# FactSheet

National Aeronautics and Space Administration

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ADVANCED AIR TRANSPORTATION TECHNOLOGIES (AATT)

# The AATT Project: Developing decision support tools for the future air transportation system


## Overview

The major focus of the Advanced Air Transportation Technologies (AATT) Project is to improve the capacity of transport aircraft operations at and between major airports in the National Airspace System (NAS) by developing decision support tools (DSTs) to help air traffic controllers, airline dispatchers, and pilots improve the air traffic management and control process from gate-to gate. The AATT Project is responsible for defining, exploring, and developing advanced air traffic management (ATM) system concepts to a state suitable for pre-production prototype development by the Federal Aviation Administration (FAA) and industry, leading to eventual full-scale development and deployment. The AATT Project approach is to develop baseline operational concepts for the NAS that can be used to guide decisions regarding the value and appropriateness of ongoing work, and determine the best direction for future work. Further, the operational concepts will include a transition strategy from the baseline to the mature state (2015). The Project will ensure that all user classes are considered in the concept of operations.

The adaptation and integration of AATT decision support tools and concepts into the NAS environment will address some of the most difficult air traffic management issues, including operations in complex airspace and the implementation of distributed air/ground responsibilities for separation. Decision support tools that will support the AATT operational concepts will include terminal/transition/en route airspace tools for arrival, surface, and departure operations. In addition to DSTs, one research concept under development in the AATT Project is Distributed Air/Ground Traffic Management (DAG-TM). DAG-TM involves the development of flight deck and ground-based tools to support the RTCA's concept of Free Flight. During Free Flight, "operators have the freedom to select their path and speed in real time. Air traffic restrictions are only imposed to ensure separation, to preclude exceeding airport capacity, to prevent unauthorized flight through special use airspace, and to ensure safety of flight."

Specific objectives of the AATT effort are:

- Enable Free Flight to the maximum possible degree to allow the users to minimize direct operating costs by making trade-offs between time and routing
- Improve the effectiveness of high-density operations in regions on the ground and in the air where Free Flight will not be possible
- Enable operation in a smooth and efficient manner across boundaries of Free Flight and capacity-constrained flight regions
- Provide system improvements that are easily deployable anywhere in the world

## Decision Support Tools

Examples of decision support tools under development in the AATT Project are:

Traffic Management Advisor (TMA)

- Provides aircraft sequence and scheduling information to air traffic control while coordinating arrivals from a single Air Route Traffic Control Center (ARTCC) into a TRACON

Direct-To (D2)

- Advises sector controllers of time-saving direct routing options for aircraft within an ARTCC

Multi-Center TMA (McTMA)

- Provides aircraft sequence and scheduling information to air traffic control while coordinating arrivals from multiple ARTCCs into a single TRACON

Surface Management System (SMS)

- Advises airlines, ramp controllers, and air traffic control on push-back and taxi navigation for efficient surface operations

En Route and Descent Advisor (EDA)

- Provides advisories to ARTCC sector controllers on merging, sequencing, and spacing of aircraft for efficient climb, cruise, and descent constraints and flow management

Expedite Departure Path (EDP)

- Coordinates departure sequencing and scheduling to enable efficient departure ascent and merges

Autonomous Operations Planner (AOP)

- Provides flight crews information for en route free-maneuvering

Collaborative Arrival Planning (CAP)

- Accommodates user preferences in arrival flow management through collaborative decision support tools for users and air traffic service providers

Regional Metering (RM)

- Complements arrival and sector metering tools by effectively extending the metering horizon to upstream Centers and helping traffic managers efficiently plan, coordinate, and implement metering restrictions

## DAG-TM

Distributed Air/Ground Traffic Management (DAG-TM) is an integrated operational concept in which flight deck crews, air traffic service providers, and aeronautical operational control personnel use distributed decision-making to enable user preferences and increase system capacity, while meeting ATM requirements.

The goal of DAG-TM is to enhance user flexibility/efficiency and increase system capacity, without adversely affecting system safety or restricting user accessibility to the NAS. DAG-TM will be accomplished with a human-centered operational paradigm enabled by procedural and technological innovations. These innovations include automation aids, information sharing and Communication, Navigation, and Surveillance (CNS)/ATM technologies. The DAG-TM concept is intended to eliminate static restrictions to the maximum extent possible. In this paradigm, users may plan and operate according to their preferences – as the rule rather than the exception – with deviations occurring only as necessary. The DAG-TM concept elements aim to mitigate the extent and impact of dynamic NAS constraints, while maximizing the flexibility of airspace operations.

## Customers

- Federal Aviation Administration (FAA)
- National Air Traffic Controllers Association (NATCA)
- Air Traffic Control Association (ATCA)
- Air Line Pilots Association (ALPA)
- Air Transport Association (ATA)

## More Information

For more information, please visit our website at http://www.asc.nasa.gov/aatt/