The AI Up There

In our data-driven future, Maverick won't need a wingman

Matthew Jaster, Senior Editor

There's no such thing as "Too Much Information" when it comes to warfare. Lockheed Martin believes it's critical in today's global landscape for a warfighter to act on information as soon as it is available. Leveraging the strengths of manned/unmanned teaming enables rapid action during combat situations. With the assistance of AI, this has the potential to increase situational awareness and improve combat efficiency and effectiveness for any warfighter.

The U.S. Air Force partnered with Lockheed Martin Skunk Works to tackle an experiment known as "Have Raider." This project was designed to demonstrate the technologies required for an unmanned vehicle to fly as a teammate with a manned vehicle in a battlespace.

Using an experimental F-16 as a surrogate unmanned aircraft, the demonstration proved the ability to autonomously plan and execute air-to-ground strike missions, fly in formation with a manned aircraft and react to changing threat environments. This is an AI-based case study that might force *Microsoft Copilot* to consider a name change.

The research demonstrated that effective manned/unmanned teaming in fighter jets reduces the high cognitive workload, allowing the warfighter to focus on creative and complex planning and management. Autonomous systems also can access hazardous mission environments, react more quickly, and provide persistent capabilities without fatigue. They consider the "Have Raider" program a critical step to enabling future loyal wingman technology development and operational transition programs—cue the Kenny Loggins soundtrack.

Lockheed Martin Skunk Works also recently partnered with the University of Iowa's Operator Performance Laboratory (OPL) to demonstrate the use of AI in air-to-air intercept scenarios.

The successful flights are a significant milestone for Skunk Works' Tactical AI team, in which AI directly flew and conducted tactical exercises with a full-scale, live aircraft—one of OPL's L-29 Delfin jets—using heading, speed and altitude commands. The team executed simulated-to-real transfer test objectives against a virtual adversary in offensive and defensive risk postures.

Eight test cases were conducted per flight to exercise the AI agent in a variety of situations, from standard head-to-head fights to off-aspect encounters, missile support and missile defeat scenarios. The team was encouraged to see clean sim-to-real transfer of learned behaviors and that the AI agent appeared intentional and decisive in its actions.

"This was the first live exercise of the new flight interface; it's thrilling to see the separate components successfully integrate on the L-29 to demonstrate new capabilities. The complete system performed even better in live flight than in simulation," said Dr. Tom "Mach" Schnell, OPL professor at Iowa Technology Institute.

"Live flight tests are a crucial aspect of advancing our expertise in AI and autonomy. These flights are powerful demonstrations of our ability to quickly and affordably develop and test operationally relevant AI capabilities," said Matthew "Gabe" Beard, Lockheed Martin Skunk Works autonomy/AI and machine learning engineering manager.

These flight tests are part of a broader initiative to rapidly develop and test AI-driven autonomy for air-to-air missions. Several other flight tests are planned for this year, building on these achievements, and increasing the complexity by introducing additional aircraft into offensive counter air and battle management scenarios.

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