

How the Predator Grew Teeth



USAF photo

The little UAV had an inauspicious start. Things have picked up considerably.

By Walter J. Boyne

Left: Predators and Predator crews at Joint Base Balad, Iraq. Below: An MQ-1 Predator carrying two Hellfire missiles.



This is the story of how a lowly reconnaissance drone became one of the most critical weapons in the nation's air arsenal.

It is the story of the Predator unmanned aerial vehicle. More specifically, it is the story about how that UAV turned into an attack aircraft. At birth, Predator showed no signs that it would, in time, figure prominently in thousands of USAF missions over Iraq, Afghanistan, and other hotspots. No one expected it was to wind up watching terrorists; guiding fighters, bombers, and gunships to targets; and sometimes attacking enemies itself in otherwise inaccessible areas.

It was once referred to, affectionately, as "nothing more than a glider with an Austrian racing snowmobile engine." The Predator made its operational debut in 1995. It has since gained new capabilities at a rate that astonishes those accustomed to routine development programs.

The UAV, built by General Atomics Aeronautical Systems Inc., of San Diego, has now seen 14 years of combat. Designations have changed over time, but the initial prototypes were called RQ-1; later armed versions became the MQ-1.

Three groups of people played vital roles in quickly ushering in the Predator's multimission capability, which required adding a laser designator, then onboard Hellfire missiles.

The first group comprised a succession of Air Force Chiefs of Staff, with Gen. John P. Jumper (2001-05) particularly prominent among its members.

Second was a little known but influential Pentagon office having the unassuming designation of deputy chief of staff for intelligence, surveillance, and reconnaissance A2/A2U. The office is headed by James G. Clark. "Snake," as he is called by one and all, is a retired Air Force colonel and fighter pilot. His official title is director of

the Air Force's ISR Innovations and Unmanned Aerial Systems Task Force.

The third group of key advocates belongs to Air Force Materiel Command's "Big Safari" program office, which manages the development of USAF's myriad special purpose aircraft.

Military and Intelligence Community customers have pushed for advances in each of the system components over the years. The first Predator flight was in 1994, as an Advanced Concept Technology Demonstration.

In 1995, prototype Predators demonstrated their capability in NATO operations including Deny Flight and Deliberate Force.

The Army initially led the program, but responsibility was assigned to the Air Force in 1996. Deployed that year to Gjader, Albania, Predators participated in Operation Joint Endeavor. It was there that Gen. Ronald R. Fogleman, USAF Chief of Staff, selected then-Colonel Clark to assess Predator operations.

Clark observed the pilots, seated at consoles in a converted NASCAR transporter trailer, operating the Predators. The UAVs were sending back color television and infrared video surveillance images to the control center. Clark

was suitably impressed, filed a positive report, and he thought he was finished with Predators.

He was done with the Predator, until three years later, that is. On April 2, 1999, he received a call about the Predator from Gen. Michael E. Ryan, who had succeeded Fogleman as USAF Chief of Staff.

A Curious Twist

In his phone call, Ryan told Clark that Jumper, who was commander of US Air Forces in Europe, had informed him of an urgent requirement for the Predator to provide precise geographic locations of the subjects it was observing, so they could be targeted.

In one of the curious twists of modern warfare, Jumper had just been called by Lt. Gen. Michael C. Short, the commander of USAFE's 16th Air Force. Short had learned from a conversation with his son, an A-10 pilot, that although Predator operators could see targets the UAV was reconnoitering, there was no effective way to direct strike aircraft to the targets. What typically resulted was a cumbersome and inefficient conversation as the Predator operators attempted to "talk" the fighter pilots to the targets.

Ryan was already a big supporter of UAVs. In 1995, as commander of NATO's southern air region, he had commanded 16th Air Force and was the NATO air commander for Bosnia. As such, Ryan oversaw the first military operational use of the Predator during Operation Deliberate Force. The Chief was impressed by the fact that UAVs such as the Predator could be used in areas considered too dangerous for manned aircraft without concern for losing a pilot.

In fact, Ryan had once used the RQ-1 as part of a combat search and rescue effort that was searching for a French air crew that had been shot down by Bosnian Serbs.

