THE UNIVERSAL® FLYER

PBN Implementation Progress in Europe

At the end of 2015, EUROCONTROL released the 9th Area Navigation (RNAV) Approach Implementation Support group meeting (RAiSG 9) Report. The document provides an overview of the progress of Performance-Based Navigation (PBN) implementation in Europe. In particular, Section 17 of the report discusses PBN equipage in Europe for 2015:

- 89.8% Of flights have Global Navigation Satellite System (GNSS) installed
- 23.7% Have Lateral Navigation (LNAV) capability only
- 44.68% Have LNAV and LNAV/VNAV (Vertical Navigation) capability
- 2.49% Declare Localizer Performance with Vertical (LPV) capability
- 5.01% Declare Required Navigation Performance (RNP) Authorization Required (AR) Approach with Radius-to-Fix (RF) capability
- 0.73% Declare RNP AR Approach without RF

The report shows declared level of equipage increased slightly from 2014 to 2015.

The two primary components of PBN are RNAV and RNP. The collective and individual benefits of PBN are wide-reaching, well-documented and nearly indispensable. It is proven to save fuel, relieve congestion and reduce delays at many airports, domestic and international. The world is relying on PBN for airport access and operational safety.

With a Satellite-Based Augmentation System (SBAS)–Flight Management System (FMS) upgrade, operators are provisioned for PBN including Precision–Area Navigation (P–RNAV) compliance and RNP/RNAV up to 0.3 NM approach accuracy. To learn more, contact your Universal Avionics Sales Manager – www.uasc.com/salesteam.

Product News and Company Highlights

Matching Advanced Avionics to Customer Needs

2016 SBAS–FMS Upgrade Incentive Program

Calling all Learjet 40/45/40XR/45XR and Citation Excel/XLS aircraft operators! We want to help you get ready for Automatic Dependent Surveillance-Broadcast (ADS–B) Out and equip for LPV, so we are offering an incentive program to trade-in your non-SBAS (legacy) Universal Avionics FMS for a significant credit toward the purchase of a new, advanced capability SBAS–FMS. This program is available to you throughout 2016.

Our OEM-installed FMSs have been featured on Learjet aircraft for over 30 years and Citation aircraft for over 20 years. With substantial experience integrating various avionics systems in these models, we are a trusted resource when it comes to ensuring your avionics deliver exceptional performance.

Gain LPV and ADS–B

SBAS approach procedures like LPV offer several benefits over traditional GPS or Instrument Landing System (ILS) procedures. The SBAS-FMS upgrade provides:

- LPV
- Time, productivity and fuel savings with more direct routing
- Increased resale value
- An approved ARINC 743A position source for ADS–B Out compliance
- Supports RF Leg guidance and outputs to compatible displays
- Foundation for PBN requirements

Learn more at www.uasc.com/fmsincentive.

Online Familiarization Modules Available

As a complement to our classroom training options, operators can now view short, narrated videos explaining concepts and demonstrating procedures right from UniNet, our Online Service Center. Learn more about topics ranging from theory of operation to practical "how to" procedures.

These modules can be found under the "Training" tab and many include links to additional resources.

Courses currently available include:

- FMS Operations for Software Control Number (SCN) 1000
- UniLink® Familiarization

The UniLink Familiarization module breaks down UniLink UL-800/801 with SCN 30.X for Future Air Navigation System (FANS) operations. This module presents a brief introduction to FANS and UniLink, along with the basics of data entry, advisories, messages, alerting and smart operating practices. It also defines Flight Information Services, Automatic Terminal Information Service (ATIS), Terminal Weather Information for Pilots (TWIP) and Departure Clearances. Three Air Traffic Control (ATC) sections clarify emergency procedures and logging on to requests and text messaging. Communication Status and Control is also analyzed, along with operations and maintenance topics.

Login at www.uasc.com/UniNet to check it out.

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Are You Seeing 2020?

As we fast approach the ADS-B 2020 mandate, you might be wondering how the Wide Area Augmentation System (WAAS) fits into the picture and what your choices are. Many operators are starting to comply with the mandate, but that does not stop the questions from popping up along the way.

There are various ADS–B avionics choices available that use WAAS as the position source. This might lead one to ask if there is a transponder/transceiver out there that can do more than just satisfy the ADS–B Out requirement. Several manufacturers have products that will not only meet the 2020 mandate for ADS–B Out, but will also use WAAS as the navigation position source that enables en-route area navigation as well as your ability to fly RNAV (GPS) approaches to LPV minima.

The FAA has a comprehensive website to help guide you to the right choice. With over 4,100 WAAS LPV/LP approaches already available across the United States, there might be an ADS–B solution that would not only have you ADS–B Out 2020 compliant, but also seeing "20/20" to these approaches.

Source: Reprint from SatNav News, Volume 56, Winter 2016.

Universal Avionics Solution: Equip for ADS–B AND get WAAS LPV and PBN

The baseline ADS–B Out installation consists of:

- SBAS–FMS
- Extended Squitter Mode S Transponder (choose from several on the market today)
- System Failure Annunciations (may require a Radio Control Unit/RCU software upgrade)

Unlike stand-alone solutions, this integrated solution provides substantial operator benefit and adds significant value to the aircraft:

- WAAS LPV/EGNOS Approach Procedures with Vertical (APV), LNAV approaches
- PBN including P–RNAV compliance and RNP/RNAV up to 0.3 NM approach accuracy
- Data link for current and future mandates (FANS, ACARS, Link 2000+, FAA DataComm)

Be sure to choose an integrated solution, rather than a stand-alone, short-term solution.

