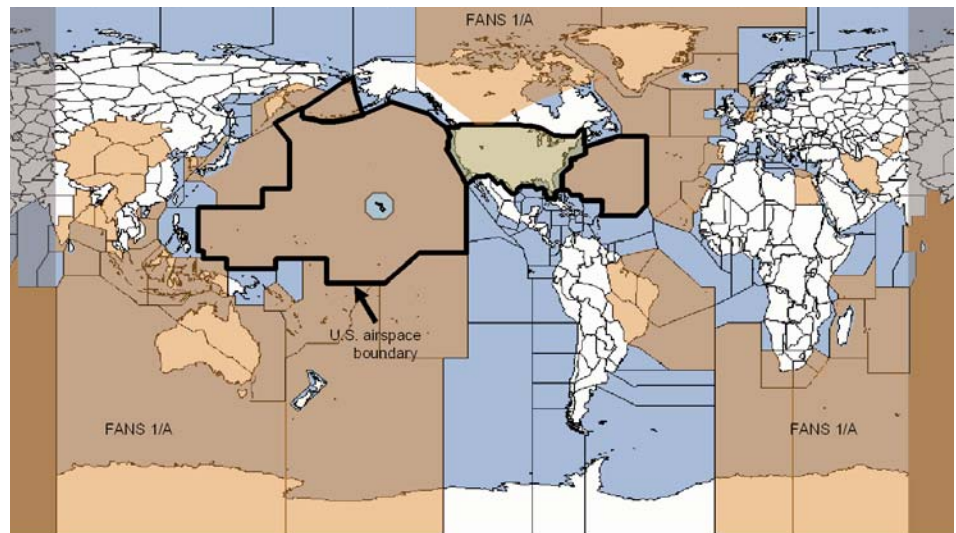




**Future Air Navigation (FANS)
Required Navigation Performance (RNP)
Wide Area Augmentation System (WAAS-LPV)**

Software upgrades for efficient and precise navigation.

Honeywell's FMS 6.1/7.1 software allows business aircraft operators the operational benefits offered by emerging technologies with its newest software upgrade for the FMZ-2000 and Primus Epic flight management systems.



Graphic courtesy of The Boeing Company

Figure 1 – Current FANS coverage shown in shaded area

Future Air Navigation System (FANS) is a concept that was developed by the International Civil Aviation Organization (ICAO) with Honeywell and others in the air transport industry to allow more aircraft to safely and efficiently utilize a given volume of airspace using automatic dependent surveillance and data link technology.

FANS plays a key role in supporting many of the evolving CNS/ATM (Communication, Navigation, Surveillance/Air Traffic Management) strategies and mandates – an evolution that has been underway for more than ten years.

Key elements of Future Air Navigation System (FANS):

FANS encompasses a set of defined software features required within the FMS:

- AFN – Air Traffic Services (ATS) Facilities Notification
- ADS-A/C – Automatic Dependent Surveillance-Addressed or Automatic Dependent Surveillance-Contract
- CPDLC – Controller / Pilot Data Link Communication
- RNP – Required Navigation Performance
- Flight Plan Updates

When FANS is implemented on business jets, operators will be able to take advantage of several needed improvements:

- Reduced separation between airplanes
- More efficient route changes
- Satellite datalink communication
- More direct routings
- Fewer or no departure delays
- No altitude loss when crossing tracks

Summary

The fuel savings, added payload, enroute time reduction and maintenance cost savings clearly make a compelling case for making your aircraft FANS capable. Operators of long-range business jets equipped today with FMS, GPS, CMU/DMU, SATCOM and VHF Data radio can enjoy the benefits of FANS operation with a simple software upgrade.

Required Navigation Performance (RNP)

For decades, modern aviation has relied on ground-based navigation aids, but recent developments in the industry are driving the adoption of Required Navigation Performance (RNP) techniques as a method of increasing capacity and enhancing traffic flow.

RNP enables aircraft to fly more precise approaches, providing benefits for lower minima operations, more favorable routing in congested or terrain challenged airspace, noise abatement compliance, improved safety, and lower operating cost.

