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THE STATE OF MINNESOTA PROVIDES THIS TECHNICAL BULLETIN IN THE INTEREST OF AVIATION SAFETY AND TO PROMOTE AERONAUTICAL PROGRESS IN THE STATE AND THE NATION

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## Alan Hoffert Joins FAA Safety Team (FAAST) In Minnesota

by Christopher Roy  
Director

We have a new force for “aviation safety” here in Minnesota. Alan Hoffert has joined the FAA Safety Team (FAAST) as the Operations Safety Program Manager for Minnesota. Alan comes to us from the Minneapolis Flight Standards District Office where he was an Operations Inspector and joins Jim Niehoff who is our Airworthiness Safety Program Manager. The FAA Safety Team has become the focal point for safety programs in Minnesota and we welcome Alan to the team and encourage you to contact him at [Alan.Hoffert@faa.gov](mailto:Alan.Hoffert@faa.gov) or 612-713-4244 to welcome him aboard!



Christopher Roy

It is remarkable to look at how

things have changed since the FAAST program started. Prior to the FAAST program the majority of safety seminars were live seminars presented by FAA and Mn/DOT representatives.

Now there is a network of FAAST representatives that prepare and present safety programs and the number of programs has grown from around 20 a year to more than one a week. In addition to these live safety seminars, there are great on-line programs available through the FAAST website ([FAAsafety.gov](http://FAAsafety.gov)) and AOPA, as well as other providers. If you want a safety presentation for a group of pilots, the FAAST program managers have a cadre of speakers available on a wide variety of subjects



Alan Hoffert

and they are happy to set up a program for you.

The FAAST Wings Program consists of safety seminar programs combined with flying. While talking about flying safely is important, piloting skills are only maintained through regular use. To that end, Mn/DOT, in conjunction with the Minnesota Council of Airports, has established the “*Passport*” program that rewards pilots for visiting airports around the state. Details for the Passport program can be found on our website at [mndot.gov](http://mndot.gov). Click on the airplane and then scroll down until you see the red Passport book.

If you are looking for a reason to go flying, check out the list of airport fly-ins and events using the link in the right hand column. We have a beautiful system of airports here in Minnesota and fly-ins are a great way to experience them. □

## Hyperbolic Positioning: The Way of the Future

**H**yperbolic Positioning is also known as “*Multilateration.*” It is the triangulation process designed to locate an object by accurately computing the time difference of arrival (TDOA) of a signal emitted from the object to three or more receivers. The U.S. military and select civil agencies already use transponder multilateration in surveillance operations for locating stationary objects, vehicles, and aircraft.

In the words of the Federal Aviation Administration (FAA),

“Multilateration is a surveillance technology that works by employing multiple small remote sensors throughout an area to compensate for terrain obstructions, and is another tool the SBS program uses to enhance air traffic surveillance. The data from multilateration sensors is fused to determine aircraft position and identification. This data is then transmitted to air traffic control for use in providing surveillance separation services.”

Multilateration can also be used by a single receiver to locate

itself, by measuring the TDOA of signals emitted from three or more synchronized transmitters at known locations. This can be used by navigation systems. In fact LORAN-C functioned using TDOA of signals from multiple synchronized transmitters. GPS can function in a similar manner.

Quite simply, Multilateration uses the signals transmitted from the aircraft, accurately pinpointing the aircraft’s position. The system utilizes existing aircraft transmission systems including Mode A, Mode C, and

Mode S transponders. This essentially eliminates the need for aircraft owners to purchase new or additional equipment for their aircraft to effectively use the system.

