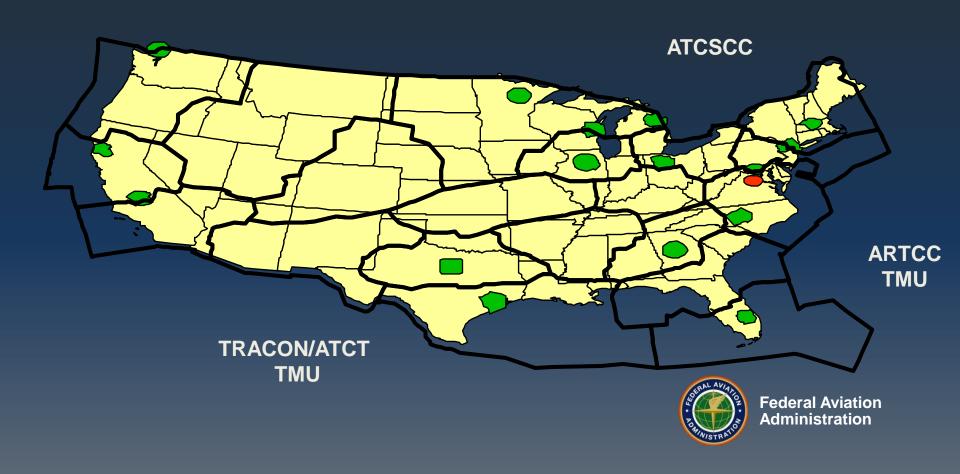
Economic Impact of Civil Aviation in the USA

- Contributes \$1.3 trillion annually to the national economy
- Constitutes 5.6 percent of the gross domestic product
- Generates more than 11.5 million jobs, with earnings of \$396 billion



TFM Management Structure

Traffic Management Units (TMUs) - TRACON ATCTS & ARTCC





Air Traffic Control System Command Center





Air Traffic Control System Command Center

Monitor and manage the flow of air traffic throughout the nation and adjacent countries producing a safe and orderly flow while minimizing delays





ATCSCC Primary Areas

- Terminal Area (Airports)
 - Communicate with field facilities and customers
 - Implement National TMIs
 - Evaluate implemented TMIs

- Severe Weather Area (Enroute)
 - Reroute aircraft around severe weather and other enroute constraints





Collaborative Planning

- Develop, communicate and coordinate the operational plan
- Planning Telcon every two hours (7:15am)
 - Routes in place
 - Enroute & Terminal constraints
 - Customer concerns





Tactical Customer Advocate (TCA)

Customer liaison

- Airport Reservations (LGA & DCA)
- Special Traffic Management Programs

Large volume events - Air Shows & Sporting Events



International Operations and

Collaboration
In Progress

- Currently
- Brazil
- Canada
- Colombia
- COCESNA
- Dominican Republic
- EUROCONTROL
- Japan
- Mexico
- Panama
- United Kingdom

- Australia
- Russia

Future

- Argentina
- Chile
- Peru







NATIONAL WEATHER SERVICE

- Provide current and forecasted information
- Use information to develop and implement TMIs





Security

- Monitors security telephone hotline
- Informs ATCSCC and hotline participants of significant issues



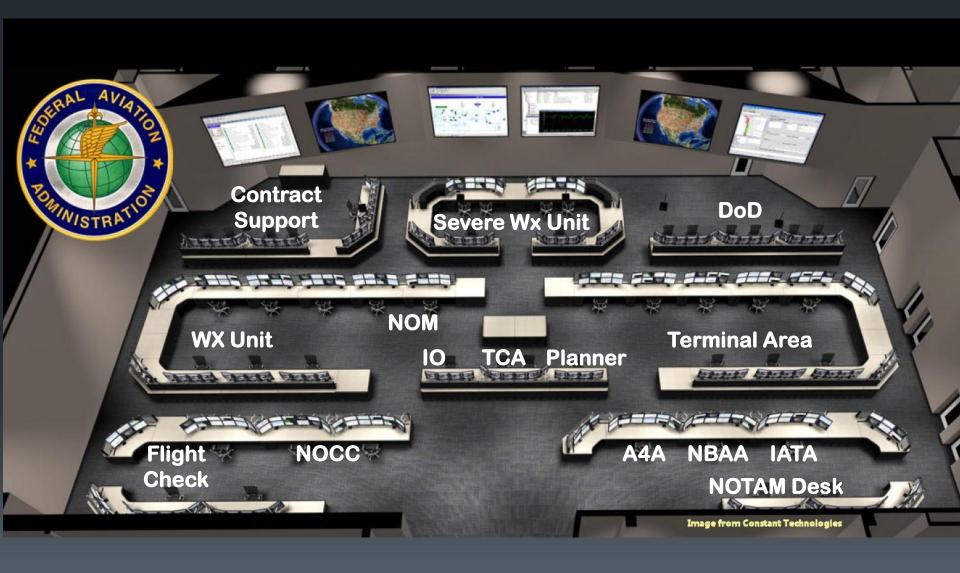


National Operations Control Center (NOCC)

- Monitors operational status of NAS facilities and services nationwide
- Receives, processes and disseminates data concerning facility/service outages or interruption
- Responsible for system components (radar, communications, navaids)



ATCSCC Operating Positions



Air Traffic Organization System Operations

ATFM Tools





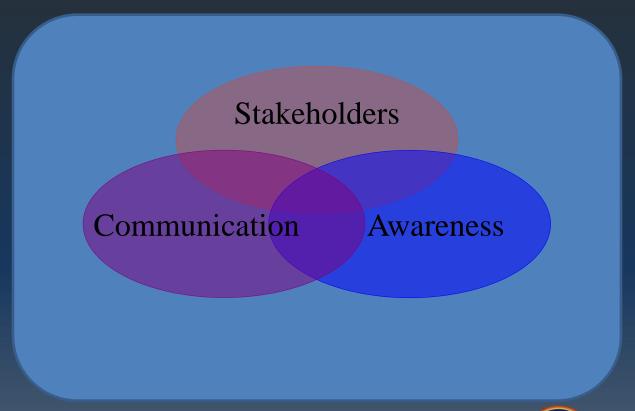
Collaborative Decision Making (CDM)

Working together to find a solution

- Embracing partnership, combining the talents and experiences of all participants, and facilitating the harmonization and globalization of our airspace system
- Sharing of data to create a common view of the ATFM system from which to base decisions, and including ATFM stakeholders in the decision-making process



Collaborative Decision Making The Philosophy & Process At Work



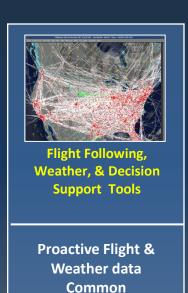


CDM Collaborative Tools

-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



understanding







Operational Information System (OIS)

The Operational Information System (OIS) Web Site provides real-time airport delay information as it is received from FAA facilities. The OIS system is a Web-based application that displays Ground Delay, Ground Stop, Deicing, and general airport delay information.

