U.S. Coalition Warfare Program Evaluates UAV Geolocation Payload Using AGI Software

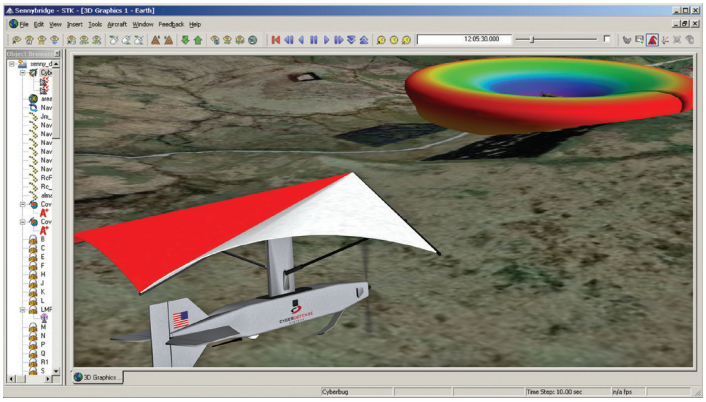
STK and NavTK Enhance Plan Development and Mission Analysis

SPECIALIZED NEEDS: Coalition Warfare Program engineers specialize in operations for Global Positioning System (GPS) and Positioning, Navigation, and Timing (PNT) technologies.

Because GPS interference poses a threat to military operations, engineers set out to geolocate transmitters that impede GPS signals with a GB-GRAM receiver payload on a CyberBug UAV. The characteristics of the test site—a military range in Wales—posed several challenges.

DETAILED INFORMATION: Focused on geolocating transmitters that impede GPS signals; planners faced a number of detailed challenges to overcome. Using STK and NavTK; they modeled GPS jammer locations, antenna gain patterns, and power with accurate digital terrain elevation data (DTED); navigated a small UAV to waypoints near roads; and predicted effects of GPS jamming on the route in order to maximize collection opportunities. At the same time; they were able to limit sorties, recreate the test from recorded telemetry and sensor data, perform post-mission analysis, and produce detailed after-action reports.

During actual operations, the payload was inserted into the CyberBug and the UAV was launched along its designated flight plan. STK software then evaluated test data and generated necessary after-action reports for post-mission analysis.



STK depicts the gain pattern of a GPS jammer on the flight path of a CyberBug UAV.

Mission planners for the U.S. Coalition Warfare Program used Systems Tool Kit (STK) and Navigation Tool Kit (NavTK) software for test-plan development and post-mission analysis. AGI's commercial off-the-shelf software created an effective UAV preflight plan that met mission requirements and successfully recreated the test for evaluation.

POWERFUL RESULTS: STK and Navigation Tool Kit (NavTK) provided test plans and post-mission analysis. The GPS constellation was modeled using antennae to simulate the L1 GPS channel. Test-range terrain and imagery data were loaded into the scenario to model the environment. Jammer location, antenna gain pattern, power, digital terrain elevation data, and the UAV test platform's performance characteristics were defined to accurately model the assets. A preliminary test route identified waypoint targets through the boresight of the imaging payload. Planners ran preflight analysis, predicted the effects of the jammer on the UAV mission route, and conducted parametric analysis to maximize collection opportunities.

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