EAA602 Log Book

Adirondack Chapter Newsletter

September 2006

From The Presidents Desk

by Tim Cowper

The President's Tent (Borrowed) from Tony

Oshkosh was a good time, but I got a rude awakening. The least expensive sport plane was about $60k, and they went right up beyond $100k. Even a 500-600 hour kit plane was $35k minimum. There was almost nothing used there…at least nothing in my price range. So, my quest for a new (to me) plane goes on. Last Tuesday night at 11:00PM, I picked up Gary Collins at Sharon Airport, and we headed out to Michigan. I had found a Zenair CH601 on Barnstormers and the price was really good. I wanted to get to it before it was gone, like several other planes I had looked at, so we drove straight out to look at it. After working all day, we drove all night, and arrived at about 10:15AM. By 10:30AM we were gone. The plane was so horrible it's hard to describe how bad it was. I didn't even want to take a test ride. 1500 miles in 24 hours. It would have been a complete waste of time and money if it weren't for Gary's company and conversation on the way out there and back. Thanks Gary. I'll stay positive and keep looking. In the meantime, Rich Logerfo has generously allowed me to fly his Challenger II. Thanks to Challenger expert Chris Brown for fixing a few things and making sure it was airworthy. We have such a great club!

What a sorry looking bunch of Arabs getting ready to start walking @ Oshkosh

This weekend is our fly-in with UL-90 and should be great. We need Young Eagles pilots so if you can make it Saturday let me, or Doug know. We're having another poker run, and this time I hope to get a better hand! Hopefully we'll have some nice weather like last time.

We're gearing up for a fantastic event with the Murphy's on September 9th. The Old Time Taildragger Fly-in is happening again, and this time they have graciously included EAA602 as a sponsor. Many of our members have signed up to help, but there is always room for more. If you want to be involved please call Dave 518-883-3931, or Mark 518-852-2279. Or you can contact me at 518-337-8342. In any case please attend, bring the kids, and a covered dish. This is a family event and one you don't want to miss!

Lastly, we have one more scheduled event for 2006, and that is our Rhinebeck fly-out. That will occur on September 23rd, weather permitting, and anybody with an airplane is invited to go with us. Even if you don't have an airplane you can bum a ride with somebody, which is what I may have to do. If it is anything like last year, it'll be a great time.

The Meeting This Month Will Be At Edinburg Airport @ 7:00pm on MON. AUG. 28th

Don't forget articles for our newsletter. And if anybody has any ideas about events, meetings, or anything else, please let me know. This is a club where everybody has a voice.

Tim

Global Positioning Systems (GPS)

by Larry S

More and more, navigation for the Sport Pilot involves the use of GPS. Only a few years back it was common for a pilot to use dead reckoning and pilotage, backed up with GPS. GPS has become so trusted and common place that now GPS is often used as the main navigation tool; backed-up by dead-reckoning and pilotage as needed (or during a check ride from Doug).

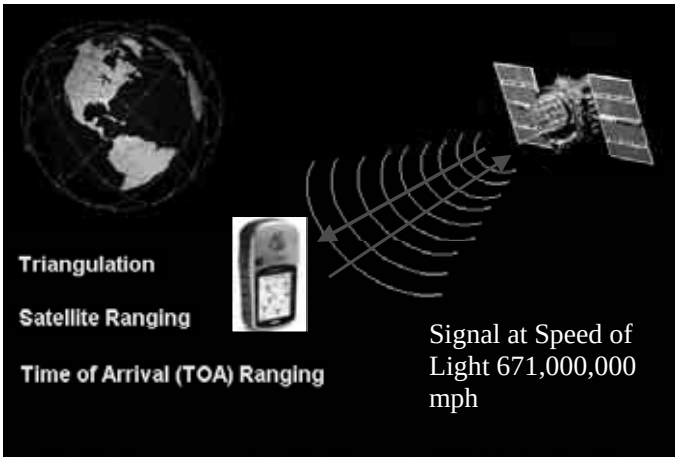
GPS navigation is relatively inexpensive, easy to use and has been accepted by the masses for multiple uses. However, the vast majority of users are still unclear as to the general theory behind the GPS technology.

