Customer Case Story

USDA Forest Service

Bringing real time visibility, control, and accuracy to forest inventory management

March 2022

The Forest Inventory and Analysis program (FIA) of the U.S. Department of Agriculture, Forest Service is congressionally mandated to install and measure an immense network of over 100,000 forest field plots across the country. This has generated a vast database of field measurements representing a spatially balanced sample of the nations forests which provides a comprehensive picture of the status and trends for the forest resources of the entire country.

Challenge

Safeguard the health and diversity of U.S. forests and grasslands for current and future generations by more efficiently and accurately linking field-measured forestry plots to remotely sensed measurements with high-performance GNSS positions.

Use rigorous tests to identify GNSS receivers that can accurately position field plot centers in the forest, and scale to the forest inventory domain spanning the entire lower 48 states, Alaska, Hawai'i and the U.S. Affiliated Pacific islands.

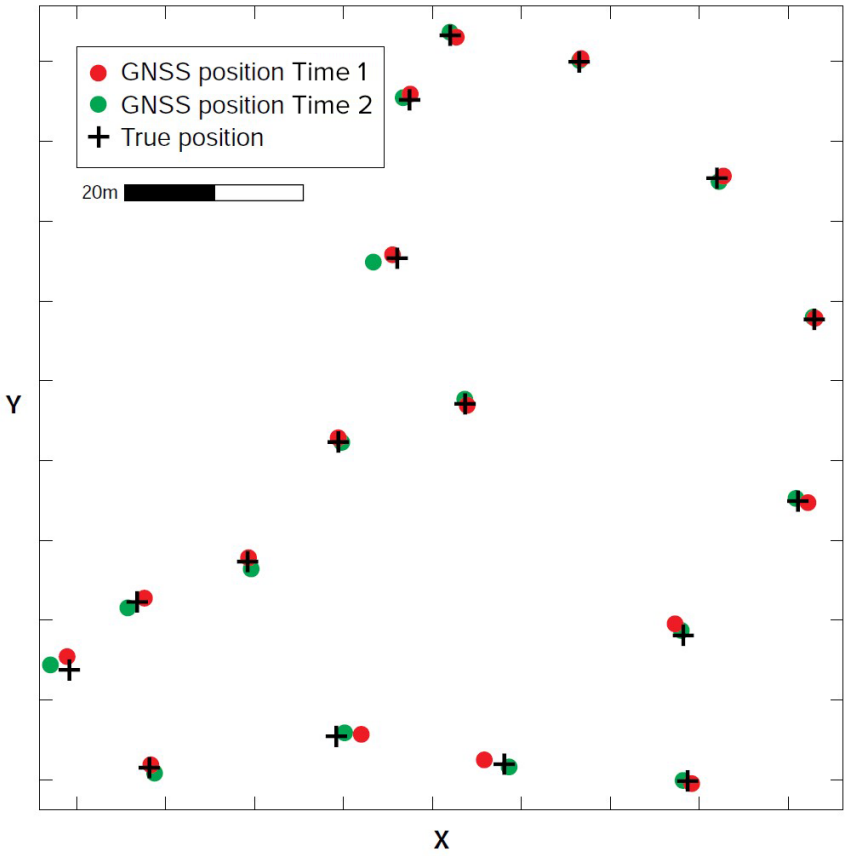
Evaluate in-woods accuracy of three classes of GNSS receiver Trimble GEO7X (mapping grade), JAVAD GNSS TRIUMPH-2 (survey grade), Garmin (recreational grade).

JAVAD's TRIUMPH-2 receiver in use on a plot in Oregon

3 types of GNSS receivers

Solution

Deploy a high-performance global navigation satellite system (HPGNSS; equipment and field protocols) over the entire USA to provide high-quality subplot coordinates in support of detailed forest analyses.



Results of the rover-to-rover scenario. Errors are computed from repeated GNSS receiver positions.[2]

Outcome

- The HPGNSS program has added significant value to the FIA program by improving the accuracy of subplot coordinates following evaluations of GNSS equipment and protocols.
- HPGNSS has enabled the measurement of 62,500 forested subplots within the Pacific Northwest FIA's inventory domain, thereby securing its future operation for the next 12-15 years. [1]
- Since 2014 HPGNSS has grown into a high-priority, nationwide component of the FIA inventory.
- Evaluation of various classes and models of GNSS receivers resulted in the JAVAD TRIUMPH-2 being used by all FIA crews in the entire USA.

  As of 2021, PNW-FIA has transitioned from Trimble to exclusively JAVAD TRIUMPH-2 GNSS receivers for all FIA field crews, and for all FIA crews in the USA from 2025. The "... improved positioning accuracy and the ability to mount the JAVAD TRIUMPH-2 receiver on a tripod are factors that motivated a transition from Trimble mapping grade receivers to the JAVAD survey-grade receivers." [3]

[1] 2022 USDA Forest Service Using High-Performance Global Navigation Satellite System Technology to Improve FIA Plot Coordinates in the Pacific Region page 31

[2] 2022 USDA Forest Service Using High-Performance Global Navigation Satellite System Technology to Improve FIA Plot Coordinates in the Pacific Region page 26

[3] 2022 USDA Forest Service Using High-Performance Global Navigation Satellite System Technology to Improve FIA Plot Coordinates in the Pacific Region page 17

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About JAVAD GNSS

JAVAD GNSS, headquartered in San Jose, CA designs, engineers, and manufactures products using multi-constellation, multi-frequency GNSS technology solutions for positioning, navigation, timing, survey, and aerospace industries. Its receivers utilize the latest GNSS technology delivering centimeter-level positioning and are recognized for their unparalleled performance, high-level security, and resilience in challenging environments. JAVAD GNSS has built many generations of GNSS receivers and full-featured office post-processing real-time software for high-precision Geodesy and GIS applications.

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