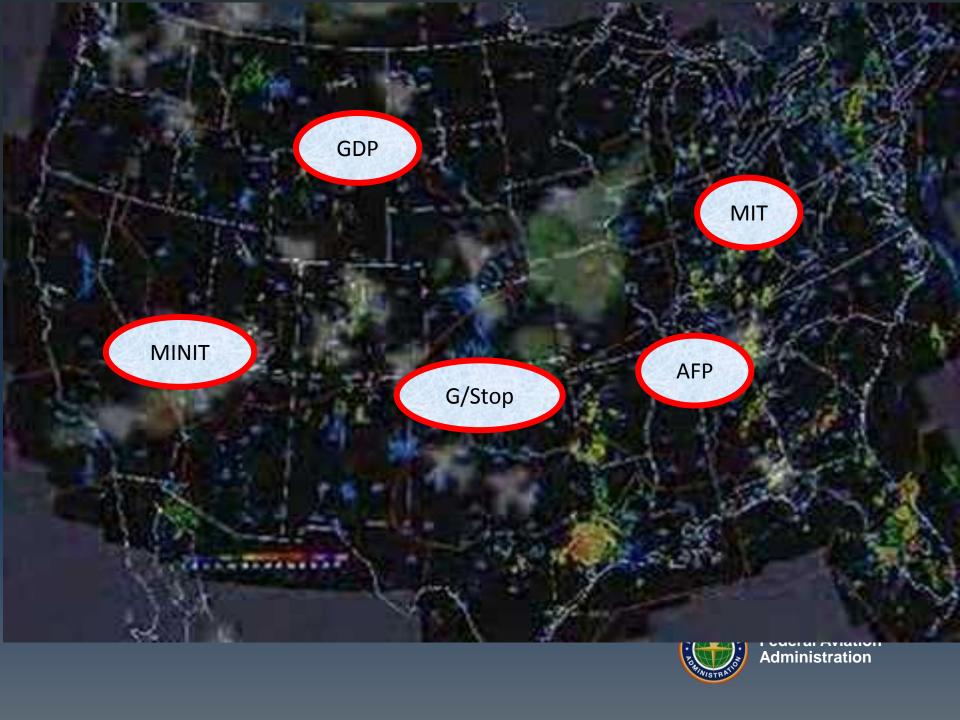




Traffic Management Initiatives (TMI)

- TMIs are used to balance demand with capacity
- Always seek the least restrictive TMI
- Any TMI creates an impact on our customers



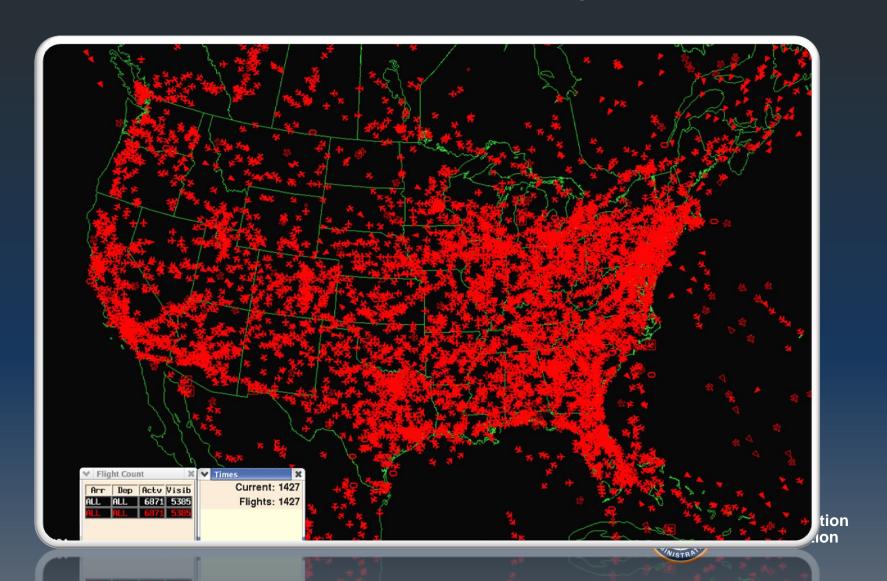


Traffic Situation Display (TSD)

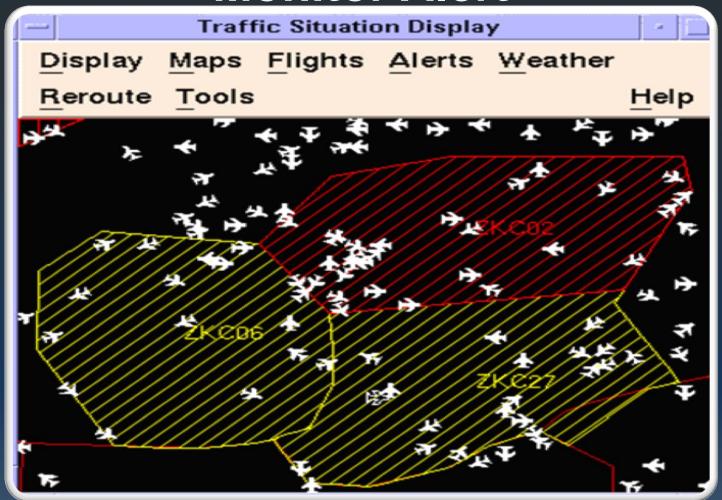
- Monitor Alert
- NAS Monitor
- Select Flights
- Route Manager (Fix encode/decode)
- Email



Traffic Situation Display (TSD)



Monitor Alert





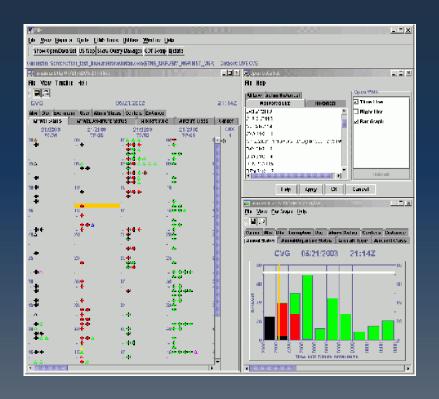
Terminal

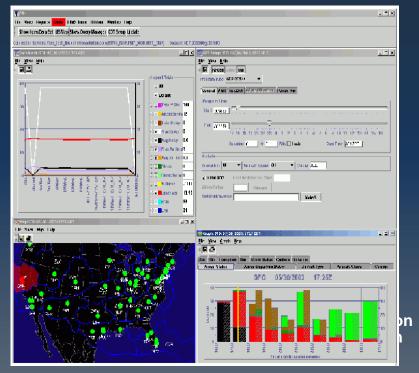
- Flight Schedule Monitor (FSM)
- GDP/UDP/GAAP/GS
- Integrated Program Modeling (IPM)
- Real Time FSA (Web Tool)
- Traffic Management Advisor
- Surface Management Aeroban and Harmony



Flight Schedule Monitor (FSM)

The **Flight Schedule Monitor (FSM)** is used by FAA traffic managers and Collaborative Decision Making (CDM) participants to monitor airport capacity/demand balance, model Traffic Flow Management (TFM) initiatives, and evaluate alternative approaches. FSM is also used to implement Airspace Flow Program (AFP), Ground Delay Program (GDP), Ground Stop (GS), and General Aviation Airport Program (GAAP) strategies.