GPS was initially entered into service by the DoD as a military tool to provide world wide positioning capabilities to the war fighter. Satellite tracking began in the US military in 1962 as a result of the Russian launch of Sputnik. The Navy funded this first program, which was called the Transit Navy Navigation System (NNS). This system was very primitive (by today's standards) and tracked objects by using radar signals and doppler shift calculations. Best position accuracy was only about 300 feet. This system also had very limited coverage and was by no means global. In 1967 the Naval Research Center funded research towards a new navigation positioning system based upon time ranging of a sender (satellite) and receiver. This new program was entitled *Timation* and is the forerunner of the current system we now know as GPS.

The first GPS constellation, *Block I*, consisted of 10 satellites and became operational in 1985. The second constellation, *Block II*, consisted of 24 satellites and became operational in 1993. The current GPS system, *Block III*, was launched this year (2006) has a constellation of 29 satellites. Each block boasts greater capability and accuracy than its predecessor. GPS satellites are flown and maintained by the USAF.

Enough about history... so how do these things know where we are? The answer lies in what is called *ranging*. Ranging is nothing more than determining how long it takes for a signal sent by the transmitter (a satellite) to arrive at your receiver. Once the signal arrives at the receiver, the receiver sends back a message to the satellite indicating what time the signal arrived. The satellite then pulls out an E6-B, and multiplies the *speed* of the signal by the *time* to determine the distance that the receiver is from the satellite. What makes this so difficult is this signal speed is very very fast (at the speed of light actually) which is roughly 671,000,000 MPH. With that type of velocity, the time measurement needs to be very very accurate . Obviously the receivers cannot have quartz time pieces embedded in them, or the cost would be quite prohibitive. The solution to this problem was to have the satellite send down the current updated time once initial contact is made (I.e. synchronizing both clocks). Once communicating with a satellite, your GPS becomes a highly accurate timepiece. Watch your GPS when it makes initial contact and you will see the displayed time update.

O.K., the next question is. The satellite knows at what *distance* it (the target) is from itself, but what about *direction*? Unfortunately one single satellite cannot determine direction, it only knows distance. It knows that you exist at a certain distance, which could be anywhere on a sphere with a radius the same length as the calculated distance. Not much help.



The solution requires more satellites to step in and exchange information. Once a satellite determines at what distance you reside, it then queries neighboring satellites to see if they have ranging information on you as well. If they do, they then compare notes. If two satellites have ranges, the intersecting areas of those spheres (which creates a circle) provides information that you lie somewhere on that circle. One more satellite can put you on one of two points of intersection, and 4 will determine your location to you exactly.

The above concept is illustrated in a 2-D sense in Figure 1 (consider you are initially communicating with only two satellites). Satellite #1 knows you are at a distance R1, satellite #2 at R2 etc.

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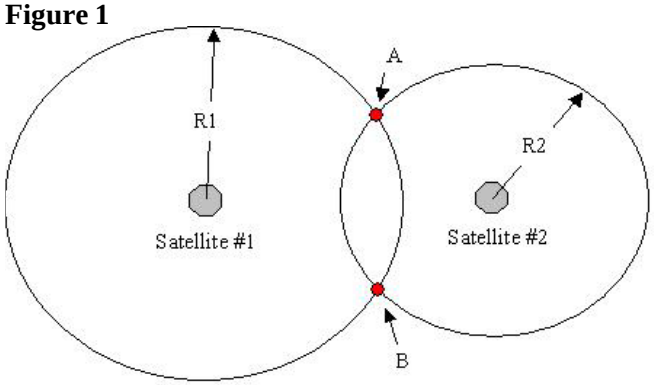
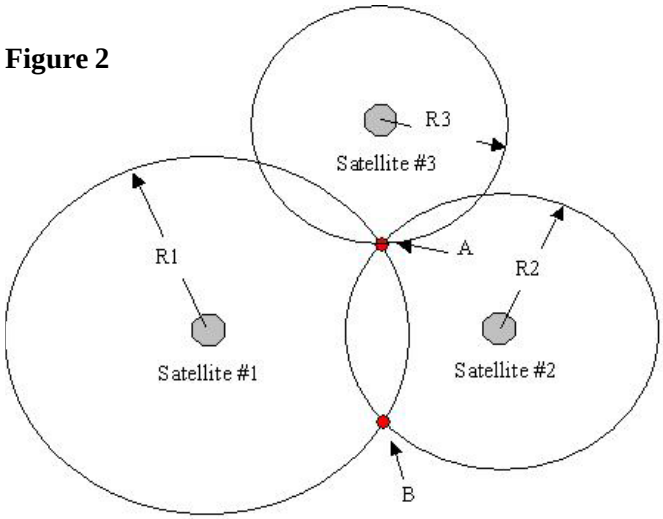
Figure 1



