The OV-10

Versatility personified

by Jason Breidenbach & Wayne Breakfield

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This picture of a daytime flight of an OV-10A maneuvering through the smoke-filled air over Kuwait on 25 February 1991 is an image I will never forget. I saw something that resembled hell. The flames were so hot I could actually sense the heat as we flew by. The impaired visibility forced us to stay under the smoke layer, flying closer to the ground and increasing the risk of being fired upon by Iraqi anti-aircraft weapons. The air reeked of partially burned fuel and covered the airplane with a thin oily film as we flew our mission. On this day, just before we took off, we received a message that the aircraft we were to relieve on station had been shot down. As we flew toward Kuwait, we wondered what happened to our squadron mates who had been flying the ill-fated aircraft. What was going on for our Marines on the ground? This mission felt like a blur as we coordinated support for the rapidly moving ground forces, letting them know what was ahead and making sure air support was available where and when needed. We watched for our fellow Marines and listened for a radio call from the downed crew that never came. We found out later one of our friends was been killed and another captured when they were shot down. It was a flight that still lives with me when I remember the Marines with whom I was privileged to serve with during Operation Desert Storm (ODS).

In November 1990, Marine Observation Squadron One (VMO-1) received orders to support Operation Desert Shield, which meant preparing twelve OV-10 Bronco aircraft and their crews for a trip across the Atlantic. The squadron was to embark on the aircraft carriers USS *America* (CV-66) and USS *Roosevelt* (CVN-71) en route to Saudi Arabia. The next few weeks were busy for the aviators, maintainers, and support personnel. On 27 December, the OV-10s took off and landed in Rota, Spain, where they began hopscotching across the Mediterranean Sea with the first OV-10 arriving in King Abdul Aziz airfield in Saudi Arabia on 17 January 1991. Less than 48 hours later, VMO-1 flew its first mission in support of ODS.

I was a member of the squadron when these orders were received, and it was a remarkable time to see the Vietnam-era designed aircraft return to flying combat missions. The OV-10 supported Marines for over two decades and created memories that are worth sharing since this aircraft has been retired and will slowly fade into the distance of history.

In the late 1950s and early 1960s, the United States Air Force and Marine

"War Horse" by Jason Breidenbach.

Corps began pressing for a simple and inexpensive fixed-wing aircraft to perform the airborne forward air controller mission and support counterinsurgency operations. The OV-10A Bronco was the first aircraft specifically designed for counterinsurgency and limited war operations. It filled a gap left by jets, which were too fast for most aspects of counterinsurgency warfare. The Bronco was designed to be faster than helicopters that were too slow and vulnerable for many missions. This aircraft replaced the venerable but very vulnerable Cessna O-1 Bird Dog, an observation aircraft that had been serving the United States military since 1947. The OV-10A promised to deliver exceptional performance and armament that would completely rewrite the forward air controller (FAC) mission.

Two Marine Corps majors, K.P. Rice and William H. Beckett, first derived the concept for the OV-10. They had served together in a Corsair squadron in 1949 and later became neighbors in Santa Ana, CA, in 1961. The two often discussed modern aircraft design and the apparent trend toward sleek, complicated, and expensive jets. They surmised the military was forgetting that close air support was a job better suited for a more conventional aircraft that could stay close to the troops, fly slowly enough, and stay on station for a long period of time. They decided the aircraft needed to be a durable observation plane that could find and destroy the enemy. They envisioned an aircraft that was faster than helicopters, but slower and more versatile than jets, featuring twin turboprop engines. They wanted the aircraft designed to be simple and easy to maintain. Lastly, the aircraft needed to be capable of operating from unimproved landing surfaces, allowing it to be with troops in combat areas giving combat battalions access to their own air assets.