Flight Schedule Monitor Ground Delay Program



Flight Schedule Analyzer (FSA)

The **Flight Schedule Analyzer (FSA)** consists of Post-Analysis FSA (PA-FSA) and Real-Time FSA (RT-FSA). **PA-FSA** is an analysis tool used by the Traffic Flow Management (TFM) community to assess the performance of ground delay programs (GDPs) on a next-day basis. The preprocessor runs nightly and completes a variety of tasks including populating the database and creating a number of reports; e.g., compliance, morning briefing materials, and others.

Real-Time FSA What's New Operations Automation Information Procedures Training QA										
LGA Performance	Flight List Generated at 1916z on 09/07/2006									
Original Start Time: 16:00z	1600	1700	1800	1900	2000	2100	2200	2300	0000	0100
FSM Program Rate	38	38	38	38	43	43	43	43	43	43
Number of Assigned Slots	34	33	38	37	43	43	43	43	43	43
Flights Controlled by Another Initiative	0	0	0	0	0	0	0	0	0	0
Cancellations	-1	<u>-0</u>	<u>-0</u>	-1	<u>-0</u>	<u>-0</u>	<u>-0</u>	<u>-0</u>	<u>-0</u>	-1
Extra Demand	6	5	2	3	7	2	1	1	3	1
Flights Arriving Prior to Their Control Hour	-2	<u>-4</u>	<u>-2</u>	<u>-1</u>	<u>-3</u>	<u>-5</u>	<u>-1</u>	-0	<u>-0</u>	<u>-0</u>
Flights Arriving After Their Control Hour	<u>-2</u>	-1	<u>-0</u>	<u>-0</u>	-1	<u>-1</u>	<u>-0</u>	<u>-2</u>	<u>-1</u>	<u>-0</u>
Total Current Demand	<u>35</u>	33	38	38	<u>46</u>	39	43	42	45	43
Number of Unassigned Slots	0	0	0	0	0	0	0	0	0	0
Total Potential Demand	35	33	38	38	46	39	43	42	45	43

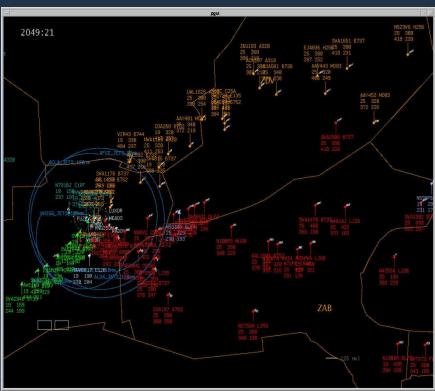
Total Potential Demand



Traffic Management Advisor (TMA)

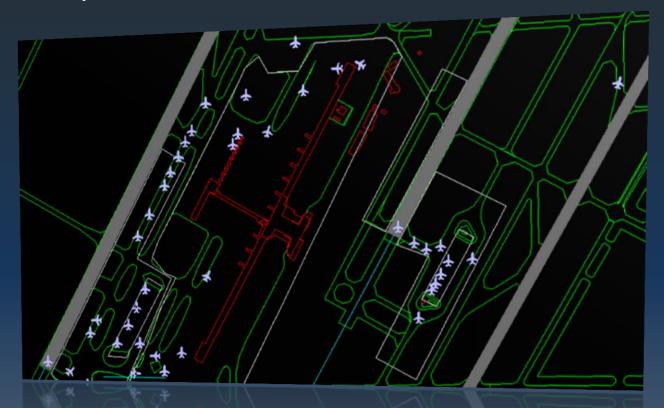
- TMA is a system wide tool designed to optimize the flow of aircraft into capacity-constrained areas
- TMA is the primary means within the NAS to conduct Time-Based Metering operations





Surface Management

Surface Management reduces taxi time, emissions, and fuel consumption.





Enroute

- Flow Evaluation Area/Flow Constraint Area (FEA/FCA)
- Integrated Collaborative Reroute (ICR)
- Area Flow Programs (AFP)
- Flight Schedule Monitor (FSM) Eligible FEA's
- Create ReRoute
- Protected Segment
- ReRoute Impact Assessment (RRIA)
- NAS Monitor
- Mile-In-Trail modeling

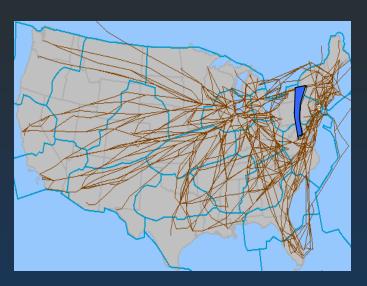


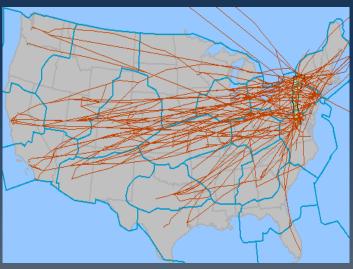
Enroute

- Modeling impact
- Sharing before publishing
- Analysis
- ReRoute Monitor
- Route Management Tool (1.5 and Web)
- Preferred Routes
- Coded Departure Routes (CDR's)
- Playbook



Airspace Flow Program (AFP)

