Air Traffic

Flow Management

Presented to: MIT

- By: FAA Command Center
- Date: October 5, 2006



Briefing Overview

• Why use ATFM?

 Benefits derived from Air Traffic Flow Management (ATFM) and the Collaborative Decision Making (CDM) process.

• Who is involved?

- Air Traffic Organization
- Customer
 - Civil
 - Military

• How is ATFM applied?

- Planning and coordination
- Automated tools and procedures



PHL Arrivals and Departures





EWR Arrivals and Departures





JFK Arrivals and Departures





LGA Arrivals and Departures





BOS Arrival and Departures





TEB Arrival and Departures





Northeast Airports Close Up





Northeast Airports Arrivals and Departures





All Traffic





Convective Weather





All Northeast Airports with Weather





Military Airspace





Air Traffic Flow Management

- **Mission** balance air traffic demand with system capacity to ensure a safe, efficient utilization of the National Airspace System.
- Appropriate application of traffic management initiatives provides operational benefits:
 - Minimizes delay and congestion
 - Increases throughput
 - Increases system safety
 - Lowers cost through fuel savings
 - Provides scheduling predictability



Air Traffic Flow Management

- ATFM supports the implementation of new technology and procedures that enhance airspace capacity such as:
 - RNAV
 - RNP
 - RVSM
 - CAATS
 - Shanwick System
 - A-380 construction
 - ERAM



Collaborative Decision Making

- The Traffic Flow Management operational philosophy, technologies, and procedures that enable the Federal Aviation Administration and the aviation industry to collaboratively manage operational constraints in a manner that balances operational efficiency with aviation safety.
- Collaborative decision making has become an integral part of our ATFM process. The success of our system relies on this collaboration



Benefit to the Customers

- Customers participate in the daily management of the NAS through
 - Daily weather assessment
 - Common situation display
 - Planning Telcons conducted every two hours
 - Representatives located at the System Command Center
 [ATA, NBAA, Military Cell]
 - Direct access to the Tactical Customer Advocate
 - Access to FAA management through daily customer telecon
 - Participate in regular system improvement meetings



The Military as a Customer

- Military Air Traffic Services Cell
 - Housed within the System Command Center
 - Mission To coordinate all priority military aircraft movement and airspace issues during times of tension, warfare, natural disasters or civil unrest.
 - Warfare Support
 - Deployment of forces
 - Sensitive, specialized, or classified mission coordination
 - Military training exercise support
 - Natural or environmental disaster assistance
 - Civil exercise collaboration involving military participation



Military Aircraft





The Customer's Role

- Customer participation through direct representation within the System Command Center via
 - National Business Aviation Association
 - Air transport Association
 - Military Cell
- Airline Operations Center participation in Planning Teleconferences conducted every 2 hours
- Participate in localized teleconferences directly with Tower, TRACON, Centers, and Command Center during establishment of traffic management initiatives
- Direct access to Tactical Customer Advocate for extraordinary issues
- Common shared situational data for planning purposes



Who's Involved

- Terminal/TRACON
- Enroute
- Command Center
- Director Tactical Operations
- Customers
 - Civil
 - Military



Approx. 5,000 Airports125 FAA staffed235 Federal Contract





35 Primary Airports





Approx. 170 TRACONs





Air Traffic Hierarchy Tower – TRACON – Center – ATCSCC - DTO





Air Traffic Organizational Structure

- Air Traffic Control System Command Center
 - National Operations Manager
 - Operations Planning Team
 - Traffic Management Coordinators/Severe Weather Specialists
 - Tactical Customer Advocate
 - Central Altitude Reservation Facility
- All 21 Air Route Traffic Control Centers have Traffic Management Units
- All major TRACONs and Towers have Traffic Management Units
- Manager, Tactical Operations 5 regional representatives.



