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New Vision for the Way We Fly

October 19, 2010 - Urging a "new vision for the way we fly," Federal Aviation Administration (FAA) Administrator Randy Babbitt spoke at the opening session of the National Business Aviation Association (NBAA) 2010 Convention held in Atlanta, Georgia. His speech outlined the benefits of a heightened safety culture and technical improvements under the Next Generation Air Transportation System (NextGen), the ongoing transformation of the National Airspace System (NAS), including the implementation of the Wide Area Augmentation System (WAAS).

This year's NBAA convention attracted over 24,000 registered attendees and 1,083 exhibitors. Speaking to a capacity crowd, Babbitt pointed out that "the people in this convention are among the best at meeting challenges," and he stressed the need for "partnership in modernization" as the FAA continues to roll out NextGen.

"I want to turn your attention to WAAS-LPV," Babbitt said. "Right now, business aircraft have access to more airfields – in all weather – thanks to WAAS-LPV. That's Wide Area Augmentation, providing lateral precision with vertical guidance. As part of NextGen, we are updating our airspace. We have published more than 2,000 new satellite-based WAAS-LPV approaches and departures at more than 800 airports in the United States. There are now more WAAS-LPV procedures than ILS procedures in the country. As you know, we augment the GPS signal to make it more accurate and create a precision approach available to those with properly equipped aircraft. And these approaches require no navaids on the ground. There's no installation, calibration or maintenance of ground equipment. It's all in the cockpit. These approaches give you all-weather access and instrument procedures to airports that never had those options before," he said.

Babbitt concluded his speech by promoting the creation of a heightened safety culture. "Through working together and being open, "he said, "we have a chance to draw on everyone's expertise to address problems . . . Now is the time for us to continue forward with a new vision for the way we fly."

- Scott Speed, FAA AJW-9131/NAVTAC

The SatNav News is produced by the Navigation Services (ATO-W) branch of the Federal Aviation Administration (FAA). This newsletter provides information on the Global Positioning System (GPS), the Wide Area Augmentation System (WAAS) and the Ground Based Augmentation System (GBAS).

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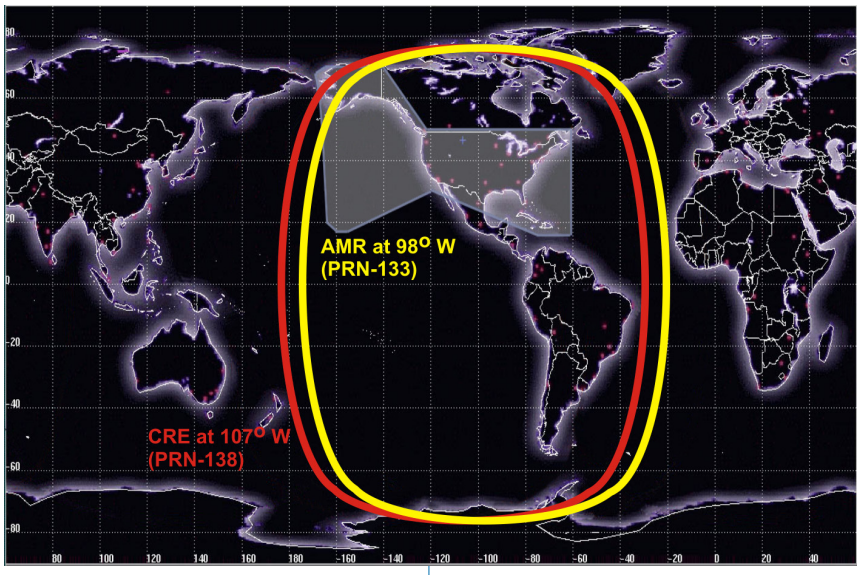


Intelsat GEO Satellite Ceases WAAS Broadcast, Resets

January 13, 2011 – The Intelsat geostationary (GEO) Galaxy 15 satellite, which ceased broadcasting the Wide Area Augmentation System (WAAS) signal on December 16, 2010, has reset itself and now accepts commands from the Intelsat Satellite Control Center. Intelsat engineers are currently conducting initial diagnostic tests to assess the health of the satellite (also known as CRW).