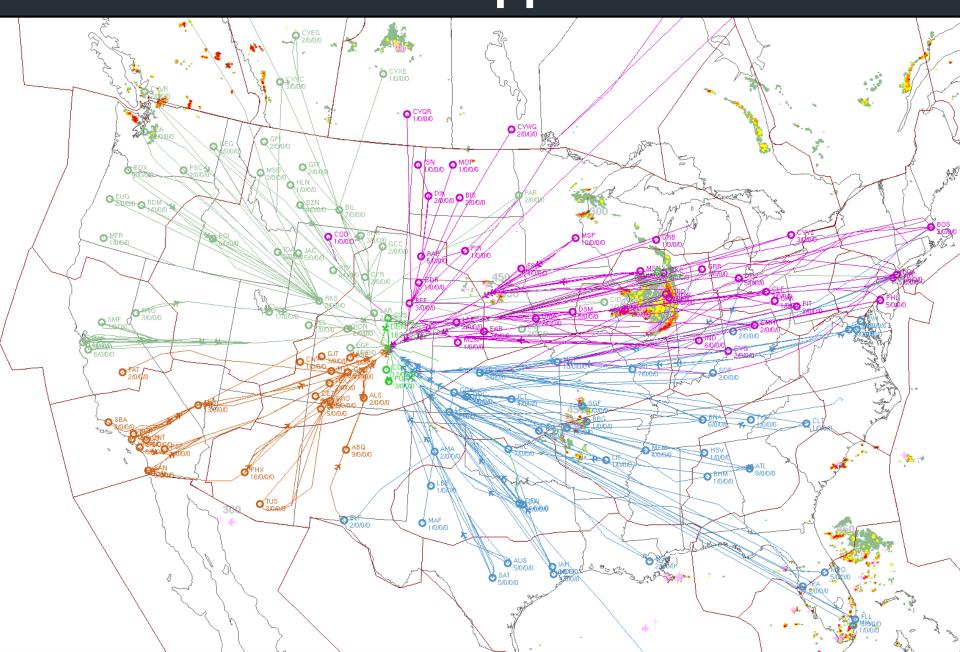




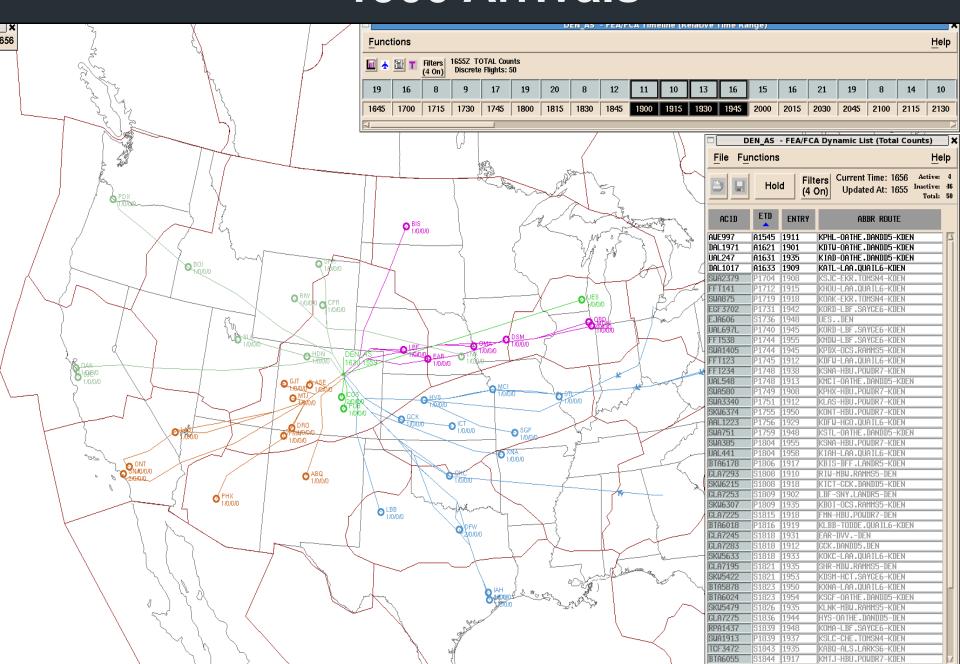
- Distributes delays equitably among flights through the constrained resource
- Avoids imposing unnecessary delays on flights that do not use the constrained airspace
- Provides customers with more predictability, flexibility, and options (e.g., rerouting out of the AFP)
- Programs can be revised as demand and weather change to make full use of all available capacity