After contemplating the design characteristics of the aircraft, the two men decided to build a fiberglass mock-up. They assembled a full-size mock-up as much as possible within the limitations of the space provided by Rice's garage, which prevented them from attaching the wings. Rice and Beckett then used the mock-up to begin selling the concept to the Armed Forces. Initially, they encountered a lack of enthusiasm for the idea because their design did not carry large numbers of weapons or bombs. However, adding that kind of weight would have completely gone against their design concept of a light aircraft stationed with front-line troops. Eventually, interest in a light combat aircraft arose for a variety of reasons. The Marine Corps wanted a small, fixed-wing aircraft for helicopter escort rather than using Army helicopter gunships because of their light weapons. The Air Force was interested in short takeoff and landing aircraft that could be used for counterinsurgency operations. It also wanted an aircraft suitable for the FAC mission that was less vulnerable and more capable than the O-1. Lastly, a need arose for an aircraft that could be cheaply produced for emerging nations. Robert S. McNamara's Department of Defense settled on trying to fulfill all requirements with a single aircraft. In March 1963, eleven companies presented designs for a light armed reconnaissance aircraft. The North American Columbus Division NA-300 won the contract with their submission of the OV-10 Bronco.

An Hoa: Capt Calvin A. Lloyd (New Berlin, NY) and 2ndLt Courtney C. Schron (Chagrin Falls, OH) (atop the aircraft) check their OV-10 Bronco Observation Aircraft for possible damage from enemy fire. (Photo by SSgt Bob Jordan, from the Jonathan Abel Collection (COLL/3611), Marine Corps Archives & Special Collections.)

Development of the OV-10A officially began in October 1964. A flying prototype was available by July 1965. The initial design was smaller than the production OV-10A, and it had twin 660-horsepower Garrett-AiResearch turboprop engines as well as a one-man crew. The prototype carried several passengers in a cramped compartment behind the pilot. Following successful tests, requirements were added, including an observer as a second crewman, 300 pounds of armor plate around the crew and engines, an increased internal fuel capacity to 250 gallons, more communications equipment, and increased weapons carrying capacity to 2,000 pounds. Overall, the empty weight of the aircraft increased by 29 percent. Because of the added weight, the wings were lengthened from 30 to 40 feet to improve lift, and the engines were increased to 715 horse power. After incorporating the new design requirements, the first production OV-10A was delivered in June 1967. Of the 271 OV-10As produced, 157 were delivered to the Air Force, and 114 were delivered to the Marine Corps. The production OV-10A was capable of being operated from rough clearings, primitive roads and waterways, prepared runways, and aircraft carriers.

The twin boom design of the OV-10A was reminiscent of the P-38 Lightning, with a large fuselage section hanging from the main wing between the booms. The cockpit in the middle fuselage section was set well ahead of the engines for superior visibility. Along with the high horizontal stabilizer connecting the two booms, this section worked well for dropping cargo and paratroopers from a removable hinged door in the rear. The twin boom design aligned the tail surfaces with the engine's prop blast. This provided maximum directional control during takeoff from unimproved surfaces, even with only one engine. The OV-10A was sufficiently rugged and designed to withstand jet fighter load factors of eight Gs. Cargo bay volume was 75 to 110 cubic feet with a maximum weight of 3,200 pounds. In addition to the 2,000 pounds of external weapons carrying capacity, the aircraft was armed with four M60 7.62mm machine guns and 500 rounds for each gun. Ordnance for the OV-10A included bombs, 2.75-inch and 5-inch rocket pods, heat-seeking missiles, and 20mm gun pods. The landing gear also handled rugged terrain and enabled the aircraft to operate from unimproved surfaces. To test that capability, a runway was built that looked like curving waves. The OV-10A easily rolled over the runway's hills and valleys.

Performance of the OV-10A was outstanding. Rather than cruising at 1,000 feet like the O-1 Birdog, the OV-10A cruised out of the range of small arms at 3,500 feet. To get a closer look, Bronco pilots dove to observe suspected enemy locations and then used the aircraft's power to return to 3,500 feet. Maneuverability was also exceptional; pilots enjoyed a turn radius that was so tight a 360-degree turn could be completed within the confines of a large sports stadium. In spite of the increased level of complexity of the OV-10A in comparison to the O-1, the aircraft did not present a serious increase to overall maintenance needs. True to Beckett and Rice's original concept, the OV-10A was designed to live with the troops.