Air Traffic Control System Command Center (ATCSCC)





Applying ATFM

• Planning

• Coordination

• Tools





Applying ATFM Planning and Coordination

- Day begins with collaborative discussion on forecasted weather impacts to the system, with continuous review throughout the day.
- Operations Plan is developed with customers, field facilities and the System Command Center.
- Plan is revisited and updated every 2 hours throughout the day.
- Specific airport and regional initiatives are managed by Traffic Management Coordinators and field facility experts in collaboration with the customers
- Capacity and constraint data is shared via automated means with all parties



Collaborative Convective Forecast Product





Planning Process





Common Situation Display





Enhanced Traffic Management System (ETMS)





Enhanced Traffic Management System (ETMS)





Flight Schedule Monitor




Flow Evaluation Area/Flow Constrained Area

- FEA Geographic area identified as being impacted by weather or other constraint, is shared with customers and FAA facilities to allow voluntary rerouting away from impacted area.
- FCA A formalized FEA which requires positive traffic management initiatives to meter traffic through constrained area
- Initiatives applied may be
 - Miles-in-trail or minutes-in-trail.
 - Capping altitude below impacted area
 - Tunneling through designated corridors
 - Ground delay programs and/or ground stops



Flow Evaluation Area





National Playbook



Air Traffic Control System

Command Center



National Severe Weather

Playbook

DFW BYP 1

Impacted Area or Flow: DFW BYP STAR

Facilities Included: ZFW/ZME/ZID/ZDC/ZNY/ZBW/CZY/ZTL/ZHU/ZJX/ZMA/ZKC/ZAU/ZOB/ZMP

Instructions: REROUTE ANY AIRBORNE TRAFFIC AND INTERNAL DEPARTURES DESTINED THE DFW TERMINAL ARI VIA THE FOLLOWING ROUTES. SUBSTITUTE OTHER DESTINATION IN PLACE OF DFW IF APPLICABLE





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101-12-22111-42:44 HPNDFWB6 KHPN KDFW KHPN BIGOV 3/75 GVE J37 SPA J14 VUZ J14 LIT BYP4 KDFW BIGOV ZhV ZhW - 101-12-22111-42:41 HPNDFWB7 KHPN KKPW KHPN KBKE J50 CULST STL, R20 FBB BIGP4 KDFW PARKE ZhV - 101-12-22111-42:41 HPNDFWB7 KHPN KDFW KHPN KBKE J50 CULST STL, R20 FBB BIGP4 KDFW PARKE ZhV ZFW - 101-12-22111-42:41 HPNDFWG7 KHPN KBFW KHPE ZhV ZFW - 101-12-22111-42:41 HPNDFWC6 KHPN KBFW KHPE ZhV ZFW - 101-12-2711-42:41 HPNDFWC6 KHPN KBFW KHPE ZhV ZFW - 101-12-2711-42:41 HPNDFWC6 KHPN KBFW KHPN KBFW KBFW KBFW KBFW ZHV ZFW - 101-12-2711-42:41 HPNDFWC6 KHPN KDFW KHPN KBFW KBFW KBFW KHFW ZFW - - 101-12-2711-42:38 HPNDFWC1 KHPN KBFW KHFW		and the second se	and the second second second second	and the second second second				and the second second second					
101-12-27 11:42:41 HPNDFWB7 KHPN KDFW KHPN PARKE J& COLNS J1:34 STL RZC FSM 6YP4 KDFW PARKE ZNY ZFW - 101-12-27 11:42:41 HPNDFWB9 KHPN KDFW KHPN VARTE J209 ORF J1:74 ILM J4 CAE J2X TL J14 LIT (19/4 KDFW WHTE ZNY ZFW - 101-12-27 11:42:41 HPNDFWCA KHPN KDFW KHPN OREX V419 JUDDS CAM J547 SYR J29 PXV J131 LIT BYP4 KDFW GREK0 ZNY ZFW - 101-12-27 11:42:38 HPNDFWCA KHPN KDFW KHPN WHTE J209 ORF J174 CHB J40 MGM J4 JAN LLD TXK BYP4 KDFW GREK0 ZNY ZFW - 101-12-27 11:42:38 HPNDFWCH KHPN KDFW KHPN WHTE J209 ORF J174 CHB J40 MGM J4 JAN LLD TXK BYP4 KDFW WHTE ZNY ZFW - 101-12-27 11:42:38 HPNDFWCH KHPN KDFW KHPN KHE J40 MGM J4 JAN LLD TXK BYP4 KDFW WHTE ZNY ZFW - 101:12-27 11:42:38 HPNDFWCH KHPN KDFW KHE J40 MGM J4 JAN LLD TXK BYP4 KDFW WHTE ZNY ZFW - 101:										ZFW	-		
101-12-27 11.42-41 HPNDFWCA KOHPN KOFW KOHPN GREIA V419-JUDDB CAM J42 T/32 P/XV J131 LTT BYP4 KDFW GREIA ZhV 2 101-12-27 11.42-38 HPNDFWCH KOHPN KOFW KOHPN GREIA ZhV ZhV - 101-12-27 11.42-37 HPNDFWCH KOHPN KOFW KOHPN GREIA ZhV ZHV -	01-12-27 11:43	41 HPNDFV	87 KHPN	KDFW	KHPN PARKE J6 COLNS J134 STL RZC F	SM BYP4 KDFW		PARKE	ZNY				
101-12-27 11:42:38 HPNDFWCH KHPN KDFW KHPN VMHTE J203 ORF J174 CHS J40 MGM J4 JAN ELD TXK BYP4 KDFW WHITE ZNY ZFW - 101-12-27 11:42:37 HPNDFWD5 KHPN KDFW KHPN PARKE J6 BWO SOS AEX LFK CWK LZZ JEN JEN8 KDFW PARKE ZNY ZFW -	001-12-27 11:43	41 HPNDEV	89 KHPN	KDFW	KHPN WHITE J209 ORF J174 ILM J4 CAE	J52 ATL J14 LIT BYP4	KDFW	WHITE	ZNY	ZFW	ŀ		
201-12-27 11:42:37 HPNDFWJ5 KHPN KDFW KHPN PARKE 38 9W0 S0S AEX LFK CWK LZZ JEN JEN8 KDFW PARKE ZNY ZFW -	001-12-27 11:42	41 HPNDEV	CA KHPN	KDFW	KHPN GREKI V419 JUDDS CAM J547 SYR	J29 PXV J131 LIT BY	P4 KDFW	OREKI	ZNY				
201-12-27 11:42:36 HPNDFWJ6 KHPN KDFW KHPN PARKE J6 BWO ARO FSM BYP4 KDFW PARKE ZNY ZFW -							ſ				-		
	001-12-27 11:42	36 HPNDFV	AJ6 KHPN	KDFW	KHPN PARKE J6 BWO ARO FSM BYP4 KD	(FW		PARKE	ZNY	ZFW	·		
	-138 / 138 reco	de										Select All	Deselect /



