NSP GB

National Simulator Program
FSTD Qualification Guidance Bulletin

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Flight Standards
Service
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**Federal Aviation
Administration**

[National Simulator Program Guidance Bulletin](#)
An NSP GB contains valuable information for FSTD sponsors that should help them meet certain administrative, regulatory, or operational requirements with relatively low urgency or impact on safety.

Subject: FSTD Qualification for RNP AR.

Purpose: To provide flight simulation training device (FSTD) sponsors guidance by outlining FSTD approval criteria for Required Navigation Performance Authorization Required (RNP AR) tasks.

Background: AC 90-101A (as amended) provides airworthiness and operational approval guidance material for aircraft operators conducting Title 14 of the Code of Federal Regulations (14 CFR) part 97 Area Navigation (RNAV) Required Navigation Performance (RNP) instrument approach procedures (IAP) with Authorization Required (AR). Training for pilots is allowed with an approved FSTD as long as it accurately replicates the operator's equipment and RNP AR approach operations.

Revision	Description of Change	Effective Date
0	Original	2009
1	Revision 1	12/16/2009
2	Remove requirements for the issuance of Op Specs/Training Specs prior to FSTD qualification of RNP AR tasks.	5/17/2010
3	Specify use of an FAA approved U.S. RNP AR approach for purposes of FSTD Qualification. Clarify need for a real-world terrain model.	1/24/2012
4	Clarify use of Nav mode in j) Normal Performance.	1/31/2012
5	Specify FSTD Level and FAA FSTD ID Number in Attachment 1.	1/8/2013
6	Updated contact information on header & Letter of Compliance; Revised evaluation criteria to reflect changes in AC 90-101A; Added note for Airbus A320 RNP AR qualification; Removed references to "training" when evaluating tasks; Removed RNP AR requirement for dual systems IAW aircraft's AFM: Added "enhanced training device" for RNP AR qualification IAW AC 90-101A	12/17/2014
7	Reformatted GB for 508 compliance. Replaced Attachment 1 with hyperlink to template. Clarified use of SOC types (T023 vs T025).	Xx/xx2016

Procedures

The sponsor must provide a Statement of Compliance which affirms simulation of the navigation systems (i.e. EGPWS, GPS, IRS, FMS) and autopilot accurately replicate the operator's equipment and is based on original equipment manufacturers (OEM) or aircraft manufacturer's design data. Statement of Compliance Templates: NSP Form T023 (for previously qualified devices adding this qualification) and NSP Form T025 (for devices seeking an initial qualification under 14 CFR Part 60), may be obtained from the National Simulator Program website.

It is highly recommended that a site-specific FSTC visual airport model (as opposed to a generic visual model) be used for RNP AR approaches although there are no regulatory requirements that airport specific models (Part 60 Class I or Class II models) be used in the qualification of an FSTD for a RNP AR task. This notwithstanding, visual models must employ real world terrain modeling and an FAA approved U.S. RNP AR approach must be utilized. At the discretion of the Training Program Approval Authority (TPAA), generic (Class III) airport models may be approved for use in training where airport recognition in the visual segment portion of the RNP AR approach is not critical to completion of the training task. In these cases, a generic airport with a real world visual terrain model may be utilized. In addition, any terrain awareness and warning system (TAWS/EGPWS) must provide correct terrain feedback (Class A terrain display) and warnings consistent with the specific approach being trained. Simulator qualification for RNP AR tasks does not constitute Training Program Approval Authority for conducting RNP AR training.

When qualifying an FSTD or other enhanced training device for a RNP AR task, the sponsor must provide evidence to the NSP evaluator that the FSTD or other enhanced training device is equipped and operated in accordance with a valid aircraft cockpit configuration and complies with current software versions or limitations.

NOTE: The Airbus 320 series aircraft simulators employ "Simulator Standards" to reflect the changes to the aircraft fleet software and hardware. These simulator standards are published on a 2-year cycle and must be taken into account when qualifying an Airbus 320 simulator for RNP AR tasks. The Airbus 320 simulator RNP AR qualification may be approved prior to issuance of the Ops Spec and without a full upgrade to the current Airbus Simulator Standard if the sponsor has complied with AFS-400 requirements and the simulated systems and subsystems function equivalently to those in the aircraft.

