1092

OV-1 Mohawk

in action

Aircraft Number 92

squadron/signal publications

OV-1 Mohawk

in action

By Terry Love

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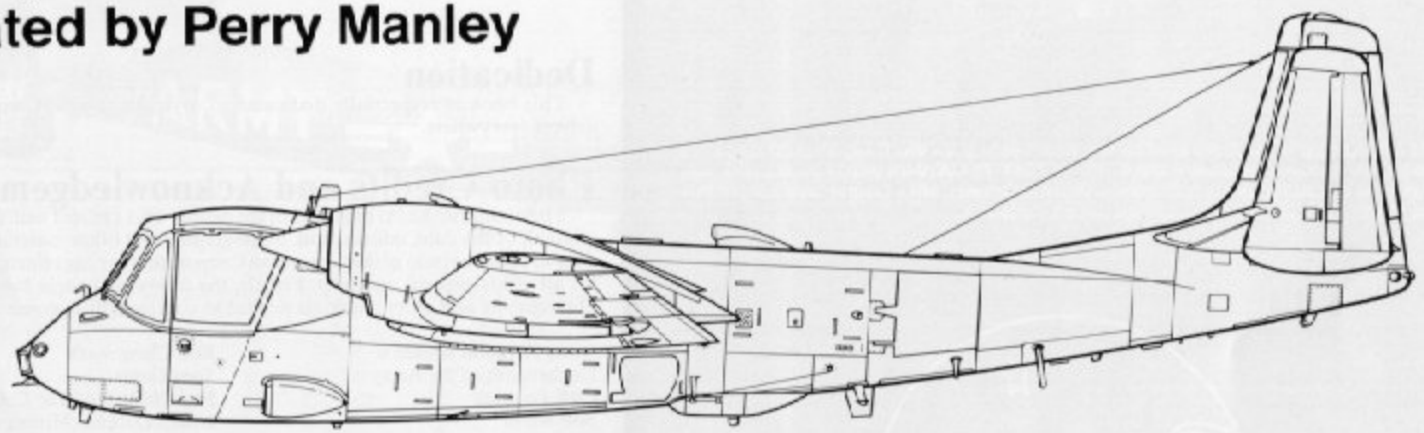
Illustrated by Perry Manley



Aircraft Number 92

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CAPT Mike Langer of the Army Aviation Test Board engages a Viet Cong target during a fire support mission over Vietnam, in December of 1964. The JOV-1A (60-3736) Mohawk was assigned to the 225th Aviation Company, Phantom Hawks. Mike Langer later bought this same Mohawk — one of the few civilian owned Mohawks.

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Dedication

This book is respectfully dedicated to my patient wife, Carol, and all Mohawk drivers everywhere.

Photo Credits and Acknowledgements

The author wishes to thank all of the people who assisted with this project and supplied all of the data, information, photographs, and other materials. A special thanks goes to Lois Lovisolo of the Grumman Corporation for her efforts and to Mike Langer for all of his support and help. Finally, the following people have provided me with photographs and other materials needed to complete this project:

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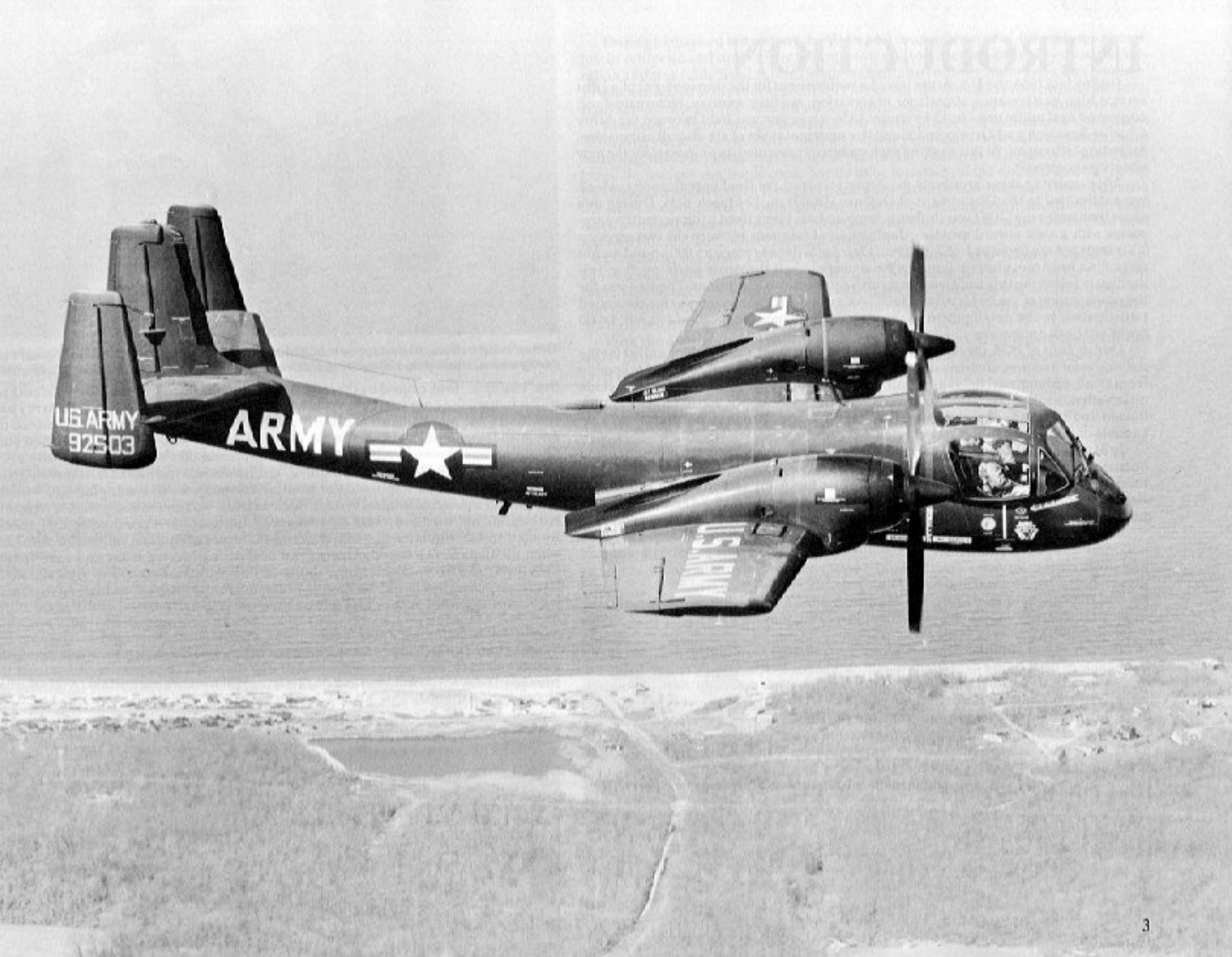
The first production OV-1A Mohawk (59-2503) over Long Island during 1961. During its testing, one British test pilot favorably compared the Mohawk's handling characteristics to that of the Gloster Meteor jet fighter and commented that the Mohawk had a better rate of roll. (Grumman)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INTRODUCTION

During late 1954, the U.S. Army issued a requirement for the development of a joint service high performance aircraft for observation, artillery spotting, reconnaissance, command and utility use. On 15 February 1956, a meeting was held between the Army Chief of Research and Development and the representatives of six aircraft companies, including Grumman. At this meeting each company presented its proposals for the new observation aircraft.

After receiving these proposals the Army prepared the final specifications, which were submitted to the Department of Defense (DOD) on 12 March 1956. During this same time frame the DOD was studying Army and Air Force fixed wing aircraft requirements with a view toward avoiding duplication of missions between the two services. This study led to a decision by Secretary of Defense Wilson to place a 5,000 pound weight restriction on Army aircraft, limiting the size of aircraft the Army could operate. Immediately following this decision, the Army requested two exceptions. The first was for the procurement of the de Havilland DHC-4 Caribou and the second was for continued participation in the development of the high performance observation aircraft. DOD approved both exceptions.

During June of 1956, the Army issued Type Specification TS145, which called for the development and procurement of a two seat, twin turboprop aircraft designed to operate from small, unimproved fields under all weather conditions. Its missions would include observation, artillery spotting, air control, emergency resupply, naval target spotting, liaison and radiological monitoring. The Navy also specified that the aircraft must be capable of operating from escort class carriers.

In March of 1957, the DOD announced that the Grumman Aircraft Corporation had been designated the prime contractor to build the new observation aircraft, which had received the company designation G-134. While the Army remained the controlling agency, the Navy, acting on behalf of the Marines, was heavily involved and would play a important role in the aircraft's development.

Since its conception, the Grumman G-134 was the center of controversy. The Army and Marine requirements were never actually compatible and compromises were made that suited neither service. From the Army's viewpoint, the design was compromised by the shipboard requirement and other Marine specifications which had little application for an Army observation aircraft. The Marines needed a fixed-wing replacement for the Cessna OE-1, and they did not require sophisticated sensors which were planned for other aircraft.

The G-134 had armament pylons because of a Marine requirement that the aircraft be capable of performing light attack missions. The Air Force strongly opposed this feature — tactical air support was the role of the Air Force, not the Army. Now all four services were involved with the development of the G-134. The battle over the air support issue became so heated that at one point, the Air Force demanded that Grumman stop printing company brochures that highlighted the attack potential of the G-134.

In September of 1957, the Marines announced that they were dropping the G-134 program. Due to budgetary problems, the Navy had decided to fund a fleet tanker instead of the G-134. The Army decided to continue the project alone and was actually pleased to be free of the Marine requirements. The first contract called for nine service test aircraft to be built under the designation YAO-1AF. Even though the Marines had dropped the program, the designation OF-1 was reserved for a Marine version.

The first service test YAO-1AF emerged as a small, mid-wing aircraft with its two 960 shp Lycoming T-53-L-3 turboprop engines mounted in streamlined nacelles on top of the wing driving three blade Hamilton Standard propellers. The aircraft had a distinctive "bug eyed" look caused by the large bulged canopy fitted over the two place cockpit which housed the crew in side-by-side Martin Baker J-5B ejection seats. The Army had specified a two place aircraft because it felt that a single pilot could not concentrate on low level flying and, at the same time, study the terrain below. The twin-engined configuration was chosen to reduce the aircraft's vulnerability to ground fire.

This wooden mockup of the Mohawk, built during the Summer of 1957, has the original T tail configuration, snow skis, 150 gallon drop tank, and proposed armament pylons. (Grumman)

The original G-134 featured a high "T" tail, however, wind tunnel tests revealed that the aircraft would be impossible to trim directionally, with one engine out, without resorting to a powered-control system. Such a system would add considerable weight to the aircraft and would increase maintenance requirements. A powered control system would also cause interference with other mechanical systems and cause trim problems when the flaps were lowered. After a great deal of engineering effort and wind tunnel tests, the YAO-1AF was fitted with a unique triple vertical stabilizer. The triple stabilizer layout also proved to be an unexpected example of early "stealth" technology, by creating a smaller overall radar cross section than the original T-tail.

The first YAO-1AF Mohawk (57-6463) on a test flight over Long Island, New York during the Summer of 1959, had the fuselage covered with yarn tufts to reveal the air flow over the fuselage. The eyebrow windows and small rear cockpit windows were deleted on production Mohawks. (Grumman)

The first YAO-1AF carried a high visibility Red and White test color scheme in the Summer of 1959. The long probe fitted to the nose was a test instrument probe and was painted with Red and White stripes. (Grumman)

The YAO-1AF made its first flight on 14 April 1959 at Bethpage, Long Island, New York. From the beginning the tests progressed smoothly, with only minor problems being encountered. On the first flight, it was discovered that the elevators were too heavy, a problem which was easily corrected. The flight test program revealed that the YAO-1AF had outstanding flight characteristics. It was fully aerobatic and the controls were found to be very responsive, especially in roll. The YAO-1AF proved to have one of the fastest roll rates of any aircraft — about 180 degrees per second. Test pilots reported that the YAO-1AF's flight characteristics were midway between those of a light aircraft and a jet fighter.

One of the requirements was that the YAO-1AF be capable of operating from rough forward airstrips. The test program revealed that the service test aircraft had exceptional Short Take Off and Landing (STOL) qualities and good low-speed control because of the full-span wing leading edge slats, triple fins and rudders and large flaps. The view from the cockpit was reported to be extremely good, even through the bullet resistant front windscreen, with an unrestricted view 20° down over the nose.

Another requirement established that the YAO-1AF have a service life of ten years, at an average of 800 flight hours per year, or 8000 flight hours. Results of fatigue tests indicated that the YAO-1AF would be safe after twice this amount, or a total of 16,000 hours.

The 297 gallon fuselage tank gave the aircraft an endurance of two hours and twenty minutes, however, the aircraft also had the provision for two 150 gallon under wing tanks, which extended the endurance to four and a half hours. For long range missions, two 300 gallon ferry tanks may be carried in place of the normal 150 gallon tanks. The structural integrity of the internal fuel tanks was subjected to special testing. The fuel tanks were designed to be a structural part of the aircraft, and to test the tanks vulnerability to ground fire, a section of the tank material was built, rested against a wall, and fired at with a machine gun — it passed the test.

The original specifications called for a gross weight of 10,423 pounds, however, the YAO-1AF weighed 11,023 pounds. This had been anticipated because of the additional strength needed for rough field operations and was accepted by the Army.

During high speed tests, where the YAO-1AF reached a speed of 460 mph, the aircraft lost its center fin and rudder. The failure was found to have been caused by excessive vibration and was easily fixed. A third hinge was installed on the rudder and a half pound of weight was added to the rudder trim tab. This ended the vibration problem, and the other eight service test aircraft were all modified with the new center fin and rudder.

Most of the flight testing was done at the Naval Flight Test Center at NAS Patuxent River, Maryland, however, other YAO-1AFs were assigned to various Army installations including the Army Aviation Board at Fort Rucker, Alabama. The Army Signal Corps tested the various electronic components to be installed on the aircraft, and the Transportation Corps developed the spare parts and maintenance program. During its tests, the Army Aviation Board found that the nose wheel steering was inadequate for rough fields and dirt runways. The Board recommended that production aircraft be fitted with a power boosted nose wheel steering system.

Originally, the YAO-1AF was to be named Montauk, after a Long Island tribe of Indians that lived near Grumman Aircraft. This was a fitting name, since the Army named its aircraft after Indian tribes. The Montauk tribe, however, was basically unknown, and the Army decided to name the aircraft after a more well-known and aggressive New York Indian tribe — the Mohawk.

With the service aircraft redesignations of 1962, the YAO-1AF was redesignated the YOV-1A. After completing all tests, the Army accepted the Mohawk and ordered the aircraft into production under the designation OV-1A.

This pre-production YAO-1AF Mohawk (57-6467) carried Army markings and special Red and White test color scheme, however, it was assigned to the U.S. Navy Test Pilots School at Patuxent River, Maryland during April of 1966. (Author)

When the Mohawk entered service, it was the first turboprop powered aircraft to enter the Army inventory. Army pilots, used to slow, piston-engined aircraft found the Mohawk to be a "hot ship." Its power and responsiveness tempted some pilots to show off, resulting in more than a few accidents. The speed and responsiveness of the Mohawk also led the Army to attempt several new records for turboprop aircraft. On 16 June 1966, test pilot Jim Peters flew an OV-1A to 3,000 meters (9,842 feet) in three minutes, forty-one seconds, and to 6,000 meters (19,685 Feet) in nine minutes, nine seconds, setting two new time to climb records. He also set a new world altitude record for turboprop aircraft in the Mohawk's weight class of 32,000 feet. The following month, COL Edward Nielson flew a Mohawk to a new turboprop speed record when he covered a 100 km closed course in twelve minutes, forty-eight seconds for an average speed of 292 mph.

