

VueStar Provides Boeing a Truth Reference for Scoring Their GPS/INS Navigation Systems

When Boeing needed a truth reference to measure the accuracy of their aircraft navigation systems, they used NavCom's VueStar™ and StarFire™ Network

BENCHMARKING PERFORMANCE

Measuring the accuracy of an aircraft GPS/INS navigation system poses a unique challenge. Traditionally, system integrators and aircraft manufacturers rely on post processing of kinematic data recorded simultaneously aboard the aircraft and ground-based reference stations in order to achieve some level of measurable airborne accuracy. Because of the distances involved, it is often difficult to get the accuracy required from post processing packages. The plane's dynamics also make it difficult to get a true trajectory without recording data at high update rates, which may not be possible when using data from pre-established permanent reference stations. The logistical problems of processing large amounts of data along with the time, effort, and cost to establish ground based reference stations, make this a difficult method for achieving a reasonable level of accuracy.

ELIMINATING THE NEED FOR BASE STATIONS

When Boeing needed a truth reference to measure positioning accuracies of onboard GPS/INS navigation systems, NavCom Technology's VueStar provided a unique solution in overcoming the traditional challenges. Boeing used VueStar, a complete global navigation solution which relies on NavCom's state-of-art GPS technology and the StarFire™ Network, a global satellite based augmentation system providing decimeter level accuracies in real-time without using a local base station. Widely used in land and offshore applications since it's inception, the StarFire Network is the result of a longtime collaboration between NASA's Jet Propulsion Laboratory (JPL) and NavCom.

REAL-TIME ANSWERS FROM A GLOBAL NETWORK

"By eliminating the range limitations of terrestrial communication links as well as the dependency on post-processing recorded data from ground-based reference stations, VueStar was able to provide us a more reliable and cost-effective solution that provided a highly accurate truth reference for several of Boeing's aircraft navigation systems in comparison with traditional methods," said Steven A. Wright, senior project engineer in the Integrated Defense Systems division, The Boeing Company.

Boeing performed several series of flight tests of integrated GPS/INS airborne navigation systems utilizing the VueStar system as their truth reference. One test series included over 120 hours of airborne data collection and traversed the eastern half of the continental United States with latitudes spanning from southern Florida to northern Minnesota.



King Air Platform for Dynamic Airborne Tests.

Primary interest was position accuracy in level flight or gentle turns, so dynamics were limited to 20-25 degrees of bank, mitigating the effects of satellite signal loss. Another flight test examined GPS/INS navigation position accuracy and tracking performance of a tightly coupled GPS/INS integration in both level flight and when stressed by higher airborne dynamics.

As a scoring system for evaluating the accuracy of GPS/INS systems, VueStar needed to continually provide significantly better accuracy than the system under test as well as meet the Boeing Company's stringent accuracy and performance requirements.

"The demonstrated performance of VueStar met all requirements of the scoring system," said Steven Wright. "Even during the high dynamic testing there were no performance issues detected provided GPS satellite signal loss was minimized."

"NavCom Technology's VueStar navigation solution provides the effective, reliable and highly accurate positioning accuracy required of an airborne truth reference system," noted Steven Wright. "We were very pleased with its performance and plan to use it in future projects."

VueStar offers Aerial Photogrammetry, Light Detection and Ranging (LIDAR) and Synthetic Aperture Radar (SAR) surveyors globally available decimeter-positioning accuracy in real time, improving the ability to return their customer's survey in days rather than weeks. VueStar provides GPS navigation enhanced to decimeter-level accuracies by using StarFire™ Network, in a small convenient form-factor.



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