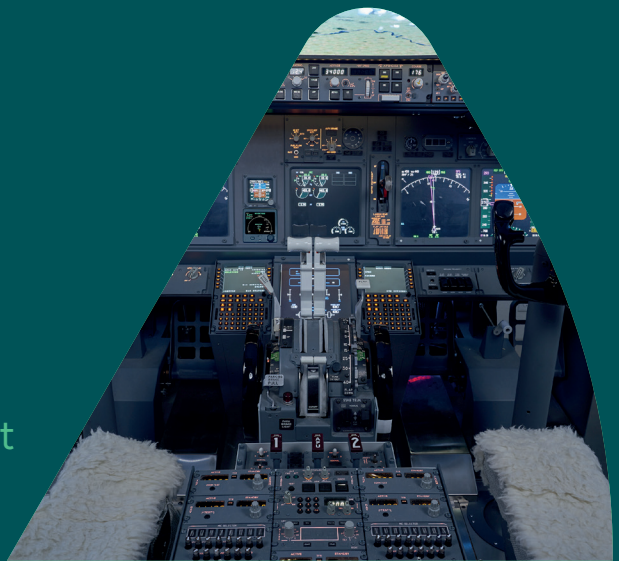
SafeRoute+™

ADS-B In solutions for safer, more efficient flight



SafeRoute+ is the only ADS-B In retrofit solution for airlines, offering increased safety and efficiency during all phases of flight. SafeRoute+ uses a suite of Automatic Dependent Surveillance-Broadcast (ADS-B) In applications, bringing operational benefits directly to the flight deck.

SafeRoute+ creates an environment of shared traffic situational awareness between pilots and air traffic controllers. A simple upgrade to the TCAS 3000SP™ or T3CAS® computers, it uses the existing displays to provide basic ADS-B In information; and the new ADS-B Guidance Display (AGD) from ACSS for advanced applications.

SafeRoute+ provides pilots with a precise forward field of view of surrounding aircraft up to 120 nautical miles using a Cockpit Display of Traffic Information (CDTI). CDTI is achieved by using the existing Multi-function Control and Display Units (MCDU) and the Navigation Displays (ND) with the new AGD.

Currently, SafeRoute+ offers four ADS-B In applications, each focused on specific phase of flight, for total flight efficacy. All applications will provide better situational awareness in the cockpit; however, operators can choose the applications which best align with their specific operations to help them increase runway throughput, optimize spacing buffers, reduce the amount of go-arounds, and reduce fuel burn and carbon emissions.

Key Features

- Software upgrade to existing T3CAS or TCAS 3000SP computers
- Uses existing displays:
  - Multi-function Control and Display Units (MCDU), Navigation Displays (ND)
- New Economical ADS-B Guidance Display (AGD) enables advanced applications
- Provides Enhanced Airborne Traffic Situational Awareness
- Enables higher runway throughput and maximizes runway capacity
- Reduces fuel burn and carbon emissions
- Enables less delay vectoring
- Facilitates better block-time predictability
- Decreases spacing buffers
- Reduces Go-Around events

DISCOVER MORE:
acronaviation.com

Enhanced Airborne Traffic Situational Awareness (AIRB)

ENABLING PILOTS TO SEE VITAL INFORMATION ABOUT SURROUNDING AIRCRAFT

AIRB is the standard SafeRoute+ application, providing flight identification, position, altitude, speed and direction for aircraft up to 120 nautical miles away. This information creates an environment of shared situational awareness and aids the crew in visual acquisition of traffic.

84%

OF PILOTS SURVEYED reported that ADS-B In enhanced situational awareness.

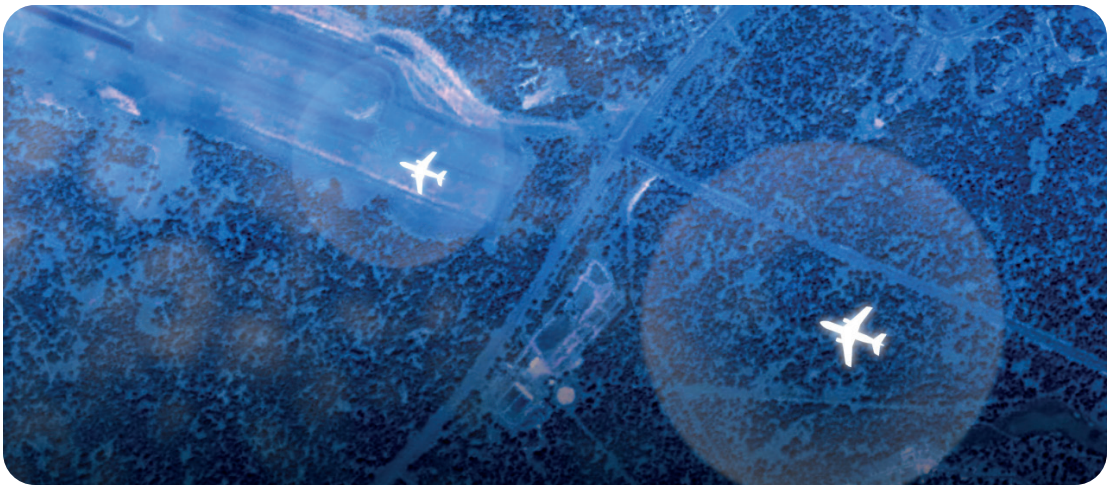
CDTI-Assisted Visual Separation (CAVS)