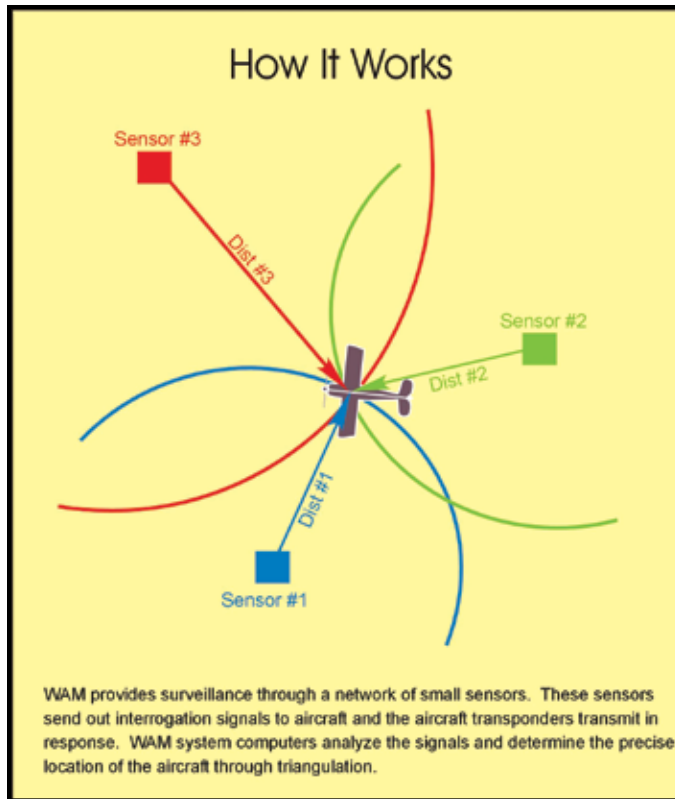
that controllers will see a smooth progression of the target without the target jumps, which were caused by the 4-12 second radar sweep and refresh.

Another advantage of WAM is that it can provide surveillance coverage over areas where current radars may be inadequate, non-existent, or not available below a base altitude of several thousand feet above ground level. This is a situation caused by natural terrain, and sometimes even man-made obstructions.

WAM is being used throughout Europe and the United Kingdom with economy and effectiveness. Several countries chose WAM as a replacement for their "Legacy" radars. They have discovered that WAM installations can be provided at significantly lower costs of installation and maintenance and it provides more accurate tracking even with stations located 100 km apart!

One might ask if WAM and ADS-B systems are similar, and the answer is, they are similar, but are differentiated by several factors. Both systems listen for an aircraft's transponder signal and both send data to an ATC center. But an ADS-B (single) station utilizes the GPS position information transmitted within the aircraft's ADS-B message, while the WAM system triangulates between several known ground stations and the aircraft, to determine the aircraft's position. This is done by computing the time difference of arrival (TDOA) of the signal.

Multilateration is finding different use potentials. Airports are exploring the possibility of using it for surface management to increase airport efficiency, resource utilization, and safety. Its use, particularly at larger air service airports, could help to significantly reduce runway incursions and on-field accidents by ground vehicles and aircraft. □



Bob Milton, Minn/DOT Aeronautics

Using the same type of (ground) equipment and procedures, larger areas can be monitored to cover enroute and approach phases of flight. This system is called Wide Area Multilateration (WAM). One advantage of WAM is

## Good News For General Aviation

*1<sup>st</sup> Signals From New Generation of GPS Satellites!*

**O**n May 27, 2010, the United States Air Force successfully launched the first of 12 new generation GPS satellites. At 11 p.m. EDT, a United Launch Alliance Delta IV rocket rose from the launch pad at Cape Canaveral Air Force Station. In just over two and a half hours from launch, the first signals were received from the new satellite.

The GPS IIF-1 satellite was deemed to be healthy by the Air Force 19<sup>th</sup> Space Operations Squadron and Boeing's Mission Operations Support Center in El Segundo, California. GPS signals will be turned on for testing of and fine tuning.

The constellation of GPS satellites currently numbers 30 spacecraft, according to the U.S. Department of Defense. When in place, the 12 new GPS IIF satellites will be able to provide more powerful and accurate signals to the nearly 1 billion military and civilian worldwide GPS users. The new

generation of satellites will also have a longer design life.

### Improved Accuracy

"The inaugural launch of the GPS IIF-1 is a milestone in Boeing's 30 years of support to the Air Force that goes back to the first days of this program," said Craig Cooning, vice president and general manager, Boeing Space and Intelligence Systems. Cooning added, "The new GPS IIF satellites bring key improvements including... a new civil signal to enhance commercial aviation and search-and-rescue operations, and significantly improved signal accuracy, (as more of these new satellites go into operation)."

Boeing is producing the next 11 GPS IIF satellites. The next launch is currently scheduled for later this year. □