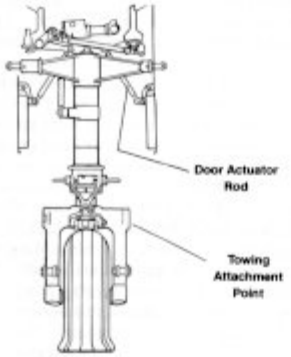
Two early production Mohawks were also used for a number of special tests. In one such test, the two OV-1As deployed to Fort Greely, Alaska, during February of 1962 to conduct cold weather tests. During the Alaskan winter exercise, Operation GREAT BEAR, the aircraft performed well at temperatures down to minus 50° F and maintained a near perfect mission availability rate.

This OV-1A at Fort Eustis, Virginia during May of 1966 carries the subdued Flat Olive Brown color scheme introduced for Mohawks operating in Vietnam. The aircraft has been modified with two FM radio antenna masts mounted on the nose. (Author)

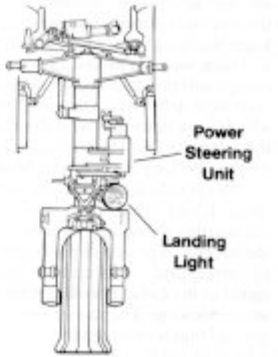
The second production OV-1A (59-2604) makes a low pass over a grass field during 1960. The box like pods on the wing roots are night photo flare dispensers which fired the flares up and away from the aircraft. (Grumman)

Nose Wheel

YOA-1AF

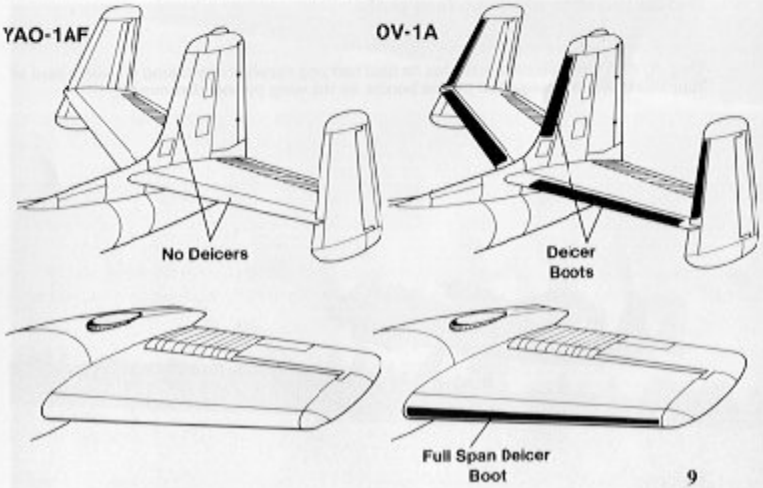


OV-1A



An OV-1A takes off from a grass airstrip during demonstrations of the Mohawk's Short Take Off and Landing (STOL) capabilities. The aircraft is in the early Gloss Olive Drab scheme with high visibility markings used prior to the Vietnam war. The 150 gallon drop tanks are in Gloss White. (Grumman)

This OV-1A Mohawk on the ramp at Fort Eustis, Virginia reveals the Black deicer boots on the wing leading edge, vertical fin leading edges, and horizontal stabilizer leading edge. (Author)



JOV-1A

The need to mark targets with smoke rockets and suppress enemy ground fire led the Army to experiment with arming the Mohawk. The original YAO-1AF had the hard points built into the wing to handle up to six underwing pylons, although early OV-1As rarely carried more than two. Normally, these pylons were used for carrying 150 gallon underwing tanks. When the Army decided that the OV-1A should be made capable of carrying armament, a total of fifty-four aircraft were returned to Grumman for installation of the full complement of six underwing pylons. These pylons were capable of carrying bombs, .50caliber machine gun pods, or 2.75 inch rocket pods. These Mohawks had the cockpit modified with a Mark 20 gunsight being installed for use by the pilot. The Mohawks that had the pylons and Mk 20 gunsight installed were redesignated JOV-1As.

The Army stated that the sole purpose for arming the Mohawk was for fire suppression over the target area and for target marking with smoke rockets. Officially, the weapons were not intended for offensive operations but rather to allow the Mohawk to get into and remain over the target area — often at altitudes below 200 feet. It was felt that the gun pods would allow the Mohawk pilot to suppress enemy defenses long enough to get the pictures necessary to identify the target. In reality, Army field commanders liked the idea of having an aircraft capable of supplying their own tactical air support. This was further reinforced by the Mohawks fast reaction time to calls for air support. Mohawks, being based at forward bases, could be over the target area much faster than other air support aircraft that were confined to large bases further back from the battle.

Six JOV-1A Mohawks were assigned to the 23rd Special Warfare Aviation Detachment for operational testing in Vietnam. The JOV-1A was found to be a very stable and accurate weapons platform. Normal mission loads consisted of a .50 caliber machine gun and either seven shot or nineteen shot 2.75 inch rocket pods, although the JOV-1A could carry a variety of other ordnance including 500 pound bombs, Mk 24 flares, and five inch Zuni rockets. After this period of operational testing, the Air Force demanded that the aircraft be withdrawn from combat.

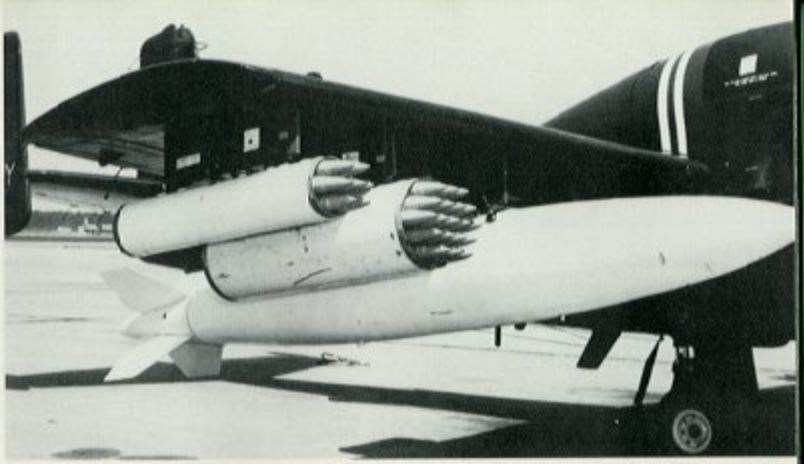
A rocket armed Mohawk of the 131st SAC ready for pre-flight on the pierced steel ramp at Phu Bai, Vietnam during 1970. On one occasion, a rocket armed OV-1 is reported to have shot down a North Vietnamese MiG-17 fighter. (Scott Rubke)

The JOV-1A had created a storm of controversy in the Pentagon, where the Air Force remained steadfastly opposed to armed fixed wing aircraft being assigned to the Army. As a result of this Air Force opposition, an agreement was finally reached where the Army would cease operations with armed fixed wing aircraft and leave the close air support mission to the Air Force. The JOV-1A Mohawks were once again redesignated as OV-1As and, while officially they were no longer used for close air support, they retained their pylons and weapons capability. Many of the redesignated aircraft were passed to other Army aviation units in Vietnam and continued to serve in-country where, on more than one occasion, they continued to carry armament —for self defense.

This JOV-1A Mohawk demonstrates its load carrying capability by taking off with a load of four World War II vintage 500 pound bombs on the wing pylons. (Grumman)

This JOV-1A makes a practice firing run with 2.75 inch rockets over an army gunnery range. The Mohawk was cleared to carry the Aero Products XM-157 seven shot 2.75 inch rocket pod and other ordnance. (Grumman)

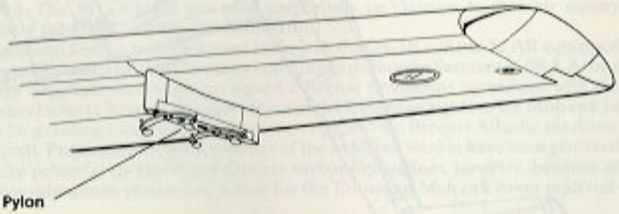
This JOV-1A Mohawk is configured for night armed reconnaissance with an SUU-12 .50 caliber machine gun pod on the center pylon and multiple ejector racks, each armed with nine Mk 24 flares, on the inboard and outboard pylons. (Army Aviation Museum)



Mohawks in Vietnam were usually armed with seven-shot XM-157 rocket pods and nineteen-shot XM-159 rocket pods, both of which carried 2.75 inch rockets. The underwing weapons pylons on the Mohawk were a carry-over from the original Marine specification which had called for a close air support capability. (Army Aviation Museum)

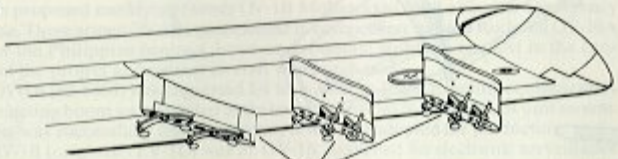
Wing Pylons

OV-1A



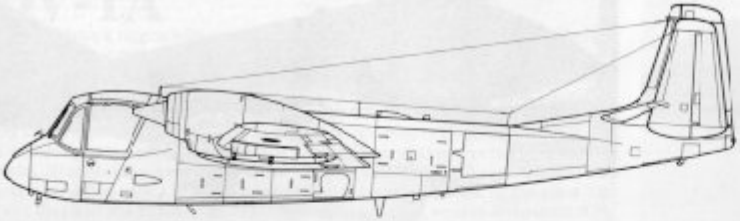
One Pylon

JOV-1A



Three Pylons

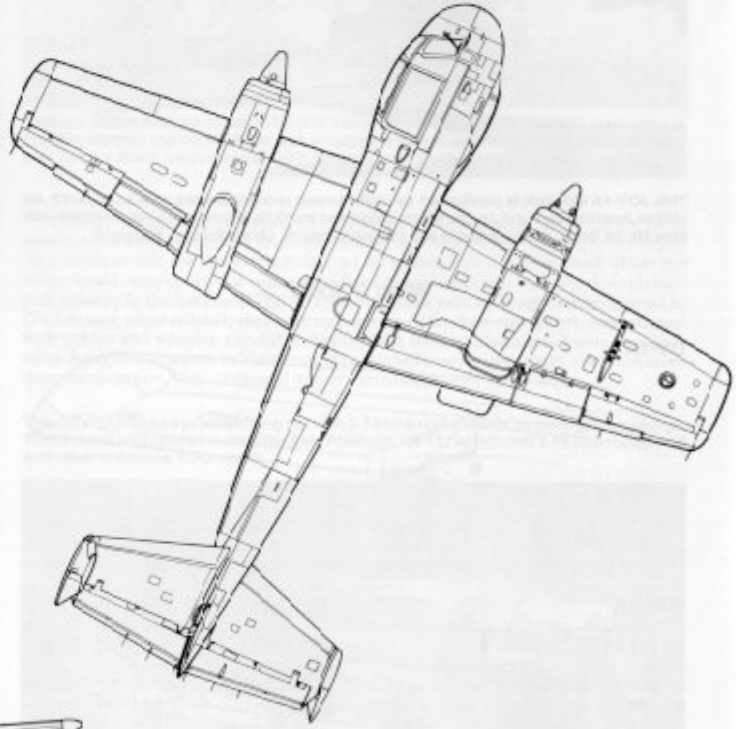
This JOV-1A Mohawk over the South China Sea is armed with four XM-157 rocket pods each containing seven 2.75 inch rockets. The Mohawk also carries two 150 gallon drop tanks and wing root photo flare dispensers. (Grumman)

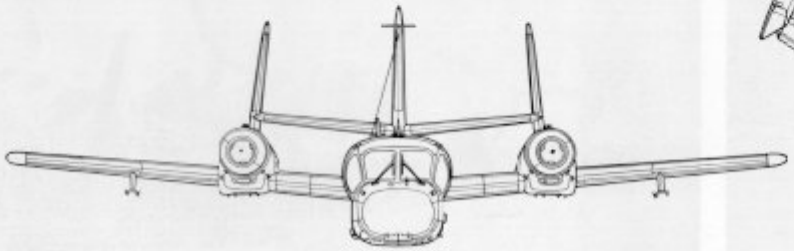


Specifications

OV-1A/JOV-1A Mohawk

Wingspan	42 feet
Length	41 feet 1½ inches
Height	12 feet 8 inches
Empty Weight	11,023 pounds
Maximum Weight	15,020 pounds
Powerplants	Two 1,050 shp Lycoming T-53-L-7 turboprop engines
Armament	Six underwing pylons capable of carrying gun and/or rocket pods (JOV-1A)
Performance	
Maximum Speed	297 mph
Service ceiling	25,000 feet
Range	645 miles
Crew	Two





OV-1B

The next Mohawk variant in the Army plan featured a Side Looking Airborne Radar (SLAR) mounted asymmetrically in an eighteen foot pod under the starboard side of the forward fuselage under the designation OV-1B. In addition to the SLAR system the OV-1B was to retain the photographic capabilities of the OV-1A. One of the original service test YAO-1AFs (57-6541) was used by Grumman as the prototype and converted to the OV-1B configuration.

Besides installation of the eighteen foot fiberglass SLAR pod, a number of other changes were made to the OV-1B. To compensate for the loss of single engine climb performance and to improve lift, the outer wing panels were increased in length bringing the wingspan to 47 feet 10 ½ inches from 42 feet. To save weight, the fuselage air brakes, observer's flight controls and four of the underwing pylons were deleted; however, two pylons were retained to allow the OV-1B to carry underwing fuel tanks. To ease the work load on the pilot and allow the OV-1B to fly uniform radar patterns, an autopilot and a Doppler navigation system was installed. Late in the production run, the aircraft was re-engined with two Lycoming 1,150 shp T-53-L-15 engines replacing the 1,005 shp Lycoming T53-L-7 engines. A total of ninety OV-1Bs were built.

The SLAR unit is the heart of the OV-1B. The system consists of a Motorola AN/APS-94 SLAR unit with automatic film processing. This system gives, within seconds of exposure, a permanent film record of radar images on either side or both sides of the flight path, depending on the mode of operation selected by the SLAR operator. The SLAR offered greatly improved long range surveillance of moving targets, especially at night and in bad weather. This improved surveillance capability is exactly what the Army wanted and needed.

The SLAR system also employs a Moving Target Indicator (MTI) system, which uses the Doppler principle. This allowed the OV-1B to spot a moving target against a fixed background. The MTI feature was used extensively in Vietnam to monitor enemy activity along the DMZ and Ho Chi Minh Trail.

Germany and France both expressed interest in the OV-1B and two SLAR equipped OV-1Bs were evaluated in both Germany and France during the Summer of 1963. At one point in the negotiations, Grumman signed a license production agreement with the French manufacturer Breguet. Breguet obtained the European rights to the Mohawk in exchange for granting Grumman the American rights to the Breguet Atlantic maritime patrol aircraft. Projected European versions of the Mohawk were to have been powered by the more powerful de Havilland Gnome turboprop engines, however, because of political considerations production orders for the European Mohawk never materialized.