A combination of onboard navigation technology, precise sensors and the GPS satellite network keep aircraft within a tightly specified airspace corridor. The aircraft can precisely fly a wide variety of desired flight paths including curved paths to avoid terrain and obstacles, thereby overcoming limitations of conventional instrument procedures.

Key elements of RNP:

- Takes full advantage of aircraft systems capability
- Path conformance with high degree of accuracy and repeatability
- Monitoring and alerting of navigation performance
- Curved flight paths

RNP benefits to operator:

- Better access to terrain-challenged airports, restricted airspace
- Improved access to business airports in proximity to high traffic airports
- Enables parallel runway, converging and adjacent airport operations
- Fewer weather-related delays, diversions due to lower minima
- Better access for environmental concerns (noise)
- Optimized routes
- Fuel savings
- Enables early, guided turns on missed approach
- More reliable (repeatable), predictable flight paths
- Continuous descent arrivals

Getting operational approval

To conduct RNP operations with RNP levels (<0.3 nm), at a minimum the aircraft must be equipped with FMS, IRS, GPS, EGPWS with terrain and obstacle alerting, and Honeywell flight management system software.

RNP Special Aircraft, Aircrew Authorization Required (SAAAR) procedures have been published by the FAA at airports including Reagan National and Palm Springs.

FAA Advisory Circular 90-101 requires operators to obtain approval from the FAA to fly RNP approach procedures. The operator would need to show compliance to AC 90-101 by meeting the requirements for equipment, training, flight operations, Navigation database and RNP procedures.

What an operator needs for Required Navigation Performance

1

Aircraft equipment

- FMS, IRS, GPS, EGPWS with terrain and obstacle alerting, and FMS software upgrade

2

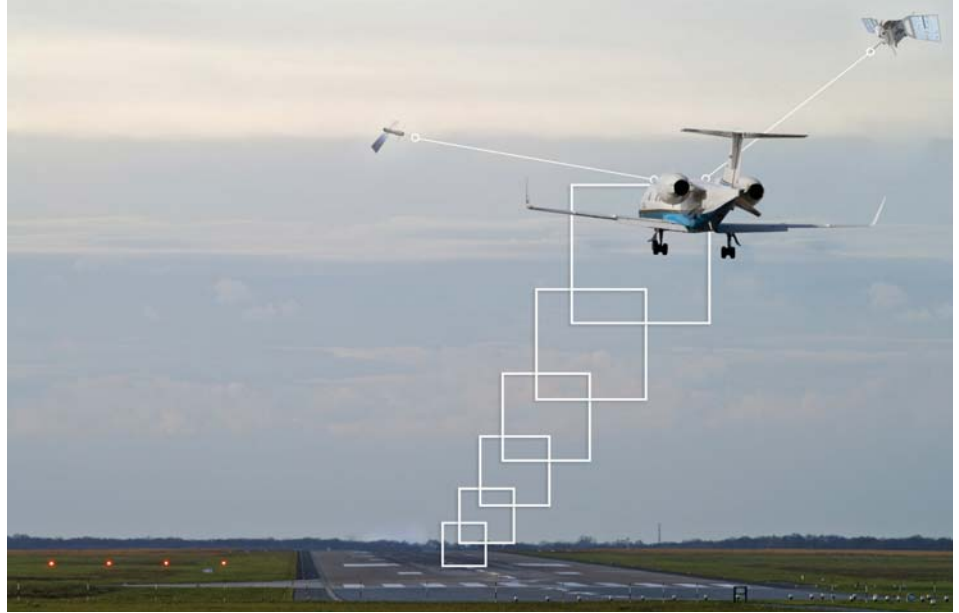
RNP procedures

- RNP charted procedures – Navigation database

3

Operational approvals

- Compliance to AC 90-101



Localizer Performance with Vertical Guidance (WAAS LPV)

- WAAS offers increased accuracy and availability for navigation throughout Continental United States (and much of Alaska), and provides advanced navigation procedures
- Vertically-guided approaches to nearly all runways is a significant safety benefit:
 - The United States has 5000 airports with at least one runway 3000 ft long
 - WAAS increases runway availability by enabling lower minimums (200ft)
 - Provides vertical guidance
- No cold weather altimeter correction limitation

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