Intelsat announced on April 5, 2010 that it had lost communication with Galaxy 15. Surprisingly, Galaxy 15 was able to continue broadcasting WAAS integrity and correction data. However, the deterioration of the satellite's stability during December 2010 caused intermittent data link disruptions that rendered the satellite unreliable for further data transmissions. The FAA's mitigation plan to activate another satellite was successful and since November 2010 the new GEO satellite, Inmarsat AMR, has been transmitting the WAAS signal in addition to the Telesat CRE GEO.

Operators in northwest Alaska, north of a line from 70N150W and 64N164W, can expect WAAS services to be unreliable. Two of the 16 airports located in the designated area, Barrow and Kotzebue, have published LPV approaches. Any operators in this area should check Notice to Airmen Publication (NTAP), Alaska/Hawaii section 4-A & H-11, for operational limitations.

The WAAS broadcast over a large portion of the rest of Alaska is now provided by a single GEO. WAAS users in this area may experience temporary service outages due to lack of redundant GEO signals. These outages will occur during a switch between the primary and backup GEO Uplink System (GUS) stations. These switchovers will occur approximately 4 – 5 times a month and it may take up to 5 minutes to fully restore LPV service after an occurrence.

Intelsat and the satellite builder, Orbital Sciences Corporation, believe they have isolated the cause of the failure and have implemented corrective actions that will serve to prevent recurrence. Intelsat is highly confident that the cause of failure has been fixed.

After the current tests are complete, Intelsat plans to move the Galaxy 15 to its primary orbital location of 133 degrees west or its backup location of 129 degrees west. The Galaxy 15 should arrive at this final location in the spring.

The FAA is working with Lockheed Martin, the Ground Communications and Control Segment (GCCS) contractor, to test the navigation payload. With favorable testing results, the FAA expects to begin transmitting the WAAS Signal in Space from Galaxy 15 prior to reaching the final orbital position. *(Updated 1/31/2011)*

- Scott Speed, FAA AJW-9131/NAVTAC

WAAS LPV Approaches Approved for Des Moines Helicopter Medical Flights

January 26, 2011 – In a significant advance for helicopter emergency medical service (HEMS) flight operations, the FAA has approved Instrument Flight Rules (IFR) arrivals and departures for use in the ongoing project by the "Mercy One" Bell 429 helicopter serving Mercy Medical Center in Des Moines, Iowa. The Mercy Medical Center program, among the nation's first HEMS operations to gain approval for Wide Area Augmentation System (WAAS) IFR navigation, was selected to be the test site for an FAA government-industry partnership (GIP) project designed to collect performance data on WAAS procedures. This data will help develop public use criteria of WAAS procedures and set the stage for broader future use of these procedures under the FAA's Next Generation Air Transportation System (NextGen) program.

IFR flights rely mainly on instrument navigation rather than visual observations and therefore allow missions to be flown in poor visibility conditions. "We miss about 240 flights a year due to the fact that the weather minimums are such that we can't fly," said Dan Keough, director of emergency transport services at Mercy. "We feel that with this new technology being state-of-the-art and the first of its kind in Iowa, we will recapture at least 20 percent of those weather misses that we currently have now."

The approved approaches use WAAS Localizer Performance with Vertical guidance (LPV) procedures, which provide comparable performance to Instrument Landing System (ILS) approaches, but without expensive ground based equipment at each landing site; it's all satellite based. The Mercy Medical Center LPV ap-

The Bell 429 "Mercy One" helicopter

proaches are approved for glide paths up to 9-degrees at a minimum airspeed velocity for instrument procedures of 45 knots. According to Bell Helicopter, this will allow Mercy One to employ LPV procedures for steep approaches to a network of other hospitals and rendezvous helipads in adverse weather conditions, improving safety in low-altitude flight.