In response to a requirement from the Philippine government for a new armed turboprop attack aircraft to be used against Libyan-supported communist insurgents, Grumman proposed modifying twenty OV-1B Mohawks to fill the counter-insurgency (COIN) role. These armed OV-1Bs were entered in competition with the Rockwell OV-10A Bronco for the Philippine contract, however, economic problems resulted in the cancellation of the project and neither aircraft was purchased.

One OV-1B (62-5868) was converted for tests with in-flight refueling equipment. A straight refueling boom was mounted at the base of the front fuselage SLAR unit mount. The system was successfully tested, however, it was not adopted for production.

The RV-1B (originally EV-1D) was an OV-1B converted for electronic surveillance with an AN/ALQ-133 target locator system mounted in place of the SLAR pod and in wing tip pods. This system employed a data link communications system that gives the ground commander real time intelligence on enemy radars and communications.

An OV-1B (62-5874) lands on a grass field during 1964. The OV-1B's outer wing panels were extended nearly three feet, increasing the wing span to 47 feet 10 ½ inches. (Grumman)

The OV-1B was also used to test a ski landing gear. One OV-1B was equipped with the Grumman designed skis and tested at Bemidji, Minnesota, during 1963. Tests were also carried out at Fort Richardson in Alaska. While the ski landing gear was never used operationally, the ski landing gear had successfully passed all its tests and remained an option that could have be used if necessary.

Another experimental landing gear was tested on the OV-1B which consisted of a set of water skis developed by All American Engineering of Philadelphia, Pennsylvania. The water skis allowed the Mohawk to land on shallow water and taxi to the beach. The major drawback to the system was that the aircraft had to maintain a minimum speed of 23 mph during its taxi to the beach or it would sink. The water ski landing gear, although successfully tested, was not cleared for production.

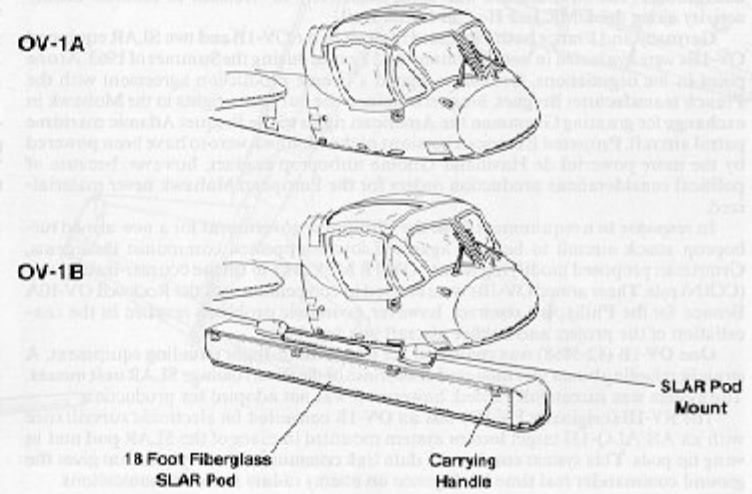
The first production OV-1B (59-2621) during a flight test of the SLAR unit. The SLAR unit was housed in an 18 foot fiberglass pod hung asymmetrically beneath the starboard fuselage. The OV-1B also carries an APN-129 Doppler Navigation system which imprints annotated target position data on the SLAR film. (Grumman)

The first production OV-1B (59-2621) on a test flight from the Grumman test facility deploys its fuselage mounted speed brakes. These speed brakes were later deleted as a weight saving measure on late production OV-1Bs. (Grumman)

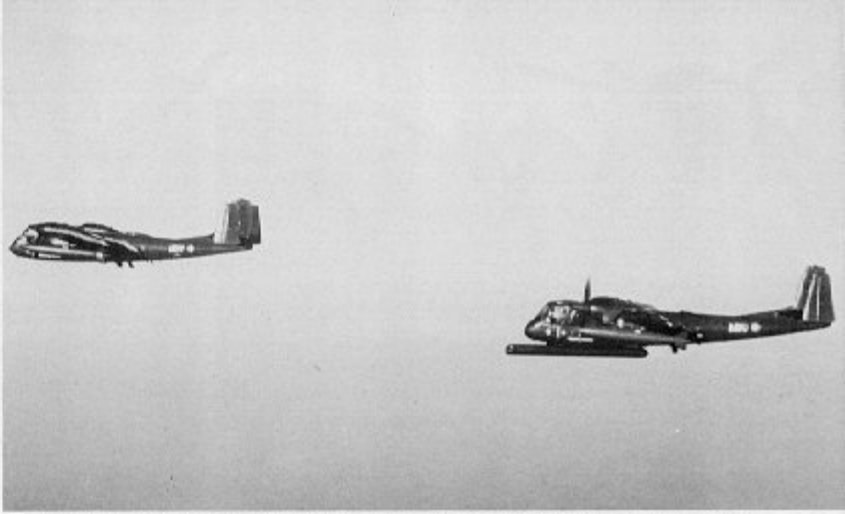
This Mohawk (59-2621) was the first OV-1B to roll off the production line. The OV-1B Mohawk had no provisions for dual flight controls or underwing armament, carrying only 150 gallon drop tanks on the underwing pylons. The SLAR (side looking airborne radar) unit carried on the OV-1B was the Motorola AN/APS-94. (Grumman)

The first production OV-1A (59-2503) and the first production OV-1B (59-2621) in formation over Long Island, New York during 1961. The OV-1B carried an eighteen foot SLAR antenna pod attached to the starboard fuselage side. (Grumman)

SLAR Installation



This formation of three OV-1B and one OV-1C Mohawks on a training mission is unusual because most Mohawk missions, both training and operational, were conducted either singlely or in pairs. (Grumman)



The French Air Force tested these two OV-1Bs during 1962; however, the French decided not to purchase the Mohawk. While undergoing its evalustion in France, both aircraftcarried French roundels and the side registrations ABU and ABV in White. (Grumman)

The West German Army Aviation tested the same two OV-1Bs that the Frenchhad flown during 1962. Both aircraft carried German markings and the side code Q/W + B in Black. The aircraft flew 386 demonstration flight hours with both German and American pilots, however, for political reasons, the Mohawk failed to win a contract. (Grumman)

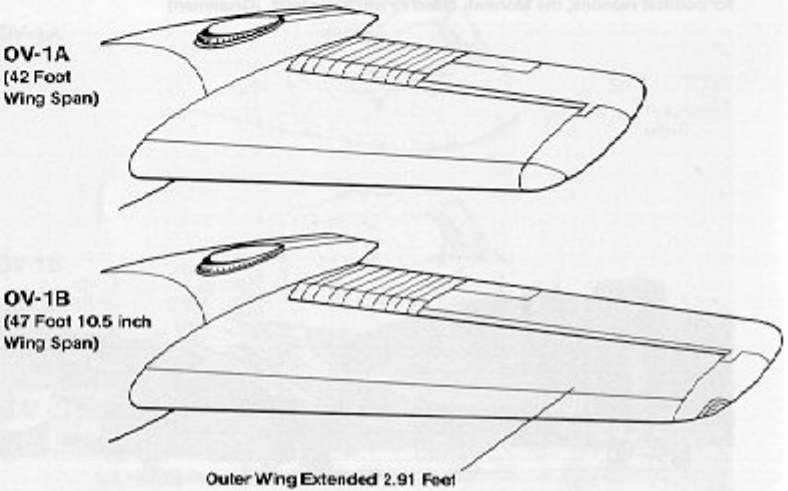
This OV-1B (62-5903) carries Vietnam-era Army markings consisting of overall Flat Olive Brown with reduced Flat Black markings. Mohawks in Vietnam did not carry the normal U.S. star and bar insignia. (Grumman)

Maintenance personnel of the Aerial Surveillance and Target Acquisition (ASTA) platoon of the 1st Cavalry Division at An Khe, Vietnam prepare an OV-1B for another mission during 1967. The Mohawk featured large cowling panels which allowed for easy access to the engines. (U.S. Army)

A groundcrewman directs this OV-1B of the 131st SAC out of its parking spot on the ramp at Phu Hai, Vietnam during 1970. OV-1Bs in Vietnam normally flew with 150 gallon drop tanks to increase their endurance. Most OV-1B missions flown by the 131st SAC were over the DMZ, or over Laos and Cambodia. (Scott Rubke)

Spud 12, an OV-1B (64-14267) of the 131st SAC, taxies out past a C-123 and a line of HH-3 Jolly Green Giant rescue helicopters for another mission from Da Nang, Vietnam during late 1966. One of the missions of the 131st was to maintain surveillance over the DMZ between North and South Vietnam. (Tom Hanson via Wayne Mutza)

Wing Development



An OV-1B is directed out from its parking spot on the pierced steel plank ramp of Landing Zone English on 28 February 1968. Both side canopy windows are open to combat the heat buildup in the cockpit, under the tropical Vietnamese sun. (U.S.Army)

LUCKY, an OV-1B (59-2623) of the 131st Surveillance Airplane Company (SAC) on the ramp at Da Nang, Vietnam during late 1966 or early 1967, had the radio call sign Spud 11. The Mohawk carried the name on the nose in front of the cockpit, along with a White pair of dice. (Tom Hanson via Wayne Mutza)

LUCKY carried its name on the nose in Yellow along with a White pair of dice showing a 6 and a 5 for its call sign Spud 11. The Flat Olive Drab paint used on the Mohawks in Vietnam always looked rough due primarily to the tropical climate. (Tom Hanson via Wayne Mutza)

OV-1C

The third basic model of the OV-1 was the OV-1C, intended for infrared reconnaissance of the battlefield. No prototype was produced for the OV-1C, the aircraft basically being an OV-1A airframe modified to carry a UAS-4 infrared ground surveillance sensor and data transmitter mounted behind a dielectric panel on the underside of the fuselage. Late production OV-1Cs were modified further, with the infrared sensor being relocated to a pod on the fuselage underside just behind the wing. This pod also contained a panoramic camera and and anti-collision light rotating beacon. A number of these late production OV-1Cs also featured a nose mounted panoramic camera with two camera windows mounted at the extreme end of the nose. This camera recorded a 180 degree swath ahead of the aircraft. When the camera was not in place, the camera port was covered by a metal plate. This nose camera was also retrofitted to many earlier OV-1As in Vietnam.

The *Red Haze* infrared system installed on the OV-1C was used to detect telltale heat traces of truck engines, campfires, or other disturbances ordinarily hidden by darkness, camouflage, or the density of the natural jungle. Shortly after the first production aircraft was delivered to the Army in October 1961, the OV-1C production line shifted to the longer forty-eight foot wing and the deleted air brake of the OV-1B airframe. All further OV-1Cs featured these modifications.

As with the OV-1B, late production OV-1Cs had the 1,005 shp Lycoming T53-L-7 engines replaced with 1,150 shp Lycoming T-53-L-15 engines. The OV-1Cs produced with the L-15 engines were called "super Cs." A total of forty-eight were produced and used mainly for operations in Vietnam where it had been found that the L-7 powered aircraft lacked the power needed to drive an improved air conditioning system. The higher capacity air conditioner was needed, both for the cockpit and for cooling the equipment bays against the high temperatures found in Southeast Asia. Later, early production OV-1Cs were retrofitted with the T-53-L-15 engines during scheduled overhauls.

The wing slats, which had promised to be very effective in reducing the Mohawk's landing speed and had been successfully tested in wind tunnel tests, on flight tests with the service test aircraft, and on early OV-1As, proved to be less effective under the operational conditions found in Vietnam and as a result were usually bolted closed on the OV-1C and also OV-1Bs operating in Southeast Asia.

The OV-1C was also used to set a number of records for turboprop powered aircraft. The OV-1C records are unusual in that they marked one of the few world records attempts ever made by an Army tactical unit. During June of 1971, an OV-1C from the 293rd Aviation Company based at Ford Hood, Texas set three new time-to-climb records. The Mohawk also set a new altitude record of 39,880 feet (peak altitude) and 36,352 feet (sustained altitude).

OV-1Cs serving in Vietnam with the 73rd SAC were initially equipped with the UAS-4 infrared sensor. These aircraft were later updated with improved avionics and other equipment, including the rear fuselage pod mounted AAS-14 infrared data system. The AAS-14 features a data-link transmitter which sends the film data in real-time as a conventional FM signal. This capability permitted strikes to be mounted against targets detected by the OV-1C within seconds of being detected. The more advanced infrared sensor is reportedly capable of detecting small heat sources such as cooking fires, a recoilless rifle flash, or a truck engine that has been parked for as long as sixteen hours.

All OV-1 variants initially used an above the wing mounted photo flare pod carrying A4 and B6 flare cartridges that were fired upward and outward from the aircraft for night photography. These flares, being pyrotechnic, were actually of limited capacity and caused a number of handling problems in the field. As a result of experience in Vietnam, the use of the flare pods was discontinued after 1966 in favor of an electronic flasher pod, which was mounted on the outboard underwing pylon.

An OV-1C takes off from a dirt strip while on an Army field exercise during 1965. The Mohawk has excellent short field capabilities thanks to the large flaps mounted inboard of the engines and auxiliary flaps located between the main flaps and the ailerons. (U.S. Army Military History Institute)

Nose Development

OV-1B/OV-1C (Early)

OV-1C/OV-1A (Late)/(Retro Fit)

KA-60 Panoramic Camera

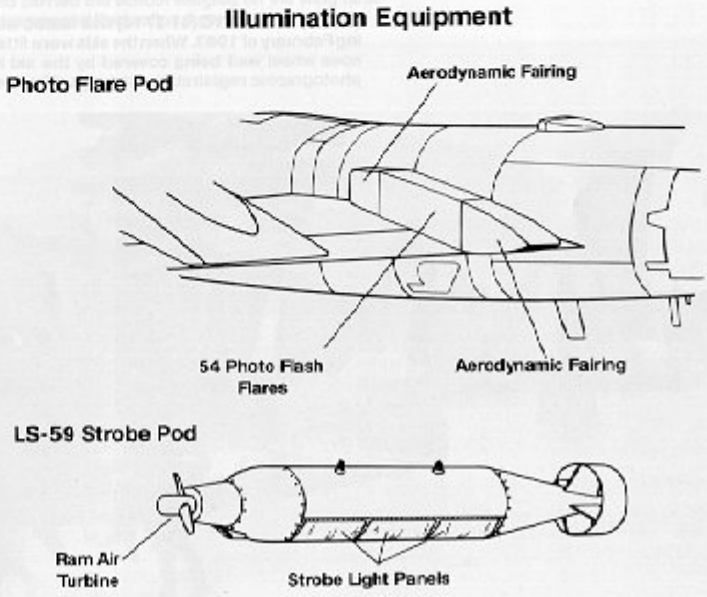
During 1968 a number of specially modified OV-1Cs were deployed to Vietnam under the code name *Seymour Project* (C-more). These were used by the 131st Aviation Company at Phu Bai Vietnam until 1972 and reportedly were equipped with a multi-million dollar sensor and avionics package, although the aircraft were externally identical to a standard OV-1C. Their uses, functions, and missions remain classified.

The RV-1C (later changed to RV-1D) designation was used for OV-1Cs that were converted for permanent use in the electronic reconnaissance role under the *Quick Look I* program. Externally identical to standard OV-1C, these aircraft carried improved and updated electronics and pylon mounted ALQ-133 Elint pods to monitor enemy communications and electronic emissions.

