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In this Issue:

What Controllers Need to Know About WAAS

WHAT CONTROLLERS NEED TO KNOW ABOUT WAAS

/*TRF/E Wide Area Augmentation System (WAAS) is a navigation system that improves the Global Positioning System (GPS) signal accuracy, and allows for localizer performance with vertical (LPV) guidance approaches. WAAS also enables the future decommissioning of many of today's ground-based navigational aids.

These LPVs can be thought of as a space-based Instrument Landing System (ILS). One advantage is an LPV has the potential to serve nearly every runway end in the United States (U.S.). Increased availability of vertically guided approaches improves flying safety and increases pilot and controller options. While an airport may only have one ILS, it could have LPVs to several runway ends. Since WAAS does not have any ground-based navigational equipment at an airport, approach capability will not be lost to events such as a flood, snowstorm, or rare accident. In addition, LPV approaches are not affected by signal reflection by waiting or landing aircraft and do not require protection of critical areas although precision obstacle-free zone criteria still apply.

LPV approaches are published throughout the United States on instrument flight rules (IFR) runways 3,200 feet by 60 feet or larger. WAAS does not have separate approach charts. Rather, the LPV

minima line is located on the area navigation (RNAV) GPS charts with lateral navigation (LNAV) and lateral/vertical navigation (LNAV/VNAV) minima. Similar to the ILS and localizer approach chart, these three minima (LNAV, LNAV/VNAV and LPV) all have the same ground path, but different final approach descent altitudes. Also similar to an ILS, LPVs share similar U.S. terminal instrument procedures criteria and provide decision height minima as low as 200 feet above ground.

There are 1,051 of these LPV approaches available¹, and in July, the number of LPVs will exceed the number of Federal Aviation Administration ILS instrument procedures. The National Flight Procedures Office is publishing LPVs at a rate of 300 plus per year, which far exceeds the FAA's Flight Plan goal.

Previous WAAS coverage limitations, along both the east and west coasts and in Alaska, have been rectified by WAAS infrastructure improvements which were completed in September 2007. Coverage now extends to most of Alaska, Canada, and Mexico.

The aircraft avionics equipment will determine which RNAV GPS approach minima line should be flown. However, the aircraft equipment code "/G" will not differentiate the aircraft's type of GPS capability. IFR-certified WAAS avionics have been on the market for general aviation aircraft since 2004, and over 30,000 have been sold. Business jets,

¹ As of the April 10, 2008, Terminal Procedures Publication (TPP) cycle

turboprops, airliners and helicopters are getting equipped as more WAAS-integrated flight management systems become available. Understanding the aircraft capabilities helps controllers better sequence their arrival pattern.

Like GPS, WAAS does not provide controllers with a remote monitor capability. Only the pilot would know if the WAAS fails, or loses coverage in his/her local area. If the WAAS correction signal is lost, the aircraft avionics would automatically default to basic GPS, and the pilot would then use the LNAV minima on the same RNAV GPS approach. Controller reporting responsibility in instances of pilot-reported GPS or WAAS anomalies is nearly identical as GPS outages and delineated in FAA Order (FAAO) JO 7110.65, Air Traffic Control, Paragraph 2-1-10, NAVAID MALFUNCTIONS, and FAAO JO 7110.10, Flight Services, Paragraph 13-1-4, AIRCRAFT REPORTED MALFUNCTIONS, subparagraph c.

There are different types of WAAS Notices to Airmen (NOTAM) including predictive, actual flight data center (FDC), and procedure FDC. Predictive WAAS NOTAMs are derived from a computer program which analyzes the geometry of GPS satellites and predicts where short WAAS outages should occur. These NOTAMs state that WAAS coverage is unreliable. Unreliable has flight planning implications, but allows the pilot to fly LPV minima if the avionics is receiving the WAAS correction signal. An FDC NOTAM may be issued if WAAS is unavailable; however, actual system

outages are rare. Procedure FDC NOTAMs may be issued to limit a function of WAAS, e.g., runway 17 LPV not authorized (LNAV is available), or make an adjustment to an approach chart, e.g., runway 20, chart WAAS symbol). WAAS unreliable NOTAMs, pilot-reported GPS anomalies, or WAAS unavailable NOTAMs are delineated in FAAO JO 7110.65, paragraph 4-8-1, subparagraphs f, g, and h.

The WAAS inverse W symbol **W** is found on an approach chart briefing strip and indicates that WAAS predictive NOTAMs are not provided for that airport. This symbol was created for airports that had more than one daily predicted NOTAM. Although a concern during initial system operations, WAAS coverage has improved to the point where most **W** symbols will be removed.

WAAS procedures without vertical guidance are called localizer performance (LP) procedures and should be available in March 2009. LP minima will be listed on the RNAV GPS charts where a glide path is not possible because of terrain or obstacle issues. Therefore, LPV and LP will not share the same approach chart. Not only will WAAS LPV and LP serve runways, they will also be developed for point-in-space helicopter operations supporting off-airport heliports.

Additional information is provided in the WAAS Controller-Based Instruction #57097, dated June 2005, and at the FAA Web site at <http://gps.faa.gov>.

In this publication, the option(s) for which a briefing is required are indicated by an asterisk () followed by one or more letter designators, i.e., *T = Tower, combined tower/approach control, *R = TRACON, *E = ARTCC (En route), or *F = AFSS/FSS. (Reference FAAO 7210.3, para. 2-2-8.)*

This table lists Air Traffic Bulletins published since 2003. They can also be found on the Internet at http://www.faa.gov/airports_airtraffic/air_traffic/publications/.

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