Ground Stops/Ground Delay Programs

(No	e: This	o page vi	ll refre	sh every minute. Last updated We	3, 14 Jun 2000 20:14:5	57 OMT.)			
	GROUND DELAY PROGRAMS								
	ARPT	START	END	FACILITIES	REASON		MAX AVG	AAR	
<u>.</u>	ATL	1809	2359	ZTL2 - DFW	WX ENROUT	E	74 38	80	
	DFW	1800	0259	ALL	THUNDERSTOP	RMS	150 39	72	
-	ENR	1800	0359	ALL CYYZ/CYUL/CYOW/CYHZ	SUPPORT OF S	SWAP	354 276	5	
-	LGA	2030	0159	NONEST	TSTRMS ENRTE	/SNAP	301 242	-28	ATCSCC Advisory
	PHL	1600	2359	ALL CANADA	LOW CEILIN	our stimuler also size size der der also size d	267 150	30	ATCSCC ADVZY 109 LGA/ZNY 07/14/2004 CDM PROPOSED GROUND DELAY
	STL	1900		ALL	TSTHS		197 113	32	
	010	1500	0135	ALL	Torno		157 115	52	MESSAGE; AIRPORT: LGA
_									ADL TIME: 1637Z Arrivals estimated for: 14/1800Z - 15/0459Z
				GROUND	STOPS			Edit	ARRIVALS ESTIMATED FOR: 14/10002 - 15/04392 ANTICIPATED PROGRAM RATE: 27
50	ARPT		TIME	FACILITIES		REASON		1/17/2004 (Charleston)	FLIGHTS INCLUDED: ALL CONTIGUOUS US DEPARTURES
}	BOS		2030	ZDC/ZTL/ZJX/ZM	/ ZHU	THUNDE	RSTORMS OF	N RTE	SCOPE: (NOWEST+CZY AP) ZAU ZBW ZDC ZFW ZHU ZID ZJX ZKC ZMA
, _	BNI		2100	ZID/ZOB/ZMP/ZAU/ZK	KC/ZNE/ZFW		WX EN RTE		ZNY ZOB ZTL CYHZ CYOW CYUL CYYZ
	CLE 2100		2100	ZNY/ZDC/ZID/ZAU/ZBN/ZOB/ZMP		NEATHER/TSTMS		1S	CANADIAN AIRPORTS INCLUDED: CYHZ CYOW CYUL CYYZ
	CLT	2100		ZDC/ZNY/ZBI	1	1			DELAY ASSIGNMENT TABLE APPLIES TO: ZNY
	CVG		2015	ZID/ZOB/ZNY/ZB	I/ZDC		TSTHS		ANTICIPATED MAXIMUM DELAY: 345
			2100	ZID/ZOB/ZMP/ZAU/ZK	ZHE/ZFW	E/ZFW WX EN			ANTICIPATED AVERAGE DELAY: 202
	DTN 2100		2100	ZDC/ZJX/ZTL/ZHA/ZAU/ZBW/	TSTMS ENROUTE			REASON: WEATHER, THUNDERSTORMS	
	IAD		2000	ZID/ZOB/ZMP/ZAU/ZK	KC/ZHE/ZFW		WX EN RTE		REMARKS: REDUCED AAR TO 27 AND EXTENSION
JFK			2030	ZDC/ZJX/ZHA/ZTL/ZHE/ZH	U/ZFW/ZAB/ZLA T		TSTRM ON RTE		USER UPDATES MUST BE RECEIVED BY: 1700Z
	LGA		2030	ZDC/ZJX/ZHA/ZTL/ZHE/ZH	/ZFW/ZAB/ZLA	TS	TRM ON RT	E	
	HDH		2100	ZAU/ZID/ZHE/ZTL/ZDC/ZJX/	MA/ZOB/ZNY/ZBW		TSTHS		
	ORD		2100	ZAU/ZID/ZOB/ZHA/ZJX/ZTL/ZHE/ZDC/ZNY/ZBW			TSTMS/NO ROUTES		
	STL		2100	ZNY/ZBW/ZOB/ZII	/ZDC	TSTHS			EFFECTIVE TIME: 141643 - 141759
	TEB		2030	ZDC/ZJX/ZHA/ZTL/ZHE/ZH	ZHU/ZFW/ZAB/ZLA THU		UNDERSTORMS ON RTE		SIGNATURE: 04/07/14 16:44
	ZOB		2100	ZTL/ZJX/ZM		NC	ROUTES/W	X	