During 1964 production of the Mohawk was halted until the Army and Air Force could reach an agreement on which service would operate the Mohawk (and other Army fixed wing assets). Finally an agreement was reached that transferred tactical air support solely to the Air Force. The Army gave up its C-7 Caribou transports to the Air Force and agreed to not use the Mohawk in a tactical air support role. After this agreement was finalized production orders for additional Mohawks were placed. Grumman used this time to move the Mohawk production line from Bethpage to a new facility at Stuart, Florida where Mohawk production resumed during 1967. Total production of both the L-7 and L-15 powered OV-1Cs was 133 aircraft, with the last being delivered during 1969.

The photo flare dispenser carried on the wing root was bolted in place and was easily removed. Despite its bulky appearance the dispenser had a negligible effect on the Mohawk's performance. (Author)

Spud 23, an OV-1C of the 131st SAC sets in its revetment at Phu Bai, Vietnam during 1970. While on the ground, the propellers were feathered and the side windows were normally left open to offset the heat in the cockpit generated by the canopy. (Scott Rubke)



(Above) This OV-1C (61-2686) at Fort Eustis, Virginia during March of 1966 carries photo flare dispensers on the wing trailing edge next to the fuselage. The dispenser can be carried singly or in pairs with each flare dispenser carrying fifty-four photo flash flares. (Author)

This OV-1C (60-3748) was the fourth OV-1C off the production line. It features the short wing and fuselage mounted speed brakes of the OV-1A. Later OV-1C production changed over to the long wing and no speed brake of the OV-1B. (Hugh R. Muir)

(Below) This OV-1C (61-2714) was tested with a ski landing gear at Bemidji, Minnesota during February of 1963. When the skis were fitted, the nose wheel doors were removed with the nose wheel well being covered by the ski itself. The White stripes on the fuselage were photographic registration markings. (Grumman)

This OV-1C (61-2686) was used as a test aircraft at Fort Eustis, Virginia during 1966 and carried the early Gloss Olive Drab scheme and full markings. (Author)

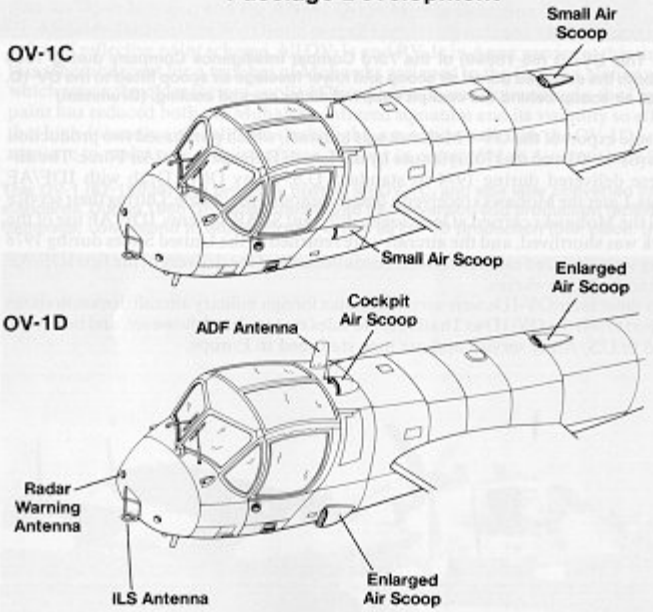
This overall Flat Olive Drab OV-1C (68-15952) of the Georgia National Guard is an early production aircraft fitted with the fuselage mounted air brakes. The National Guard insignia is carried on the rudder. (Douglas Slowiak)

(Below) This OV-1C (64-14243), although in Army markings, was assigned to the Navy Test Pilots School at Patuxent River, Maryland and carried the school insignia on the wing tank. This same aircraft later served with the Environmental Protection Agency. (Jerry Geer)

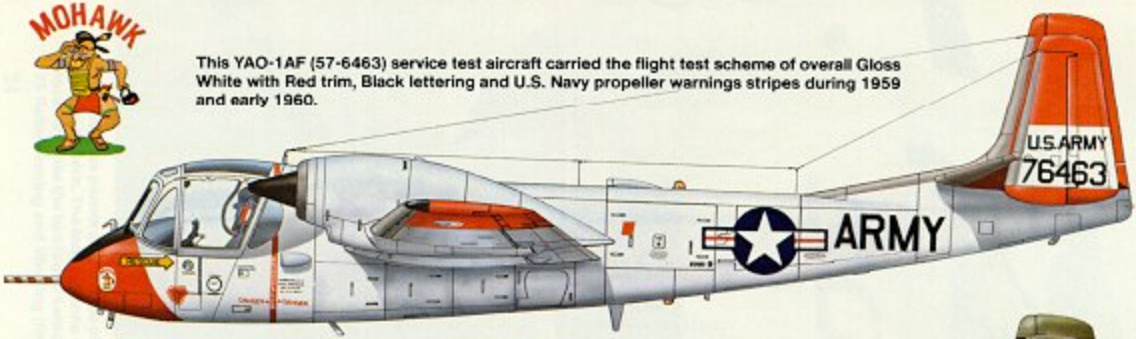
The flat glass panels on the nose of this OV-1D are the camera windows for the KA-60C panoramic camera. The loop antenna under the glass panels is for the AN/ARN-58 glide slope receiver, while the two round sensors on each side of the nose are antennas for the AN/APR-25 Radar Homing and Warning (RHAW) receiver. (Dick Divald via Cobra Company)

This OV-1D (67-18898) of the 73rd Combat Intelligence Company (CIC) during 1969 is carrying a pair of the rarely used 300 gallon ferry drop tanks in place of the 150 gallon drop tanks normally carried on the Mohawk. (Grumman)

Fuselage Development



This YAO-1AF (57-6463) service test aircraft carried the flight test scheme of overall Gloss White with Red trim, Black lettering and U.S. Navy propeller warnings stripes during 1959 and early 1960.



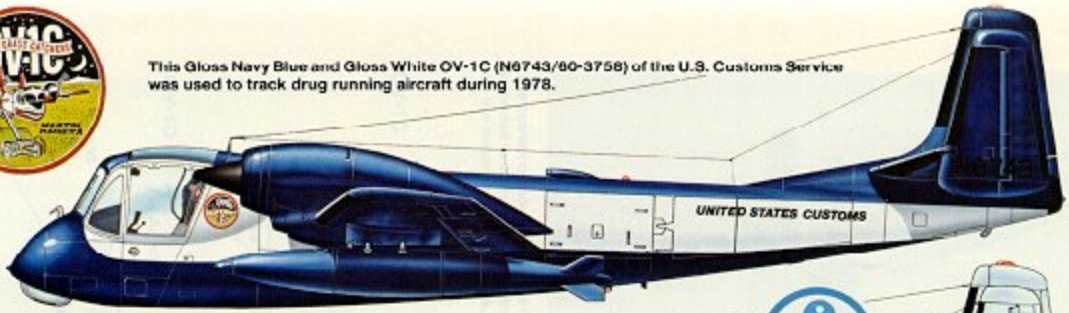
This OV-1A (59-2617) of the 23rd Special Warfare Aviation Detachment was one of six deployed to Vietnam during 1963 for operational testing.

An OV-1C (61-2691) of the 1st Infantry Division based at Phu Loi, Vietnam during 1967. Most Mohawks assigned to the 1st INF DIV carried Gloss Red and White sharkmouth markings.

An OV-1B (59-2673) of the 131st Surveillance Airplane Company based at Phu Bai, Vietnam during 1967.

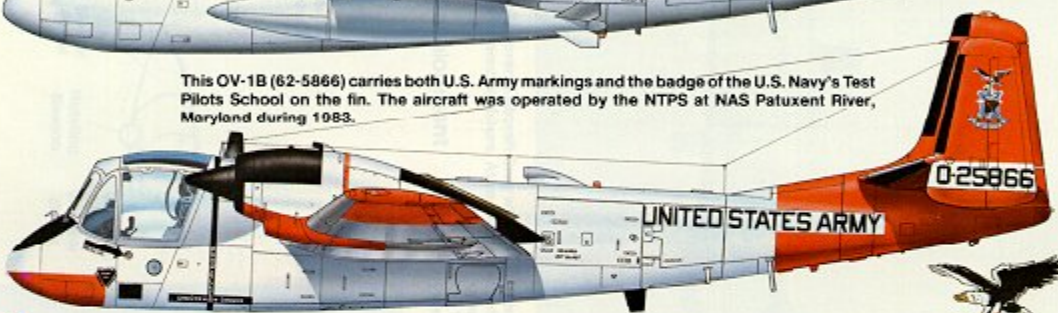
An OV-1D (69-17021/4X-JRB) of the Israeli Defense Force/Air Force during 1975. The IDF/AF operated two OV-1Ds until they were replaced by Grumman E-2C Hawkeyes.

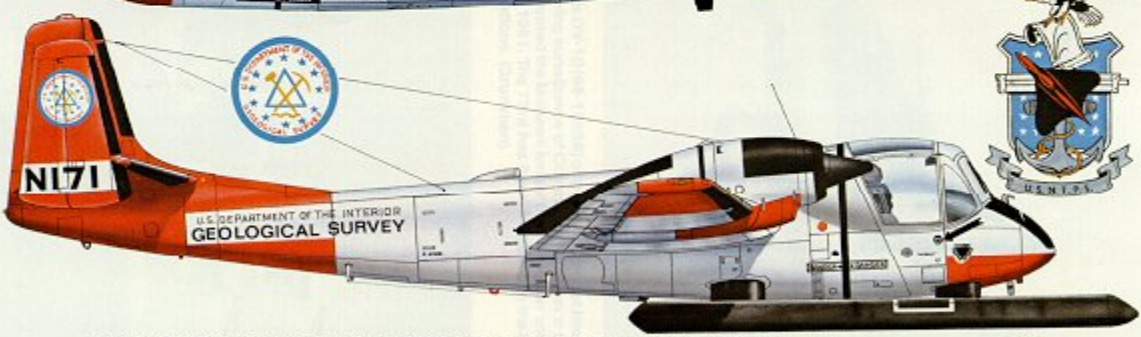
This Gloss Navy Blue and Gloss White OV-1C (N6743/60-3758) of the U.S. Customs Service was used to track drug running aircraft during 1978.



This overall Gloss White OV-1D (64-14243) served with the U.S. Environmental Protection Agency during 1974.

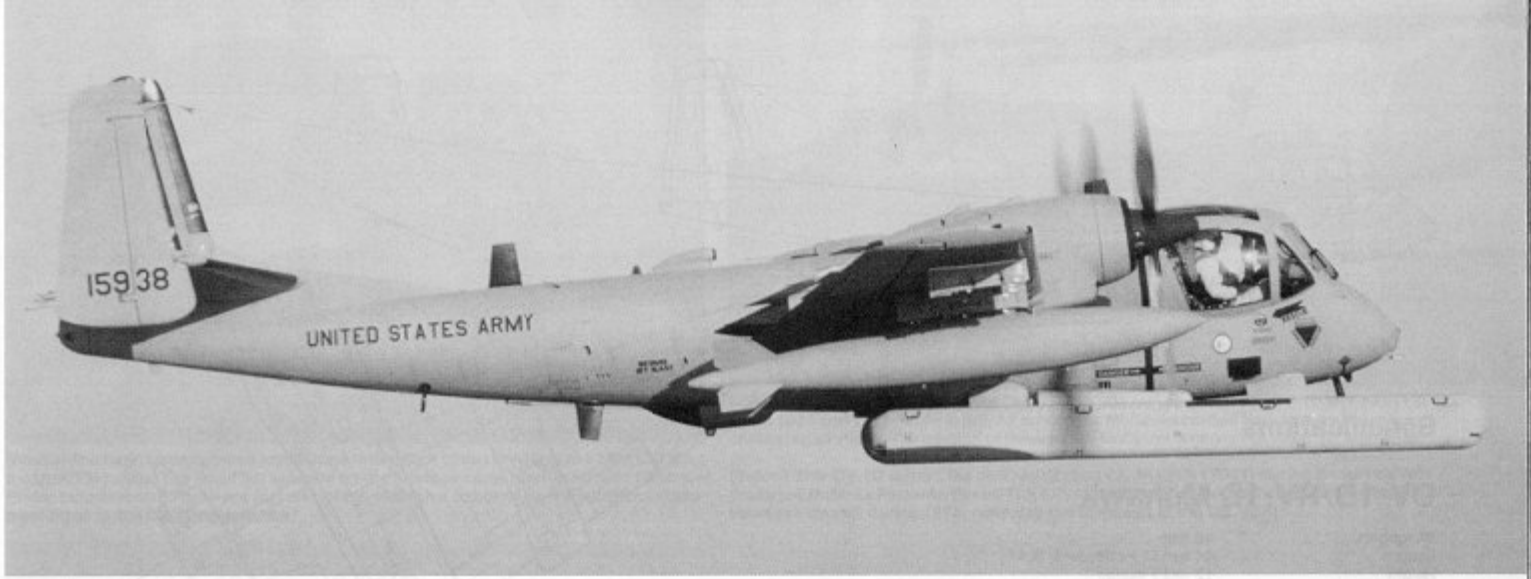
This OV-1B (62-5866) carries both U.S. Army markings and the badge of the U.S. Navy's Test Pilots School on the fin. The aircraft was operated by the NTPS at NAS Patuxent River, Maryland during 1983.





This OV-1B (N171) was flown by the U.S. Department of the Interior, Geological Survey during 1971 to survey earthquake fault lines.

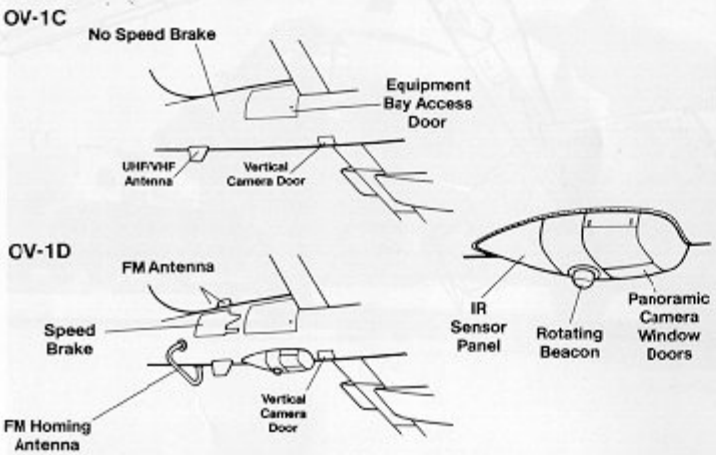
An RV-1D (64-14263) of a U.S. Army military intelligence unit in Germany during 1986. The overall Flat Light Gray paint is designed to reduce the aircraft's IR signature.

