



News Release

Defense Advanced Research Projects Agency

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IMMEDIATE RELEASE

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UCAV PROGRAM SUCCESSFULLY COMPLETES BLOCK 1 DEMONSTRATIONS

The DARPA/U.S. Air Force Unmanned Combat Air Vehicle (UCAV) System Demonstration Program successfully completed all Block 1 demonstrations on February 28.

During Block 1, the UCAV program completed 48 discrete laboratory, simulation, and flight demonstrations. The demonstrations reduced risks related to the technologies, processes, and system attributes of the UCAV objective system, and covered system integration, air vehicle, mission control, and supportability. The two X-45A air vehicles have completed a total of 16 flights and nearly 13 flight hours since May 2002.

The final Block 1 activities were two demonstration flights accomplished at the NASA Dryden Flight Research Center, Edwards AFB, Calif., that verified safe operation of the weapons bay door at altitudes of 35,000 feet and speeds up to 0.75 Mach, the maximum planned altitude and speed for the demonstrator vehicles.

"I'm extremely proud of our joint team of DARPA, Air Force, NASA, and Boeing personnel for their accomplishments," commented Col. Earl Wyatt, USAF, UCAV Program Manager. "When we first flew last May, the team committed to completing Block 1 demonstrations by February 2003, and we did it."

Key demonstrations in Block 1 included:

- **Wing Attachment:** The team demonstrated X-45A wing removal from the transport container, wing handling, wing attachment, and the process for verification and inspection.
- **Autonomous Taxi:** The X-45A demonstrated autonomous taxi with the ability of the operator to intervene in the event of an emergency. It also demonstrated accurate ground navigation and waypoint steering, air vehicle position control, and reliable communication links.
- **Concept of Operations Simulations:** Boeing's UCAV System Integration Lab, Seattle, Wash., demonstrated several advanced attributes of the Mission Control Segment (MCS) in support of potential UCAV concept of operations. The Lab also demonstrated decision aiding software and multiple levels of autonomy in the MCS, as well as several approaches to vehicle hand-off between two different operators. Simulations also demonstrated decision-aiding related to target engagement.

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- **Distributed Control:** During flight tests, the team demonstrated the distributed control capability of the UCAV system, passing control between the Mission Control Shelter and the Mission Control Van and back again.
- **Loss of Communication Response:** The UCAV system demonstrated the ability to autonomously respond to a complete loss of communication with the UCAV ground station by executing the appropriate onboard contingency management plan. As planned, the air vehicle returned to base and landed safely upon loss of communication.
- **Four-Dimensional Navigation:** Four-dimensional navigation is the ability to accurately control time as well as position. The X-45A was given Time of Arrival (TOA) commands so the vehicle would reach a certain waypoints (defined by latitude, longitude, and altitude) in the mission plan at specified times. The X-45A automatically adjusted its speed to overcome headwinds and changed its flight plan to arrive at the specified waypoints at the times commanded by the operator. Four-dimensional navigation is intended for coordinating attacks in support of combat missions and is the foundation for the UCAV's multi-ship coordinated flight capability, where UCAVs will use this capability to arrive simultaneously at a designated waypoint and autonomously form up into a coordinated flight package, thereby greatly reducing the operator's workload.

“Block 1 was an intensive effort that has contributed greatly to reducing the risks of developing and fielding an operational UCAV system,” said Marc Pitarys, UCAV Technical Director. “We could not have reached this point without an outstanding team of government and contractor personnel who have combined stable software, reliable hardware, and efficient flight-testing in completing nearly 50 ground and flight demonstrations.”

A hallmark of the joint nature of the UCAV System Demonstration Program is the direct involvement of the Air Force Research Laboratory (AFRL), Wright Patterson AFB, Ohio. Throughout the UCAV Block 1 activity, AFRL contributed resources, technical expertise, and personnel. AFRL's Information Directorate, Human Effectiveness Directorate, and Air Vehicles Directorate were involved in almost every aspect of the development of the Block 1 capability and completion of the demonstrations.

Block 2 demonstrations have already begun, with seven of the 40 planned demonstrations completed to date. Block 2 flight demonstrations with the X-45A will begin this spring, and will expand to multi-vehicle operations this fall.

The UCAV program is a joint DARPA/U.S. Air Force/Boeing effort to demonstrate the technical feasibility, military utility, and operational value of a UCAV system to effectively and affordably prosecute 21st century lethal and non-lethal suppression of enemy air defenses and strike missions within the emerging global command and control architecture. The X-45A is demonstrating the technical feasibility of the UCAV concept. The program is now designing a more operationally representative robust prototype that will demonstrate the military utility and operational value of the UCAV system.

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