

Title: GROOM LAKE TESTS TARGET STEALTH  
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Advanced coatings and unmanned designs appear to dominate efforts to keep new-generation, low-observable aircraft unseen both day and night

U S. military and aerospace officials contend that tests of improved stealth technologies, which are already underway and showing success, could make warplanes virtually invisible to radar, infrared sensors and the human eye. The claim puts an interesting light on a call by top U.S. Air Force scientists for the Pentagon to push rapid development of a new generation of stealthy, unmanned combat aircraft.

At least two classified aircraft programs, one unmanned and another that can fly with or without a pilot, are involved in current stealth research, according to a senior aerospace industry official.

The projects, reportedly being worked on within a block of each other at the Groom Lake development facility on the restricted government ranges north of Nellis AFB, Nev., involve aircraft built primarily of composite materials that use the same type engine and employ a special, next-generation stealth coating that limits their visibility in at least two spectrums.

PENTAGON OFFICIALS confirmed last year that there were at least two fixed-wing black aircraft projects at the facility, but denied that either had yet taken to the air. A senior Defense Dept. official echoed that assessment last week by saying, "If it's [already] flying, it belongs to some other agency." The industry official contends that the pure UAV, at least, has flown and evidenced some control or stability problems. These qualified affirmations leave open the possibility that more than two projects are involved.

The manned/unmanned aircraft's coating, considered a forerunner of the smart-skin concept, is activated by a 24-v. charge that helps trigger both radar and visual masking. The electrically charged coating attenuates radar reflections better than current stealth coatings. Dissipation of 10 dBsm. of radio frequency energy can reduce the operating range of an air defense radar by 40-50%. Moreover, the coating has properties that allow aircraft's skin color to be changed to blend the aircraft into the sky if viewed from below, or various hues of earth if seen from above. The aircraft also incorporates infrared limiting technology for a multispectral signature reduction effect.

Natalie Crawford, a long-time RAND official and chairman of the attack panel for the U.S. Air Force scientific advisory board, said the Air Force must raise the threshold for new stealth technology and pursue an "invisible air vehicle" so that U.S. stealth warplanes can operate in daylight. High visibility and distinctive shapes are a major limitation of the F-117, F-22, and, in particular, the large, black B-2 bomber. But being invisible means considerable improvement both in the infrared and visual spectrum.

PARALLEL, ALTHOUGH not necessarily associated research, has shown that aerodynamic drag can be reduced and shock wave buildup on high performance aircraft delayed by putting an electrical charge on aircraft skins.

Both aircraft being tested at Groom Lake have hard points to carry weapons. Since U.S. combat rules currently do not allow UAVs to drop bombs or shoot missiles, some aerospace officials note that the larger aircraft could be flown by a pilot on strike missions and then be operated unmanned on reconnaissance missions, particularly where enemy air defenses are heavy. Air Force Chief Scientist Gene McCall predicted that unmanned aircraft and their sensors will be sophisticated and reliable enough to carry weapons within 10-20 years.

Other aerospace specialists suggest that the accommodations for a pilot were made simply to get through the testing more easily and with less fear of a crash that would delay or kill the project. This is a common practice within the UAV community where there often are one or two test vehicles.

An aircraft without a pilot can be maneuvered far more violently, thereby making it harder to shoot down. Both Air Force pilots and scientists concur that an aircraft capable of making 15-20g turns could outmaneuver most enemy missiles.

McCall called for uninhabited combat and reconnaissance aerial vehicles (UCAVs and URAVs) that can endure +10--20g. The Nellis unmanned/manned aircraft project is reportedly designed for 12g. U.S. Air Force officials are more demanding, saying they need "15-18-20g," to ensure they can win aerial fights against newer missiles.

McCall estimates the UCAVs will be demonstrated within 10 years and operational within 20 years. Moreover, he predicted that the lost aircraft off the Joint Advanced Strike Technology (JAST) production line will likely be built as unmanned vehicles. Air Force officials have suggested that operators on board the larger sensor platforms--such as the E-3 AWACS or E-8 Joint-STARS--will direct the unmanned JAST and reconnaissance UAVs during missions and return them to home base operators for the return flight and landing.

UCAVs, BY ELIMINATING the pilot, could present a completely smooth, seam-free surface to ground-based radars during a flight, McCall said. The landing gear, the seams of which are impossible to hide, would be on top of the aircraft. When ready to descend, the aircraft could simply roll over and lower its landing gear, a feat impossible with a pilot on board.

McCall noted that stealth shaping has about reached its limits. To make an aircraft truly invisible, the Air Force would need to perfect the ability to repeat and reverse radar signals so that there appears to be no return and to further improve infrared signature reductions."

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