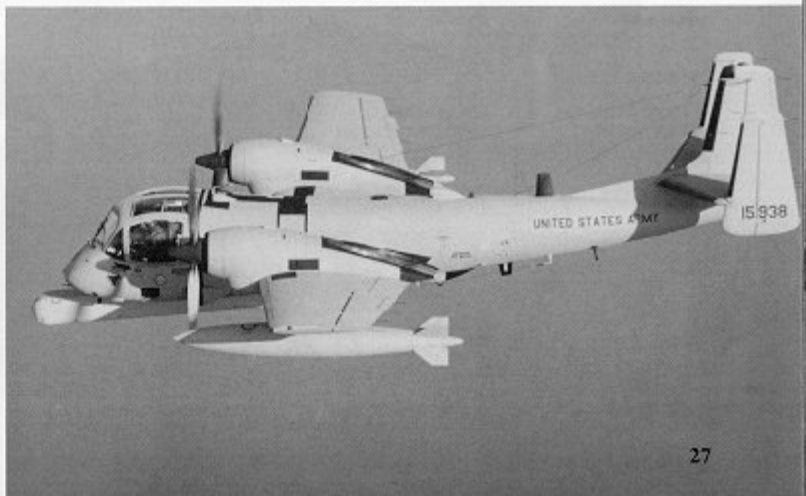


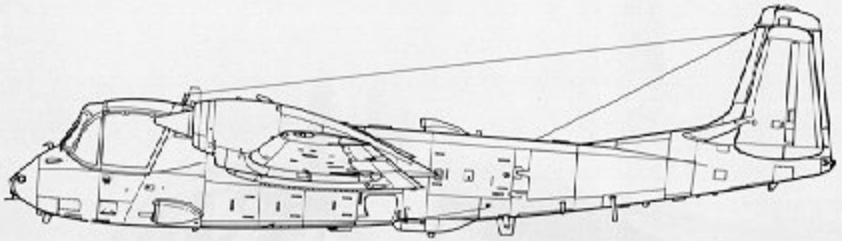
The current camouflage for the OV-1D consists of a low visibility overall Aircraft Gray which is intended to both reduce the aircraft's visibility and lower its infrared signature. All markings on the aircraft are in Flat Black. (Grumman)

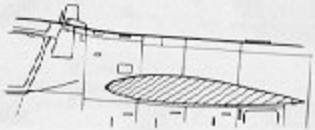
This OV-1D (68-15938) of the 73rd Combat Intelligence Company operates in Europe, maintaining surveillance of Communist activities in the Eastern Bloc countries. The 73rd CIS has operated the Mohawk longer than any other unit in the Army, receiving their first aircraft during 1961. The 73rd has flown Mohawks in the United States, Vietnam, Germany, and other locations. (Grumman)

Rear Fuselage Development





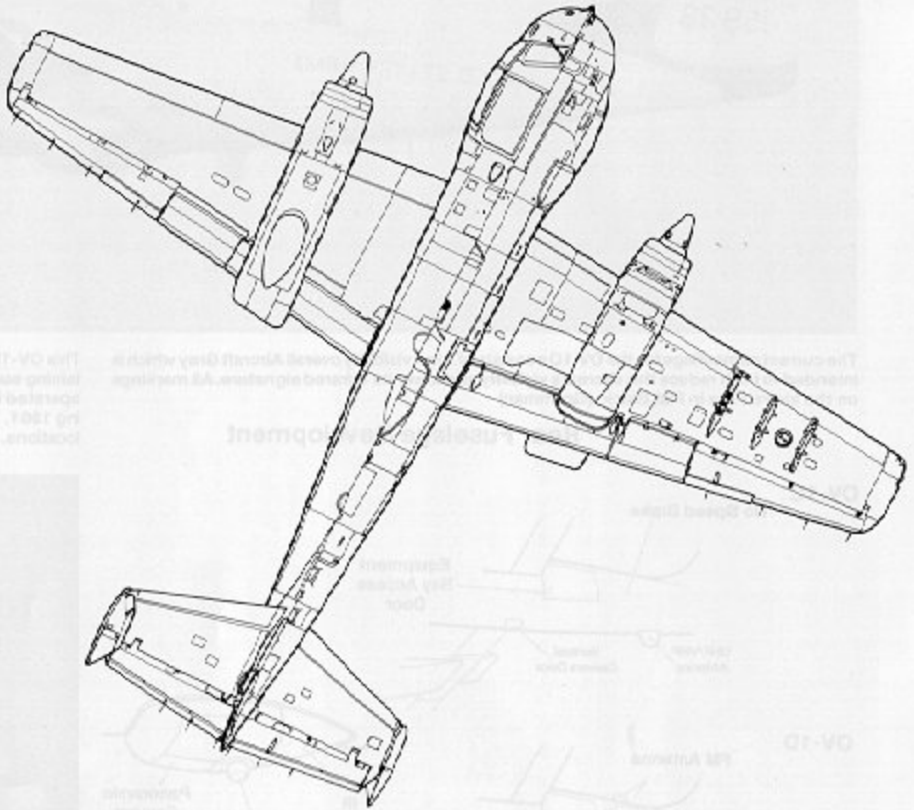


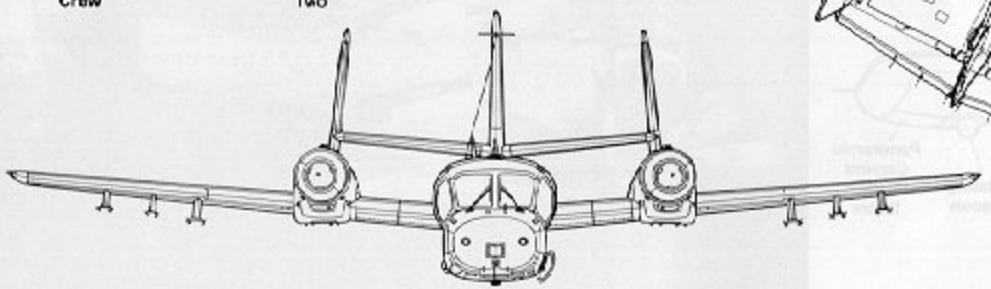


Specifications

OV-1D/RV-1D Mohawk

Wingspan	48 feet
Length	44 feet 11 inches (with SLAR)
Height	12 feet 8 inches
Empty Weight	11,757 pounds
Maximum Weight	18,109 pounds
Powerplant	Two 1,150 shp Lycoming T-53-701 turboprop engines
Armament	None
Performance	
Maximum Speed	305 mph (289 mph with SLAR)
Service ceiling	25,000 feet
Range	1,011 miles
Crew	Two





(Above) The large blade antenna just behind the cockpit of this OV-1D of the 73rd CIC is for the UHF/FM radios. The small flat antenna on the fuselage spine is an Automatic Direction Finder loop antenna. These are just part of the extensive onboard communications equipment fitted to the OV-1D. (Grumman)

(Above) The Israeli Self Defense Force/Air Force (IDF/AF) operated two OV-1D Mohawks between 1974 and 1976. While in IDF/AF service the Mohawks carried both military insignia and civilian registrations. The mission of these Israeli Mohawks remains classified. (Z. Marqulies)

(Below) This OV-1D carried the civil registration 4X-JRA (69-17021) during its service with the Israeli Defense Force/Air Force. This IDF/AF replaced the Mohawks with Grumman E-2C Hawkeye aircraft during 1976, returning the Mohawks to the US. (IDF)

RV-1D

To meet an Army requirement for a dedicated electronic intelligence aircraft (ELINT) Grumman converted one of the early service test Mohawks (YAO-1 57-6364) and an early production OV-1C (60-3748) as proof of concept prototypes under the *Silver Lance* project. These aircraft were flown during 1962, making them one of the earliest dedicated ELINT aircraft ever built. Both aircraft were extensively evaluated in Europe for a number of years before being returned to Grumman.

This project was followed by conversion of a number of OV-1Cs to the ELINT role under the *Quick Look I* program. Besides the internal signal receivers and processors, *Quick Look I* aircraft carried ALQ-133 ELINT pods on the outer wing pylons. These aircraft received the designation RV-1C.

During 1970, two OV-1Cs (68-15964 and 68-15965) were used as prototypes for an improved ELINT aircraft under the *Quick Look II* project. These aircraft had the SLAR pods and camera systems removed and replaced with electronic signal intercept antennas and processors. After a successful test period, the Army ordered thirty-six OV-1Bs to be converted to full OV-1D standards and modified for the ELINT role under the designation RV-1D with production beginning during 1974.

The RV-1D has all the modifications of the standard OV-1D, however, the aircraft were some 500 pounds lighter because of the removal of the camera systems. At a gross weight of 18,500 pounds, the RV-1D has a slightly higher landing speed than a standard OV-1D, however, the maximum speed is the same as the OV-1D. The RV-1D differs from the OV-1D in that the bulged IR/camera fairing under the fuselage is removed and the nose camera windows are faired over. The cameras and IR/SLAR installations are replaced with electronic tactical reconnaissance systems (both internal and pod mounted) capable of detecting, identifying, and locating emitter platforms in daylight, darkness, and under all weather conditions. The data recorded can be data-linked to ground stations for near real-time processing, providing ground commanders with accurate data on the type and location of the enemy emitters opposing them.

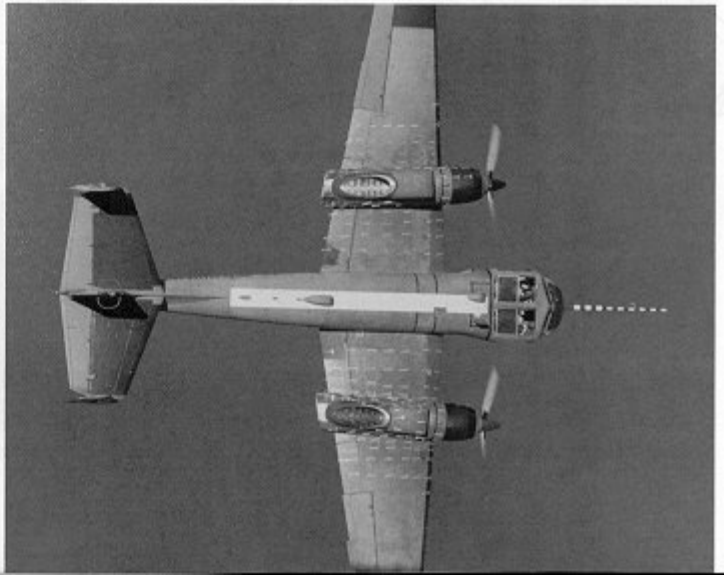
RV-1E

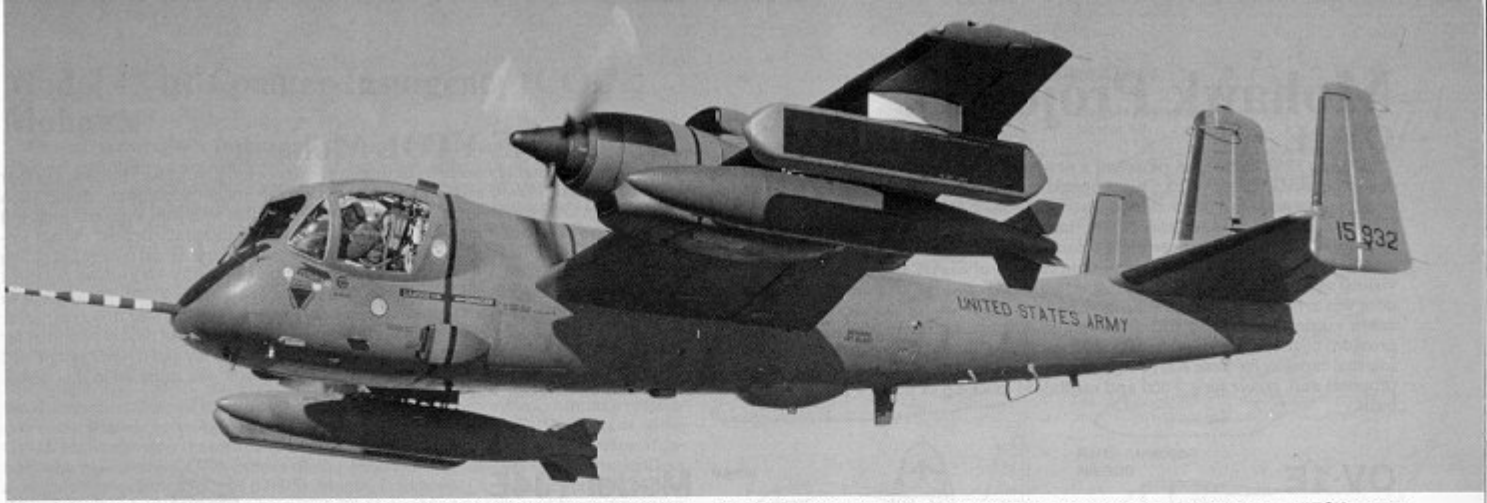
Following the *Quick Look II* program the Army continued development of its ELINT/SIGINT capabilities and during 1972, installed an improved USQ-61 ELINT/SIGINT system in two OV-1C aircraft (67-18902 and 67-18905). Both these aircraft were deployed to West Germany for an extensive evaluation under field conditions.

These aircraft were followed by sixteen OV-1Bs converted for electronic/communications intelligence duties, outfitted with AN/ALG-133 electronic surveillance equipment under the designation RV-1E. The aircraft carry an ELINT equipment package similar to the *Quick Look II* aircraft, with the addition of SIGINT pods on the outer wing stations. Reportedly, the Army did not take these aircraft into the inventory and their exact fate remains unknown. Some reports suggest that they were later re-designated as additional RV-1Ds to cover their real role, while other reports suggest that Israel may have received two of these aircraft, although all agencies involved (both US and Israeli) deny this.