ENABLING OPTIMUM SPACING AND ENABLING HIGHER RUNWAY THROUGHOUT

CAVS enables a continual visual approach in reduced visibility conditions. With CAVS, flight crews are able to optimize spacing by using the data shown through SafeRoute+ on the display. This technology can reduce go-arounds, keeping flights and airports running on time during reduced visibility conditions. The CAVS application supports CDTI-Assisted Separation (CAS) operations, allowing the runway capacity benefits of visual separation operations during weather conditions that do not support visual approaches.

14%

The CAVS application has shown to **REDUCE AIRCRAFT FINAL APPROACH TIME** by as much as 14% in reduced visibility conditions



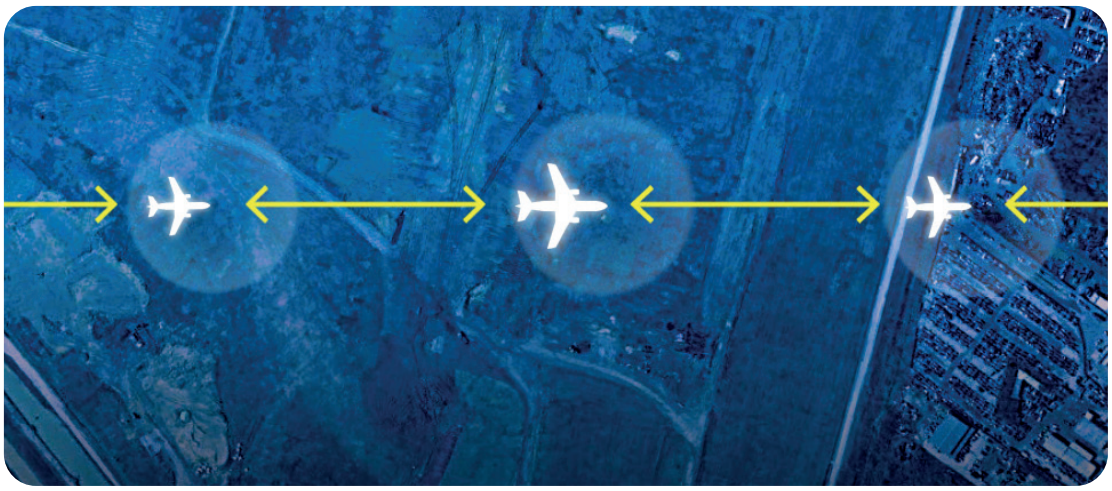
Interval Management Spacing (IMS)

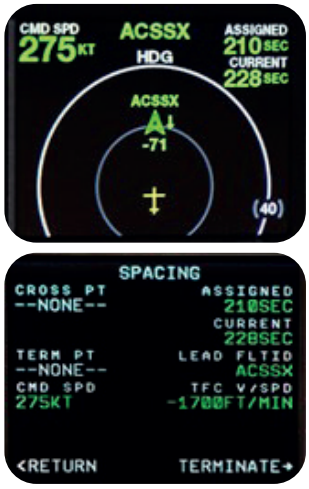
REDUCING INTER-ARRIVAL TIME AND MAXIMIZING RUNWAY CAPACITY

During the arrival phase of a flight, the Interval Management Spacing (IMS) application main-tains time-based spacing during instrument meteorological conditions, enabling flight crews to maintain consistent and well-spaced arrival flow to an airport. IMS reduces the distance and time flown, lowers the probability of vectoring and reduces low-variance aircraft Inter-Arrival spacing. These key features enable block time predictability and maximizes runway capacity.

23%

IM can help reduce variance in the delivery of airplanes by 7 seconds, **IMPROVING RUNWAY THROUGHPUT** up to 23%.





