Boeing Demonstrates Innovative Technologies that Expand Network-Centric Capabilities of Fielded Aircraft

In recent live flight tests, advanced information management technologies developed by researchers from Boeing [NYSE:BA] and the U.S. Air Force Research Laboratory (AFRL) demonstrated they could dramatically improve the way airborne platforms acquire, sort and exchange real-time mission data with each other and with command and control centers on the ground.

The enabling technologies include algorithms called intelligent software agents that can autonomously infer and execute actions to access, evaluate and integrate desired data. In this case, they allow aircraft to fully exchange information in real time with the Global Information Grid (GIG) -- an expansive network-centric information system used by the U.S. Department of Defense as well as national security and intelligence communities for fast, efficient communications.

The intelligent software agents enable aircrews of platforms like the F-15 to use the GIG to publish, subscribe and pull information and imagery tactically relevant to their missions, including the location of friendly forces and unmanned platforms, as well as the status of potential targets.

"These GIG-enabling technologies demonstrate they can provide both the aircrew and the commanders with an unparalleled view of the common operating picture as well as improved real-time situational awareness, contributing to an increased operational tempo," said Patrick Stokes, Boeing Phantom Works manager of Network-Centric Operations Contract R&D Programs. "This dramatically improves their ability to complete missions in a dynamic, time-critical environment."

Boeing Phantom Works has been under contract with the AFRL since October 2004 to develop information management services that provide network-centric machine-to-machine interoperability between tactical fighters and command and control elements. The effort is funded by the AFRL Information Directorate, based in Rome, N.Y., under the Joint Battlespace Infosphere (JBI) program. One of the objectives of the JBI program is to develop and demonstrate Global Information Grid information management services in an operational context.

Phantom Works engineers and the AFRL demonstrated the new capabilities on Feb. 1 and 3 during flight tests in St. Louis involving the Boeing F-15E1 Advanced Technology Demonstrator, which was modified with intelligent software agents. The F-15E was linked to the GIG as its aircrew flew tactically relevant scenarios similar to those flown during Operation Iraqi Freedom. It was the first time an in-flight tactical aircraft had been linked to the GIG to provide unprecedented situational awareness.

As the intelligent software agents autonomously sorted and filtered information, the F-15E aircrew quickly and accurately sent and received only the most pertinent mission data and images along the GIG. Additionally, the agents transformed Link 16 data such as target status, vehicle health, fuel status and weapon stores into information that was shared across the GIG for use by commanders in a Command and Control Air Operations Center. In turn, the commanders used this information to direct and redirect the F-15E aircrew to engage primary and secondary targets.

The F-15E aircrew exercised on-demand access to the GIG for updates on friendly forces, unmanned air vehicles, and intelligence, surveillance and reconnaissance data around target areas -- all of which dramatically improved the crew's ability to effectively complete dynamic, time-critical missions.

"The intelligent software agents were critical to the success of the demonstration," said Eric Martens, Boeing Phantom Works principal investigator for the program. "This demonstration validated the Boeing approach of using off-board intelligent agent technology to enable fielded aircraft to operate effectively in the GIG," he said.

Phantom Works is the advanced research and development unit and a catalyst for innovation for The Boeing Company. It provides advanced solutions and innovative, breakthrough technologies that reduce cycle time and cost while improving the quality and performance of aerospace products and services.
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For further information:
Daryl Stephenson
Boeing Technology Organization
314-232-8203
daryl.l.stephenson@boeing.com