"WAAS technologies, when combined with the Bell 429, provide all helicopter operators engaged in IFR operations a vehicle to complete missions that were unthinkable in the past," said Larry D. Roberts, senior vice president of commercial business at Bell Helicopter. "This total aircraft solution will increase the number of missions that are flown and ultimately save more lives."

Six pilots in Mercy Medical Center's emergency response team have been trained to fly the Mercy One. Additional pilots will be trained on the aircraft in future months.

The GIP organizations involved in the Mercy One collaborative effort are Bell Helicopter, Air Methods (the company that operates Mercy Medical Center's emergency flights), the FAA, and Mercy Medical Center in Des Moines, Iowa.

The GIP team is developing a network of five fixed WAAS approaches in Iowa including the helipad at Mercy's main hospital in Des Moines plus approaches to three other regional hospitals in Centreville, Albia, and Osceola; as well as a brand new rural rendezvous IFR helipad in Stuart.

Air Methods and the Des Moines air traffic control (ATC) have signed a letter of agreement which enables Des Moines tower control to provide specific ATC guidance for Mercy One flights. These initial routes are the first part of a future low-level route structure for the entire Des Moines metro area, according to an FAA official. *(Updated 1/28/2011)*

- Scott Speed, FAA AJW-9131/NAVTAC

New LPV Upgrades for Dassault and Gulfstream Aircraft

Atlanta (October 20, 2010) - Rockwell Collins announced today several new Supplemental Type Certificates (STCs) to provide Wide Area Augmentation System (WAAS) GPS capability with Localizer Performance with Vertical guidance (LPV) upgrades for Dassault and Gulfstream aircraft equipped with its Pro Line 4™ and Pro Line 21™ avionics.

These STCs allow many Falcon and Gulfstream operators with Rockwell Collins Pro Line 4 and Pro Line 21 avionics to take advantage of the more than 2,300 LPV approaches available today with minimum decision heights as low as 200 feet.

Rockwell Collins achieved certification of its LPV solution for the Dassault Falcon 50, 50EX, 2000 and 2000EX aircraft equipped with the company's Pro Line 4™ avionics. In addition, the company achieved certification of its LPV solution for the Gulfstream G150 aircraft equipped with Rockwell Collins Pro Line 21 avionics. The STC for the Dassault aircraft is held by Rockwell Collins, while the STC for the G150 is held by Gulfstream.

Operators who upgrade aircraft avionics to the Satellite-Based Augmentation System (SBAS) GPS capability may take advantage of WAAS capabilities in North America (as well as EGNOS and MSAS SBAS capabilities in Europe and Japan, respectively). WAAS/SBAS improves the availability and integrity of GPS lateral navigation for all classes of aircraft and flight operations within the WAAS Geo footprint and provides LPV capability within the specified LPV service area.

Operators may check with their aircraft's manufacturer, their avionics manufacturer, or their maintenance

service center to determine if this upgrade is available for their aircraft. *(Updated 1/28/2011)*

Satellite Navigation Approach Procedures Updates

December 22, 2010 - The number of Wide Area Augmentation System (WAAS) enabled approach procedures continues to increase.

A listing of current LPV locations and associated information can be found on our website at http://gps.faa.gov by selecting the GPS/WAAS Approaches button from bottom of page.

The FAA's Aviation System Standards organization keeps an inventory of all approach procedures available for the National Airspace System, including those based on ground-based navigation aids (navaids). Some highlights from this inventory, are shown in the tables. One thing to note from the information in these two tables is the growing proportion of area navigation (RNAV) approach procedures, based on satellite navigation systems, compared to approach procedures enabled by traditional ground-based navigation systems.