In 1968, when the United States was heavily involved in Vietnam, the first Air Force Broncos arrived as part of an evaluation called Operation Combat Bronco. After the evaluation was completed, the OV-10A was deployed to the 19th Tactical Air Support Squadron (TASS) at Ben Hoa and the 20th TASS at Da Nang. The 23rd TASS performed special operations missions with the OV-10A from Nakhom Phanom, Thailand.

VMO-2, MAG-13 (Fwd) King Abdul Aziz Air Base, Saudi Arabia. The only Battle Broncos not flying missions at the time, February 1991. *(Photo by Capt W.L. Kramer, Aerial Observer.)*

Three Marine Corps VMOs flew the OV-10A in Vietnam. VMO-2 was the first to receive the Bronco in July 1968 and operated the aircraft from the Marble Mountain airstrip near Da Nang. VMO-1 began operating the aircraft in October 1968, and VMO-6 operated the OV-10A from Quang-Tri but was soon withdrawn and eventually disestablished in January 1977. During the Vietnam War, the Marine Corps used the OV-10A Bronco to perform almost every role for which it had been designed, including as a FAC, radio relay station, artillery spotter, helicopter escort, visual reconnaissance, convoy escort, and attack aircraft. It performed every aspect of its mission profile as well or better than anticipated. In addition to the four M60 machine guns, the normal Marine Corps load out was four rocket pods; two were filled with 5-inch Zuni white phosphorus rockets for marking targets and the other two with 2.75-inch, folding-fin, high-explosive rockets for attacking targets.

The Navy also had tremendous success with the OV-10A. One of the more famous Navy squadrons to use the OV-10A was the Short/Vertical Takeoff and Landing Light Attack Squadron Four (VAL-4). They became known as the Black Ponies. VAL-4 began combat operations on 19 April 1969, flying air support for the mobile riverine force in the Mekong Delta and supporting the Navy SEALs. The squadron performed patrol, overhead air cover, scramble alert, and gunfire and artillery spotting.

In Vietnam, the Bronco's capabilities allowed it to do what the Services needed and thwarted enemy troops. The enemy in Vietnam learned it was a mistake to open fire on an OV-10 because doing so would only bring bombs and rockets from an unseen fighter bomber waiting for a target. Pilots were prohibited from firing on targets unless the enemy fired first. To confront the frustration of not being able to shoot at the enemy, pilots sometimes went great lengths to get the enemy to shoot. Gordon Evans, a Marine first lieutenant in 1971, remembers flying a patrol twenty miles west of Da Nang when he spotted a group of about ten North Vietnamese soldiers lined up on a dike.

He made a close pass to get them to fire—nothing. He went around again, "They just didn't pay me any mind," Evans says, "They knew what was going on. So I went around to make still another pass, real slow. My backseater got agitated and said, 'I don't think this is a good idea. We're gonna get hosed.'" But there was still no fire from the men on the dike. "I was all of 24, bulletproof, and knew everything," he says, "I dropped my gear and my flaps, put all the lights on in the airplane—this is daytime—and went by in a landing configuration" to make the best possible target. Evans finally elicited a response, "Several guys on the dike pulled down their trousers and mooned us." Overall, pilots enjoyed the fact they could do a significant amount of damage to a target before the larger weapons, dropped by F-4 Phantoms or other aircraft, were available.

Two OV-10As from the Marine Corps OV-10 Night Observation Gunship System program were modified to include a turreted forward-looking infrared (FLIR) sensor with a co-bore sighted laser target designator and turreted 20mm M197 gun slaved to the FLIR aimpoint. The system was tested in the Mekong Delta region of Vietnam quite effectively. It was able to identify and successfully attack and sink boat targets, taking away a safe haven for the Viet Cong in the region. Consequently, the Vietnam War provided the impetus and the testing ground for the utility of the Bronco as a night observation aircraft, but it would be almost ten years before the Marines developed the OV-10D.

