

VOLUME 43  
Spring 2012

<http://gps.faa.gov>

# SatNavNews

FAA Navigation Services, AJM-32 I



## Des Moines IFR Low Level Helicopter Infrastructure

In February, 2012, the Federal Aviation Administration (FAA) approved an Instrument Flight Rules (IFR) low level helicopter infrastructure for use by Mercy Medical Center in Des Moines, Iowa. The infrastructure consists of five helipads in key locations throughout central Iowa - one at Mercy Medical Center's Des Moines main campus, three at outlying hospitals, and one at a new Helicopter Emergency Medical Service (HEMS) landing zone in the town of Stuart, Iowa. Air Methods Corporation will be conducting these new HEMS flight operations, which arose from a Government Industry Partnership (GIP) with Bell Helicopter, Mercy Medical Center, Air Methods, and the FAA's Global Navigation Satellite System (GNSS) program.

A Copter Point-in-Space RNAV Approach Procedure and an Obstacle Departure Procedure was designed for each of the five landing sites along with a low altitude IFR enroute structure to connect them. With the WAAS enabled avionics of aircraft such as the "Mercy One" Bell 429 helicopter, the approaches allow landings at these sites with visibilities as low as three quarters of a mile and with cloud ceilings as low as 300 feet. Prior to the network's implementation, the helicopter could not land at these heliports under low IFR conditions, but had to land instead at a nearby airport, if one

was available, and transfer the patient to or from the helicopter by ground.

Also, before the network's approval, departing helicopter flights at the hospital were restricted to Special Visual Flight Rules (SVFR) departures with an ensuing IFR transition. This required a cloud ceiling of at least 700 feet and at least two miles of visibility - restrictions that quite often grounded helicopter operations. The new infrastructure allows IFR departures directly from the hospital during poor visibility with a departure minimum cloud ceiling of 500 feet and minimum visibility of  $\frac{3}{4}$  mile. The network's enroute structure also allows transit between its five hubs at the lowest safe altitude, which mitigates conflicts with other IFR air traffic and reduces the risk of aircraft icing during cold weather.

"There are times with limited visibility and road conditions it may take an ambulance coming from the Stuart area 60 -90



The *SatNav News* is produced by the Navigation Services AJW-91 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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### Tell Us Your WAAS Story

We're collecting testimonials about the benefits of Wide Area Augmentation System (WAAS) navigation from users. If you are a pilot, passenger, airport manager, airline employee, or are involved in aviation in any capacity - whether you fly fixed-wing or vertical flight aircraft - we want to hear from you! Please send your stories and contact information to Scott Speed at [scott.ctr.speed@faa.gov](mailto:scott.ctr.speed@faa.gov)

minutes to cover the 40-45 miles to the downtown Des Moines trauma centers," said Jeff Howard, Paramedic Director, Stuart Rescue and EMS. "The Mercy One helicopter can be at Mercy Medical approximately 12 minutes from the time they lift off at Stuart."

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. The WAAS signal is satellite based.

"The new infrastructure represents a quantum leap forward for helicopter EMS IFR operations," said Joe Wahlig, a Mercy One pilot. "It vastly improves the viability and efficiency of IFR operations and greatly enhances safety."

The Mercy Medical Center program, among the nation's first HEMS operations to gain approval for 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.

"In 2011, Mercy One completed over 1050 patient missions," said Jeff Johnston, a Mercy One flight nurse. "It is estimated that with the WAAS approach landing zones that we now have in place, we potentially would be able to complete another 50-65 missions that were missed due to weather conditions. In short, the new infrastructure adds another 'tool' for reaching that trauma or acutely ill patient in conditions that other IFR and VFR helicopters cannot, while maintaining the highest standards of medical helicopter operations and safety."

- Scott Speed, FAA AJM-321/NAVTAC

## Global SBAS Conference in Germany

The Satellite-Based Augmentation Systems (SBAS) Interoperability Working Group (IWG) was hosted by the German Aerospace Center (DLR) at Oberpfaffenhofen near Munich in Germany, on January 17-18, 2012.