Other satellite-based approach procedures worth noting are the WAAS Localizer Performance (LP) and the GBAS Landing System (GLS). GBAS stands for Ground Based Augmentation System. The WAAS LP is scheduled to debut in the spring of 2011 and provide capability to runways unsuitable for vertically-guided approaches. GLS approaches, as the name implies, are used in conjunction with GBAS. There are currently five GLS approaches published at Newark Liberty International Airport in preparation of the site acceptance of the GBAS stationed there. Current NOTAMs prohibit the use of these approaches until the Newark GBAS comes online for operational use. More on both of these GNSS approach procedure types will be covered in future editions of the SATNAV News.

- Mary Ann Davis, FAA AJW-9131/NAVTAC

Instrumentation Approach Procedures (IAPs) Based on Traditional Navaids

ILS	1,342
ILS (CAT II)	170
ILS (CAT III)	121
NDB	943
VOR	1,362
VOR / DME	969

(Data as of November18, 2010)

Table truncated for publication. Full table available at http://avn.faa.gov/index.asp?xml=nfpo/inventory-summary/

Japanese Launch QZSS Satellite

Japan's first quasi-zenith satellite, nicknamed "Michibiki," (meaning "guiding" or "showing the way") launched successfully from the Tanegashima space center on September 11, 2010 and reached its quasi-zenith orbit on Monday, September 27. The Quasi-Zenith Satellite System (QZSS) is a Japanese satellite positioning system augmentation program.

By sharing almost the same positioning signals for transmission with the currently operated GPS, the QZSS system enables an expansion of the areas and time duration of the positioning service's availability in mountainous and urban regions in Japan.

The satellite positioning system is well known for car navigation, but it is also vital for mapping, measurements for construction work, monitoring services for children, detecting earthquakes and volcanic activities, weather forecasting, and many other applicable fields. New services may be invented when positioning accuracy is further improved by the QZSS.

The QZSS figure eight orbit

Michibiki is the first in a planned series of three satellites that will provide navigation signals focused on the Japanese islands. Key to their mission is a figure eight orbit that will allow a tight northern swing over Japan and a much broader southern pass over Australia. The orbit has been designed so that one of the planned three QZSS satellites is always in the skies above Japan. This "quasi-zenith" orbit gave the project its name: Quasi-Zenith Satellite System (QZSS). The QZSS satellites are not compatible nor intended for aviation receiver use. *(Updated 1/28/2011)*

GBAS Program Update

2011 is expected to be an important year for Ground–based Augmentation System (GBAS). In early 2011, the first Category One (CAT I) GBAS is planned to be operational at Newark Liberty International Airport. Also in 2011 the FAA plans to establish a GBAS at Houston Bush International Airport in cooperation with Houston

Satellite-based Approach Procedures (by Procedure Type)

	Procedures (Part 139 Airports)	Procedures (Non-Part 139 Airports)	Total Number of Procedures
LNAV Procedures	1706	3270	4976
LNAV/VNAV Procedures	1190	1131	2321
LPV Procedures *(LPV w/200' HAT)*	1119	1247	2366 *(419)*
GPS Stand-Alone Procedures	34	366	400

(Data as of January 13, 2011)

Airport System (HAS), Continental Airlines, and Honeywell. This provides the FAA and Continental with a GBAS city pair (Houston-Newark) and the potential for GBAS data collection on system performance and GBAS benefits.

The FAA also continues work toward a CAT II/III GBAS capability. This work includes coordination with the Radio Technical Commission for Aeronautics, Inc. (RTCA), the International Civil Aviation Organization (ICAO), and industry partners. In conjunction with RTCA and ICAO reviews, the FAA Navigation Services group is developing the draft CAT III GBAS ground facility specification. The GBAS CAT I ground system will provide a platform to begin validating CAT II/III concepts. Prototypes for the CAT III GBAS ground system and CAT III GBAS avionics will be developed in cooperation with industry at the FAA William Hughes Technical Center.

