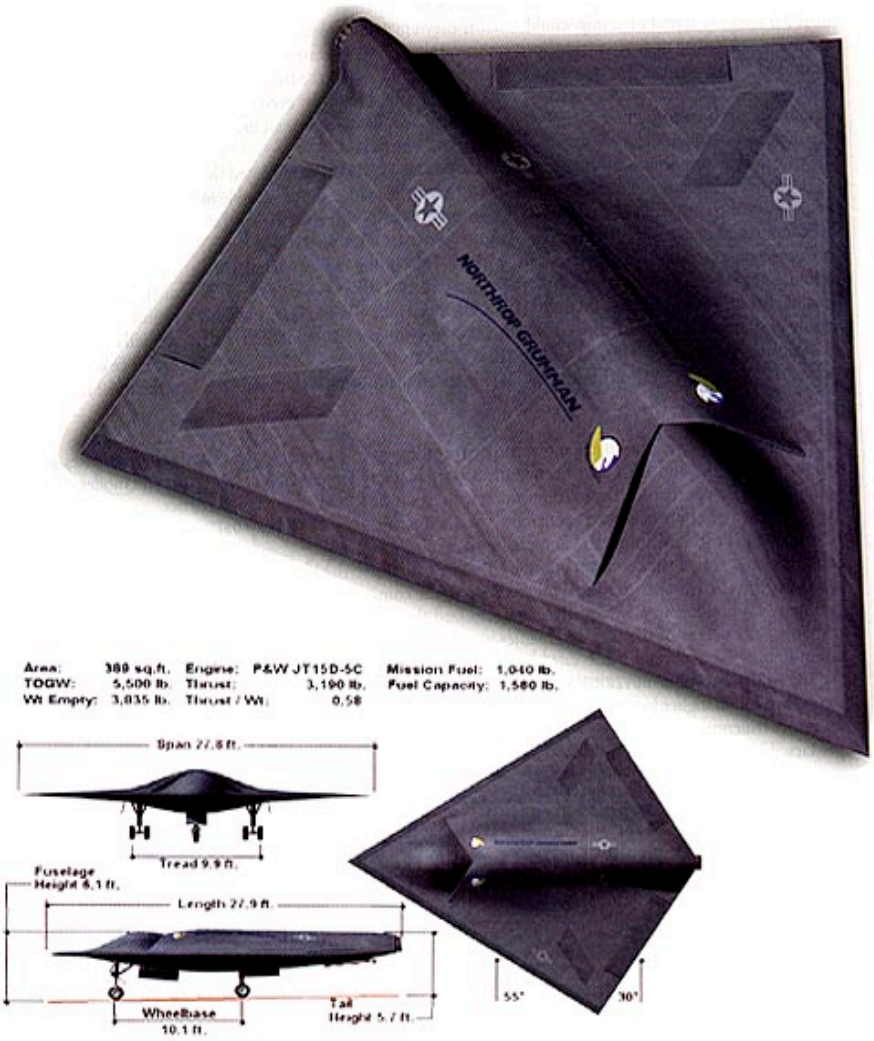
Sightings

Flying Battlebots

Unmanned combat planes will replace humans on missions that are D3"dull, dangerous, or deadly.

By Steve Douglass



Ensign Nolo was a master at tank plinking. Twenty enemy tanks destroyed in half as many days. In fact, Nolo's entire squadron was filled with eagle-eyed tank killers that had flown through enemy defenses, dropped their bombs with unheard-of accuracy, and made it back to the carrier without a scratch.

But as Nolo touched down on the carrier deck, no celebrations were being planned. No medals would be awarded. Even beer call in the officer's club and a pat on the back for a job well done was out of the question. Instead, Nolo (short for No Live Operator) would be crated and returned to storage.

Nolo is an unmanned combat air vehicle, or UCAV, that could be deployed as early as 2010. Boeing and Northrop Grumman have already unveiled UCAV demonstrators, and flight tests are expected to begin later this year at China Lake in California. By the year 2030, Pentagon planners predict, UCAVs will dominate air warfare. Not only will these robotic warriors spare pilots, lives, but they,ll also be capable of maneuvers that aren,t humanly possible. And they,ll be able to carry twice the payload of a manned fighter, but will cost only one-third as much to build.

UCAVs "will take on some of the dangerous and demanding kinds of missions during a combat situation," says Lt. Col. Michael Leahy, the Pentagon,s UCAV program manager. "This aircraft will help take care of some of the air-to-ground threats that we face right now and allow manned assets to

do their jobs more efficiently and safely."

Unmanned military aircraft are not a new idea. Pilotless planes have already served as reconnaissance gatherers, target drones, and test vehicles. Over war-torn Bosnia, for example, the Predator surveillance plane gave soldiers real-time views of the ever-changing battlefield. But unlike earlier unmanned aircraft, UCAVs will be capable of seeking out and attacking enemies. And unlike "smart weapons, such as the cruise missiles used during the Gulf War, UCAVs will return to base after completing their missions.

