
Project Overview

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ATD-3 Scope

ATD-3
Applied Traffic Flow Management (ATFM)

ATD-2
Integrated Metroplex Traffic Management

ATD-1
Terminal Sequencing and Spacing (TSAS)
Flight-deck Interval Management (FIM)

TOC - Top of Climb
TOD - Top of Descent
ATD-3 Technical Challenge

*Reduce weather-induced delays* through integration of weather information to better manage aircraft, traffic flow, airspace and schedule constraints by delivering air/ground procedures and user-tool technologies.
ATD-3 Technologies

Multi-Flight Common Route (MFCR):
Automated search for efficient high value reroutes for individual flights and common reroutes for multiple flights - delay recovery from stale TMIs.

Traffic Aware Strategic Aircrew Requests (TASAR):
Airborne automated continuous searching for efficient reroutes that reduce fuel and/or flight time, avoid interactions with traffic, weather and restricted airspace.

Dynamic Routes for Arrivals in Weather (DRAW):
Efficient reroutes to maintain metering operations in the presence of weather, find efficient arrival routes, and balance meter fix demand.
ATD-3 Integrated Concept

MFCR
Ground-based automated search for efficient high value reroutes for individual flights and common reroutes for multiple flights - delay recovery from stale TMI's
MFCR User Interface

Congestion on Flight Plan

Congestion on MFCR Route

Detailed Results for UAL581

Original FP: KDEN / GCKX244086.BYP.LIT.PXV.IUJ78.HVQ.GIBBZ2.KIAD/1748

Reference FP: KDEN / GCKX215068.GCKX187078.IUJ78.HVQ.GIBBZ2.KIAD/1748

NASCENT FP: KDEN / GCKX215068.GCKX187078.EOSVE.IUJ78.HVQ.GIBBZ2.KIAD/1748
MFCR Architecture Diagram

- Dispatch or Traffic Management Coordinator
- AOC or ARTCC
- Rapid Refresh Wind Model (NOAA)
- CIWS
- TFM Data (via SWIM)
- TFR System (FAA)
- SUA System (FAA)
ATD-3 Integrated Concept

Current Flight Plan Route

Suggested reroute

MFCR
Ground-based automated search for efficient high value reroutes for individual flights and common reroutes for multiple flights - delay recovery from stale TMI

TASAR - Flight-deck based automated continuous searches for efficient reroutes during flight

Freeze Horizon

~90 min to MF

~60 min to MF

Dest

Dep

(20 min to MF)
TASAR User Interface
Traffic Aware Strategic Aircrew Requests (TASAR)

Pilot uses onboard automation tool to optimize an aircraft’s trajectory

NASA Technology

Operational Outcomes

Greater flight efficiency en route

Crew Request → ATC Response

Increased ATC approval of requests

Tool leverages networked connectivity to real-time operational data
**ATD-3 Integrated Concept**

- **DRAW**: Efficient reroutes to maintain metering, avoid weather, and balance meter fix loading.
- **MFCR**: Ground-based automated search for efficient high value reroutes for individual flights and common reroutes for multiple flights - delay recovery from stale TMI.
- **TASAR - Flight-deck based automated continuous searches for efficient reroutes during flight.**
DRAW – Time-Saving Reroutes to Alternate Meter Fix

Current Flight Plan

Freeze Horizon

DRAW Efficient Reroute

Adjusted times of arrival and metering impact

Current scheduled times of arrival and delay

AC1
AC2
AC3
AC4
AC5

Meter Fix 1

Meter Fix 2

MF1
MF2
DRAW - Route Correction to Avoid Weather & Maintain Accurate Schedule Time of Arrival

Current scheduled times of arrival do not reflect the need to deviate for weather.

Adjusted time of arrival and delay.
DRAW Architecture Diagram

Traffic Management Coordinator
In ARTCC

Traffic Management Unit
In ARTCC

DRAW

CIWS

Rapid Refresh Wind Model (NOAA)

ERAM
ATD-3 Integrated Concept

**Current Flight Plan Route**

**Suggested reroute**

**MFCR**
- Ground-based automated search for efficient high value reroutes for individual flights and common reroutes for multiple flights - delay recovery from stale TMI.

**TASAR**
- Flight-deck based automated continuous searches for efficient reroutes during flight.

**DRAW**
- Efficient reroutes to maintain metering, avoid weather, and balance meter fix loading.

**Air/Ground Integration**
- Leverage capabilities of both TASAR and MFCR systems to maximize potential benefits of dynamic reroutes.

**Freeze Horizon**
- (20 min to MF)

**Dep**

**Dest**

**Ground station**
- (AOC or ANSP)
Air/Ground Integration

Plan through Q2FY17

• Qualitative benefit assessment of candidate air/ground concepts

• Leveraging existing airline and FAA partnerships and agreements, solicit feedback on top candidate concepts, establish demonstration partnership(s)

• Develop Objectives, initial ConOps, and top-level requirements for air/ground concept and demonstration

• Complete Air/Ground Integration Plan through FY20 leading to demonstration
DRAW System Demonstration