The SBAS Interoperability Working Group (IWG) is the forum for SBAS service providers to assure common understanding and implementation of International Civil Aviation Organization (ICAO) Standards And Recommended Practices (SARPs), which provide overarching standards and guidance for global SBAS implementation.

The IWG forum allows coordinated development of interchangeable avionics technology designed to easily transition from one SBAS region to another. Operational SBAS systems exist in the United States, Japan, and Europe. India and Russia SBAS systems are in development.

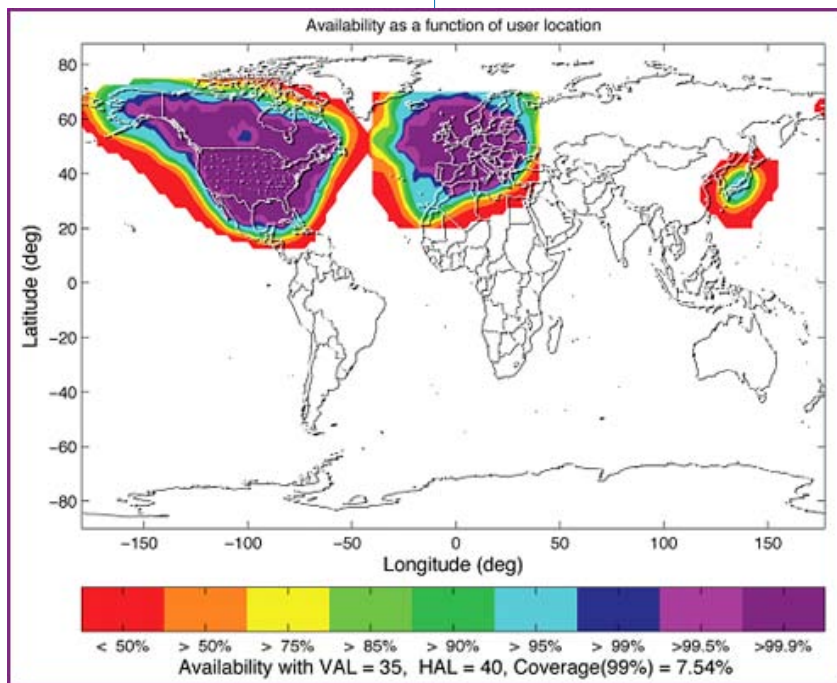
The meeting was co-chaired by Didier Flament, the European Space Agency's European Geostationary Navigation Overlay Service (EGNOS) Program

Manager, and Deane Bunce of the US Federal Aviation Administration's (FAA) Global Navigation Satellite Services (GNSS) SBAS program. The meeting had 30 attendees, including representatives of Russia's Roscosmos space agency. Additional partners included Eurocontrol (the European Organization for the Safety of Air Navigation, which promotes the adoption of EGNOS across Europe), the European Satellite Services Provider (ESSP), Stanford University, and the US MITRE organization, which performs research and development for the FAA.

The forum considered the following topics:

- Harmonization of SBAS modernization plans
- Forum for discussion on SBAS standards
- Harmonization of technical improvements from operations and users' feedback
- Research and Development (R&D) cooperation on key SBAS technologies
- Support of joint SBAS promotion

"As new SBASs are being implemented globally, such as the System of



Global SBAS coverage

SBAS IWG participants seen here under a mock-up of a Galileo satellite.



Differential Correction and Monitoring (SDCM) in Russia, the need for a forum for all SBAS providers to be able to meet and provide their technical plans for future development becomes increasingly important," said Deane Bunce. "During IWG 22, progress was made on progressing the signal and message definition for a multi-frequency SBAS. It is this future capability that should support the use of SBAS globally."

- Scott Speed, FAA AJM-321/NAVTAC

### Canadian LPVs

NAV CANADA, Canada's civil air navigation services provider, currently provides WAAS Localizer Performance with Vertical Guidance (LPV) service at 36 airports with a total of

57 approaches published. Over the next 12-18 months NAV CANADA has 180 approaches pending design and publication at 92 airports.