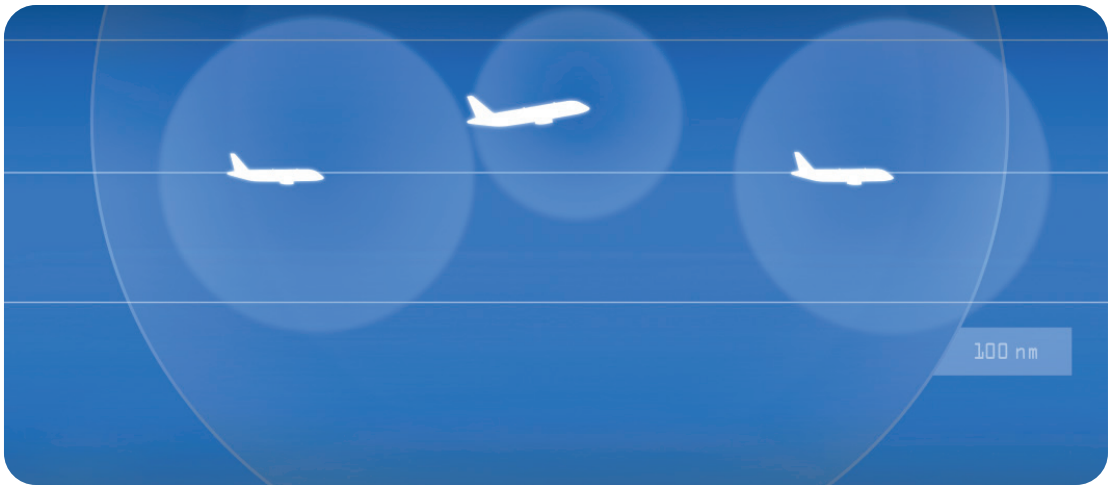
In-Trail Procedures (ITP)

INCREASING FUEL SAVINGS WHILE REDUCING CARBON DIOXIDE EMISSIONS

The In-Trail Procedures (ITP) application provides the flight crew with a vertical profile view of surrounding traffic up to 120NM away, which is useful during oceanic routes to determine if an ITP maneuver is possible. The Federal Aviation Administration (FAA) has released studies reporting transatlantic ITP-equipped flights have saved an average of 670 pounds of fuel and likewise, transpacific flights have saved an average 521 pounds per flight. This fuel savings also results in a significant reduction in carbon emissions.

670

Aircraft equipped with ITP have **SAVED AN AVERAGE OF 670 POUNDS OF FUEL** on transatlantic flights.



FIrst available retrofit ADS-B in suite of applications

CREATES AN ENVIRONMENT OF SHARED TRAFFIC SITUATIONAL AWARENESS BETWEEN PILOTS AND CONTROLLERS

American Airlines, the Federal Aviation Administration and ACSS have initiated the ADS-B In Retrofit Spacing (AIRS) evaluation program. This program will measure and report on benefits realized by American Airlines' entire fleet of A321 SafeRoute-equipped aircraft as they conduct Interval Management and CAS on Arrival operations. Preliminary data shows measurable improvement in runway throughput, optimized flight paths and more consistent aircraft spacing en route.

Air Traffic Controllers have noted benefits being realized not only by the SafeRoute aircraft, but by other aircraft operating in the same arrival environment. Pilots using CAS have the most information ever available about surrounding aircraft, so it creates an extra set of eyes and helps ATC in their management of traffic flows.

12 SECONDS =4 AIRCRAFT

The AIRS program is showing an average 12-second reduction in threshold spacing due to the **CAS-A PROCEDURE** into DFW. This equates to 4 additional aircraft per hour.

ADDITIONALLY REPORTED BENEFITS INCLUDE:

- Increased situational awareness
- Go-around avoidance
- Alerting ATC of overtake issues
- Advance planning for holding
- Turbulence and Storm avoidance
- Better tools = better decision making!

HOST COMPUTER PLATFORMS

With this new, patented architecture, selectable SafeRoute+ ADS-B In applications hosted in the TCAS 3000SP™ or T³CAS® computers utilize the existing Navigation Displays (ND) and Multipurpose Control and Display Units (MCDU). Advanced applications require the installation of the newly developed AGD from Acron Aviation.

ADS-B OUT TRANSPONDERS AND NEXTGEN OPERATIONS

ACSS is leading the industry in ADS-B technology and the implementation of NextGen/SESAR capabilities by developing ADS-B avionics. ADS-B is the transmission of an aircraft's position, speed, and intent to other aircraft and to Air Traffic Control. ACSS's Mode S transponders are certified to DO-260B, the highest level of ADS-B Out meeting global ADS-B mandates.

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