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## Flight Of The KillerBees (5/20/2009)

*Unmanned system takes aim at tactical military need*



*Raytheon purchased the rights to the technology and name of the KillerBee unmanned aircraft system from Northrop Grumman. Raytheon has submitted the KillerBee, which has undergone testing at Yuma Proving Ground, Ariz., for the Navy and Marine Corps' Small Tactical UAS and Tier II competition.*

[KillerBees](#) will soon be serving in the U.S. Navy and Marine Corps if Raytheon gets its way. Raytheon is trying to get the unmanned system into launch and recovery missions aboard ships as well as handling other tactical operations.

Raytheon Missile Systems, Tucson, Ariz., has just bought the rights to the KillerBee unmanned aircraft system (UAS) from Northrop Grumman. Under the agreement, announced on May 1, Raytheon is offering the militarized KillerBee IV for the Navy and Marine Corps' Small Tactical UAS (STUAS)/Tier II programs.

The unmanned system has also been mentioned as a candidate for a U.S. Special Operations Command program first made public in December 2008. Raytheon has the rights to manufacture and upgrade the system and is moving ahead with plans to develop a family of UAVs based on the KillerBee airframe for the global market.

## Advantages of Blended-Wing Design

The KillerBee was originally designed by Swift Engineering of San Clemente, Calif. Northrop Grumman previously teamed with Swift to offer the system for the Marine Corps' Tier II requirement, but that relationship was broken off in December 2006 for undisclosed reasons. In late April 2009, Northrop Grumman acquired the KillerBee line and announced that it would offer it as the "Bat" family of unmanned aerial vehicles (UAVs).

Northrop Grumman also agreed, as part of the licensing accord with Raytheon, that it would not enter the STUAS/Tier II competition with its own version of the unmanned system.

The aircraft has a unique blended-wing design, which provides a significantly better lift-over-drag ratio compared to standard designs. The turned-down wings can accommodate antennae and improve yaw stability, improving turn performance. The configuration allows the KillerBee to carry a larger payload than many UAVs, while using a less powerful engine and enjoying better endurance.

Adding to the KillerBee's military potential, there is room for growth for future payloads and additional mission capabilities. It is a fully autonomous system that requires a crew of two to operate. It can also be manually controlled if needed.



The overall system includes a fully automated catapult launch, utilizing four rodless pneumatic cylinders to produce 16 Gs of launch acceleration, and a net system for recovery. The latter was demonstrated during tests in early May at Yuma Proving Ground, Ariz., that simulated an at-sea recovery. The net was mounted on a rapidly moving truck, utilizing its onboard guidance system and completing a successful recovery at speeds similar to those of a naval vessel.

The KillerBee has flexible fuel tank arrangements, including inboard,

outboard, conformal and multiple tank configurations, for various mission packages. Potential mission profiles include 30 days of operations at 10 hours per day or 10 days at 24 hours per day.

The payload systems include electro-optical/infrared sensors, voice and data links, laser designator and an automatic identification system (AIS). The payload is mounted externally. Payload volume provided is 3.4 cubic feet, with a maximum weight of around 30 pounds (14 kg), or 50 pounds (23 kg) including communications equipment.

The KillerBee's wingspan is 10 feet (3.1 m), with a maximum takeoff weight of 164 pounds (74 kg); the aircraft is powered by an 8-hp engine driving a standard two-blade propeller. It has a maximum speed of 120 knots, a ceiling of more than 10,000 feet (4,500 kg) and a range of more than 100 miles (60 km).

## Raytheon Get Involved

Raytheon became involved with the KillerBee program in July 2007 when Swift Engineering agreed to partner with the defense company for the STUAS/Tier II competition. Swift had flown the KillerBee IV for the first time in April 2007 at Yuma Proving Grounds. By the end of the year, the air vehicle had flown several times and demonstrated a beyond line-of-sight tactical communications relay (BTCR) capability.

The air vehicles were equipped with communications relay payloads based upon EPLRS, SecNet 11, and MeshNet capabilities. They demonstrated compatibility with normal command-and-control and pilot situational awareness video links across the payloads.

In September 2008, Raytheon and Swift Engineering tested the KillerBee in a simulated combat environment. A Raytheon crew loaded the system on a Humvee, bringing it to a remote location where it was set up and launched within 45 minutes. The simulated mission utilized Marine Corps combat operations center hardware, and a variant of Raytheon's Universal Control System was used to operate the air vehicle.