"More LPVs will be published going forward based on a positive business case and a level of service assessment," said Gary Chandler, Manager, NAV CANADA Air Navigation Services (ANS) Program Co-ordination.

NAV CANADA is a private sector corporation. With operations from the east coast to the west coast to the north coast of Canada, NAV CANADA provides air traffic control, flight information, weather briefings, aeronautical information services, airport advisory services, and electronic aids to navigation.

- Scott Speed, FAA AJM-321/NAVTAC

### GBAS Milestone in Houston

A milestone in the development of the Ground Based Augmentation System (GBAS) is expected to be reached on May 31st with the publication of six GBAS Landing System (GLS) procedures at Houston's George Bush Intercontinental Airport (airport code

IAH). The new procedures, which overlay existing Instrument Landing System (ILS) procedures, will be used in simultaneous independent parallel runway operations. Publication of the procedures clears the way for United Airlines to initiate the first regular passenger flights in the United States using the GBAS technology.

GBAS provides digital guidance for precision approaches using a Differential Global Positioning System (DGPS) for aircraft equipped with a Multi-Mode Receiver (MMR). The system boosts the accuracy and integrity of GPS by transmitting corrections to the aircraft. The system offers a number of advantages compared to ILS: 1) weather and obstacles have no negative impact on the system; 2) unlike ILS, the equipment does not need to be installed right at a runway where it must be surrounded by a protected area to prevent possible interference by taxiing aircraft; and 3) up to 26 arrivals, destined for various runways, can be supported by just one GBAS station. This makes it much more cost-effective, both in purchase price and maintenance costs.



Canadian airports with one or more runways with LPV approaches (as of February 24, 2012)





Honeywell Corporation, the manufacturer of the non-federal GBAS station installed at IAH, will contract with Houston Airport System (HAS), the owner of the station, to provide maintenance for the equipment. The Federal Aviation Administration (FAA) will exercise maintenance oversight.

- Campbell Motley, FAA AJM-321/NAVTAC

## How to Find GPS and WAAS NOTAMS

There are numerous sources and services for providing aeronautical information and NOTAMS to pilots. The two primary sources discussed here are the United States Flight Service Station (FSS) and PilotWeb on the internet. Both sources are provided by the FAA. The FSS services are provided through an FAA contract with Lockheed Martin Corporation, except for the State of Alaska, which are provided by FAA employees. The FSS only provide GPS NOTAMS when a pilot requests them. These NOTAMS consist of satellite outages and area outages contained in the Air Route Traffic Control Center (ARTCC) NOTAMS. The FSS no longer provides receiver autonomous integrity monitoring (RAIM) outage information, but instead refers the pilot to the AC 90-100A GPS RAIM Prediction website at [www.raimprediction.net/ac90-100/](http://www.raimprediction.net/ac90-100/).

The PilotWeb Site provides access to current NOTAM information from the United States NOTAM System. GPS

and Wide Area Augmentation System (WAAS) NOTAMS require an understanding of the website and how to locate the required information. Satellite outages are displayed by entering KGPS or KNMH in the location block of the NOTAM Retrieval section on the home page of PilotWeb.

GPS and WAAS area outages, system outages, and interference NOTAMS are located on the ARTCC Notices, TFRs and Special Notices Page. The specific ARTCC has to be checked for the area you are interested in to get the information. After you select the ARTCC you are interested in, selecting View GPS NOTAMS will show you only those NOTAMS that have GPS as a keyword. This may miss some WAAS NOTAMS that do not have the GPS keyword, such as a WAAS system outage that would be listed as an FDC NOTAM.

Airport specific FDC NOTAMS can be found by entering the airport identifier in the location block of the NOTAM Retrieval section.

