# CAP

# Collaborative Arrival Planner

Purpose:
Improve the efficiency of air carrier operations and increase NAS flexibility through information sharing and collaboration between air carriers and air traffic service providers.

Users:
- Air carrier dispatchers
- Ramp tower personnel

Field Sites:
- American Airlines Systems Operations Control Center, Fort Worth, Texas
- Delta Airlines Airport Coordination Center, Dallas-Fort Worth Airport (DFW)

Operational Results:
- Dispatchers made better-informed hold/go decisions during periods of extended airborne holding.
- Ramp controllers made better-informed decisions about holding planes for passenger connections, and ramp personnel more effectively managed ground resources.

**Overview**
The Collaborative Arrival Planner is an extension of the NASA Center-TRACON Automation System (CTAS), a set of software Decision Support Tools (DSTs) that provides computer-generated advisories to assist both Center and TRACON traffic management coordinators and air traffic controllers in the efficient management and control of terminal area air traffic. While CTAS was designed to assist air traffic service providers (air traffic managers and controllers), CAP assists the users of the NAS (air carriers) by leveraging and expanding the capabilities of CTAS. A specialized CAP Display System was designed and developed in order to facilitate the sharing of CTAS Traffic Management Advisor (TMA) information with air carriers. The CAP Display System provides air carriers with the same CTAS TMA information that is used by air traffic managers and controllers to plan and control the flow of arrival traffic into the Dallas-Fort Worth Airport (DFW). In cooperation with the FAA and air carriers, CAP Display Systems were installed at American Airlines and Delta Airlines facilities in DFW in 1998 and 1999, respectively. The CAP Display Systems have assisted air carrier operations in both Airline Operational Control and Airline Ramp Tower settings by providing accurate time of arrival predictions and situational awareness of Center and TRACON operations.

**Time of Arrival Prediction Accuracy**
A major impediment to an airline's ability to accurately predict arrival times for its aircraft is uncertainty in the magnitude of terminal-area ATC delays. At Fort Worth Center, terminal area delays are calculated and assigned to each arrival aircraft by the CTAS TMA. Controllers then issue speed and heading commands to arrival aircraft in order to meet TMA scheduled times of arrival. Because the TMA scheduled times of arrival are actually used to control the flow of arrival traffic, they are more accurate than airline estimates of arrival time. Analysis of airline and CTAS data has shown that for a typical arrival rush period, 66% of the TMA scheduled times of arrival fall within 2.2 minutes of the actual times of arrival, compared to 5.8 minutes for airline predictions.

**Situational Awareness of Center and TRACON Operations**
In addition to improved time of arrival predictions, CAP Display Systems provide airlines with better situational awareness of Center and TRACON operations. The CAP Displays allow airlines to see real-time aircraft position and speed data and assigned landing runway. Airlines also have access to air traffic management information including both current and planned runway configuration and airport arrival rate. This is the first time that real-time air traffic management information used to control arrival traffic has been shared with air carriers.

**CTAS Digital Data to Industry**
Based on the success of the CAP Display Systems at American and Delta Airlines, it is expected that CAP will aid all airlines that hub at sites where CTAS operates. To aid in the dissemination of CTAS data, airlines have requested that NASA provide CTAS TMA data in digital format so that it can be integrated into their own decision support systems. In coordination with the FAA, NASA is working with the Volpe Center to develop the capabilities to distribute CTAS TMA information to the airlines via the CDMnet. This should enable greater collaboration between the airlines and air traffic management, further reducing the economic impact of ATM restrictions on the airlines and increasing airline operational efficiency.