The Pentagon foresees a future in which waves of robotic aircraft will identify and wipe out enemy ground defenses and fighter planes, clearing the way for manned strike forces. Randy Secor, program manager for Northrop Grumman's Navy UCAV, says "UCAVs will replace humans on D3"dull, dangerous and deadly"missions such as tactical reconnaissance or over areas where SAMs (Surface-to-Air Missiles) threaten manned aircraft."

Stealthy, small, and nimble, UCAVs will be able to loiter over a battlefield"relaying tactical data back to a command center. If an enemy tank column is sighted, the UCAVs can be ordered to attack immediately, rather than waiting for strike aircraft to be dispatched from a carrier that may be hundreds of miles away.

Flying battlebots appeal to military planners on many more levels. The chief consideration is that the American public has become more and more sensitive to losing sons in combat. When a UCAV is shot down, all that,s lost is the hardware. There,s nobody to bury in Arlington National Cemetery.

What,s more, the Pentagon will be able to slash its budget for pilot training. The pilot of a UCAV doesn,t have to be trained. It only has to be programmed.

Eliminating the pilot also makes UCAVs cheaper to build than a manned fighter. Engineers don't have to incorporate life support systems, ejection seats, control systems, or even flight gauges. In fact, there,s no cockpit at all.

Piloted aircraft are designed around the limits of human physiology. Your average jet jockey can only withstand about 10 Gs before blacking out. There,s no such limitation with UCAVS. Imagine a manned fighter having to duel with an aircraft that can make 15-G turns!

Unlike human pilots, a UCAV will never get bored, tired, scared, or overconfident. (According to a joke circulating through the Pentagon, the reason the military is planning to build unmanned combat planes is because the pilots, heads are getting too big to fit in the cockpits.) But just how smart can a flying automaton be?

Designers are calling UCAVs "brilliant," because they go a step beyond the "smart" of smart bombs. UCAVs will require little human intervention from takeoff to landing. They,ll be capable of communicating with each other while in flight to coordinate their attacks. They,ll report to each other about threats, radar, weather, and where enemy (or friendly) forces are located.

UCAV missions will be preprogrammed, and operators will intercede only if mission parameters

change. For example, if reconnaissance reveals that an enemy battalion is no longer at the location the UCAVs were dispatched to attack, an operator could reprogram UCAVS with new coordinates on the fly.

Operators will send data and commands to UCAVs via satellite or manned aircraft, on multiple redundant paths. If one communication link fails or is jammed, others ensure the UCAVs remain controllable. "If all communications should become cut off,says Secor, "the UCAV will fly to a pre-programmed loitering area to await reestablishment of communications or automatically return to the aircraft carrier or base it was launched from."

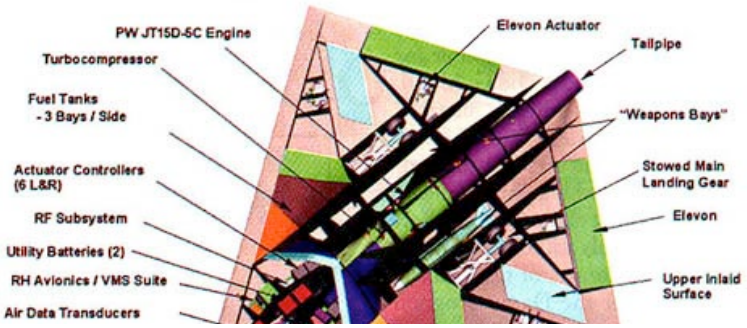
NEW! UPDATED PHOTOS OF X-47 ROLLOUT

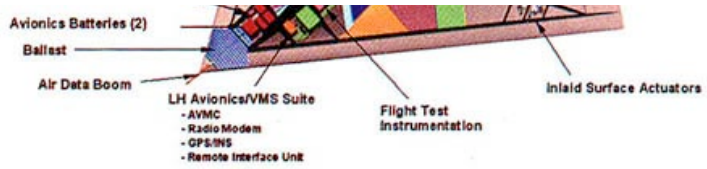
NEW: OFFICIAL NORTROP GRUMMAN X-47 ROLLOUT PHOTOS

Both Boeing and Northrop Grumman are developing UCAV versions. Boeing's experimental UCAV, designated X-45, was unveiled last September. Designed for the Air Force, the delta-wing aircraft was funded by the Defense Advanced Research Projects Agency (DARPA). Flight tests will begin soon.

Northrop Grumman, meanwhile, is working on a naval UCAV. The company,s contract with DARPA and the Navy is for a design study, but Northrop Grumman spent its own money to build a proof-of-concept UCAV demonstrator. Rolled out in February, it,s named Pegasus but has been dubbed "the kite" because of its unique diamond shape. Its first flight is scheduled for the fourth quarter of this year.