Ryan sent Clark to the NATO combined air operations center at Vicenza, Italy, to obtain and integrate target mensuration capability for the Predator.

At that time, Predators were flying over Kosovo 24 hours a day, trying to identify hostile forces. The current rules of engagement called for a visual identification of any potential target by a forward air controller before a strike could be made.

A major problem was that the similarity of terrain, housing, and other features made it difficult to convey to an attacking pilot exactly where the target was. Pilots spoke of being told to use a building with an orange roof as a landmark, while they were flying over a figurative sea of orange-roofed buildings.

Clark turned to the Big Safari office at Wright-Patterson AFB, Ohio, led by William Grimes. The Big Safari office was famous for its scientific analysis of weapon systems, combined with a pragmatic approach to acquisition and logistics.

Among its many responsibilities, Big Safari sustains and modifies special mission aircraft, such as the RC-135 Rivet Joint, MC-130E Combat Talon, EC-130H Compass Call, and other sometimes secret programs. At any time, Big Safari's specialized acquisition and contracting process supports as many as 24 projects and logistically sustains up to 50 aircraft.

The Big Safari office recommended that the Predator's sensor camera ball be replaced with a different sensor that would offer both a camera and laser designator. This would allow transmission of target data with pinpoint accuracy from the Predator to NATO's F-16s.

Things moved with what became legendary speed. The laser designator



USAF photo



Gen. John Jumper (standing, center), then ACC commander, is flanked by “Big Safari” members, USAF’s specialized acquisition and contracting process team.

was obtained from the Navy only 18 hours after the recommendation was approved. Testing was accelerated, and the first laser-equipped Predator was deployed to Kosovo just 38 days later. Probably by coincidence, the Serbs surrendered one day after the upgraded Predator flew its first combat mission.

Jumper, who was also commander of Allied Air Forces Central Europe, had consistently advocated reducing the “kill chain,” the time required to find, fix, track, target, engage, and assess targets.

Close analysis indicated that by making the same aircraft both the “sensor” and the “shooter,” an armed Predator could greatly reduce the kill chain time.

When Jumper returned to the United States to lead Air Combat Command, he inquired how things were progressing on the task of installing the laser designators on Predators. He was dismayed to discover that the lasers not only weren’t installed, but the existing installations were actually being removed from their host Predators.

Procedural bureaucracy had reared its ugly head, and the laser designators were being pulled from the airframes, Jumper said in an interview, because they were “not part of the program.”

Jumper made a quick call to Ryan, who was also unaware of the situation.

After asking for and receiving ACC responsibility for the program, Jumper went to the acquisition community and called for fleetwide installation of the laser designator on the Predator.

Jumper was aware of Predator film which had almost certainly showed Osama bin Laden at an al Qaeda firing range. Because at the time there was no way to attack him immediately, a strike was ordered using Navy Tomahawk land-attack missiles. They took too long to arrive, and so the attack was a failure.

Three Million and Three Months

The ACC commander therefore asked for something else as well—the ability for the Predator to carry and fire Army Hellfire anti-tank missiles. Jumper’s goal was to give operators the ability to take immediate advantage when perishable, high-value targets were spotted.

The first response to Jumper’s request was predictably routine—the project could be completed in five years, for about \$15 million. Jumper responded, “I’ll give you \$3 million and three months, and I’ll take responsibility for failures.”

It was the kind of charter that Clark, Big Safari, and other special program developers relished. An unorthodox but realistic test program was set in motion.

The Predator’s small size and lack of overall structural strength dictated that the RQ-1 could only carry a missile—and rails—that weighed less than 175 pounds. This made the Hellfire missile almost the only choice.

There were particular concerns about firing a helicopter-borne anti-tank weapon from a lightweight UAV. Would firing the missile break up the Predator, either by wrenching a wing from its mounts or knocking off the vertical stabilizer?

Clark witnessed a test which consisted of chaining a Predator to a concrete pad and shooting the missile.

No parts fell off the Predator.

On Feb. 16, 2001, Predator #3034 took to the air and successfully fired a Hellfire in flight. A series of tests showed how effective the Hellfire was against tanks. Clark keeps on his desk the salvaged warhead of the first Predator Hellfire to strike a tank.