ADS–B Out Pricing Incentive

This limited-time incentive package program includes a SBAS–FMS upgrade and Rockwell Collins TDR-94(D) Mode S Transponder, together providing equipage requirements to meet the upcoming NextGen ADS–B Out mandate.

The biggest value of this package is that you will receive an integrated SBAS–FMS.

For program details and additional information, visit www.uasc.com/ads-b.

Recent Service Bulletins and Letters

Visit UniNet today at www.uasc.com/UniNet to download any of our Service Bulletins (SB) or Service Letters (SL), including the recently released ones listed to the right, from the Tech Pubs tab.

SB / SL No.	Release Date	Title
SB3640	12/10/15	Identified Issue with Certain Direct-To Operations
SB3639	12/17/15	World Magnetic Model (WMM) Reverting to Base Year of 2000 on 1 January 2016 for UNS-1( ) FMS SCN 80X.X/90X.X
SL2860	2/3/16	SBAS Flight Management System (FMS) Compliance with AC 90-101A, Appendix 2
SL2861	3/3/16	SBAS-FMS Compliance with EASA CS-ACNS

Feedback

Your feedback is appreciated. Email your comments to: universalflyer@uasc.com.

Update

Receive *The Universal Flyer* by mail or email. Email universalflyer@uasc.com or call the Marketing department at (800) 321-5253 or (520) 295-2300 to update your profile.

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From the Flight Deck

Discussing ICAO Aircraft & Equipment Capabilities Codes with Universal Avionics Pilot Instructor – Customer Training

Recently, there have been numerous questions concerning the appropriate International Civil Aviation Organization (ICAO) equipment suffix codes to use with regard to PBN RNAV and RNP specifications.

In this issue of *The Universal Flyer*, we will discuss these codes and in later issues, we plan to cover other ICAO designations for Controller-Pilot Data Link Communications (CPDLC), ADS–B and Aircraft Communications Addressing and Reporting System (ACARS).

Mike Michalski, Pilot Instructor – Customer Training

The following recommendations will apply to the majority of FMS installations using SCN 601 and later. The tables below highlight PBN/RNAV and RNP specifications per pages 5-1-24 and 5-1-25 of the Aeronautical Information Manual (AIM).

Area Navigation

PBN/	RNAV Specifications
A1	RNAV 10 (RNP 10)
B1	RNAV 5 all permitted sensors
B2	RNAV 5 GNSS
B3	RNAV 5 DME/DME
B4	RNAV 5 VOR/DME
B5	RNAV 5 INS OR IRS
B6	RNAV 5 LORAN C
C1	RNAV 2 all permitted sensors
C2	RNAV 2 GNSS
C3	RNAV 2 DME/DME
C4	RNAV 2 DME/DME/IRU
D1	RNAV 1 all permitted sensors
D2	RNAV 1 GNSS
D3	RNAV 1 DME/DME
D4	RNAV 1 DME/DME/IRU

Please note:

- A1 – If you have Federal Aviation Administration (FAA) approval, either so stated in the Aircraft Flight Manual Supplement (AFMS) or by FAA Letter of Approval (LOA).

- B2 – For most installations. B2 does meet the European requirement for RNP Bravo.
- B5 – For those aircraft that also have an Inertial System.
- C2 – For most installations.
- D2 – For most installations.

Required Navigation Performance

	RNP SPECIFICATIONS
L1	RNP 4
O1	Basic RNP 1 all permitted sensors
O2	Basic RNP 1 GNSS
O3	Basic RNP 1 DME/DME
O4	Basic RNP 1 DME/DME/IRU
S1	RNP APCH
S2	RNP APCH with BARO–VNAV
T1	RNP AR APCH with RF (special authorization required)
T2	RNP AR APCH without RF (special authorization required)

Please note:

- L1 – Same requirements as for A1.
- O1 – For most installations but applies to European departure and arrival requirements.
- S1 – Only for installations that do not provide vertical approach guidance. Most installations can provide vertical guidance.
- S2 – For most installations. Note: RNP approach here does not refer to a North American RNAV (RNP) "Authorization Required" (AR) approach.
- T1 or T2 – Only for operators who have authorization to do AR approaches. RF refers to the flight guidance system's ability to navigate the ARINC Precision Arc (RF) leg type which was first implemented in FMS SCN 801.

Additional Information

Codes not listed in the above tables are not applicable to most Universal Avionics installations. A typical domestic flight in the U.S. for a non-AR installation would use B2, C2, D2 and S2.

For more information, please contact Universal Avionics Support at (520) 573-7627 • (800) 595-5906 or customersupport@uasc.com.

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Customer Spotlight

My history with Universal started back in 1994 when I was on exchange with the USAF at the Air Force Flight Standards Agency. I got to fly the first USAF jet (C-21A Learjet) FAA certified to fly GPS approaches and happened to be the first guy to do that. As a Canadian! Of course, your FMS was the equipment we chose and your folks back then helped babysit us into the new GPS world.

When I got back to Canada, my own Air Force joined the new world and I got to help equip our King Air training fleet with FMSs. Guess who I insisted we go with? Universal Avionics!

Again, your team was there to help as the C-90 King Air did not come with that kit. That was over a decade ago. When we updated to newer King Airs we again went with Universal. Over the years you were always ready to help me out with training, advice etc. I pushed the Air Force to buy the FMS Trainer software back then and got great support from you.

My career is slowly winding down and I am now a part time Reservist after 28 years of service. I do 14 days a month. People still ask me questions about the history of GPS and FMS. I always tell them I chose your product because it was easily the most intuitive FMS out there. For young student pilots it was the way to go.

–Major Mike Wolter, Retired