Global Positioning Systems (GPS) in Blaise: An Experimental Approach

Andrew Hupp & Peter Sparks, The University of Michigan

Global Positioning Systems

The U.S. Department of Commerce (2010) defines GPS as a constellation of 24 U.S. government satellites providing free positioning, navigation and timing services to anyone with the proper equipment. A GPS receiver can calculate its location on or above the surface of the Earth.

GPS Packets

Garmin has set up their GPS units with a specific set of instructions based upon the model. The manuals describe all the commands available to all units. Hence, one of the first steps to do when working with a GPS is to find out what command set is supported for the hardware.

GPS Device Overview

On the surface getting data from a GPS unit should be as simple as sending a request to the unit and then reading the results. However, the steps to accomplish that are more complex.

Garmin GPS 18x unit used in this trial continuously reads data from the available satellites. Valid information is ready once it has a fix on a minimal number of satellites.

Information about each satellite is constantly changing: satellites in view, signal strength, quality of the fix; date/time information, latitude, longitude, and so forth. In other words, the unit is not waiting for the computer but rather dumps the information it has back in a first-in-first-out order.

The Garmin unit used for this trial was discontinued, so older examples and programs were used for programming.

Future Directions

There are several things that we learned and new issues from this test that need to be addressed in the future:

- Investigate GPS hardware again/
- Newer GPS receiver
- Periodic GPS hardware upgrades
- Periodic laptop upgrades
- Periodic software upgrades (Blaise/SMS)

- Best way to affix to the laptop
- Coordinate GPS coordinates with digital photographs
- GPS not plugged in or not working
- GPS USB cord get disconnected
- GPS not communicating with Blaise

What do we do if the GPS receiver:

- Refuses to attach to the computer
- Contents of the laptop are corrupted
- GPS not communicating with Blaise

What information should we be collecting coordinates on?

- If items are really close, is GPS the best way to capture the differences between the two locations?

References


"Garmin Device Interface Specification", May 19, 2008, Drawing Number: 001-00000-00 Rev C

"GPS/ISA Technical Specifications", 1990-09870-08, Revision B, January 2008


For Further Information

Please email AndyHupp@umich.edu or PeterSparks@umich.edu for more information.