If you are required to check RAIM due to a WAAS outage, or you are using a GPS receiver, the primary RAIM source is located at [www.raimprediction.net/ac90-100/](http://www.raimprediction.net/ac90-100/).

The Notices to Airmen Publication (NTAP) should also be checked for any long-term NOTAMS that affect your

flight. The NTAP is published every 28 days. Data of a permanent nature can be published in the NTAP as an interim step between publication cycles of the Airport/Facility Directory and aeronautical charts.

The Notices to Airmen Publication is divided into four parts:

- Part one contains selected NOTAMS that are expected to be in effect on the effective date of the publication.
- Part two contains revisions to Minimum En Route IFR Altitudes and Changeover Points.
- Part three, International, contains Flight Prohibitions, Potential Hostile Situations, Foreign Notices, and Oceanic Airspace Notices.
- Part four contains special notices and graphics pertaining to almost every aspect of aviation; such as, military training areas, large scale sporting events, air show information, and airport-specific information.

## NOTE: WAAS Predictive NOTAMS

At WAAS commissioning it was determined to provide predicted WAAS service availability and short term airport outages. A WAAS Service Volume Monitor (SVM) was developed at the John A. Volpe National Transportation System Center to provide these predictions. The SVM relied on the following: GPS satellite status from the GPS Master Control Station, received in the format of a NOTAM from the FAA; GPS almanac data from a GPS receiver with a backup source from Schriever Air Force Base; location information for airports with Area Navigation (RNAV); and GPS procedures from a listing provided by Aviations System Standards that is converted into a database by the FAA. The SVM generated the WAAS service availability for a 30-hour period once every 24 hours. The data was processed at one-minute intervals over the 30-hour prediction window. Any predicted outages were formatted as FDC NOTAMS

and automatically posted to the airport NOTAMs listing. This service was terminated on November 3, 2009, due to software issues that caused problems with the NOTAM system. The Aeronautical Information Management Office is overseeing the development and testing of a new predictive system for future implementation.

- Jimmy R. Snow, FAA AJM-321/NAVTAC

## Air Berlin Flight Lands Using GBAS

With the successful touchdown of a Boeing 737 at Bremen Airport on the evening of February 9th, 2012, Air Berlin became the first airline in Europe to use the satellite-based approach and landing system known as the Ground Based Augmentation System (GBAS) on regular flights. The pioneering flight came quickly after the certification of GBAS as an approach and landing system by the Federal Supervisory Authority for Air Navigation Services (BAF).

Tim Techt, the pilot technician for Air Berlin's Boeing fleet, said, "This innovative technology will make it possible to land more efficiently and with less noise pollution. In the future, GBAS will play a central role in the on-board navigation of our Boeing fleet."

GBAS provides digital guidance for precision approaches using a Differential Global Positioning System (DGPS). The system boosts the accuracy and integrity of GPS by trans-

mitting corrections to the aircraft. The system offers a number of advantages compared to ILS: 1) weather and obstacles have no negative impact on the system; 2) the equipment does not need to be surrounded by a protected area to prevent possible interference by taxiing aircraft at the airport; 3) up to 26 arrivals, destined for various runways, can be supported by just one GBAS station; and 4) the system does not need to be checked by flight inspection as often as an ILS system. This makes it much more cost-effective, both in purchase price and maintenance costs.

At Bremen Airport, Deutsche Flugsicherung (DFS) will be the first air navigation service provider in the world to operate GBAS for CAT I precision approaches for regular air services. DFS, the German air navigation service provider, is a state-owned company under private law responsible for ensuring the safe and orderly flow of air traffic over Germany.

DFS has been working on pilot projects in Munich and Frankfurt testing this type of GPS technology since the mid-1990s. The DFS has been working closely with the FAA GBAS program office and the International GBAS Working Group on development and implementation issues and solutions.

The GBAS station in Bremen, built by Honeywell, has been used in test operations since 2008 with the two

airlines TUIfly and Air Berlin under instrument meteorological conditions down to minimum descent altitude. GBAS certification and operations under all-weather operations (CAT II and CAT III) is expected by the middle of the decade.