This RV-1D (68-15964) carries a *Quick Look I* ECM pod on the outboard wing pylon suspended from an Aero 15C stores rack. The *Quick Look I* system featured a monitor in the cockpit which permitted real time readout of intercepted signals. (Grumman)

This RV-1D was used for test flights during 1976 fitted with yarn tufts to record the airflow around the Hot Brick system. The Hot Brick system lowered the infrared signature of the T-53 engines, lessening the threat from Soviet SA-7 Strella ground-to-air shoulder launched anti-aircraft missiles. (Grumman)





(Above) This RV-1D (68-15932) of the Army Flight Test Center was a developmental test aircraft used for the testing of the AN/ALG-147 infrared suppression system (Hot Brick) during 1977. The Hot Brick system required an extra air intake which is visible just above the engine. (Grumman)

(Below) This overall Light Gray RV-1D (64-14263) is carrying the *Quick Look II* ECM sensor pod on the outboard starboard pylon. The *Quick Look II* pod is hard mounted on a Grumman designed non-jettisonable pylon. (Grumman)

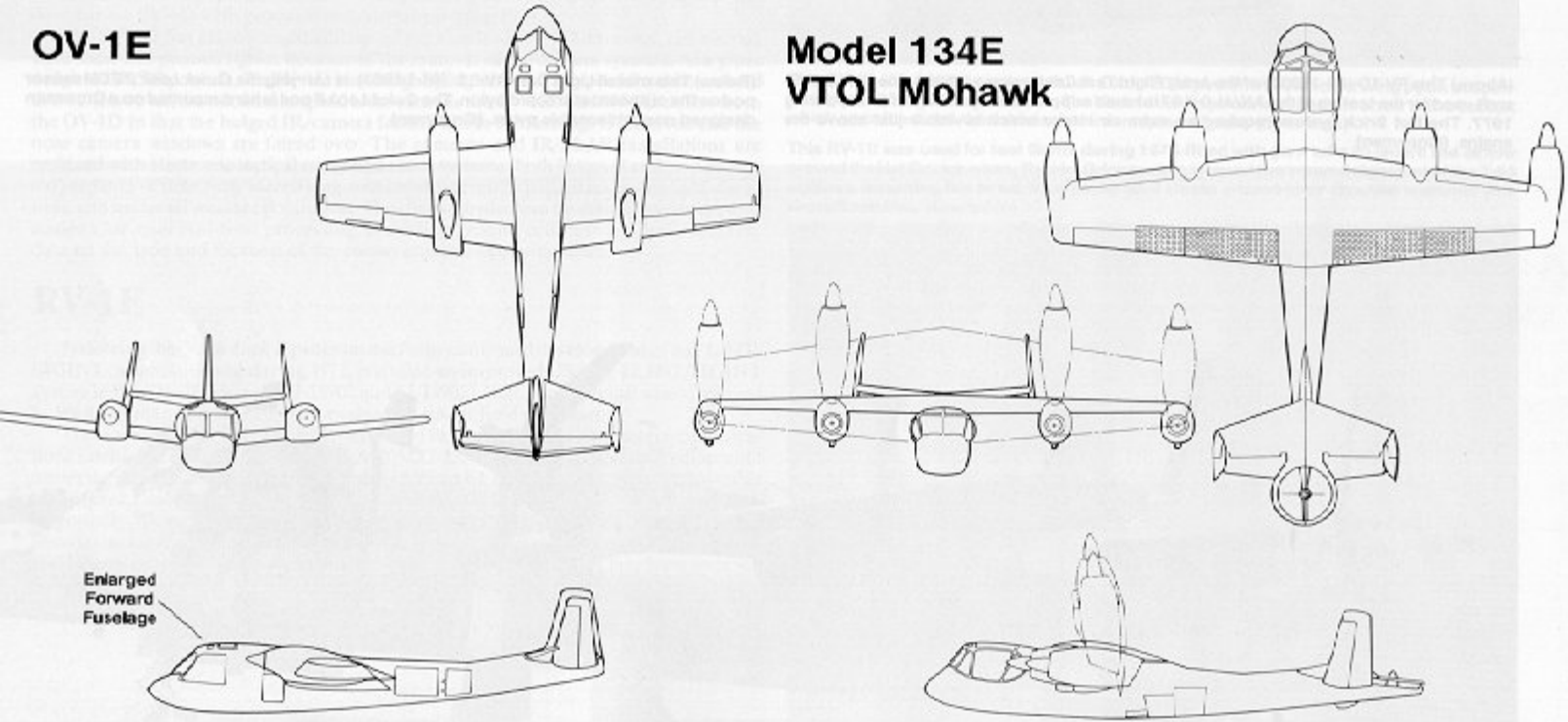
Mohawk Projects

OV-1E

During 1960, Grumman proposed a new variant of the OV-1A Mohawk under the designation AO-1EF (OV-1E). This projected variant retained the wings, engine nacelles, tail, landing gear, and other components of the basic OV-1A, but would have a completely redesigned forward fuselage. The fuselage was to be stretched twenty-eight inches forward of the wing, incorporating a second cockpit. The rear cockpit would house an additional systems operator for real-time readout of SLAR and/or IR imagery. Provisions were to be made for the fitting of both SLAR and infrared equipment. A cabin door was to be cut into the starboard side of the fuselage just forward of the wing and two cabin windows were to be added. As an alterative configuration, the additional space provided by the enlarged forward fuselage could also be used for cargo missions, with an internal capacity for some 800 pounds of cargo. In the event, the Army did not accept the proposal and, except for a wood and cardboard mock-up of the new cabin, none were built.

Model 134E VTOL Mohawk

Another design study made by Grumman involved modifying the Mohawk as a four engined vertical take-off and landing (VTOL) aircraft under the company designation G-134E. The G-134E was to be an OV-1 airframe modified with a tilt wing and enlarged fuselage, and featuring a shrouded tail rotor mounted horizontally behind the tail section. The VTOL Mohawk was to be powered by four turboprop engines (either Lycoming T53 or General Electric T-58s) two in the same position as the OV-1A and two mounted at the wing tips. The widened fuselage was intended to allow the VTOL Mohawk to be used as an aerial ambulance (two stretchers), cargo aircraft, eleven seat troop carrier, or five seat VIP transport. Although Grumman figures showed a great deal of potential for the VTOL Mohawk, the project did not gain favor with the Army and it never progressed beyond the engineering study stage. No letter designation was assigned to this design study and no mock-up was built.



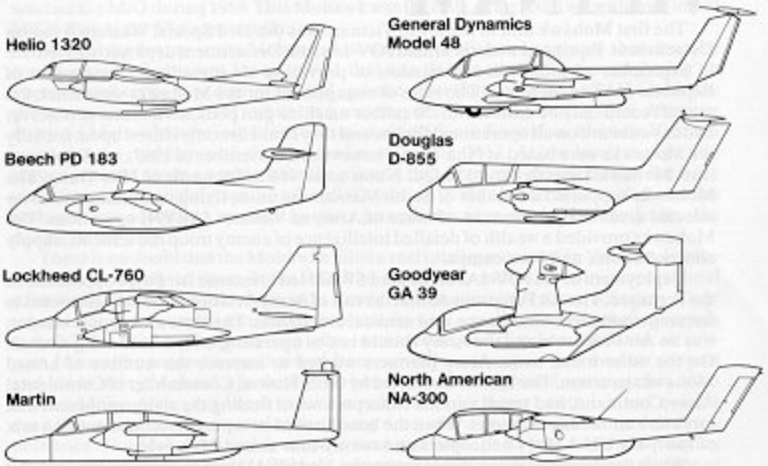
Model 134R Counter-Insurgency (COIN) Mohawk

During the early 1960s, Department of Defense (DOD) planners were faced with the prospect that future wars would be one of two types; either an all out nuclear war or limited brush fire wars fought by guerrilla forces. In response to the need for a specialized aircraft capable of fighting in a limited war environment against insurgent forces, DOD issued the Light Armed Reconnaissance Aircraft (LARA) specification. The LARA specification called for a two seat close air support and reconnaissance aircraft that would be operated by the Navy, Air Force, and Marines in the counter-insurgency role. A number of manufacturers responded to the design contest including Convair, Douglas, Lockheed, Grumman, and North American.

Previous to this specification the Marine Corps had issued a request for proposals under the Light Marine Attack Airplane (LMAA) program. This program called for an aircraft that would bridge the gap between high performance jet fighters and armed helicopters. The LMAA was envisioned to be an aircraft that could conduct armed reconnaissance, close air support, helicopter escort, and observation. Grumman responded to the Marine proposal with an armed counter-insurgency (COIN) variant of the OV-1A Mohawk under the company designation Model 134R. When the LARA specification was issued, the COIN variant of the Mohawk was entered in the competition alongside entries from Douglas (D-855), Martin, Lockheed (CL-760), General Dynamics (Model 48), Beech (PD 183), Goodyear (GA 39), Helio (Model 1320), and North American (NA-300).

The LARA competition inspired some very unusual design studies that had but one thing in common–they were all turboprop powered aircraft. The General Dynamics Model 48 was a twin boom, shoulder wing, tandem seat, aircraft powered by two turboprop engines with a high mounted horizontal stabilizer. The Lockheed entry was a more conventional twin turboprop aircraft with a shoulder mounted wing. Martin's proposal was another twin boomed aircraft which featured an inverted V tail. The Helio 1320 closely resembled the Grumman 134R except for the conventional tail. The Douglas D-855 featured a shoulder mounted wing, under-slung engines, and a conventional tail mounted on a cut back rear fuselage. The Beech PD 183 had a mid-mounted wing with under-slung engine nacelles and a high mounted horizontal stabilizer. The most unusual aircraft entered in the competition was the Goodyear GA 39 which had its engines mounted on pylons high above the shoulder wing and a tall T tail with small outrigger stabilizers. North American's NA-300 featured a pod fuselage suspended below a high mounted wing, twin booms, and a high tail.

The Grumman Model 134R differed from the OV-1 Mohawk in that it was to have a redesigned forward fuselage with the crew housed in an armored tandem cockpit under a long bubble canopy. The wing was repositioned to the mid-wing position and provision was made for internal gun armament in the forward fuselage. The standard OV-1A wing was retained, with its six underwing pylons, however, the outer pylons were to be wired for Sidewinder air-to-air missiles. In addition to the missiles, the Model 134R was to have been capable of carrying a wide variety of underwing ordnance including bombs, rocket pods, gun pods, cluster munitions and fuel tanks. In the event, the design failed to win a development contract when North American's NA-300 entry (later designated the OV-10) was selected as the winner of the LARA contract. The Model 134R did not progress further than the engineering study/model stage.



The Model 134R was Grumman's entry in the Light Attack Reconnaissance Aircraft (LARA) competition for a multi-service Counter-Insurgency (COIN) aircraft. The 134R was an OV-1 with a revised forward fuselage featuring a tandem cockpit and a repositioned wing. The NA-300 eventually won the competition and entered production as the OV-10. (Grumman)

VIETNAM

The first Mohawk unit to deploy to Vietnam was the 23rd Special Warfare Aviation Detachment. Equipped with six armed JOV-1As, the Detachment deployed to Vietnam in September of 1962 with the mission of providing air surveillance in support of Republic of Vietnam forces. The rules of engagement for the Mohawks were strict; the aircraft could only be armed with .50 caliber machine gun pods, a Vietnamese observer had to be aboard on all operational flights, and they could fire only if fired upon. Initially the Mohawks were based at Nha Trang, however, in November of 1963 one flight team (two Mohawks) was deployed to Qui Nhon some 100 miles north of Nha Trang. The Mohawks supported a number of South Vietnamese units, flying reconnaissance over selected areas of operations in advance of Army of Vietnam (ARVN) operations. The Mohawks provided a wealth of detailed intelligence of enemy troop movements, supply concentrations, and base camps.

Deployment of the JOV-1As of the 23rd SWAD led to intense Air Force opposition in the Pentagon. The Air Force argued that the role of Army Aviation should be restricted to ferrying troops, reconnaissance, and medical evacuation. The close air support mission was an Air Force role and the Army should not be operating armed fixed wing aircraft. On the other hand, some Army planners wanted to increase the number of armed Mohawks in action. The Howze Board, led by GEN Howze, Commander of Continental Army Command, had tested various concepts toward finding the right equipment mix for future air mobile divisions. When the board issued its report, it recommended a mix of thirty-six UH-1 Huey helicopters and twenty-four armed Mohawks.

While the debate raged in Washington, the 23rd SWAD was making its presence felt in the war zone. Visual and photographic reconnaissance services provided by the Mohawks produced a wealth of intelligence for supported units and hundreds of structures, most of them camouflaged, were detected in Viet Cong areas for the first time. One of the unique advantages of the Mohawk in reconnaissance was its ability to approach the target area quietly. The aircraft's speed and relatively quiet turboprop engines allowed it to get within observation distance of people on the ground before they were alerted to its presence.

Artillery fire directed from the air was nearly tripled by the activities of Mohawk observers. Ground units quickly developed special air-to-ground procedures to exploit the capabilities of the Mohawks. The one area that bothered Army officials was the limitation on Mohawk armament. In a report dated 23 March 1963, COL Hal D. McCown stated that "...the full potential of the Mohawk aircraft cannot be realized because of the limitation of armament to the .50 caliber machine guns. Mohawks have consistently located remunerative targets that are beyond the range of friendly fire. The majority of these targets are small bodies of troops in the open. These troops are a fleeting target that, unless immediately engaged, will disperse and disappear. It is felt that the addition of rockets, napalm, and small fragmentation bombs to the Mohawk would have greatly increased the number of VC casualties during the past few weeks and the increase in fire power would have a profound effect on VC ability to conduct daylight troop movements." Other commanders were equally in favor of increasing the armament of the Mohawk and eventually Mohawks did carry 2.75 inch rocket pods.

Additional Mohawks arrived in Vietnam during the Fall of 1964 when the 4th Aerial Surveillance and Target Acquisition (ASTA) Detachment deployed with a mix of OV-1Bs and OV-1Cs.

During the tests with the 11th Air Assault Division the Mohawks were featured as *attack* aircraft. The Division table of organization called for twenty-four JOV-1As. According to GEN Johnson, Army Chief of Staff, as much as sixty percent of his time was spent trying to justify to the Air Force the need for these Mohawks. In the end, the armed

This OV-1C (62-5857) still carries the high visibility glossy markings that were replaced with flat markings during late 1965 and early 1966. The seven-shot rocket pods have aerodynamic nose cones installed to cut down on their drag. When the rockets fired, the nose cone broke away or was shattered. (Army Aviation Museum)

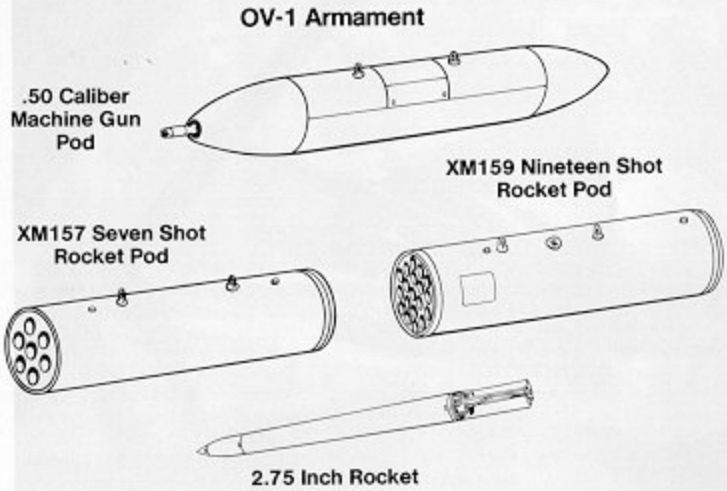
Mohawks were deleted from the table of organization when the 11th Air Assault Division became the 1st Cavalry Division (Airmobile) on 1 July 1965, however, six *unarmed* Mohawks were retained by the Division for surveillance tasks.

By the Summer of 1965 there were thirty Mohawks in Vietnam and these were combined to form the 73rd Aerial Surveillance Company. The 73rd ASC operated in support of the 1st Cavalry Division with a mixed group of OV-1A, JOV-1As, OV-1Bs, and OV-1Cs. Although the Mohawks were officially unarmed, most of the OV-1As and OV-1Cs continued to carry gun and rocket pods for "self-defense." As late as 1971, Mohawks of the 131st Aviation Company, which operated a mix of OV-1As, OV-1Bs, and OV-1Cs, were flying support missions for the 101st Airborne and 1st Marines with rocket armed OV-1As. The 131st flew out of Pha Bai and conducted missions over the DMZ, Cambodia and Laos with the OV-1Bs, while the OV-1As and OV-1Cs flew in-country missions.

In December of 1965, the Air Force launched Operation TIGER HAND, a series of attacks against the Ho Chi Minh Trail. The trail was used by infiltrators coming from North Vietnam to South Vietnam and was a vital enemy supply line. The Army provided OV-1s to monitor the trail at night, locating targets with either SLAR or IR. The OV-1s were usually accompanied by Air Force Lockheed C-130 flareships which would illuminate the targets detected by the OV-1 for orbiting Air Force fighter-bombers.

In one rare incident, a Mohawk reportedly scored an air-to-air victory. Although not officially confirmed, a number of sources have stated that in late 1966, an armed OV-1A Mohawk of the 131st SAC based at Phu Bai shot down a North Vietnamese Air Force MiG-17 over North Vietnam. The incident occurred when two OV-1s were on a mission against the northern portion of the Ho Chi Minh trail. The Mohawks were in trail formation, when the MiG-17 attacked the lead Mohawk. He apparently did not see the leader's wingman and the trailing OV-1 salvoed his 2.75 inch rockets, shooting down the surprised MiG.

