

Naval Postgraduate School UAV Trials Optimize Success with STK

UNMANNED AERIAL VEHICLES (UAVS) ARE AMONG the hottest technologies in the marketplace today. Aircraft—some the size of model airplanes—serve as the eyes and ears for war-fighters, gathering intelligence to help save lives in the battlefield. Since 2006, AGI has demonstrated how its STK software supports this emerging technology in exercises held by the Naval Postgraduate School (NPS), Monterey, CA, and sponsored by the U.S. Special Operations Command.

Every three months, the NPS holds the Tactical Network Topology (TNT) trials, which draw together military graduate-student research, new commercial off-the-shelf (COTS) technologies, and experienced operators. They test the systems in a remote, austere southern California environment that mimics battlefield conditions. STK is used in TNT's UAV test and evaluation exercises; small tactical UAV operations; and post-mission analysis.

One such experiment tested optimization of search patterns. The vehicles ranged from the 40-pound ScanEagle (which requires a launcher to put it into flight) to the four-pound Raven (launched by hand). During the simulation, the UAVs flew over the simulated battleground looking for riders on all-terrain vehicles (ATVs), which represented enemy forces. The trial studied the entire search system including UAV sensors, sensor movements, platform stability, communications links, and the users' interaction with the software's graphical user interface (GUI).

The UAVs sent data and images back to the operations center, where STK showed real-time aircraft position and attitude in 3D. It also calculated and displayed each UAV's sensor footprint, sensor coverage over terrain, proximity to other aircraft, and restricted airspaces including a bald eagle's nest situated near the air strip.

Compared to what UAV operators are used to, STK provided enhanced situational understanding and geometrical analysis. "Typically, users of small UAVS will only have a



A Raven UAV flies in the TNT trials in southern California. STK showed that the flight was conducted according to plan.

video feed and a simple 2-D map to determine where the vehicle is," says Dr. Peter Aves, AGI director of business development. "With STK, the enhancement is dramatic. We could see the range from a useful angle and get a sense of what the UAV's were looking at and where exactly they were. STK was also able to tell them how good their search pattern was."

Dr. Nita Lewis Miller, Human Systems Integration Program, NPS, says, "I truly believe the potential benefit of AGI's application is enormous since the ability to visualize the sensor footprint is critical to commanders' understanding of the battlefield."

Following the trial, AGI performed post-reporting in an after-action review. "The participants didn't know how long or how many times the sensors on the UAVs had seen the target prior to the operators spotting the targets on the GUI," says Aves. In the past, it had taken as long as two weeks to analyze where the UAV had flown; where the ATV had traveled; and how many times the UAV's sensors had missed it. "Using STK's access capabilities, we created a report in seconds, saving weeks of work." For more on how AGI technology supports unmanned systems, visit www.agi.com/UAV or the AGI booth at the AUUSI conference this August in Washington, D.C. ▲

ORIGINAL ARTICLE
PRINTED JULY 2007

JULY 2007

Solving the Integration Puzzle

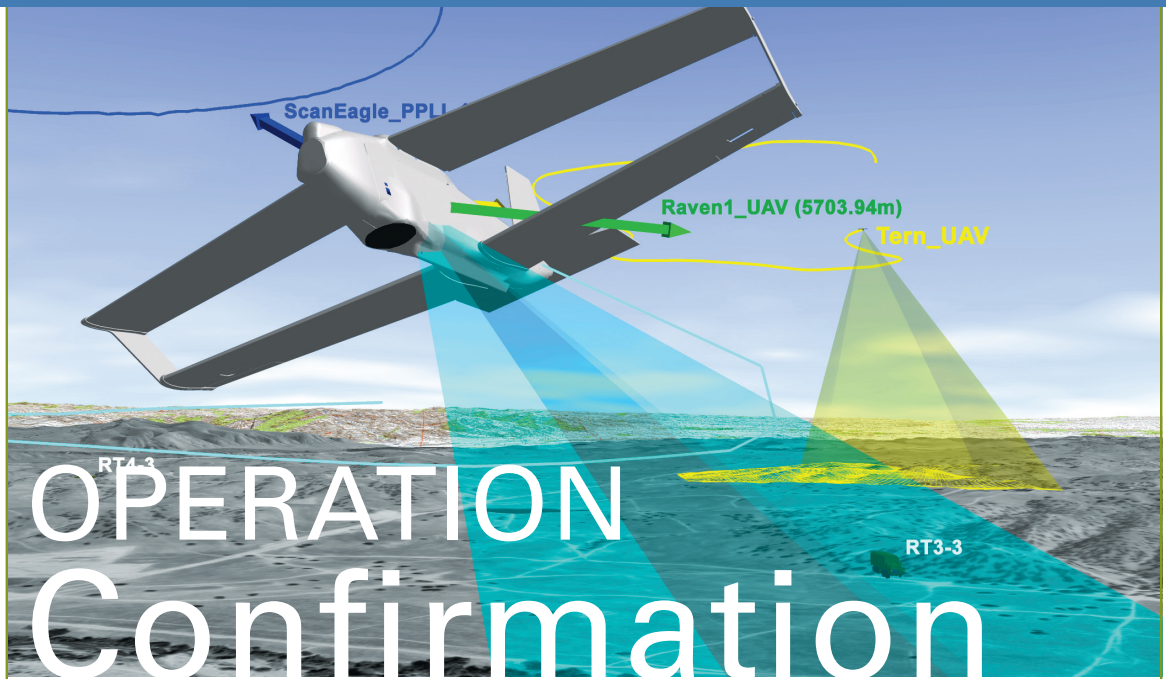
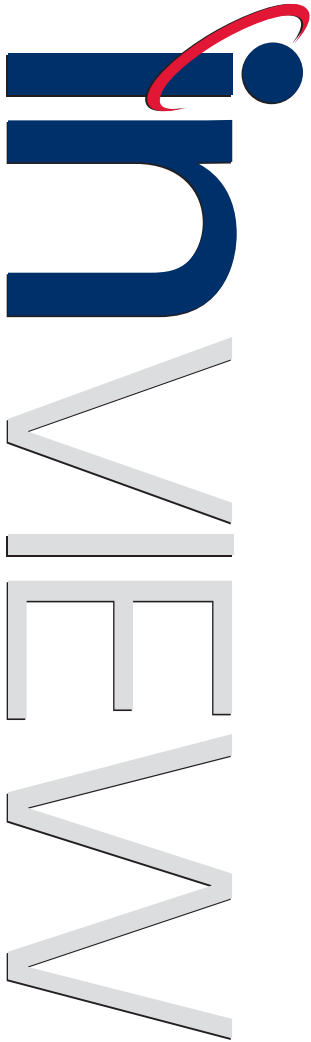
Software developers and integrators are quickly adopting system capabilities using off-the-shelf technology. Do you know how to integrate it?

