FUTURE AIR NAVIGATION SYSTEM

The Future Air Navigation System (FANS) is an avionics system that provides data between the pilot and the air controller. The data link includes air traffic control clearances, pilot requests, and position reports.

The traditional World's Air Traffic Control system (ATC) uses analog radio systems for aircraft communications, navigation and Sur-veillance (CNS). In 1983, the International Civil Aviation Organization (ICAO) had established a committee charged with the development of the Future Air Navigation System (FANS) in an effort to improve aviation communication, navigation, surveillance and air traffic management in the rapidly growing mode of air travel. By 1988 the basis for the future strategy for Air Traffic Management (ATM) through digital Communications, Navigation and Surveillance (CNS) using satellites and data links was realized and work was started on the development of the technical standards needed form the FANS concept. By the 1990's the first generation of FANS products known as FANS-1 was introduced by the Boeing Company and implemented as a software package on the flight management computer of the 747-400 to improve routing and reduction of fuel burn. Airbus developed a similar product known as FANS-A. Together, the two products are known as FANS-1/A and were installed on Airbus A380 and Boeing 787.

AIRCRAFT OPERATIONS-POSITIVE & PROCEDURAL CONTROL

Positive Control is used in areas that have radar so the air controller can see the aircraft and uses Very High Frequency (VHF) voice to provide instructions to the flight crew to ensure safe separation and recognition and corrective directions when needed. Separation standards establish the number of aircraft which can occupy certain airspace in the controllers radar view.

Procedural Control is used in oceanic or land areas that do not have radar. The FANS avionics system was developed to improve the safety and efficiency of aircraft operating under procedural control by using a time-based procedure to keep aircraft from getting to close to one another and allowing an increase in the number of aircraft in the controlled airspace at the same time.

Communication Improvements with an Aircraft Addressing and Reporting System (ACARS), the communications medium is transitioned from voice communications to digital communications. From a standardized ATC communications known as controller-pilot data link communications (CPDLC) a flight crew can select a menu from the data-link control and display unit for sending and receiving CPDLC digital message data between the pilot and the air controller reducing communication time and providing clear messages through automation and satellite navigation.

Navigation Improvements using GPS satellites provides the aircraft with a much more accurate positioning through calculations based on the number of satellites in their constellation. The navigation system will calculate the position and alert the flight crew should the actual navigation performance exceed the Required Navigation Performance (RNP).

Surveillance improvements involve the transition from voice reports that are based on positioning, to automatic digital reports. This reporting application is known as Automatic Dependent Surveillance, Contract (ADS-B). This system allows the aircraft's navigational system to automatically send a position report on a specified time base as well as allow Air Traffic Control to set up a deviation of position contract with the aircraft's system which would automatically send a position report if certain criteria of established positioning was exceeded. Air Traffic Control (ATC) using ADS-B can *see* the same or better than radar. Currently the industry is moving into the third level of fully automated, global and frequently updated surveillance systems and ADS-B ground stations are in operation.

How does ADS-B work? Under the NextGen Air Transportation System and Single European Sky (SES), properly equipped aircraft will broadcast their identity, position, track, speed and other vital data via ADS-B "Out" technology. Air traffic control ground stations and ABS-B "In" equipped aircraft receive this information once every second. ADS-B ground stations will broadcast traffic information-and subscription- free weather in the U.S. -back up to properly equipped aircraft in the service area for display in the cockpit.

What are the benefits? Air traffic controllers will be able to reduce congestion, noise, emission and fuel consumption through more efficient routing and resource management. The system has the ability to provide pilots access to detailed traffic information representing a leap forward in pilot situational awareness greatly enhancing safety. With **optional ADS-B "In" equipment**, properly equipped aircraft can also receive highly accurate traffic information directly from other aircraft and ADS-B signal corrections. In the U.S, access to graphical NEXRAD radar information, as well as METARs, TAFs and other subscription-free aviation weather information will be available.

When should I equip for ADS-B? In the U.S., if you operate in airspace that currently requires a Mode C or Mode S transponder; you'll need to be equipped with ADS-B "Out" by 2020. This includes Class A, B, or C airspaces, Class E airspace at and above 10,000 ft MSL over 48 contiguous United States and District of Columbia, and Class E airspace over the Gulf of Mexico from the coastline of the U.S. out to 12 nm and above 3,000 ft MSL. You must be equipped with ADS-B "Out" if you find yourself flying from the surface up to 10,000 ft MSL within most primary Class B airports.

R.C. AVIONICS® FAA CRS KP5R996M http://www.rcavionics.com/images/logo.gif