

2014

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Recommended Citation

Unger, Daniel; Whitlock, Raymond; Zhang, Yanli; Erhart, Jon; and Carmical, Randy, "Accuracy Evaluation of Hand Held GNSS Units in Applied Urban Forestry (Abstract)" (2014). *Faculty Posters*. Paper 2.

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Accuracy Evaluation of Hand Held GNSS Units in Applied Urban Forestry

Daniel Unger, Raymond Whitlock, Yanli Zhang, Jon Erhart, and Randy Carmical

The implementation of hand held Global Navigation Satellite Systems (GNSS) units for practical use in urban forestry is drastically increasing. Knowledge that the accuracy of a particular unit's reliability can only be attributed to what technology companies list as the unit's specifications based on ideal conditions. The purpose of this research was to: 1) identify the accuracy of four units in three different environments (urban, open field, and forest); and, 2) address the accuracy of each unit with real world conditions that induce locational errors. Urban forestry data was collected with Global Navigation Satellite Systems. Field data was gathered using a Garmin eTrex 30, Garmin Oregon, Trimble Juno, and an iPhone 5. Exact control locations were established using a Total Station. With ArcMap 10.1 and Pictometry image data (at 4 inch spatial resolution) maps were made to show the relative accuracy of all the units used under different environmental conditions. The data demonstrated that the Garmin eTrex 30 and Garmin Oregon were both more accurate than the Trimble Juno. These results conclude that out of the four units tested the cheapest GNSS hand held unit was actually more accurate.

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