



**JEPPESEN®**

# **BRIEFING BULLETIN**

JEP 05-03

## **REQUIRED NAVIGATION PERFORMANCE (RNP): FAA INTRODUCES THE FIRST “PUBLIC” RNAV (RNP) APPROACH PROCEDURE AT RONALD REAGAN WASHINGTON NATIONAL AIRPORT (DCA)**

### **BACKGROUND**

Required Navigation Performance (RNP) is a major component of the FAA's goal for facilitating more efficient airspace and procedure design as well as improving safety, access, capacity and operational efficiencies in the National Airspace System.

RNP, a refinement of RNAV, is part of a collaborative effort by FAA and the aviation industry to develop performance-based procedures, i.e., procedures not dependent on any specific piece of equipment. RNP is a statement of navigation position accuracy necessary for operation within a defined airspace. It establishes highly refined parameters for aircraft airspace containment including navigation performance accuracy within which the aircraft's navigation system is expected to remain 95% of the time. And the integrity of the system assures pilots they will remain within the containment area.

This is accomplished by an aircraft's RNP-capable flight management system (FMS) which utilize enhanced software to monitor sensor inputs and compare real time navigation accuracy, also referred to as Actual Navigation Performance (ANP). Navigation performance for a particular RNP type is expressed numerically. Depending on the capability of each aircraft's system, RNP values can be as low as 0.1 nautical miles. A performance value of RNP 0.3, for instance, assures that the aircraft has the capability of remaining within 0.3 nautical miles to the right or left of the centerline 95% of the time and within a linear containment area of 0.6 nautical miles (twice the RNP value) 99.999% of the time.

### **OPERATIONAL ADVANTAGES OF RNP**

The accuracy and integrity monitoring of RNP can provide more precision than conventional RNAV procedures. Aircraft with the more capable authorized systems will be able to operate into airports where current instrument approach procedures, because of specific constraints, must be designed with high landing minimums. RNP Decision Altitudes (DAs) can be as low as 250 feet with visibilities as low as three quarters of a mile. Besides lower minimums, the benefits of RNP include improved obstacle clearance limits as well as reduced pilot workload. And by having RNP-capable aircraft fly an accurate, repeatable path, ATC can be confident that these aircraft will be at a specific position, thus maximizing safety and the efficient flow of aircraft through the airspace.

### **RADIUS-TO-FIX LEGS (RF LEGS)**

To attain these benefits, a key component of RNP approach procedures are curved flight tracks. Constant radius turns around a fix are referred to as RF legs (or Radius-to-Fix legs). These turns, encoded into the navigation database, allow the aircraft to avoid critical areas of terrain or conflicting airspace while maintaining positional accuracy by maintaining precise, positive course guidance along the curved track.

The introduction of RF legs into the design of terminal RNAV procedures will result in improved use of airspace and allow procedures to be developed to/from runways that are otherwise limited to traditional linear flight paths – or in some cases – not served by an IFR procedure at all. Navigation systems with RF capability are a pre-requisite to flying a procedure which includes an RF leg. Refer to charted notes.

**REQUIRED NAVIGATION PERFORMANCE (RNP):  
FAA INTRODUCES THE FIRST “PUBLIC” RNAV (RNP)  
APPROACH PROCEDURE AT RONALD REAGAN  
WASHINGTON NATIONAL AIRPORT (DCA)  
(Continued)**

**SPECIAL RNP REQUIREMENTS**

In the United States, all RNP procedures fall into the SAAAR category (Special Aircrew and Aircraft Authorization Required). Operators who seek to take advantage of RNP approach procedures must meet the requirements outlined in FAA Order 8260.52 “United States Standard for Required Navigation Performance (RNP) Approach Procedures With Special Aircraft and Aircrew Authorization Required (SAAAR).” Currently all new air transport category aircraft being produced are equipped with RNP-capable FMSs. However, differences may exist in the level of precision that each system is qualified to meet.