		DELA	AY INFO	Edit	DEICING	Edit
ARPT	AD	DD	TIME	REASON	ARPT AAR/ADR TIME	PLAN?
ATL		+90	1800	ORD G/S		Contraction of the second
ATL		+60	2001	HX		
BOS		+135	1920	SNAP		
BNI		+15	1703	LDN/AML RSTRN		



Documen



Airspace Flow Program

- New tool delivered in spring 2006
- Combines FSM flight data, Ground Delay Program algorithms, and FEA/FCA technology to target specific NAS element such as
 - Volume of enroute airspace
 - Specific airway
 - Airport
 - Specified fix
- More precisely targets impacted enroute airspace as compared to GDP technology



Airspace Flow Program



FCAA08 is defined by the western boundary of ZDC and a line across central Virginia.

Altitude Filters: 120 – 600

Arrival Filters: ZNY, ZBW, ZDC

Departure Filters: None

Likely weather for use: Weather in the Ohio Valley region or in ZDC airspace.

Weather Triggers: Lines and popcorn storms. CCFP predicted intensity levels of greater than 50% with High Confidence.

NESP Rate Guidelines

Flow through ZDC:

Low Weather Impact:	135 – 145 Rate/Hour
Med Weather Impact	125 – 135 Rate/Hour
High Weather Impact	115 – 125 Rate/Hour



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European Traffic





Pacific Traffic





Mexico and Caribbean Traffic





Polar Route





International ETMS Data Exchange

- Current Agreements
 - Mexico
 - Canada
 - United Kingdom
 - COCESNA
 - Chile
 - Columbia

- In Progress
 - Eurocontrol
 - Panama
 - Dominican Republic
- Future Expansion
 - Brazil
 - Japan



ATCSCC Web Site



The status information provided on this site indicates general airport conditions; it is not flightspecific. <u>Check with your airline</u> to determine if your flight is affected. Information on <u>wait times at security checkpoints</u>.

Leg	iend
• General Arrival/Departure delays are 15 minutes or I	less.
 Departures are experiencing taxi delays of 16 to 45 minutes and/or arrivals are experiencing airborne holding delays of 16 to 45 minutes. 	• Departures are experiencing taxi delays greater than 45 minutes and/or arrivals are experiencing airborne holding delays greater than 45 minutes.
 Traffic destined to this airport is being delayed at its departure point. Check your departure airport to see if your flight may be affected. 	 Closed airport

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