

# CALLBACK

From NASA's Aviation Safety Reporting System

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## Going Global with GPS



As the cost of Global Positioning System (GPS) units decreases, more pilots are using these devices to supplement their other navigational equipment. However, problems can arise when some pilots fail to recognize that GPS is designed to be a *supplemental*—not a *primary*—navigational aid. A report from a corporate pilot illustrates:

■ *I departed on an IFR flight plan with an IFR-approved GPS. I was cleared direct to ABC, at which time I dialed ABC into the VOR portion of the GPS and punched "direct." The heading was 040 degrees. After a few minutes, Approach inquired as to my routing, heading, etc. I stated direct ABC, 040 degrees. They suggested turning to 340 degrees for ABC. I was dumbfounded. My GPS receiver had locked to ADC, 3,500 miles away [in Norway]! Closer inspection revealed that my estimated time en route was 21 hours.*

*I did not verify my position with the VOR receiver. I mistakenly, blindly, trusted a GPS.*

Now that is truly **global** positioning!

Other reporters have found themselves somewhere other than where they wanted to be as a result of overreliance on GPS. A general aviation pilot provides an example:

■ *I recently purchased a hand-held GPS, and was anxious to use my new acquisition. Without thinking (obviously!), I punched in XYZ VOR and navigated along the direct route. I did not cross-check myself with the VORs and allowed myself to invade restricted airspace. I tuned in 121.5, and received instructions and polite guidance out of my dilemma. I realize that this is a serious problem and a **very** stupid mistake.*

### Limits of Hand-Held GPS

Many hand-held GPS units have an inherent system limitation, as our next reporter discovered.

■ *Flying VFR, using a hand-held GPS for navigational reference. While en route, position and status seemed fine. According to the GPS position, a "big airport" was getting closer and closer, but still out of the overlying Class C airspace. From a visual standpoint, the position was definitely in Class C airspace. When I landed at ABC, the GPS indicated the location was XYZ [about 40 nm west]. I turned the unit off, then back on, and the position now indicated ABC.*

*I called the manufacturer, which had received numerous calls about erroneous positions. A new satellite had been*

*put in orbit; there were now a total of 26 satellites. My unit showed 25. The manufacturer leaving the GPS on for 45 minutes to acquire the information from the new satellite. I did so, and my unit now shows 26 satellites. The GPS positions seem correct.*

*Conclusion: use hand-held GPS as a reference only.*

According to the reporter's conversation with the manufacturer, hand-held GPS units currently in use do not have the RAIM—Receiver Autonomous Integrity Monitor—that is built into installed, IFR-certified units. The RAIM monitors the actual navaid signal, primarily on SID and STAR routes, to assure that there is adequate signal strength for navigation in the selected mode. If the signal is not sufficient, an error message will occur. This is analogous to the 'OFF' flag showing on the VOR receiver when the aircraft is out of range for adequate signal acquisition. Since the reporter's GPS unit did not have RAIM capability, there was no way to know that the unit was providing erroneous information.

Because of the inherent limitations of hand-held units, pilots should carry and use the appropriate charts as cross-reference material, rather than relying solely on GPS.

### GPS Water Rescue

When properly programmed and used, GPS has incredibly accurate position reporting capability, which can prove to be a lifesaver—literally. The next reporter, the pilot of a long-range amphibious airplane on a ferry flight across the Pacific Ocean, tells a "GPS-to-the-rescue" story.

■ *While we were ferrying the aircraft...the left engine began backfiring severely and would not develop [power]. Engine #2 was brought to METO [Maximum Except Take-Off] power attempting to maintain best altitude. An immediate turn was made for the nearest land, and our "Pan" emergency shifted to a "Mayday" call.*

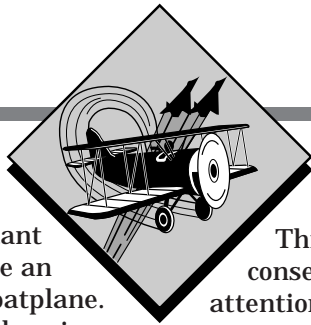
*After about one hour, descent into the water was imminent. The night ocean visibility would be termed zero/zero...and a standard night IFR approach was set up. After a successful night IFR water landing, we began taking on water. Seven people escaped without injury into a lifeboat. Coordination with ATC and very accurate position reporting with GPS resulted in a very expeditious rescue by the Coast Guard and a maritime vessel. We were in the ocean less than one day. Very spectacular efforts by all parties involved.*