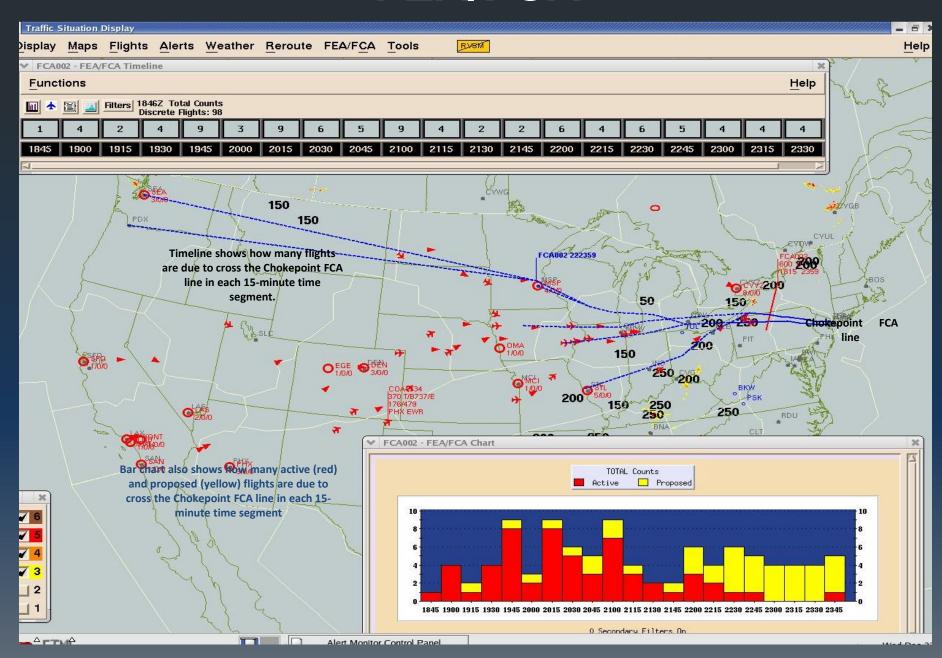
FEA/FCA Applications

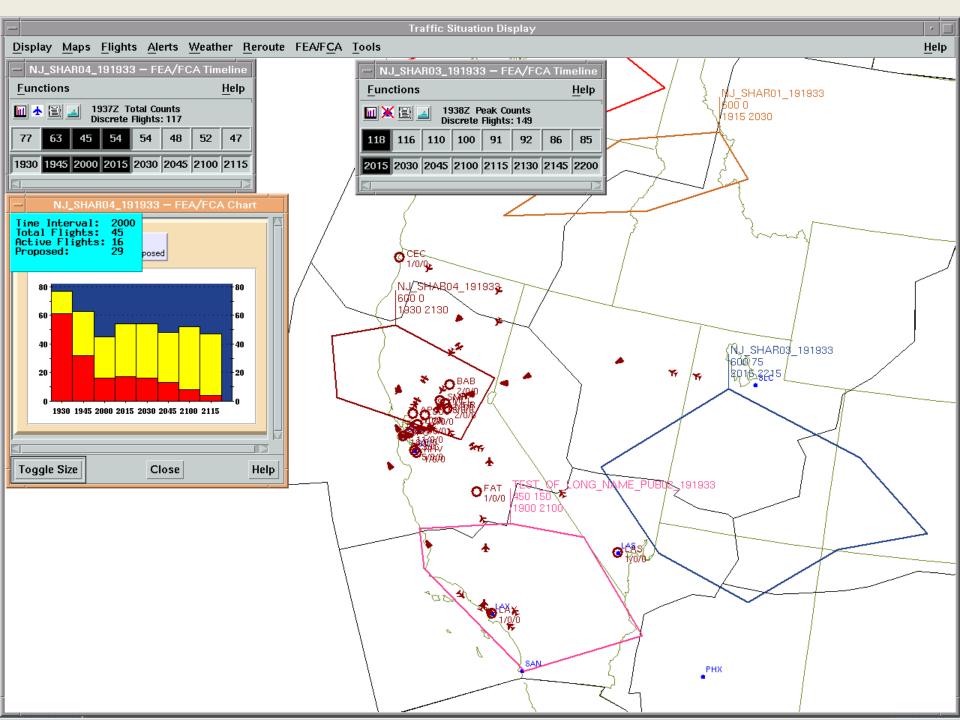


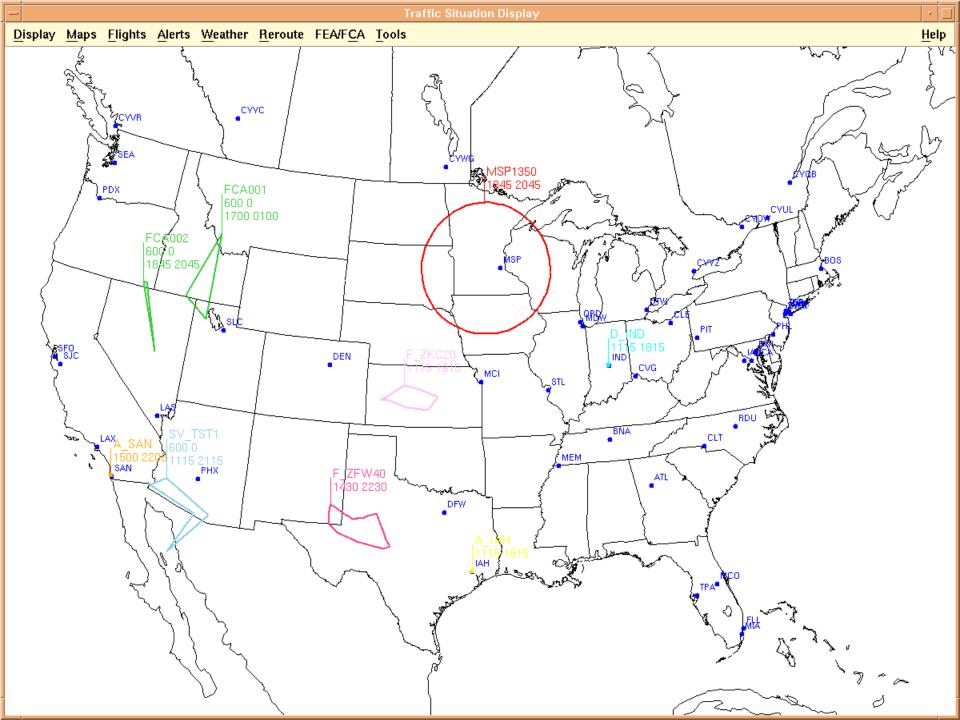
1900 Arrivals



FEA/FCA







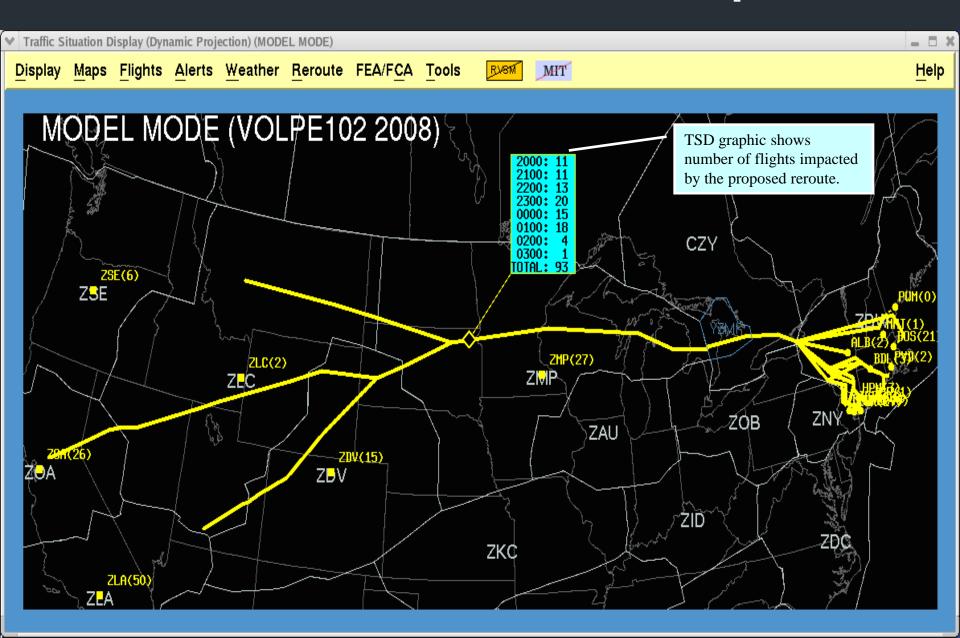
Reroute Impact Assessment RRIA

- RRIA Graphical User Interface (GUI) is an extension of existing TSD functions
- Built to blend the Create Reroute tool and NAS Monitor for modeling system impact
- Reduce Reroute Coordination Time Through
 - Graphical and interactive tool to support reroute construction
 - Faster access to numbers of affected flights
- Modeling Reroute and Mile in Trail (MIT) Together
 - Prediction of reroute and/or MIT impact on sector loads
 - Sharing of model results with FAA facilities
 Federal Aviation Administration

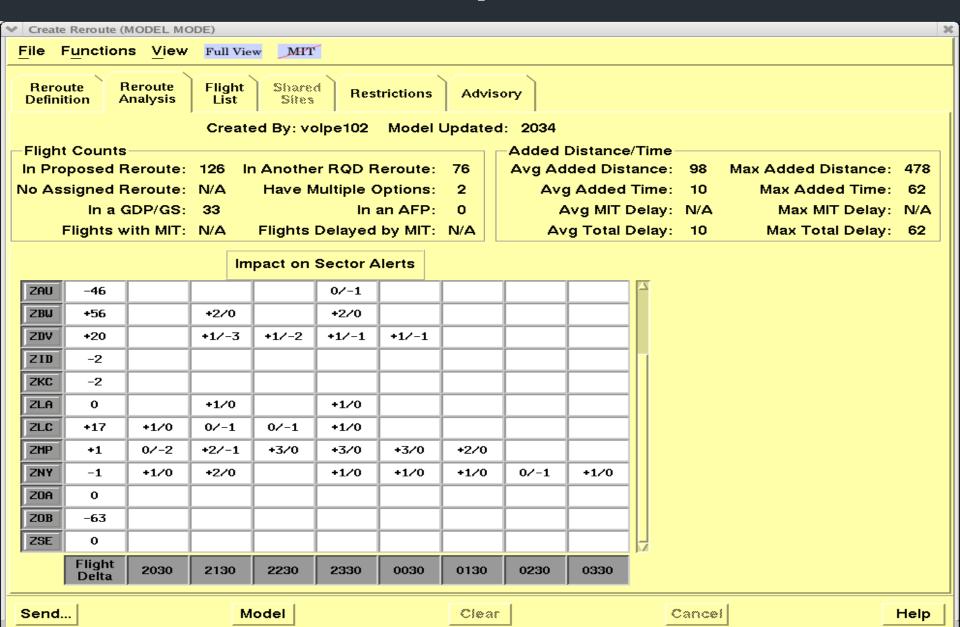
Create Reroute Tool is Used to Model Reroute Impact