**JEPPESEN AIRWAY MANUAL CHARTS & NAVIGATION DATABASES**

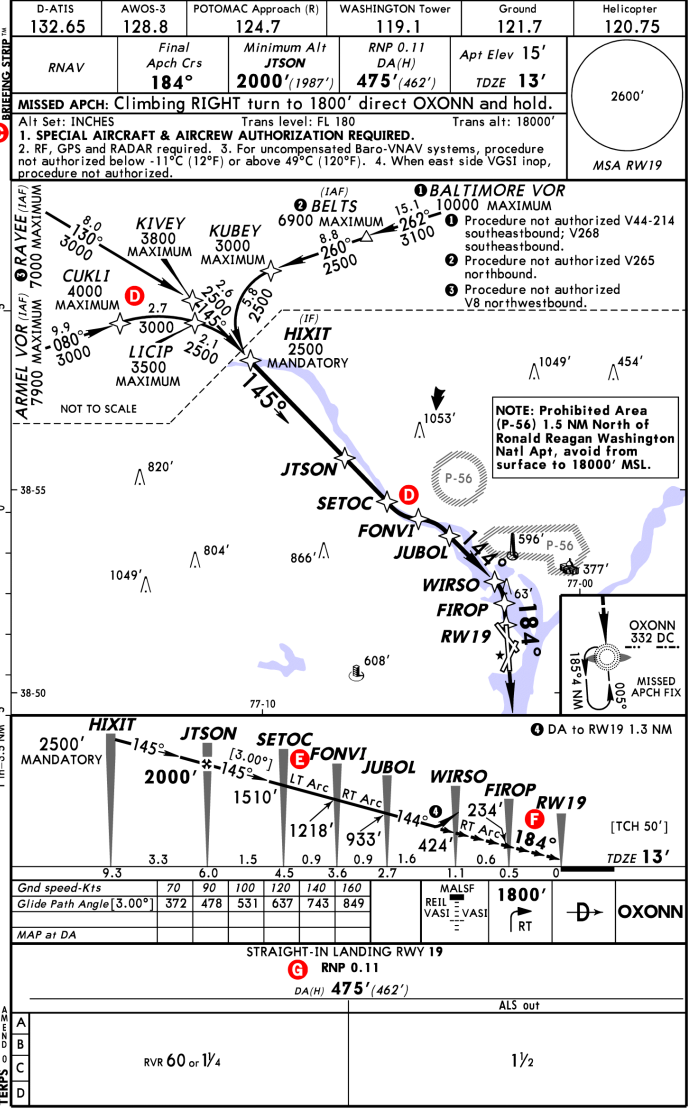
To date only “Tailored” or “Special” RNP approach procedures have been published and incorporated into individual customer’s tailored (customized) Airway Manuals and NavData for selective distribution and use. The introduction of the first public-use RNAV RNP SAAAR approach procedures will result in these procedures becoming part of the *Standard* Airway Manual and *Standard* NavData delivery. It is incumbent upon each individual operator to obtain the necessary approval and authorization to utilize these procedures.

Jeppesen Airway Manual Charts:  
Explanation of RNAV (RNP) Features  
(Refer to sample chart on page JEP 05-03B)

- A** Procedure title “RNAV” includes parenthetical “(RNP)” terminology.
- B** RNP procedures will be sequenced in the Airway Manual in the same manner as RNAV (GPS) procedures. Where there are both RNAV (RNP) and RNAV (GPS) procedures to the same runway, the RNP version will be sequenced first due to its lower landing minimums.
- C** RNP SAAAR requirements, required sensors and FMS capabilities, and relevant procedure notes are included in the procedure notes section of the Briefing Strip™.
- D** RF legs may be used in any segment of the procedure (transition, intermediate, final or missed approach). RF leg turn directions (left or right) are not noted in the planview as the graphic depiction of the flight tracks is intuitive. Likewise, the arc center points, arc radius, and associated RF leg performance limits such as bank angles and speeds will not be depicted because these aircraft performance characteristics are encoded in the navigation database.
- E** RF legs in the profile view will include turn direction labels (i.e., LT Arc or RT Arc). This is done to provide relative information about the turn direction or course change for arc segments correlated to the planview (overhead) depiction.
- F** On this particular procedure, lateral and vertical course guidance – from the Decision Altitude (DA) to the Runway Waypoint (Landing Threshold Point or LTP) – is provided by the aircraft’s flight management system and onboard navigation database; however, any continued flight beyond and below the DA to the landing threshold is to be conducted under visual conditions (VMC).
- G** RNP values for each individual leg of the procedure – defined by the procedure design criteria for containment purposes – are encoded into the aircraft’s navigation database. Applicable landing minimums are shown in a normal manner with the associated RNP value in the heading of the minimums box. When more than one set of RNP landing minimums is available, and where an aircrew is able achieve lower RNP through approved means, the available (multiple) sets of RNP minimums will be listed with the lowest set shown on the left side of the box and remaining sets shown to the right, in ascending order, based on the RNP value.

## REQUIRED NAVIGATION PERFORMANCE (RNP): FAA INTRODUCES THE FIRST "PUBLIC" RNAV (RNP) APPROACH PROCEDURE AT RONALD REAGAN WASHINGTON NATIONAL AIRPORT (DCA) (Continued)

**KDCA/DCA**      **JEPPESEN**      **WASHINGTON, DC (VA)**  
**RONALD REAGAN**      **WASHINGTON NATL**      26 AUG 05 (12-1) **Eff 1 Sep** **RNAV (RNP) Rwy 19**



**RETAIN THIS BULLETIN UNTIL ADVISED TO DESTROY**

26 AUG 05