The GBAS team continues activities to meet milestones of the FAA acquisition management system (AMS) for an FAA CAT III GBAS investment decision. On August 25, 2010, the GBAS group briefed the program status to the FAA Enterprise Architecture Board (EAB) seeking a concept and requirements definition readiness (CRDR) decision. The board reached a favorable decision which allows the program to proceed onto the concept and requirements definition (CRD) phase. The GBAS program provided a revised schedule to allow more time to prepare and complete remaining AMS milestones. The new date for the FAA final investment decision moved to September 2013.

International interest in GBAS remains high. The International GBAS Working Group (IGWG) continues to meet regularly. The next meeting is scheduled to be held in Osaka in February 2011 and will be hosted by the Electronic Navigation Research Institute (ENRI) in coordination with the Japan Civil Aviation Bureau (JCAB). This international working group has had strong impact on the proliferation of GBAS technology. With the GBAS technology moving from the development stage to the implementation stage, new participants - commercial airlines in particular - have joined the working group to monitor progress and to provide information about their operations and equipage plans. As a part of those plans, new generation Airbus and Boeing aircraft will all be GBAS-capable.

More and more countries continue to approach the FAA to learn about the development and implementation of GBAS. In the last quarter, the FAA GNSS Program Office has continued to host international visitors and inform them about FAA GBAS activities. The FAA is working with its counterparts in Australia, Germany, Spain, and Brazil to achieve GBAS certification. This international cooperation will also be the key to achieving a coordinated approach for the next generation CAT III GBAS.

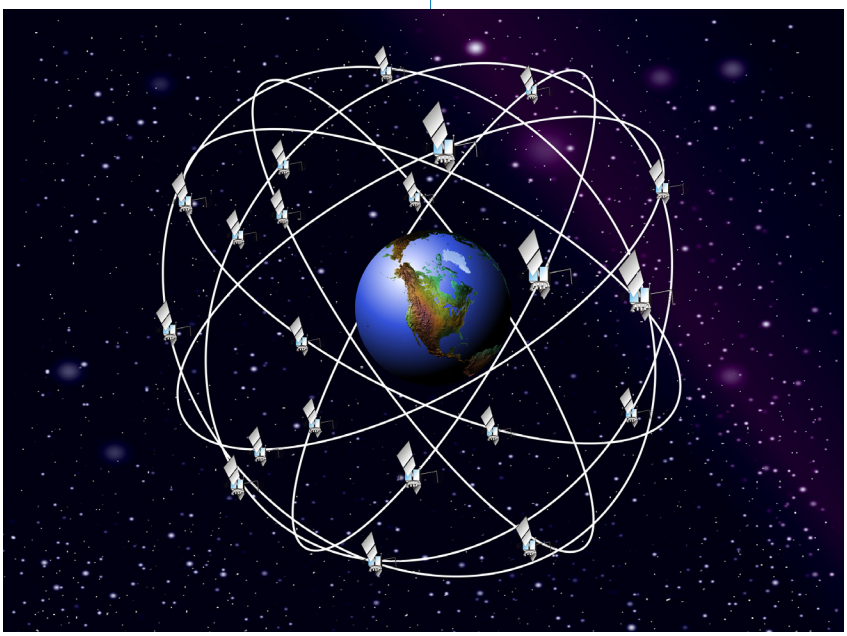
- Dieter Guenter, FAA AJW-9132/NAVTAC

Industry Day for Alternate Position, Navigation and Timing (APNT)

The Federal Aviation Administration (FAA) held Industry Day meetings August 10th and 11th at the Stanford University campus to share and gather ideas on alternate positioning, navigation and timing techniques (APNT) to mitigate accidental and intentional GNSS signal interruptions. If implemented, one or more of these techniques are projected to be operational in the 2025 timeframe. Interference sources of interruption discussed at the gathering included examples from historic GPS "Notice to Airmen" (NOTAM) data as well as interference caused by the use of personal privacy devices.

