Boeing, U.S. Air Force Demonstrate Advanced Airborne Networking First

Boeing [NYSE: BA] and the U.S. Air Force have demonstrated for the first time how -- with advanced airborne networking and information management technology -- a near-space vehicle can be used as a flexible, low-cost, theater-wide information broker that provides real-time tactical information to ground forces to enhance their effectiveness and survivability.

The recent demonstration was the first in a series of experiments dubbed Project Marti. The Marti concept seeks to combine the wide-area coverage and loiter time of a near-space vehicle (such as a High-Altitude, Long Endurance or HALE concept vehicle) with the sensing ability and agility of lower-altitude unmanned air systems (such as the Boeing/Insitu Group's ScanEagle UAS).

The goal is to provide information over a large geographic region, beyond the reach of a single low-altitude asset, without the need for expensive space-based assets that are often reserved for higher priority missions.

"The challenge here is much more than just the establishment of a high-altitude communications relay," said Patrick Stokes, Boeing Phantom Works manager of Network-Centric Operations-related programs. "It's really all about effectively bringing the power of real-time information to bear within a tactical theater, and doing so without the need for an expensive, fixed infrastructure."

To bring this communication power to the troops, Project Marti is leveraging innovative information management brokering techniques to provide advanced publish and subscribe capabilities across a broad geographical region. Researchers from Phantom Works and the Air Force Research Laboratory Information Directorate recently conducted an initial risk-reduction demonstration of these capabilities.

In the demonstration, multiple information sources, including ground-based software clients representing low-altitude unmanned aerial systems (such as the Boeing/Insitu ScanEagle), delivered near real-time imagery and data through an Internet Protocol network to an airborne information broker (onboard a balloon acting as a surrogate for a near-space vehicle).

The sources transmitted the data simultaneously in a Cursor-on-Target format that allows accurate tactical information to be passed more efficiently among multiple systems. The information broker then successfully distributed to ground stations only the data that matched users' subscriptions.

"This demonstration was the first instance of an airborne information manager storing published UAS sensor data for delivery to ground-based subscribers, who could then utilize that data on a tactical display," said Dr. Jim Paunicka, Phantom Works principal investigator on Project Marti. "The subscribers need only display the data that's relevant to their tactical missions, much in the way that an Internet user would employ a search engine to obtain relevant information."

Future tests in Project Marti will expand the amount and complexity of data as well as the number of assets involved. The tests will culminate in a tactically relevant live flight demonstration in which multiple airborne and near-space assets will operate over an extended range to support a large number of ground units.

During this final demonstration, planned for early 2008, live imagery and tactical data from UAS sensors (including those onboard a ScanEagle) will be published to the airborne network through an information broker on a high-altitude surrogate near-space vehicle -- a balloon that will be launched to about 80,000 feet. Ground units will be able to collaborate with each other to subscribe to data relevant to their respective missions.

Project Marti is one of several programs that support the AFRL's Tactical Information Dominance vision to show how combined UAS and near-space assets can provide widespread information access in tactical operations.

Phantom Works is the advanced R&D unit of Boeing. Its charter is to provide innovative technology solutions that reduce cycle time and cost of aerospace products and services while improving their quality and performance.
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For further information:
Daryl Stephenson
Boeing Engineering, Operations & Technology
office: (314) 232-8203
daryl.l.stephenson@boeing.com