OV-10D

Working with the OV-10A as a foundation, the Marine Corps sought to develop a relatively cheap night interdiction aircraft to spot enemy movements. It started with two aircraft, but more were converted in the late seventies. North American Rockwell modified two OV-10As with a FLIR and a M-197 20mm gun turret under the fuselage. The nose was lengthened by 30 inches to accommodate the upgrade. The resulting aircraft was designated as the YOV-10D Night Observation Gunship. The large cargo area proved ideal for carrying the ammunition for the M-197. The underwing hard points were also modified for carrying fuel. The Marine Corps was satisfied with the new aircraft, but still sought improvements. The engines were upgraded to Garrett T76-G-420/421s, each producing 1,040 shaft horse power. Improvements to the electronics and avionics were also made, and the gun turret was eliminated because of budget limitations. In 1978, eighteen OV-10A's were converted to the OV-10D. Eight aircraft were delivered to VMO-1 and nine were delivered to VMO-2. One aircraft remained with North American Rockwell for additional testing. The OV-10D gave the Marine Corps a truly multi-role aircraft. Primary missions included day or night visual/FLIR reconnaissance, FAC, tactical air controller, artillery and naval gunfire air spot, helicopter escort, and close-in fire suppression.

"I was all of 24, bulletproof, and knew everything."

Use in the 70s and 80s

Throughout the 1970s and 1980s, the VMO's supported the three active and one Reserve Marine divisions as well as MAWs for a wide variety of exercises and operations. VMO-1 was part of 2d MAW and operated from Marine Corps Air Station (MCAS) New River, NC; VMO-2 operated from MCAS Camp Pendleton, CA, as a member of 3d MAW; and Headquarters and Maintenance Squadron 36 operated OV-10s for the 1st MAW at MCAS Futenma, Okinawa, Japan. VMO-4 was part of the 4th MAW operating from Naval Air Station Atlanta, GA.

The observation squadrons supported Marines in every clime and place throughout the two decades between Vietnam and ODS. If the helicopter squadrons were conducting vertical assaults, the OV-10s were there to provide escort. If a fixed-wing squadron needed airborne FAC support to train their aircrews, the OV-10s were there. When a division command post exercise needed an airborne radio relay, they called for the OV-10. When a recon battalion or ANGLICO needed to keep their jump quals current, the OV-10 squadrons were called upon. When an infantry battalion deployed to Twentynine Palms for a combined arms exercise (CAX), an OV-10 detachment was there to lead the way. The OV-10 squadrons supported nine CAXs per year to include the Reserve CAX. The OV-10s even embarked on LHAs to support amphibious operations on the West Coast and in Europe. If the Marines went, the VMO squadrons were ready to go. In the early 1980s, the VMOs started supporting the counter-narcotics mission by working with law enforcement agencies to intercept aircraft and maritime craft attempting to smuggle illegal drugs into the United States. The utility of design of the OV-10 enabled it to remain useful as the missions changed and the decades wore on.

During ODS after flying that first combat mission, VMO-1 provided continuous surveillance along the Kuwaiti-Saudi Arabia border in support of the 1st and 2d Marine Divisions as well as other coalition forces. While conducting surveillance along the Saudi Arabian-Kuwaiti border on 29 January 1991, VMO-1 aircraft provided the first warning of Iraqi forces massing on the border as the Battle of Khafji began. The squadron was instrumental in coordinating close air support for Wild Eagle—a Marine ground unit in close proximity to the Kuwaiti border—enabling it to successfully disengage from the invading Iraqi force. Once again, the OV-10 helped Marines complete their mission.