The first day included public briefings from the FAA on the strengths and weaknesses of three alternatives under consideration: Distance Measuring Equipment (DME), passive multilateration, and pseudolite (a contraction of the term "pseudo-satellite"). The FAA also presented basic summaries of the NextGen Concept of Operations airspace environment and the applications and coverage of trajectory-based operation (TBO). "NextGen" is an abbreviation for the Next Generation Air Transportation System, the FAA's modernization program for the national airspace system.

Also reviewed was the need for a seamless transition to a backup means to maintain safety where Required Navigation Performance (RNP) 0.3 – 1.0 is used for 3 nm aircraft separation spacing with use of the Automatic Dependent Surveillance Broadcast (ADS-B). The 2025 Next-



Gen transition from ground based navigation aids to satellite based aids enables support for the Operational Improvements (OI) that will meet the projected doubling or tripling of air traffic. Traditional legacy ground-based navigation aids such as VHF omnidirectional radio range (VOR) or DME cannot support a seamless transition for use as a backup for aircraft that fly direct routes. The NextGen environment uses four dimensional (Latitude-Longitude-Altitude-Time, also known as 4DT) flight paths. Future flight paths will be selected by the user (dispatcher or pilot) in agreement with Air Traffic Management (ATM) to allow "RNAV everywhere" and RNP where required. RNAV is the term for area navigation that allows aircraft to choose any course within the navigation coverage network, rather than navigating point to point based on ground navigation aids. RNP is a defined level of performance with airborne monitoring and alerting capabilities. Industry representatives had the opportunity to ask questions throughout the presentations as well as offer input using 20 minute presentation slots made available on a first come basis during the afternoon public session.

The second day's meeting included private closed-door sessions with industry and the APNT team. Throughout both days, representatives from various organizations presented points of view regarding research, development, and potential implementation of systems, avionics, processes, and procedures.

Next Steps

The APNT initiative continues to progress in the FAA's Lifecycle Management Process as it prepares for the Concept Requirements Definition (CRD) phase. The APNT team is reviewing suggested systems and various relevant questions about them as presented by industry representatives. These include alternate solutions from current and projected technologies that use current equipage and minimize cost.

An example of an alternative concept study includes DME data being reviewed to determine if the true performance characteristics are better than previously acknowledged and good enough to meet NextGen position, navigation, and timing (PNT) requirements or if the DME specifications can be tightened to improve performance for the next DME acquisition. Trade space considerations will determine if the NextGen backup system capabilities will be supplemental or redundant. The difference between supplemental and redundant will be defined by the performance requirements to maintain safety and provide coverage where economically beneficial.

- Darin Chapman, FAA AJW-913/NAVTAC

What's New on the Web!

In our continuing efforts to bring the aviation community the best and most accurate information, the content of the FAA's Navigation Services Global Navigation Satellite System (GNSS) website is regularly updated. Here are some highlights of our site content:

GNSS Library Page – This page has briefings, fact sheets, and other documents that are constantly updated. This page is maintained with the most current information to keep our readers in the know on the GNSS and all its aviation applications.

GPS/WAAS Approaches Page – This page gives the most current list of available Localizer Performance with Vertical guidance (LPV) approaches, as well as related data about each published LPV, to include airport identifier and airport census information and a graphic of all current LPVs in the U.S. The page also includes a helpful link to the FAA's Instrument Flight Procedures (IFP) Production Plan web page which contains information on projected IFP production by region or fiscal year and links to how to apply for an IFP at your airport.

GNSS Main Page – Just by typing http://gps.faa.gov into any web browser to access links and news items for the online community in seconds. In addition to the prominent GPS/WAAS Approaches button that links directly to the page with all of the above mentioned information, the GNSS main page offers hot links to all of our latest program news items and uploads. This page is the gateway to the wealth of information available within the site.

Type http://gps.faa.gov for easy access to the Global Navigation Satellite Systems segment of the FAA website.

- Gretchen Adragna, FAA AJW-9131/NAVTAC