With two satellites tracking, they know that the receiver (you) are either at Point A or Point B.

In Figure 2 we add a third satellite Adding this third satellite will then determine if your actual location is at A or at B. In this 2-D case, your position has been shown to be Point A.

Figure 2



So how accurate is this? Well... it depends on what mode the constellation is operating under and the type of receiver being used. The GPS system is still primarily a military asset and is used for warfighting position information. The military can claim position accuracy of one to two inches and speed resolution of 0.2 MPH. The signal, however, is degraded for general use, with typical position accuracies in the neighborhood of 50 to 150 ft. Not good enough to put your plane on the first brick of a runway during foggy weather, but hopefully close enough to get you near the traffic pattern for a standard approach. This article was very brief and only a quick introduction to GPS. Additional information can be found at the following links:

If I have a street address how do I find my GPS coordinates (Lat-Long)?
http://www.maporama.com

If I know my GPS coordinates at two locations, how do I find the distance between them?
http://jan.ucc.nau.edu/~cvm/latlongdist.html

If I have a GPS coordinate to start from, how can I obtain a Lat-Long map of my area?
http://www.mapquest.com/maps/latlong.adp
http://tiger.census.gov/cgi-bin/mapsurfer

If I have a GPS coordinate or a street address, how do I get an aerial satellite image?
http://terraserver.microsoft.com/

Where can I find more information in GPS?
http://www.gpsworld.com/gpsworld/
http://rockyweb.cr.usgs.gov/public/outreach/gps/gps_websites.html
http://jan.ucc.nau.edu/~cvm/latlon_find_location.html

A view of our sorry looking camp

Up-Coming Events

For more information on events, call Doug @ 862-2409

August 26-27
Edinburg Fun Fly-In & Poker Run Edinburg, NY

September
2nd Annual Rhinebeck Small Plane Fly-out

Remember; regular <u>DUES ARE DUE IN JUNE</u>.
Use this form to send any changes in your information. Thanks, Doug

Name _____ EAA Number_____Exp Date _____

Address _____ City _____ State _____ Zip _____

Home Phone _____ Cell Phone _____ Work Phone _____

E-Mail _____ Ratings _____

Experience Years____ Hours_____ Aircraft Owned _____

Mail To: Douglas Sterling ~ 819 North Shore Road ~ Hadley, NY 12835 ~ Phone 518-863-2409

EAA602 Trading Post

For Sale

Fisher 202 Koala
with Rotax 447 fresh rebuild,balistic chute contact tony rizzio 518 661-5893

Cont. A-65
fresh rebuild no logs & Rotax 277 with gear box 14 total hours ,contact Fred Blowers 518 661-5623

Piper Colt
$19,500 Experimental colt, TW, sticks, Dual doors, 160 Lyc, 131 smoh strobes, gyro insts radio-xpond pix avail • Contact Tom Kravis - located Northville, NY • Telephone: 518 863 4988

1960 Cessna C150
TTAF 4100 SMOH 570
Interior 8 Exterior 8 With New Paint & windshield ~ New climb prop ~ 19 gallon extended range tanks ~ Annual May 2006 **$16,500** with Garmin 295 GPS
Ken Johnsen 696-4822 Day Camp 265-2962 Home
Can be seen at Edinburg Sky Ranch Airport (1F2)

EAA602

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