Create Reroute (MODEL MODE)	✓ Create Reroute (MODEL MODE)	
File Functions View Full View MT		
Reroute Definition Reroute Analysis Flight Shared Sites Restrictions Advisory Display Reroute		
Import Routes From: Playbo	ook Route Search My Routes RMT File Show: Fixes Navaids	
Identify Flights based on: Erase Preview Flight Count: 126		
, ,	ublic FEA/FCA Flight List	
*Start Time: 14 1800	*Name: jcan 1 Fest Color:	
	✓ Primary Filters Domain: □ Private □ Local □ Shared ● Public	
*End Time: 15 0200 Entry	time: Prom: 10: = = = = = =	
Flight Status: 🔴	All Airborne Not Airborne Status: Active Planned	
	Filter Town	
# Origin(s)	Filter Type Route Full Destination(s) RAP J158 ABR CESNA JUVAC JAKEY VIXIS PENDO SIBKI TULEC	
2 7 50 ZLA	BCE J100 EKR MBW RAP J158 ABR CESNA JUVAG JAKEY VIXIS PEND	
3 🗸 2 ZLC	BOY J32 CZI J82 RAP J158 ABR CESNA JUVAC JAKEY VIXIS PENDO	
4 🗸 2 ZLC	EKR MBW RAP J158 ABR CESNA JUVAG JAKEY VIXIS PENDO SIBKI I	
5 🔽 27 ZMP 🔟	VIXIS PENDO SIBKI TULEG	
6 🔽 26 ZOA 🔟	SAC J32 CZI J82 RAP J158 ABR CESNA JUVAC JAKEY VIXIS PENDO 🔟	
7 🔽 6 ZSE 🔟	HLN J90 ABR CESNA JUVAG JAKEY VIXIS PENDO SIBKI TULEG	
<u> </u>		
Destination Segments for Split Routes:		
# Destination	Route	
8 🔽 10 LGA	TULEG RKA HAARP1	
9 🔽 1 MHT	TULEG CON	
10 📈 3 MMU	TULEG HNK V167 WEARD V489 COATE	
11 2 PVD	TULEG HNK TEDDY3	
12 7 0 PWH	TULEG CON NEETS	
13 7 13 TEB	TULEG HNK V167 WEARD V489 COATE	
7		
1		
Send	Model Clear Cancel Help	