Tests continued all through the spring and summer. Firing runs were made at varying altitudes. There were no problems until the altitude for test shots reached 12,000 feet, so a simple but pragmatic decision was



This Predator—#3034—was the first to shoot a Hellfire missile. It now hangs in the National Air and Space Museum in Washington, D.C.

made: Don't fire the Hellfire from the Predator at altitudes above 10,000 feet.

The result was that only 61 days after Jumper's challenge, and with the expenditure of \$2.9 million, the Predator was qualified to use the Hellfire.

The terrorist attack on Sept. 11, 2001 thrust the RQ-1 back into prominence. Predator #3034, in fact, was also among the first three to deploy overseas on Sept. 12, 2001. For its historical significance, it is now exhibited at the Smithsonian Institution's National Air and Space Museum.

At one point, Clark's deputy, Kenneth J. Johns, called his counterpart at the Army's Huntsville missile center to inform him that a Boeing C-17 was inbound. Johns wanted 10 Hellfires loaded on it, no questions asked.

That accomplished, the C-17 shortly took off for the Middle East, loaded with both essential ingredients for a

and there are 10 other sites. In an interview, Clark expressed particular gratitude for the manner in which the Air National Guard has embraced the challenge of operating the Predator.

Speed and Flexibility

As Clark recounts, the Air Force entered the UAV era with relatively little experience developing or operating unmanned aircraft. In the last 14 years, however, USAF has learned a great deal, much of which has been translated into additional Predator capability and which will be used to generate requirements for next generation UAVs.

In one example of a lesson learned, some Predators were armed with the AIM-92 Stinger missile, to defend themselves against Iraqi fighters. Getting the Stinger certified on the Predator took only 91 days.



USAF photo

Pictured are then-Secretary of the Air Force James Roche (r), Snake Clark (center), and Gen. John Jumper (back to camera), three of the major players in the development of the armed Predator.



The Predator's big brother, the MQ-9 Reaper carries four Hellfires and two GBU-12 laser guided bombs.

new twist in warfare: Predators and Hellfire missiles.

Clark and his unit weren't done yet; they next set up Predator's "remote split operation" system in just five days in September 2001.

Satellite relays allow Predator pilots in the US to operate the armed UAV in combat in the Middle East. A conservative estimate indicates that this then-new reachback method saved the Defense Department the time, cost, and effort of moving roughly 1,000 personnel—and all their attendant equipment—from the United States to the theater.

The Global Operations Center for reachback operations is at Creech Air Force Base in Indian Springs, Nev.,

On Dec. 23, 2002—less than three months before Operation Iraqi Freedom began—a Stinger-armed Predator was performing reconnaissance over a no-fly zone when an Iraqi MiG-25 turned in to attack. The Predator fired at the MiG-25, and the TV imagery showed the smoke trails of the two missiles crossing in midair. Unfortunately, the MiG's missile downed the Predator, but the Iraqi Air Force apparently drew the conclusion the US would have wanted them to: that

there was no future in combating Stinger-armed Predators. There were no further attacks against the UAVs.

When asked about the unusual success of the Predator program, its chief proponents, Jumper and Clark, were quick to stress the importance of personal trust among the teams that made drastic changes with speed and flexibility.

Each of the participants in the saga was quick to reel off the names of many other people who also played key roles in solving the problem of arming the Predator with the Hellfire missile, and who thereby helped bring to fruition one of the fastest reactions in high-technology modern warfare—placing Hellfire missiles on the Predator.

The Predator fleet reached 500,000 flight hours on Feb. 18, 2009 and is currently generating 4,400 weekly combat hours.

Its newer, larger, and more heavily armed derivative, the MQ-9 Reaper, has already reached 40,000 flight hours. This unmanned aerial vehicle has truly revolutionized low-intensity conflict, and top defense officials say its importance will only increase in the years to come. ■

Walter J. Boyne, former director of the National Air and Space Museum in Washington, D.C., is a retired Air Force colonel and author. He has written more than 600 articles about aviation topics and 40 books, the most recent of which is Hyper-sonic Thunder. His most recent article for Air Force Magazine, "Carbon Copy Bomber," appeared in the June issue.