

An Accuracy Test of Garmin & Magellan Hand-Held GPS Units

Introduction

The availability of hand-held Global Positioning System (GPS) units on the market has led to the question - how accurate are they?

To answer that question, a test was done with two of the more common ones on the market: Garmin & Magellan. The Trimble Pro-XR, a unit with sub-meter accuracy was utilized as a control in which to measure the results. The important data gathered by a GPS is location and elevation. This experiment will see how reliable the data is in specific points, overall path and elevation.

Methodology

The Trimble Pro-XR was set to continuously collect points. The Garmin & Magellan receivers took points simultaneously throughout the path recording location and elevation. Points were taken as the path direction changed. At specific points, the Trimble recorded points in which to compare.

The Trimble information was downloaded into ArcView. The Garmin & Magellan data was inputted in the ArcView database. Garmin & Magellan receivers record elevation in feet requiring a conversion to meters when comparing with the Trimble information. Three maps were created to isolate each variable tested.

Results

Points

As seen in Figure 1, both GPS units have difficulty lining up on specific points.

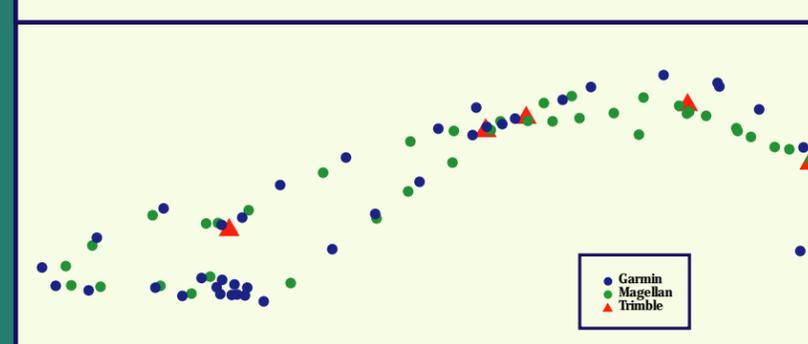
Overall Path

When comparing the paths in Figure 2, it can be seen that both GPS units have difficulty at certain places. A 120 - meter buffer is shown to give an idea of the distance each line varies from the Trimble control line. At point A, the Magellan places the location 122 meters from the actual location. At point B, the Garmin's location varies from the Trimble's by 72 meters.

Elevation

The elevation of the test path can be seen in Figure 3. The range of the Trimble elevation is between 230 and 259 meters. In comparison, the elevations of the hand-held units jump from 190 to 279 meters. The Garmin tended to over-estimate the elevation. The Magellan underestimated the elevation but overall was closer than the Garmin.

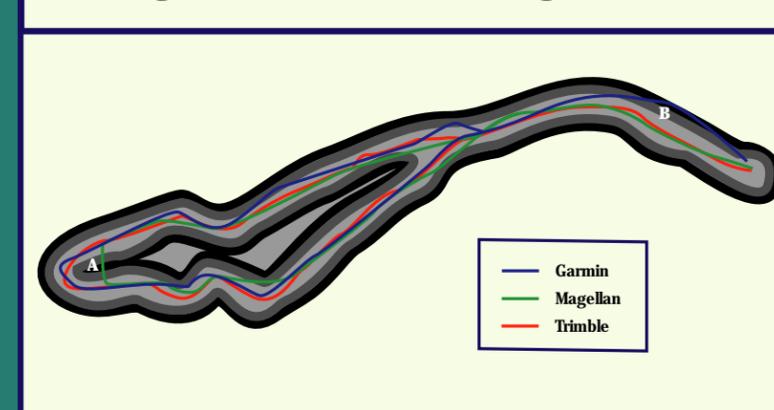
Figure 1: Comparison of Known Trimble Points



Conclusion

In looking at the data, it can be concluded that the hand-held GPS units are not as accurate as the Trimble Pro-XR. Both hand-held units show a general idea of the route and elevation. This alone makes them useful to novice GPS users. A user requiring exact location would be better off purchasing a Trimble Pro-XR.

Figure 2: Trimble, Garmin & Magellan Paths



Test Area



Figure 3: Comparison in Elevation Points