The system received target inputs from a [Javelin](#) command-launch unit and an Improved Target Acquisition System (ITAS) on a [TOW](#) missile. The KillerBee's electro-optical/infrared payload was cued to the targets before passing target confirmation back to the weapon systems. According to the Raytheon and Swift team, the trial demonstrated the KillerBee's interoperability, integration and functionality as an end-to-end combat system, as well as its network-centric warfare capabilities.

### **Navy, Marines Set Up Bidding War**

In April 2009, the Navy released a request for proposals (RFP) for its STUAS program, which will also meet the Marine Tier II requirement. The RFP is for a two-year engineering and manufacturing development (EMD) phase, including at-sea testing, according to Gary Letterman, Raytheon's senior manager for business development.

The joint Navy/Marine requirements cover at least 56 systems, each with three air vehicles, three payload packages and a ground-control system. The eventual system will replace the land- and ship-based intelligence, surveillance and reconnaissance (ISR) services currently being provided by Boeing with the [ScanEagle](#) system.

That RFP was released 18 months later than originally scheduled due to the need to synchronize the Navy and Marine requirements. As a result, the expected initial operational capability date has been moved from fiscal 2010 to late fiscal 2012. Company responses to the RFP were due on May 19, Letterman said.

The KillerBee is not a lock for the tactical competition. Other potential competitors for the program include AAI's [Aerosonde Mk 5](#); Boeing Insitu with either the ScanEagle or [Integrator](#); and General Dynamics/Elbit Systems with the [Skylark II](#).

Nevertheless, Raytheon is confident in the KillerBee and has been pressing the Navy for an opportunity to demonstrate the system at sea, Letterman told Military Periscope at the recent Navy League exposition in Maryland. The company is particularly eager to test the KillerBee's performance in the electronic environment of a warship. As it stands, the Navy expects to hold a three-day flight demonstration on land in June, said the manager.

Raytheon has spent the last two years investing in the KillerBee in preparation for the STUAS/Tier II contract. The company insists the airframe's larger payload capacity, modular configurations, aerodynamic performance and demonstrated combat capabilities, including its expeditionary autonomous takeoff and landing features, give the KillerBee a leg up on the competition.

The next step is up to the Navy and Marines, with a final decision expected by the end of the year.

**Sources:** Interview, Gary Letterman, Raytheon senior manager, May 6, 2009; "Raytheon KillerBee Demonstrates Capabilities In Simulated Combat Environment," Raytheon, Sept. 30, 2008; "Raytheon Purchases Rights To KillerBee Unmanned Aircraft System," Raytheon, May 1, 2009; "Test Proves Raytheon KillerBee Unmanned Aircraft System Can Be Recovered At Sea," Raytheon, May 5, 2009; "KillerBee Unmanned Aircraft System Factsheet," Raytheon, 2009; "Raytheon Poised To Make Second Run At Unmanned Platform Market," *Flight International*, July 16, 2007; "STUAS Vendors Respond To New Special Ops Contract," Stephen Trimble, *Flight International*, Dec. 23, 2008; "U.S. Military Launches Bidding War For Small UAS Contract," Stephen Trimble, *Flight International*, April 7, 2009; "Northrop Buys Swift's KillerBee UAS Family," Stephen Trimble, *Flight International*, April 28, 2009; "Raytheon Affirms Plans To Launch Family Of KillerBee UAVs," *Flight International*, April 30, 2009; "Raytheon, Northrop Grumman Plan Separate Blended-Wing-Body UAVs," Ben Iannotta, *C4ISR Journal*, May 5, 2009; "Navy/Marine STUAS/Tier II – Who Will Bid?" Graham Warwick, *Ares*, April 7, 2009; "Caught In The Net," Paul McLeary, *Ares*, May 5, 2009; "KillerBee UAV First Look: Raytheon Fights Boeing In Drone Race," *Popular Mechanics*, March 13, 2008; "Maiden Flight For Swift Engineering's Latest KillerBee UAS," Swift Engineering, April 12, 2007; "Swift Engineering And Raytheon Team For The Navy/Marine Corps' STUAS/Tier II UAS Competition," Swift Engineering, July 17, 2007; "Swift Engineering Completes BTCR Demonstration," Swift Engineering, Dec. 13, 2007.

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