Pegasus has a single jet engine, buried in the airframe. Air enters the engine through a V-shaped inlet, and exits through a cylindrical thrust-vectoring exhaust nozzle. The aircraft has six control surfaces"two elevons and four small, retractable control surfaces called "inlaids" that take the place of a split rudder and tail to provide directional stability. The





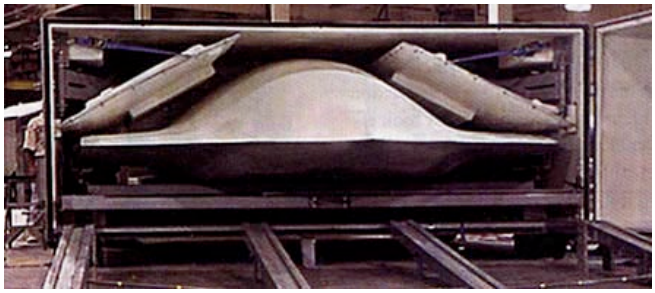
inlaids"two on top and two on the bottom"fold flat against the aircraft. "We believe [Pegasus] is probably the most complex shape we can envision flying off a carrier, says Paul K. Myer, director of advanced systems development for Northrop Grumman's Air Combat System

The 5,500-pound Pegasus prototype will have a normal operating altitude of 35,000 feet while carrying a 1,000-pound payload. However, the production version will be more robust: It,s expected to carry a 2,000-pound payload and be capable of flying for 12 hours without refueling. It will also be able to withstand higher G-loads than the Pegasus prototype, which is only designed for 3 Gs.

Although Pegasus won,t attempt any launches or landings aboard aircraft carriers and assault ships, the demonstrator will enable the Navy to begin testing the feasibility of automating these activities. "Our primary objective is to demonstrate the aerodynamics characteristics suitable for carrier operations," says David G. Mazur, Northrop Grumman's UCAV program manager.

One problem the Navy will address is how to coordinate UCAV operations with manned flights. Northrop Grumman is working on a handheld remote control system that could be used by a single trained crewman as a UCAV taxi system.

Also under consideration is a vertical landing system that would enable UCAVs to land on a ship,s helicopter pad, which would leave the rest of the carrier free for conventional jet operations. The Navy is also studying a rocket-launched version that could be deployed by submerged submarines. UCAVs will be stored on ships in compact containers, and taken out of storage periodically for testing, upgrades, and war games. To ready a UCAV for combat, technicians will attach the wings and landing gear, program the mission, fuel and arm the vehicle, and transport it to the carrier deck. The whole procedure should take only a couple of hours.



Both the Navy and Air Force plan to deploy UCAVs by 2010, with the Navy expected to field its force first. One reason the Navy is in the forefront is because the 1987 Intermediate-range Nuclear Forces treaty prohibits the United States and Russia from deploying some land-based cruise missiles, but

there are no restrictions on sea-based systems. It is not clear yet whether the Russians will view UCAVs as cruise missiles and their deployment as a violation of the INF treaty.

French STAR UCAV

Other countries are also developing UCAVs. The French company Dassault has already flown a prototype of its AVE (aeron de validation experimental), a star-shaped stealthy unmanned vehicle. And in Sweden, Saab Aerospace is studying a UCAV design called SHARC (Swedish Highly Advanced Research Configuration). But few experts here and abroad can foresee a time when pilots will disappear altogether. "There will always be a need for manned combat aircraft, says Secor. "UCAVs will only make the combat pilot's job safer and easier in the long run."

Putting the C in UAV

In February, the U.S. Air Force carried out three test firings of Hellfire missiles from a Predator unmanned air vehicle (UAV). The Predator, a 48-foot-span, 2,000-pound airplane with a Rotax piston engine, is the Air Force,s only operational reconnaissance UAV. During the Kosovo war in 1999, some Predators were experimentally equipped with laser designators, to mark targets for laser-guided bombs dropped by fighters. The experiment revealed problems with coordinating the fighters and the UAVs, so the Air Force decided to cut out the middleman and arm the UAVs themselves. Hellfire is a laser-guided missile that,s normally carried by the Army's Apache attack helicopter. The first series of tests was intended to show that Hellfire would separate properly from the UAV and that

the guidance system would work. In one test, the tank target was "lased" by observers on the ground; in another firing, the Predator's operators found and designated the target using the onboard laser. All the shots were direct hits. The Air Force plans a second series of tests, including attacks on moving targets and launches from altitudes above 15,000 feet.

Armed reconnaissance UAVs like Predator will not do the same job as dedicated UCAVs. They are slower, less stealthy, and pack lighter warheads. But an armed UAV could attack a target of opportunity"such as a radar or missile site that it discovers"and could provide emergency fire support to small teams on the ground. --Bill Sweetman

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