When armed with a pair of seven-shot and a pair of nineteen-shot rocket pods on the wing stations, a total of fifty-two 2.75 inch FFAR rockets could be carried by the Mohawk. This JOV-1A Mohawk is assigned to the 73rd SAC based at Vung Tau, Vietnam during October of 1966. (Author)



The air-to-air battles were not always in favor of the Mohawk and at least one OV-1 was lost to a MiG during 1969. This Mohawk was the only Army fixed wing aircraft lost to MiGs during the Vietnam conflict.

Most of the twenty-seven Mohawks lost during the Vietnam war were shot down by enemy ground fire except for one OV-1 that was destroyed on the ground during an enemy attack on its base during by 1968 and one other that was lost to a SA-2 Guideline surface-to-air missile (SAM) while on a mission near the DMZ during 1966. A further thirty-six Mohawks were lost due to operational accidents. Several accidents in Vietnam pointed out a problem with the ejections seats on the OV-1. At low level, the ejection sequence could cause a problem for the pilot, in that when the observer's seat fired, the aircraft would tilt slightly, sending the pilot's seat out of the aircraft at an angle. Once the problem was identified, revised ejection procedures were established to lessen the danger to the pilot.

There is no doubt that the Mohawks filled a real intelligence need in Vietnam. For the first time the Army advisors in the field had an aircraft under their direct operational control that could provide them with timely information on enemy activities. Their requests for aerial surveillance and fighter attacks were usually routed through channels to the VNAF, this lengthy procedure led to increased requests for direct Mohawk air support. In turn the request soon changed from surveillance support to armed air support and led to using Mohawks in the fighter-bomber role. The ground commanders often request Mohawk support because the aircraft was under Army control, it was quickly available, could remain on station for a long time, and it was accurate when delivering ordnance. The Mohawk's quick reaction time was perhaps its best asset, since having the air support arrive quickly is far more important to the ground soldier than the type of aircraft providing that support.

A Mohawk of the 73rd SAC, armed with .50 caliber machine gun pods and 2.75 inch rocket pods, sets in a revetment made of sand filled 55 gallon fuel drums at Vung Tau, Vietnam during October of 1966. (Author)

Fast, quiet, and rugged, the Mohawks in Vietnam proved their worth time and again. At the battle of Ia Drang during 1965 and later in the Bong Son Campaign, Mohawks provided the ground forces with important visual reconnaissance reports and the growing usefulness of SLAR and IR imagery became increasingly apparent to the ground commanders. The Air Force, finally using the capabilities of the Mohawk instead of fighting against it, used precision targeting data provided by OV-1s to direct B-52 strikes against the Ho Chi Minh trail. Navy coastal patrol forces were directed to infiltration points discovered by Mohawk radar and the Marines made good use of Mohawk night reconnaissance data to conduct Operation STARLIGHT in August of 1965.

OV-1Bs used their SLAR to monitor enemy activity along the DMZ. These flights were opposed by the North Vietnamese air defense system which fired SA-2 Guideline surface-to-air missiles across the border at the Mohawks. Fortunately for the OV-1s, the radar guidance signal of the SA-2 caused static bars to show up on the SLAR readout, alerting them that they had been fired upon. Most missile firings were misses, since the OV-1s could out maneuver the SA-2, although one OV-1 was shot down by an SA-2 during 1966. By 1969, passive warning ECM equipment was installed on the OV-1Bs operating along the DMZ, giving them a much earlier warning of a radar lock-on and missile firing.

Working at night with Army Cobra AH-1 helicopters as hunter-killer teams, the Mohawks also provided real-time imagery to locate enemy sampans and other targets for the Cobras. Air Force bombers were also guided to their targets in the same way. Regardless of official policy, OV-1s in Southeast Asia often flew armed with a mix of rockets and gun pods. The rugged constitution of the OV-1 proved a blessing for flight crews, particularly when Viet Cong forces began employing heavier anti-aircraft weapons. The Mohawk's reputation and high survivability prompted the frustrated VC to offer a $1,000 reward to any soldier who shot down a Mohawk. The Viet Cong called the armed Mohawks the "Whispering Death," because the quiet whine of its turboprops gave little or no warning of the aircraft's presence until it was too late.

Army combat records show that the Mohawk had the highest sustained operational readiness rate of any Army aircraft that served in Vietnam. At times the Mohawk units were able to maintain a ninety-five percent availability rate, a high tribute to both the aircraft and the maintenance personnel who maintained them.

An OV-1B of the 73rd SAC on a mission over Vietnam on 11 September 1967. The 73rd SAC was based at Vung Tau, Vietnam, a beautiful Rest & Recreation (R&R) center about thirty-five miles south east of Saigon on the South China Sea. (U.S. Army)

This OV-1C (61-2712) of the 131st Surveillance Airplane Company, radio call sign Spud 23, carried the name *Newt's Dream* in Black on the nose under the cockpit. The aircraft was based at Phu Bai, Vietnam during late 1966 or early 1967. (Tom Hanson via Wayne Mutza)

Spud 12 of the 131st SAC shares the ramp at Da Nang, Vietnam during late 1966 or early 1967 with an O-1 Bird Dog. The 12 carried on the center of the Black anti-glare panel was in Yellow. (Tom Hanson via Wayne Mutza)

An OV-1C (61-2691) of the 1st Infantry Division parked in its revetment at Phu Loi, Vietnam during 1967. Most of the Mohawks assigned to the Big Red One were painted with Red and White sharkmouth markings and carried the Division crest on the center fin. (Grumman)

An OV-1A fires on a target with 2.75 inch FFAR rockets. The Mohawk is armed with an XM-2 (SUU-12) .50 caliber machine gun pod on the starboard outer wing pylon, a nineteen-shot XM-159 2.75 inch rocket pod on the starboard inner pylon, a seven shot rocket pod on the port outer pylon, and a four shot Aero Products LAU-10A Zuni 5 inch rocket pod on the port inner pylon. (Grumman)

This OV-1A of the 1st Infantry Division at Tan Son Nhut, Vietnam in December of 1966 carries a Red and White sharkmouth marking on the nose. The propellers are feathered to prevent them from windmilling while the aircraft is parked. (Author)

These armed OV-1As of the 131st Aviation Company (formerly the 131st SAC) on the pierced steel plank ramp at Phu Bai, Vietnam during 1971 have all their access panels open for pre-flight inspections. *Officially* the use of weapons on Mohawks was ended during 1965. (Scott Rubke)

A crew chief cleans the windscreen of an OV-1A that has been retrofitted with a nose camera and ILS antenna. The nine small Redhearts painted on the nose wheel door indicate that this OV-1 has taken nine hits from enemy ground fire. (Scott Rubke)

An armed OV-1A of the 131st SAC, Nighthawks, on patrol over the Vietnamese country side. The White bar down the fuselage spine was a recognition marking to make spotting the Mohawk easier for higher flying fighter aircraft. (Scott Rubke)

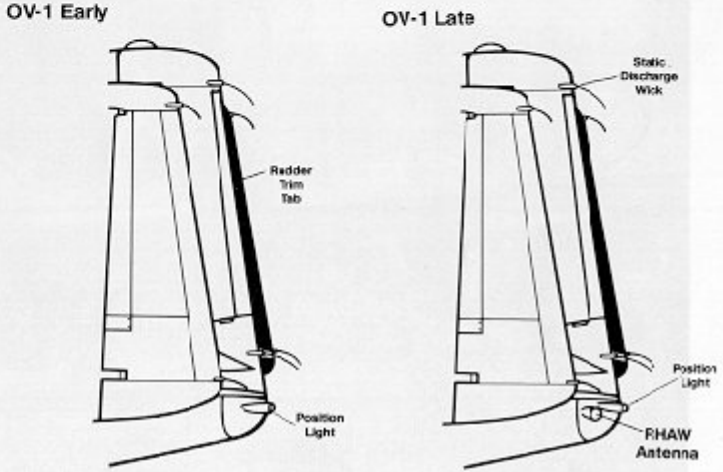
These OV-1Bs were used by the 131st SAC for SLAR missions into Cambodia, Laos, and North Vietnam. The protective revetments for the Mohawks were made of wood filled with sand. These proved to be impractical and were later replaced with metal and concrete revetments. (Scott Rubke)

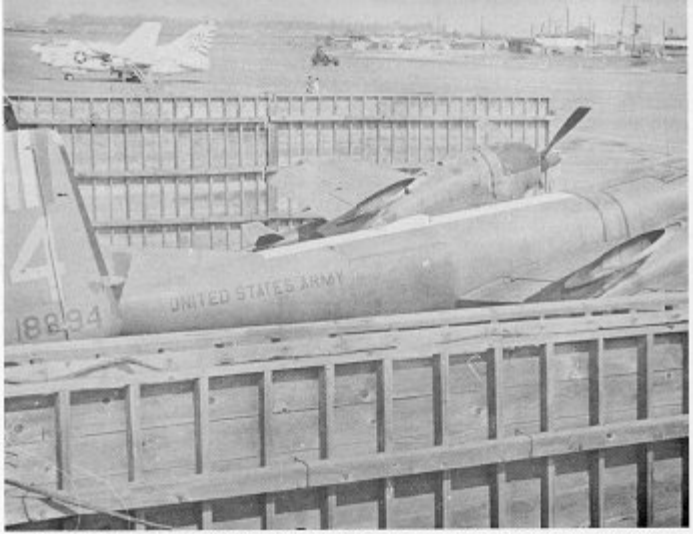
This OV-1 of the 131st SAC waits in its revetment for its next mission with the canopy open and propellers feathered. The Hawk insignia on the tail was in Black, with a White beak and Yellow talons. The banner beneath the hawk read *131 AVN Co* with *NIGHT* on the left side and *HAWKS* on the right side. (Scott Rubke)

An OV-1 of the 131st Surveillance Aviation Company on patrol over Vietnam during 1971/72. The forward portion of the engine cowlings were painted Flat Black to serve as anti-glare panels for both the pilot and observer. (Scott Rubke)

During one period at Phu Bai the company tow tractor was broken and the Mohawks were taxied into their revetments and had to use reverse pitch on their propellers to back out. The small blister alongside the tail position light is the tail antenna for the Radar Homing and Warning (RHAW) system fitted to OV-1s for protection against SA-2 missiles. (Scott Rubke)

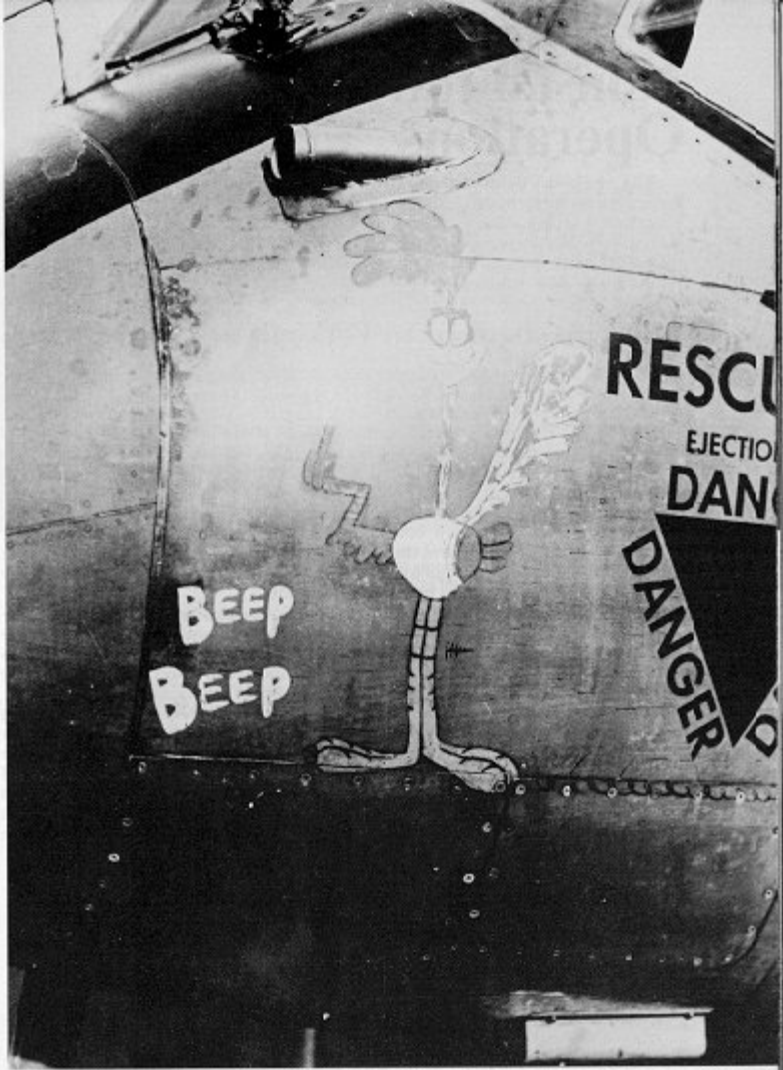
RHAW Antenna





This OV-1 formerly belonged to the 225th SAC before being assigned to the 131st at Phu Bai and still carries its former unit marking on the tail. The vertical bars were Red, White, and Blue, while the tail number 4 was in Yellow. (Scott Rubke)

This armed JOV-1A Mohawk carries four XM-157 seven-shot rocket pods and a CTU-1/A air dropped resupply container painted with a Red and White sharkmouth marking. (Bob Chenoweth via Cobra Company)



The Roadrunner cartoon character carried on the nose of this Mohawk of the 131st SAC graphically sums up the way most soldiers felt about being in Vietnam during 1971. (Scott Rubke)

Non-military Mohawk Operations

The Mohawk's unique combination of extremely sensitive sensors and versatile radar systems, along with its excellent visibility from the cockpit, have prompted other government agencies to make use of the Mohawk in a variety of special non-military roles. OV-1C Mohawks have been called upon by State and Federal agencies to use their infrared systems to survey icebergs, record oil spills at sea, detect heat loss in government buildings, measure earthquake faults, and as a monitoring system for pollution control.

Army Assistance to Federal/State Agencies

Army OV-1C Mohawks have been placed under the control of the U.S. Forest Service in the forest fire prevention role. Using the IR system, the Mohawks have flown missions over national forests to detect the remains of camp fires. Once a hot spot was detected, teams of forest rangers were vectored to the site by the Mohawk crew, saving thousands of acres of timber that otherwise might have been destroyed. Army Mohawks have been used to fly pipeline surveys, photographing hot spots in the Alaskan pipeline that might reveal the presence of an oil leak.

In a spectacular series of missions, Mohawks of the 641st Military Intelligence Battalion, Oregon National Guard, based out of Salem, Oregon were used to monitor the eruptions of Mount Saint Helens during 1980. The Mohawks recorded the eruption on infrared film to enable officials to determine the extent of the damage, lava activity within the crater, and possibly predict future activity.

Army Mohawks have flown missions for various state agencies to monitor conditions in large forested areas. Using Camouflage Detection Infrared Film (CDIR) the Mohawk can detect plant disease in these forests. CDIR can detect the heat differences between live and dead or dying plants. In this manner it can detect blister rust on pine trees and Dutch elm blight before these valuable timber resources are destroyed.