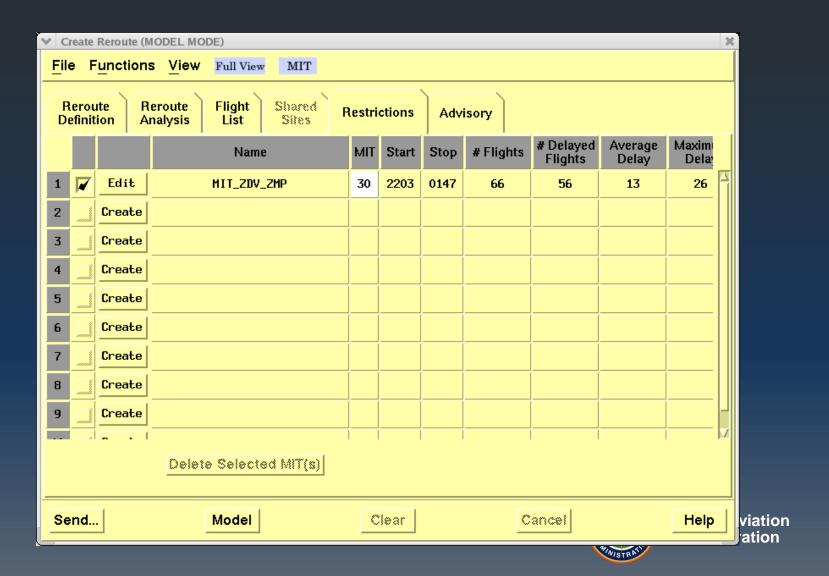
View Modeled Reroute Impact



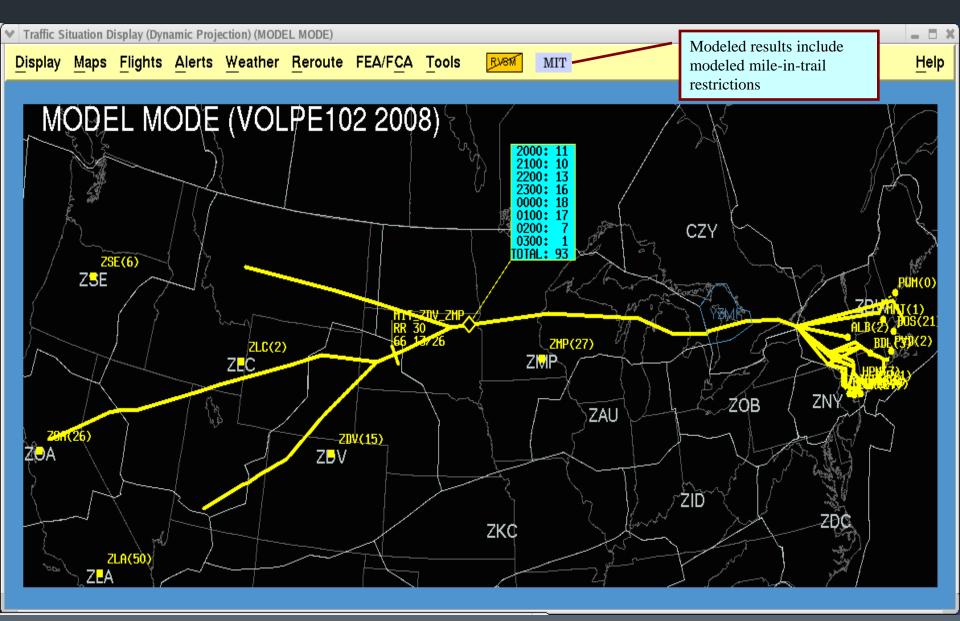
See Overall Impact on Sectors



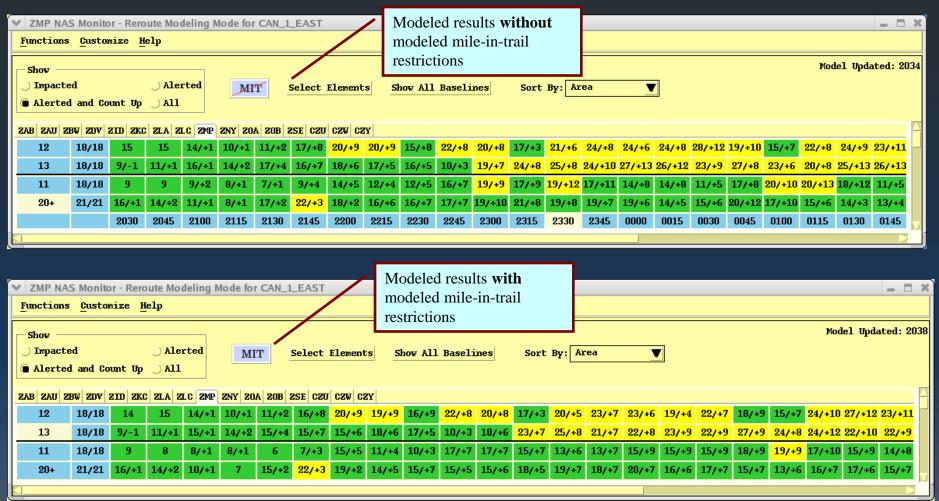
Model Mile-in-Trail Restrictions



View Modeled MIT Results

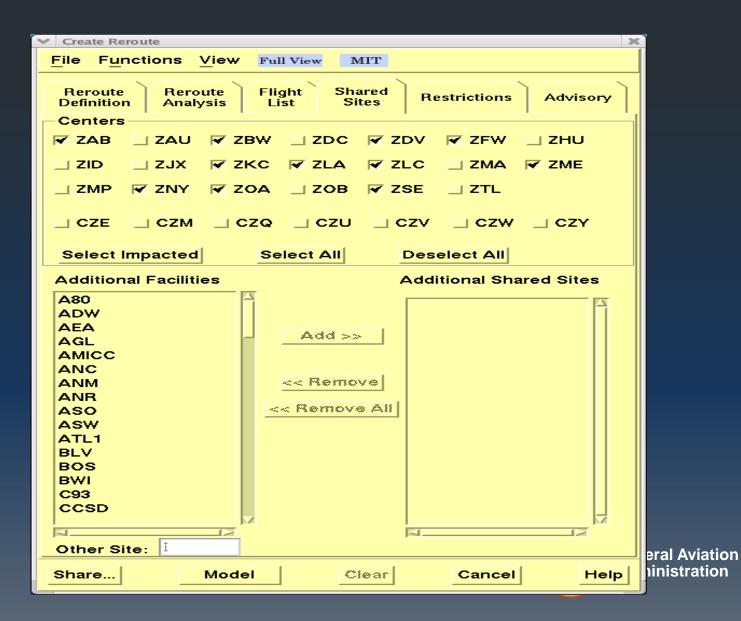


Analyze Impact on Sectors with MIT

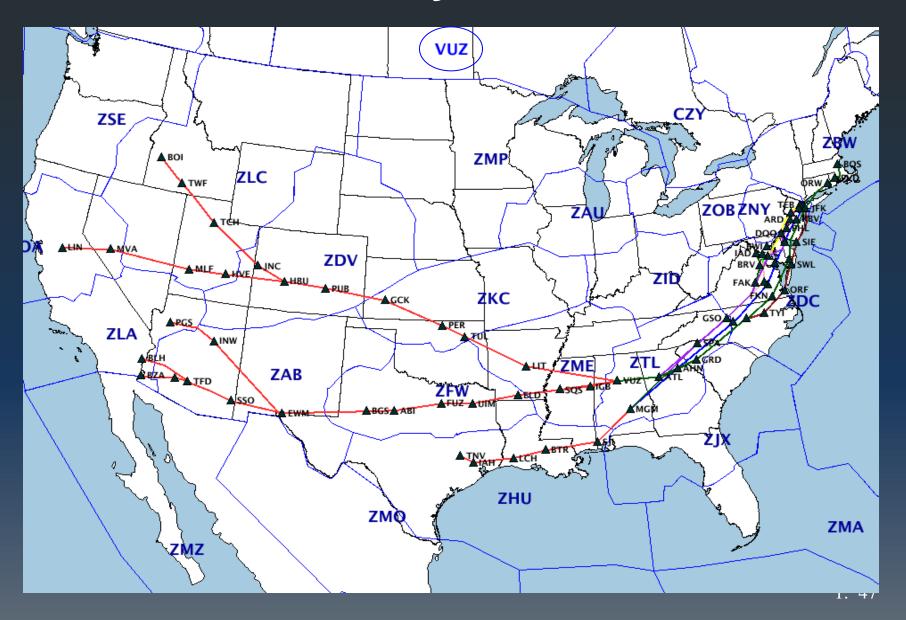




Share Reroute Definition and Model Results



National Playbook Routes

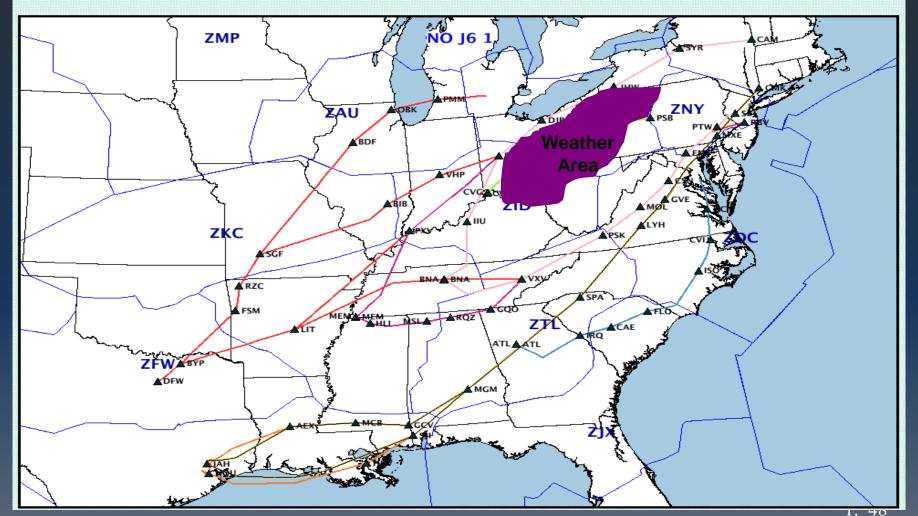


Playbook Routes for Closed Airways (J6)