AGI

To subscribe to *InView* or read past issues, visit www.agi.com/InView

ANALYTICAL GRAPHICS, INC.
220 VALLEY CREEK BLVD.
EXTON, PA 19341





OPERATION Confirmation

Naval Postgraduate School UAV Trials Optimize Success with STK

UNMANNED AERIAL VEHICLES (UAVS) ARE AMONG the hottest technologies in the marketplace today. Aircraft—some the size of model airplanes—serve as the eyes and ears for war-fighters, gathering intelligence to help save lives in the battlefield. Since 2006, AGI has demonstrated how its STK software supports this emerging technology in exercises held by the Naval Postgraduate School (NPS), Monterey, CA, and sponsored by the U.S. Special Operations Command.

Every three months, the NPS holds the Tactical Network Topology (TNT) trials, which draw together military graduate-student research, new commercial off-the-shelf (COTS) technologies, and experienced operators. They test the systems in a remote, austere southern California environment that mimics battlefield conditions. STK is used in TNT's UAV test and evaluation exercises; small tactical UAV operations; and post-mission analysis.

One such experiment tested optimization of search patterns. The vehicles ranged from the 40-pound ScanEagle (which requires a launcher to put it into flight) to the four-pound Raven (launched by hand). During the simulation, the UAVs flew over the simulated battleground looking for riders on all-terrain vehicles (ATVs), which represented enemy forces. The trial studied the entire search system including UAV sensors, sensor movements, platform stability, communications links, and the users' interaction with the software's graphical user interface (GUI).

The UAVs sent data and images back to the operations center, where STK showed real-time aircraft position and attitude in 3D. It also calculated and displayed each UAV's sensor footprint, sensor coverage over terrain, proximity to other aircraft, and restricted airspaces including a bald eagle's nest situated near the air strip.

Compared to what UAV operators are used to, STK provided enhanced situational understanding and geometrical analysis. "Typically, users of small UAVS will only have a



A Raven UAV flies in the TNT trials in southern California. STK showed that the flight was conducted according to plan.

video feed and a simple 2-D map to determine where the vehicle is," says Dr. Peter Aves, AGI director of business development. "With STK, the enhancement is dramatic. We could see the range from a useful angle and get a sense of what the UAV's were looking at and where exactly they were. STK was also able to tell them how good their search pattern was."

Dr. Nita Lewis Miller, Human Systems Integration Program, NPS, says, "I truly believe the potential benefit of AGI's application is enormous since the ability to visualize the sensor footprint is critical to commanders' understanding of the battlefield."

Following the trial, AGI performed post-reporting in an after-action review. "The participants didn't know how long or how many times the sensors on the UAVs had seen the target prior to the operators spotting the targets on the GUI," says Aves. In the past, it had taken as long as two weeks to analyze where the UAV had flown; where the ATV had traveled; and how many times the UAV's sensors had missed it. "Using STK's access capabilities, we created a report in seconds, saving weeks of work." For more on how AGI technology supports unmanned systems, visit www.agi.com/UAV or the AGI booth at the AUUVSI conference this August in Washington, D.C. ▲

ORIGINAL ARTICLE
PRINTED JULY 2007



To subscribe to InView
or read past issues, visit
www.agi.com/InView

ANALYTICAL GRAPHICS, INC.
220 VALLEY CREEK BLVD.
EXTON, PA 19341
WWW.AGI.COM