- Dieter Guenter, FAA AJM-321/NAVTAC

## FCC Issues Statement on LightSquared Plans

A February 14, 2012, letter from the National Telecommunications and Information Administration (NTIA) to Federal Communications Commission (FCC) chairman Julius Genachowski made the following concluding statement:

"The federal agencies and LightSquared have invested significant time and resources to identify and analyze proposed solutions to address the impact of LightSquared's planned network implementations. Based on the testing and analyses conducted to date, as well as numerous discussions with LightSquared, it is clear that LightSquared's proposed implementation plans, including operations in the lower 10 MHz would impact both general/personal navigation and certified aviation GPS receivers. We conclude at this time that there are no mitigation strategies that both solve the interference issues and provide LightSquared with an adequate commercial network deployment."

In a statement also issued on February 14, FCC spokesperson Tammy Sun said, in part:

"LightSquared's proposal to provide ground-based mobile service offered the potential to unleash new spectrum for mobile broadband and enhance competition. The Commission clearly stated from the outset that harmful interference to GPS would not be permitted. This is why the Conditional Waiver Order issued by the Commission's International Bureau prohibited LightSquared from beginning commercial operations unless harmful interference issues were resolved.



Officials greet the Air Berlin crew that flew the first regular flight to use a GBAS approach

"NTIA, the federal agency that coordinates spectrum uses for the military and other federal government entities, has now concluded that there is no practical way to mitigate potential interference at this time. Consequently, the Commission will not lift the prohibition on LightSquared. The International Bureau of the Commission is proposing to (1) vacate the Conditional Waiver Order, and (2) suspend indefinitely LightSquared's Ancillary Terrestrial Component authority to an extent consistent with the NTIA letter."

The full texts of both documents, as well as other materials relevant to the proposed LightSquared network, are available at the website of the National Executive Committee for

Space-Based Positioning, Navigation, and Timing (PNT):  
<http://www.pnt.gov/interference/light-squared/>

- Scott Speed, FAA AJM-321/NAVTAC

### Satellite Navigation Approach Procedures Update - LPVs/LPs Exceed 3000

March 31, 2012 – The number of Wide Area Augmentation System (WAAS)-enabled approach procedures continues to increase. Earlier this year, the number of LPVs and LPs, combined, surpassed 3000!

The tables shown here reflect the latest numbers. More information about WAAS approach procedures

can be found on our GNSS - GPS/WAAS Approaches web page ([http://www.faa.gov/about/office\\_org/headquarters\\_offices/ato/service\\_units/techops/navservices/gnss/approaches/index.cfm](http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gnss/approaches/index.cfm)).

- Mary Ann Davis, FAA AJM-321/NAVTAC

### What's New on the Web!

Just type <http://gps.faa.gov> into any web browser to access the best and most accurate information available from the FAA's Navigation Services Global Navigation Satellite System (GNSS) website.

Click on recently posted articles on the "In the News" sliding banner to stay informed of developments in satellite navigation.

Satellite-based Approach Procedures (by Procedure Type)			
	Procedures (Part 139 Airports)	Procedures (Non-Part 139 Airports)	Total Number of Procedures
LNAV Procedures	1756	3599	5355
LNAV/VNAV Procedures	1255	1430	2685
LPV Procedures (LPV w/200' HAT)	1231	1545	2776 (593)
LP Procedures	43	213	256
GPS Stand-Alone Procedures	20	240	260

Note: Number of GPS Stand-Alone will continue to decrease as they are replaced by RNAV procedures  
 (Data as of March 8, 2012)

Instrumentation Approach Procedures (IAPs) Based on Traditional Navaids	
ILS	1,285
ILS (CAT II)	160
ILS (CAT III)	112
NDB	867
VOR	1,323
VOR / DME	974

(Data as of February 9, 2012)

Table truncated for publication. Full table available at  
[Instrument Flight Procedures \(IFP\) Inventory Summary](#)