Impacted Area or Flow: J6 BETWEEN MRB-BWG

Facilities Included: ZBW/ZNY/ZDC/ZID/ZOB/ZTL/ZME/ZHU/ZJX

Instructions: REROUTE ANY AIRBORNE TRAFFIC AND INTERNAL DEPARTURES VIA THE FOLLOWING ROUTES



Weather

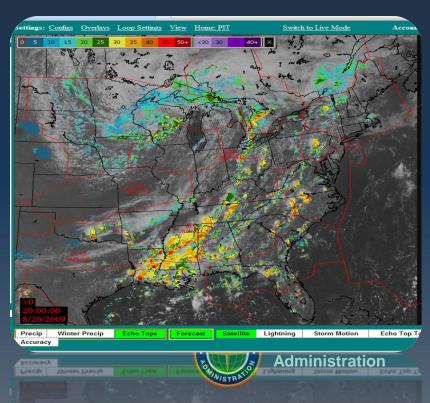
- CIWS Corridor Integrated Weather System
- ITWS Integrated Terminal Weather System
- RAPT Route Availability Planning Tool
- CCFP Collaborative Convective Forecast Product
- Chat Room
- Weather Channel
- Aviation Weather Center (AWC) Web Site



Corridor Integrated Weather System (CIWS)

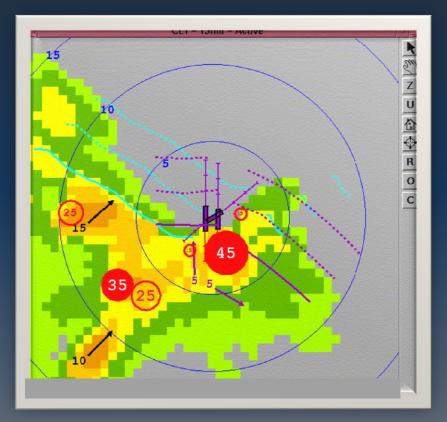
CIWS provides the only automated forecast of storm tops. The requirements also specify the capability to provide route impacts, most notably for departure routes.





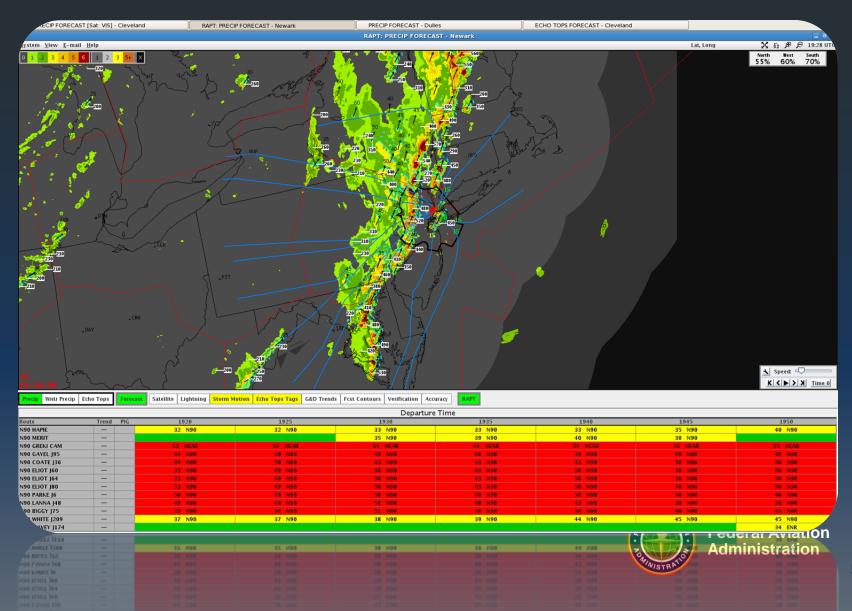
Integrated Terminal Weather System (ITWS)

 ITWS provides high resolution depiction of near airport storm intensity and location as well as rapid update rate of TRACONarea precipitation and motion. It also provides a long range ARTCC viewpoint of precipitation intensity and motion.



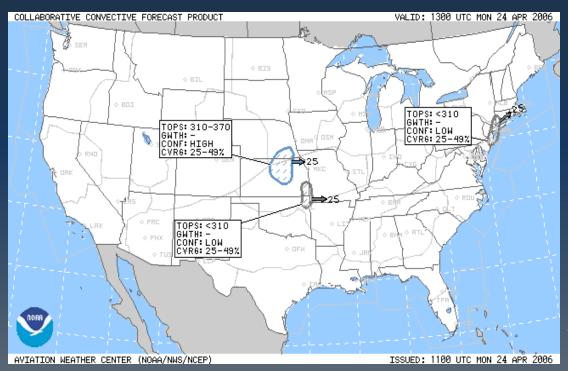


Route Availability Planning Tool (RAPT)



Collaborative Convective Forecast Product (CCFP)

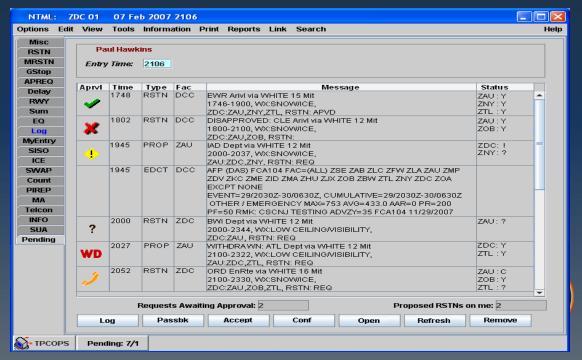
The Collaborative Convective Forecast Product (CCFP) provides common situational awareness across the FAA and National Airspace System (NAS) stakeholder community of significant forecasted convective weather that may impact the flow of air traffic. The CCFP is initiated at the Aviation Weather Center (AWC) and is most frequently used during the severe weather season.



Federal Aviation Administration

National Traffic Management Log (NTML)

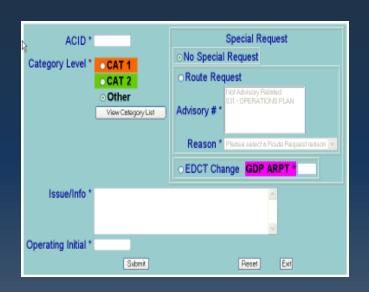
The National Traffic Management Log (NTML) provides single-point, automated collection, and real-time distribution of National Airspace System (NAS) operational data over the Traffic Flow Management System (TFMS). It modernized the previous FAA process for entering local traffic management facility operational data into multiple systems.



Federal Aviation Administration

Tactical Customer Advocate (TCA)

 The Tactical Customer Advocate (TCA) Web Tool is used to facilitate communications on line between Collaborative Decision Making (CDM) customers and the Air Traffic Control System Command Center (ATCSCC)







e-CVRS

The Computerized Voice Reservation System (e-CVRS) is a Webbased application that allocates and manages arrival and departure slots at high-density traffic airports (HDTA). The FAA requires that unscheduled Instrument Flight Rules (IFR) operations have a reservation in e

-CVRS Benefits:

- Request, confirm, update, and cancel reservations on line
- Change date and time of reservations



http://www.fly.faa.gov/ecvrs/index.html



e-STMP

Special Traffic Management Programs (e-STMPs) are implemented for special events that attract thousands of people and aircraft to participating airports.



The Web interface has been developed to simplify the reservation process and allow for more reservation flexibility.

Federal Aviation Administration