

## FAA's latest PARC roadmap unveiled

At a meeting in late July 2006, the FAA's PARC (Performance-Based Operations Aviation Rulemaking Committee) released the second version of its roadmap to performance-based navigation, which has more details on how the FAA plans to proceed toward that goal, including possible equipment mandates.

The near-term period (2006-2010) focuses on taking advantage of the investment aircraft operators have already made in avionics and the FAA spending on satellite-based navigation. It includes the wide-scale rollout of RNAV (area navigation) procedures, including the instrument departures and arrivals commissioned this year at large airports such as Atlanta and Dallas-Fort Worth.

In addition to RNAV, which could eventually be available everywhere in the continental U.S., the FAA sees RNP (required navigation performance) procedures playing a major role in U.S. airspace, at least in busy en route or terminal areas.

To fly a route based on RNP an aircraft must meet a navigation performance accuracy and reliability specification, which allows procedure designers to increase the number of aircraft that can occupy a particular airspace - whether over land or sea - without compromising safety. RNP also allows a qualified aircraft and crew to fly closer to obstacles than is otherwise possible, which can reduce or eliminate approach visibility restrictions, and allow takeoff and landing operations with payloads not previously allowed.

Some of these procedures are also dependent on satellite position information, and the ability of modern navigation computers, such as FMS (flight management systems) to follow RNAV routes.

These same FMS computers, along with inertial associated sensors, also enable other advantages, such as reduced - or ideally idle - power descents to save fuel and the ability to calculate and meet time constraints over navigation waypoints. Moreover, most aircraft that are capable of RNP also enjoy satellite-based navigation systems which free them from the restrictions of terrestrial nav aids. All of these can be combined synergistically to dramatically improve the efficiency, capacity and safety of future flight operations.

Jeff Williams, manager of the FAA's RNAV/RNP group, says RNP development is being accelerated. For example, while the FAA's Flight Plan called for 30 RNAV arrival and departure procedures for FY 2006, the agency now estimates that 63 will be completed. The Plan also called for 5 public RNP procedures in FY 2006, but at least 26 should be completed and possibly as many as 30.

The PARC roadmap's mid-term (2011-15), anticipates many of America's 100 busiest airports will have RNAV approaches and departures, and a number of U.S. airports will have RNP procedures where their higher precision adds benefits. FAA planners see as many as 300 RNAV and 50 RNP approaches being added per year in that timeframe, and RNP operations becoming a standard procedure at high altitude.

Currently, about 85% of aircraft that fly into airports with RNAV approaches and departures have the necessary equipment, but only 30% have the equipment needed for

## FAA unveils roadmap to future aerial navigation

RNP operations. Because of this, the roadmap planners are proposing that by 2015, all aircraft which fly above FL (flight level) 180 will be required to have RNAV capability, as well as any operating into 35 major U.S. airports.

By 2015, the planners propose that RNP-2 (the ability to stay within 2 nautical miles of a route's centerline 95% of the time) will be required above FL 290. And by 2025, RNAV would be required everywhere and RNP would be mandated in busy airspace. The rule-making process for these changes will probably begin in 2008.

Meanwhile, the FAA's current Operational Evolution Plan (OEP Version 8.0, dated May 2006) also details a number of achievements in navigation during the recent past and outlines some continuing initiatives. For example, the OEP notes that during FY 2005 six RNP SAAAR (special aircrew and aircraft authorization required) approaches were implemented at 4 sites, and a set of high altitude RNAV routes (Q-Routes) were established with the completion of the first phase of HAR (high altitude redesign).

The Version 8.0 OEP calls for continuing work on SAAAR procedures that will enable parallel approaches to closely spaced runways in low visibility, with a special focus on developing RNP parallel approaches with no transition, and RNP SAAAR-enabled SCIAAs (simultaneous converging instrument approaches). Version 8.0 commits the FAA to publish 25 RNP SAAAR procedures this fiscal year, which is 10 more than in the previous version.

In addition, the latest OEP says that through 2014, 300 new LPV (localizer performance with vertical guidance) approaches will be published annually for airports that don't have precision guidance procedures. It also commits to new RNAV approaches at airports with operational ILS (instrument landing systems).