Evaluation Criteria

Normal Performance and Functionality

a) Up-to-date database with display of validity period
b) FMS must support GPS (i.e. GPS installed)
c) Ability of FMS to:
   1. Fly a direct path to a fix.
   2. Fly a specified track to a fix and/or altitude.
   3. Identify the active (To) waypoint.
   4. Display distance & bearing to active (To) waypoint.
   5. Display groundspeed & time to active (To) waypoint in some manner.
   6. Display of To/From active fix.
   7. Display desired RNAV aircraft track.
   8. Display distance between flight plan waypoints.
   9. Define fix altitude constraints.
   10. Define a vertical path by a flight path angle to a fix.
   11. Display of barometric altitude to support an operational crosscheck of altitude sources.
   12. Display Required Navigation Performance (RNP) and Estimate of Position Uncertainty (EPU). EPU may be displayed as Actual Navigation Performance (ANP) or Estimate of Position Error (EPE) in certain aircraft.
   13. Have the capability to execute fly-by and fly-over waypoints. Fly-over turns are normally not compatible with RNP flight tracks and will be used only when there is no requirement for RNP containment.
   14. Display a readily visible means to verify the aircraft's RNAV-defined path and the aircraft's position relative to the desired path.
   15. Display and fly a radius-to-fix (RF) leg on navigation display.
   16. Continuous display of both lateral and vertical deviation from the desired RNAV path. These deviations can either be a fixed-scale CDI or a numeric display of deviation.
        i. Lateral – pilot must be able to readily distinguish if the cross-track error exceeds 1 x RNP value with a resolution of 0.01 NM or less.
             1. For those FMSs which can only display a cross-track error resolution of 0.1 NM, the operator will have a limited RNP capability for conducting RNP AR approaches defined in their Operations/Training Specifications.

ii. Vertical – pilot must be able to readily distinguish if the vertical deviation exceeds 75 feet with a resolution of 10 feet or less.

d) The FSTD must have an operable Class A Terrain Awareness Warning System (TAWS) identical to the aircraft.

e) FSTD must replicate the required equipment configuration, as reflected in the AFM, for the approved RNP capability (typically dual FMSs, dual GPSs, dual autopilots, dual air data systems, and at least a single inertial reference unit). All equipment must be operable.

f) Ability to load the entire RNP AR approach procedure to be flown from the onboard navigation database.

g) Ability to verify the RNP AR procedure to be flown through a review of the individual waypoints.

h) Either an equipment capability or an operational procedure to provide a direct means of inhibiting sensor updating (VOR/DME), if required (refer to the Operations Specifications C384 for details or limitations on this requirement).

i) FSTD autopilot/flight director must be able to fly a RF leg, comply with the aircraft's bank angle limits, and be able to maintain lateral track navigation without exceeding the RNP value while encountering strong tailwinds.

NOTE: RNP AR procedures with RF legs are generally designed to consider the following maximum tailwind components:

1. At or below 500 feet turn height above airport – 25 kts
2. Between 501 and 1000 feet turn height above airport – 37.5 kts
3. Between 1001 and 3000 feet turn height above airport –50 kts

Refer to FAA Order 8260.58 for expanded information.

j) Upon initiating a go-around or missed approach (through activation of TOGA or other means), the lateral flight guidance mode should remain in LNAV/NAV . If the aircraft cannot remain in LNAV/NAV after TOGA is selected, then procedures to re-engage LNAV/NAV while remaining within 1 x RNP must be demonstrated and verified in the FSTD. The FSTD must permit re-engagement of LNAV/NAV by 400 ft AGL.

Non-Normal Performance and Functionality

a) Navigation system must have the ability to monitor the achieved navigation performance and to alert the pilot when the RNP requirements are not being met (i.e. "UNABLE REQ NAV PERF", "NAV ACCUR DOWNGRAD", or other RNP messages during approaches).

b) The Instructor's Operating Panel must have the capability to induce the malfunction of an "UNABLE REQ NAV PERF" alert or other alert message that would cause a missed approach during a RNP AR approach (i.e. FMS failure, GPS failure, autopilot failure, etc.). The malfunction must appear realistic to the pilots.

c) Aircraft must provide a means to annunciate failures of any component of the RNAV system.

Contact: Questions or comments regarding this Guidance Bulletin may be directed to the National Simulator Program, AFS-205, at (404) 474-5620.