Novel Positioning System for GPS-Denied Areas

Culebra- Cayo Luis Pena Impact Area RI/FS (I02PR006813))

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Objective

Perform a pilot study to use an innovative new handheld positioning system to improve positioning of data under heavily canopied areas at Culebra, PR.

Problem being solved

Culebra is heavily vegetated and current positioning plans for transects will only have an accuracy of +/- 2m. Accurate positioning is necessary for reacquisition and is currently only available through time-consuming and/or expensive methods.

Technology Description

This new system combines handheld GPS with a 3-axis accelerometer, magnetic compass, pedometer and pressure sensor in order to use inertial navigation when fidelity of the GPS unit is low. Additionally, the sensor has a Kalman Filter to automatically throw out any data spikes.

Technical approach

Initial equipment testing will be performed either in Huntsville or Vicksburg to ensure functionality prior to going to Culebra. ERDC and CEHNC will then work with one of two contractors who will be performing field activities in support of concurrent remedial investigations on Culebra. A civil surveyor will be hired to install a few survey markers under canopied areas. Tests will be run crossing the survey markers to check positional accuracy. Additionally, USACE personnel will accompany field crew into a heavily canopied area, following the same transect routes. A direct comparison between the handheld GPS unit being used by the field crew and the new ERDC system will then be analyzed.

Expected DoD Benefit

Improvement to the geolocation of anomalies on transects and reacquisition of anomalies in tree canopied areas.

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