ASRS Recently Issued Alerts On...
Engine failures in an MD-80 and an MD-88
Parachute jumping activity near a Nevada arrival route
Erroneous computerized groundspeeds at a Utah Center
BAe-31 engine reversal due to propeller governor failure
Autopilot and elevator trim malfunctions on a Beech King Air

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May 1997 Report Intake	
Air Carrier Pilots	1798
General Aviation Pilots	701
Controllers	69
Cabin/Mechanics/Military/Other	38
<b>TOTAL</b>	<b>2606</b>

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Good pre-flight planning is particularly important when flying an aircraft with special needs—like an appropriate landing surface, in the case of a floatplane. Our first reporter, en route to the national airshow in Oshkosh, Wisconsin, apparently hadn't fully planned for fuel:

■ *I was on my way to Oshkosh, flying my floatplane and looking for a fuel stop, as I was getting low on fuel. Cruise altitude was approximately 800 feet AGL, but I went lower to look for fuel pumps at likely docks. I found a marina on the lake and fueled up, then continued on my way. There are very few seaplane bases, so finding fuel stops is difficult.*

Although sectional charts may not always indicate the presence of seaplane bases, national or local seaplane associations, and some airport guidebooks, have listings for seaplane facilities. Additional prior planning might also have saved the reporter from a possible violation of the FARs concerning minimum safe altitudes.

## Dropping the Bucket

■ *I was going to perform helicopter water bucket drops for the crowd. The helicopter was on display and open to the public, so I was expecting the switches to be in the wrong positions. I performed a thorough pre-flight of the cabin, however I did not think to check the cargo hook release [on the belly of the aircraft], which apparently had been tripped. During the demonstration, the bucket came off the aircraft at 200 feet AGL, and landed on the taxiway. There were no injuries. This could have been prevented if I had checked the hook release prior to departure.*

A pre-flight check of all equipment is particularly important after an aircraft has been made accessible to an interested public.

## Pylon Pass-By

Even for an experienced pilot, encountering wake turbulence at very low altitude and at racing speeds can be startling at the very least, and at worst, downright disastrous.

■ *During a biplane race, I encountered strong vortices from another aircraft. While recovering, with other aircraft above me, I inadvertently may have gone below the height of the top of the pylon. The officials at the pylon reported a low pass-by. While some turbulence had been anticipated, the turbulence was much stronger than encountered previously. A real learning experience!*

This reporter is indeed fortunate that the only consequence of this incident was to catch the attention of race officials.

## ...And Home Again

■ *We were making our last fuel stop for the day after leaving a fly-in. Since our aircraft had no radio, we noted the wind direction from the wind sock. The only visible traffic was taxiing out for take-off. We landed after his departure and were taxiing to the fuel pump, when what I thought was an overzealous line boy stopped us and demanded we shut down. I told him all we wanted to do was get gas and be on our way. He told me that we were not going anywhere and to get out of the aircraft. He said the field was closed as an airshow was in progress. At this point, I saw his FAA identification badge.*

*He and his partner checked all our paperwork and allowed us to gas up. The airshow waiver time was over in about 20 minutes...we took off behind 5 other departing aircraft.*

Checking NOTAMs for the route of flight and airports of intended landing would have provided the information the pilot needed to avoid this encounter. ▲

## "Who's Got It?"

■ *The First Officer (FO) was the flying pilot as we executed the ILS approach. At approximately 25 feet prior to decision height, I announced, "I've got the runway." The FO apparently did not hear my callout correctly, and misinterpreted it as a request that he relinquish the controls to me. He replied, "OK, you've got it." I immediately responded, "No, no—you've got it." During this exchange, the aircraft began to drift to the right of the centerline. It became apparent that there was still confusion as to who would manipulate the controls for landing. As such, I took control of the aircraft and...accomplished a normal landing.*

*In a post-flight discussion, we agreed that phraseology was the primary factor which led to our miscommunication. Non-descript terminology such as "I've got it/You've got it" left open the possibility for misinterpretation as to whether the speaker was referring to the runway or the aircraft. ▲*