Then, in late January 1991, Iraqi forces began igniting oil wells in Kuwait. By the end of February, more than 700 oil well fires were burning throughout the oil fields of Kuwait. On 24 February 1991, the 1st and 2d Marine Divisions moved into Kuwait toward Kuwait City to liberate the country and drive out the Iraqi forces. VMO-1 aircraft continued to provide close support to the Marine divisions, flying under the black smoke layer generated by the hundreds of oil

The YOV-10D's nose was extended 30 inches to accomodate the FLIR turret and its armament sponson was replaced by the flexible 20mm cannon to form the NOGS configuration. *(Photo by Hughes Aircraft Company, January 1971.)*

well fires. Some of the flames rose several hundred feet into the air and forced aircrews to seek paths through the fires to find positions from which they could accomplish the mission. After completing a mission in the area where the oil wells were burning and returning to King Abdul Aziz airfield, the aircraft was covered with a thin layer of oil and fire residue.

While the OV-10 was upgraded over the years after its introduction in Vietnam, it was retired shortly after ODS when the military Services went through a force reduction process. This aircraft, and the Marines who flew and supported it, provided invaluable support to the Marines in the two plus decades from Vietnam to ODS and were there to fly missions when the Marines needed them most.

The OV-10, however, has continued to serve with distinction in various roles, but never far from danger. In California, the OV-10 is being used to fight forest fires. The California Department of Forestry and Fire Protection (CAL FIRE) acquired fifteen OV-10As from the Department of Defense in 1993. The OV-10As were converted to support firefighting and provide air crews with a platform that is "newer, larger, faster, provide a larger field of vision for the crew and are more maneuverable" than previously used airframes. The "greenhouse canopy" and the amazing nimbleness of the OV-10 was exactly why CAL FIRE wanted to use it as a command and control center aircraft during wildland fire operations. The OV-10 provides tactical coordination with the ground commander, providing details such as location, movement, and spread of the fire. They also direct air tankers to their drop points. CAL FIRE's OV-10s have been upgraded with the avionics and navigation-communications systems required to properly coordinate firefighting assets, and they can loiter over firefighting operations for up to five hours.

In 2015, Special Operations Command brought the Bronco back to life to help in the fight against ISIS as part of an operation called COMBAT DRAGON II. Marine Corps Gen James N. Mattis expressed that using a complex weapon system like the Air Force F-15E to support troops patrolling streets would "amount to overkill." A concept was developed to acquire

> an inexpensive, simple, nimble combat aircraft capable of long loiter and on-call reconnaissance and attack duty, able to operate from austere airfields under primitive conditions and to deliver precision ordnance and employ state-of-the-art technology including electro-optical and infrared sensors, laser-guided munitions (the Advanced Precision Kill Weapon System [APKWS] II), and encrypted radios and night-vision gear.[1]

After a series of funding challenges and processing through several possible airframe candidates, two of a dozen former Marine Corps OV-10D+ models that were previously operated by the Bureau of Alcohol, Tobacco, and Firearms were chosen for Operation DRAGON II. The aircraft, upgraded to include such features as glass cockpit, laser guided rockets, and connected to the battlefield network allowing them to acquire, accept, and transfer data, were re-designated as the OV-10G+. The OV-10G+ featured the same Garrett T76G-420/421 turboprop engines used on the OV-10D, but with four-bladed Hartzell propellers. The OV-10G+ also used an off-the-shelf sensor turret. The two Bronco crews were able to eliminate targets through windows and in doorways, as well as attack fighters taking cover under roofs and overhangs. The Broncos performed like snipers in the sky for special operations forces hunting ISIS in Iraq. They observed the enemy in great detail from altitude, collected intelligence, and hunted the enemy. Although this operation was in no way an indication that the OV-10 would be returning to active duty in large numbers, it did prove the design that began in the 1950s was still able to adapt and perform with absolute relevance in the modern high-tech battlespace.

Notes

1. Robert Doff, "Combat Dragon II Demonstrates OV-10G+ Bronco Capabilities," *Defense Media Network,* (Online: June 2013), available at https://www.defensemedianetwork.com.