
Project Overview

August 31, 2016

Chester Gong
NASA Ames Research Center
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
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.
Freeze Horizon

Current Flight Plan Route

Suggested reroute

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
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
TASAR User Interface
Traffic Aware Strategic Aircrew Requests (TASAR)

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

- **Navigation Database**
- **Aircraft Performance**
- **Pilot Interface**
- **Optimization Engine**
- **Real-time Aircraft Data**

**NASA Technology**

- **Greater flight efficiency en route**
- **Crew Request** → **ATC Response**
- **Increased ATC approval of requests**

Tool leverages networked connectivity to real-time operational data

**Operational Outcomes**

- Increased ATC approval of requests
- Greater flight efficiency en route

**Externally sourced data**

- Traffic
- Weather
- Airspace
- Dispatch
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

- **Current Flight Plan Route**

- **Suggested reroute**

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

- **Dest**

- **Dep**

- **ATD3**
  Applied Traffic Flow Management

- **NASA**
DRAW – Time-Saving Reroutes to Alternate Meter Fix

Current scheduled times of arrival and delay

Adjusted times of arrival and metering impact

DRAW Efficient Reroute

Freeze Horizon

Current Flight Plan

AC1

AC2

AC3

AC4

AC5

AC1

AC2

AC3

AC4

AC5

MF1

MF2

AC1 1

AC2 2

AC3 3

AC4 3

AC5 3
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.

FREEZE Horizon

DRAW Route Correction

Meter Fix 1

Current Flight Plan

AC1

AC2
DRAW Architecture Diagram
ATD-3 Integrated Concept

Current Flight Plan Route

Suggested reroute

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 TMLs

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

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

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