Mohawks have also proved a valuable tool in search and rescue operations. Using both IR and Side Looking Radar, Mohawks have aided the U.S. Coast Guard, Civil Air Patrol, and other state and local police agencies searching for downed aircraft. The Mohawk's IR and SLAR is particularly effective in mountainous regions and in areas of heavy forest. Once a suspected crash site is spotted with the sensors, the Mohawk can then visually search the area to confirm the crash site. Once the exact location has been pinpointed, the Mohawk can begin the search for survivors and direct ground rescue crews to the area.

Mohawks in Other Government Agencies

The National Aeronautics and Space Administration (NASA) has also used the Mohawk for a number of test programs. In one series of tests NASA did asymmetrical testing for noise evaluation. For these tests the Mohawks had a small jet engine attached to one wing. The two aircraft modified by NASA were N512NA (ex-62-5860) and N637NA (ex-64-14244). NASA also used a modified Mohawk for a Great Lakes ice detection and ship navigation test program. The Mohawk was fitted with a special side looking radar capable of ice detection.

The U.S. Customs Service received four ex-Army OV-1Cs and four Grumman S-2D Trackers during 1971 as part of the drug interdiction program. These Mohawks were all delivered in a distinctive Red and White color scheme. Prior to delivery to the Customs Service the OV-1C were modified by Lockheed Aircraft at Marietta, Georgia with a Texas Instruments Forward Looking Infrared (FLIR) system installed in a small turret in the nose. The FLIR turret rotated 360° and was housed in a slightly elongated nose section. With the FLIR in place, the Customs OV-1Cs were limited to 250 knots maximum air speed. Customs took delivery of the modified aircraft during mid-1972.

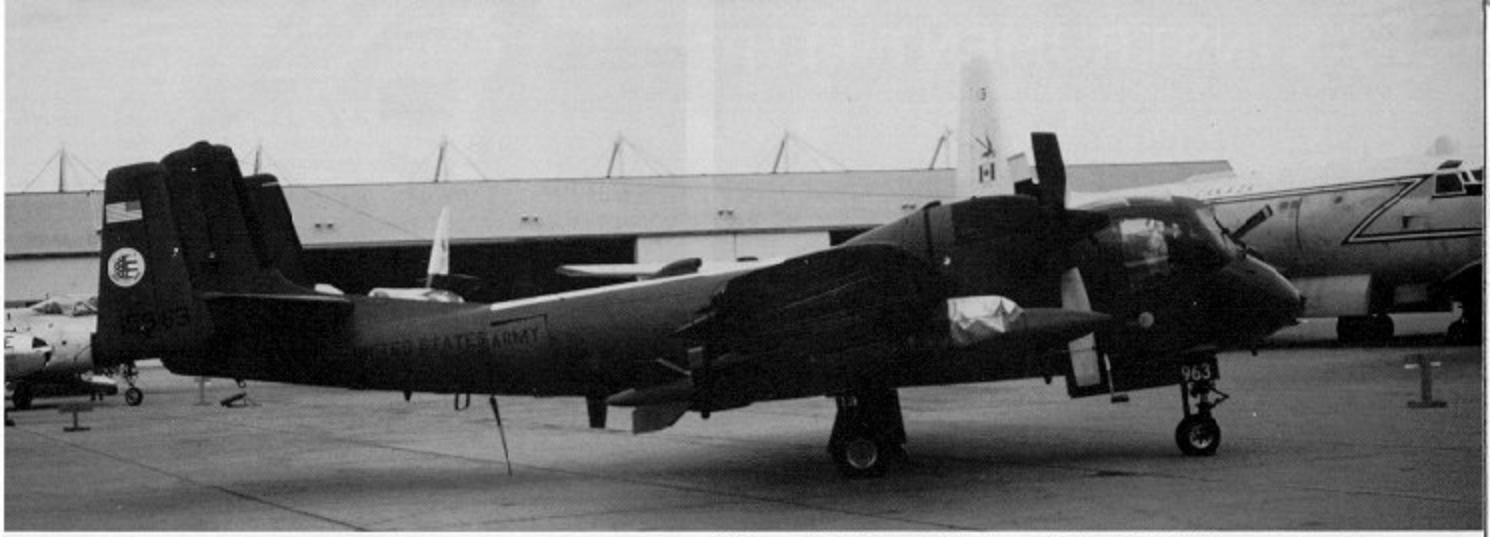
The Customs OV-1s were operated under a drug interdiction program that was initially given the code name *Grass Catcher*, however, because officials in Washington felt the code name was too revealing of the OV-1s mission, it was re-named Operation LINEBACKER. Originally the aircraft were flown without identification markings. Later, during 1973, their civil registration N numbers and U.S. Customs markings were painted on the aircraft. Customs pilots still use a lot of tape, however, covering up the word Customs as often as possible so they can to be less recognizable.

Customs OV-1s were used to intercept and track suspected drug smuggler aircraft. With the FLIR the Mohawks could maintain a stand-off surveillance of the drug runner's aircraft, relaying its position to other Customs aircraft and ground units. Often the first indication the smuggler had that he was being tracked occurred after he landed and was surrounded by Customs agents. At other times the Mohawks engaged in long tail chase pursuits of drug running aircraft. The speed of the Mohawk, however, allowed it to easily keep pace with the majority of aircraft used in the drug trade.

After being fired upon by drug smugglers with automatic weapons, there was some thought given to arming Customs Mohawks, however, U.S. law, then and now, prohibits mounting air-to-air weapons on any Customs aircraft. The Mohawks were phased out of Customs service during 1986 after some fifteen years of service. Their mission has been taken over by a variety of aircraft including Grumman E-2C Hawkeyes, specially modified radar equipped P-3 Orions, radar equipped Cessna Citations and Piper Cheyenne turboprops, and UH-60 Blackhawk helicopters.

The geodetic survey conducted in the United States during 1971 used the services of an OV-1B with a modified SLAR. Operating under the control of the U.S. Geological Survey (USGS), the OV-1B participated in a series of geologic and hydrologic studies, mapping fractured rock formations, limestone sink holes, and other phenomena to help document water resources in a number of states.

An OV-1D of the 641st Military Intelligence Battalion, Oregon National Guard is loaded with cameras, an SL-59 strobe light and other sensors for a mission during the eruption of the Mount Saint Helens volcano during in 1980. (Grumman)

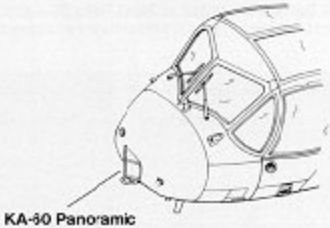


This Oregon National Guard Mohawk was originally an OV-1C which was rebuilt to OV-1D standards. National Guard Mohawks are often called upon to provide various services to State agencies such as forest surveys using CDIR film to detect plant diseases. (Author)

The U.S. Customs Service operated a total of four Mohawks, using them operationally from 1971 until 1986. They were all delivered from the Army in the standard U.S. Army Red and White training color scheme before being repainted in Customs colors and markings. (Vernon Skeen)

Customs OV-1C

OV-1C



Customs
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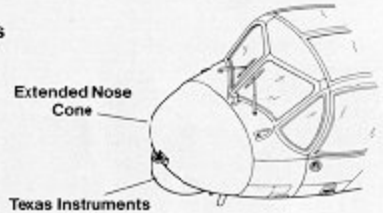


TEXAS INSTRUMENT FLIR

The FLIR turret installed on Customs Service Mohawks is made by Texas Instruments and has proven to be very effective in tracking low flying aircraft. The FLIR installation is similar to the installation used on the Navy's Grumman A-6E Intruder attack aircraft. (Vernon Skeen)

The Forward Looking Infrared sensor turret as installed on a Mohawk which is destined for the U.S. Customs Service. After the FLIR was in place an modified nose cone was added which extended the nose of the Mohawk slightly. (Vernon Skeen)

This OV-1 of the U.S. Customs Service is painted in Gloss Navy Blue and White. The White pod under the nose is a Forward Looking Infrared (FLIR) sensor turret used to track low flying aircraft. (Vernon Skeen)

During 1974, the USGS OV-1B was active surveying the route of the Alaskan oil pipeline and, later that year, it helped study pack ice in the Beaufort Sea off the North coast of Alaska. In the frozen Arctic, the use of an ejection seat to abandon a crippled aircraft would mean almost certain death due to exposure. As a result the OV-1B was equipped with special underwing pods loaded with emergency flotation gear that would allow the survey crews to ditch the aircraft and have a much better chance at survival. Originally, the USGS OV-1B retained its U.S. Army Olive Drab paint scheme and Army serial number. Later it was repainted in a Red and White color scheme with a civil N number registration. Interestingly, the primary USGS pilots were a couple of gray haired ladies who had started with the agency as secretaries, took flying lessons, graduated, and went on to become highly proficient survey pilots.

The U.S. Customs Service used the Mohawk to track suspected drug smuggler aircraft in day, night, or bad weather. The Customs Service operated the Mohawk for some fifteen years before finally replacing them during 1986 with Grumman E-2C Hawkeyes. (Vernon Skeen)

The Environmental Protection Agency (EPA) also used an OV-1C to monitor atomic power plants during the early 1970s. The specially equipped Mohawk could detect a ¼ degree change in air temperature, which could possibly signal the presence of a radiation leak. Initially it, like the USGS aircraft, retained its Army paint scheme. Later it was repainted in an overall White scheme with EPA insignia. The aircraft was later returned to U.S. Army service.

H.G. & G., an engineering firm in Las Vegas, obtained a contract with the Atomic Energy Commission to monitor the underground atomic bomb tests in Nevada. For this contract they obtained a single OV-1C during 1972 and operated it for about a year.

Additionally, there are at least three privately owned Mohawks, one of which was used in the filming of two television series, "Blue Thunder" and "Air Wolf." Usually the Mohawk was cast in the role of a bad guy with underwing gun pods.

(Above) The U.S. Geological Survey Department operated this OV-1B during 1971 with the civil registration N171. The aircraft retained its original Red and White Army color scheme with the Geological Survey logo replacing the United States Army on the fuselage in Black. (Author)

(Below) This overal Gloss White OV-1B (64-14243) was operated by the Environmental Protection Agency during the early 1970s to monitor water pollution and nuclear power plants. (Dave Menard)

Future Mohawk Programs

At the beginning of the OV-1 program, the Army had planned that the Mohawk would have a twenty year service life. Now, some thirty years later, only a relatively few Mohawks have reached a total of 7,000 flight hours, or half of the Mohawk's original design fatigue life. As a surveillance system, the equipment installed on the OV-1D has nearly twice the capabilities as those installed on the earlier OV-1As, OV-1Bs and OV-1Cs. Incredibly, most senior Army commanders feel that the Mohawk's real potential still lies ahead.

To the Army's battlefield commanders, the fact that the majority of the OV-1 fleet is far from the end of their useful services lives is welcome news. Currently there is no fixed-wing replacement aircraft under consideration or design and Army officials indicate that it will be close to the year 2000 before work on a replacement for the Mohawk will be started.

With this in mind the Army continues to plan progressive updates and improvements for their fleet of OV-1D/RV-1Ds that will keep the aircraft in front line service well into the next century. New avionics systems and surveillance equipment planned for installation on the OV-1D Mohawk will be lighter and new data-link communications equipment will be faster. Most OV-1Ds now carry the ADR-6 radiation monitoring (radiac) system in the rear fuselage. This system allows the for a constant mapping of ground radiation levels along the aircraft's flight path. Using such information the ground commander could plan his movements around areas of high radiation in the event of a tactical nuclear exchange. The ADR-6 also provides the crew with an audible warning should radiations levels reach the danger point for the aircraft and crew. New ECM equipment, such as the AN/ALQ-147 IR jammer and APR-25/26 RHAW suite carried on all OV-1Ds and RV-1Ds, will enhance the Mohawks ability to survive on the modern battlefield. These improvements will enable commanders to continue to base their battlefield decisions on accurate and timely information provided by this unique asset.

Presently, the Mohawk is no longer permitted to carry weapons, however, it does carry some of the most sophisticated electronic and imaging systems ever to go into a tactical combat aircraft. The OV-1 continues to soldier on after a career of over thirty years because it continues to delivers what it was designed to do. The airframe has been found to be extremely adaptable allowing the Mohawk to be successfully adapted to carry rapidly changing surveillance technology. Today the Mohawk is the Army's only fixed-wing combat aircraft.

The OV-1 is one of the safest aircraft currently in the military inventory. It has all weather capability, ample emergency and back-up systems, and, if all else fails, ejection seats. Grumman continues to work on future upgrades to the OV-1D Mohawk. Recently there have been reports that the Army is considering another rebuild program of older OV-1 airframes under the designation OV-1E. No details of this program have been released at this time, however, it is believed that these aircraft will be configured with uprated engines, solid state electronics, and state-of-the-art ELINT/SIGINT equipment for use in the NATO area of operations.

Grumman has also proposed for block improvements, Service Life Extension Programs (SLEP), and other programs for the existing fleet of OV-1Ds. Total production of the Mohawk was 380 aircraft, of these, approximately 225 are still in active service. Current Army Military Intelligence battalions consist of a company of ten to twelve OV-1Ds augmented by a second company equipped with six RV-1Ds and six RU-21/RC-12 aircraft. There are currently six active and reserve/National Guard battalions, plus various support and training companies. There are two battalions based in Europe, and

This RV-1D (64-14243) was converted from an OV-1B to RV-1D standards. By conducting Service Life Extension and other rebuild programs, the Army will ensure that the Mohawk's equipment and sensors will keep the aircraft current despite rapidly changing technology and operational requirements. (Doug Slowiak)

one in Korea, while the US based units often deploy to hot spots closer to home. Mohawks have been used in Central America to monitor insurgent activity in Honduras, El Salvador, and other countries.

Most of earlier OV-1As are available for future rebuild programs, being held in storage at Davis-Monthan Air Force Base near Tucson, Arizona. These aircraft are available should the Army decide to go ahead with the OV-1E rebuild program. As one Army commander put it; "The best replacement for the Mohawk would be another Mohawk."

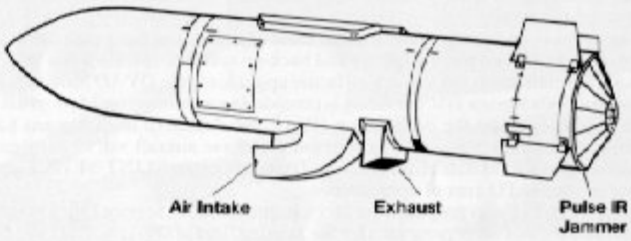
This RV-1D Mohawk (64-14244) of the 2nd Military Intelligence Battalion has its equipment access panels open for maintenance. The 2nd MIB is stationed at Stuttgart, West Germany as part of the US NATO forces. (Author)

This OV-1D was the first new production aircraft off the Grumman production line and with service life extension programs and other improvements it will probably remain in service for years to come. Mohawks are expected to remain in service with both the regular Army and National Guard well into the late 1990s. (Wayne Mutza)

This OV-1D (68-15954) of the 641st Military Intelligence Battalion carries a small cartoon character on the nose just in front of the Black ejection seat triangle. The wheel wells and landing gear door interiors are painted Gloss White. (Douglas Slowiak)

AN/ALG-147 (V) 1
IR Counter Measures Pod

OV-1D/RV-1D

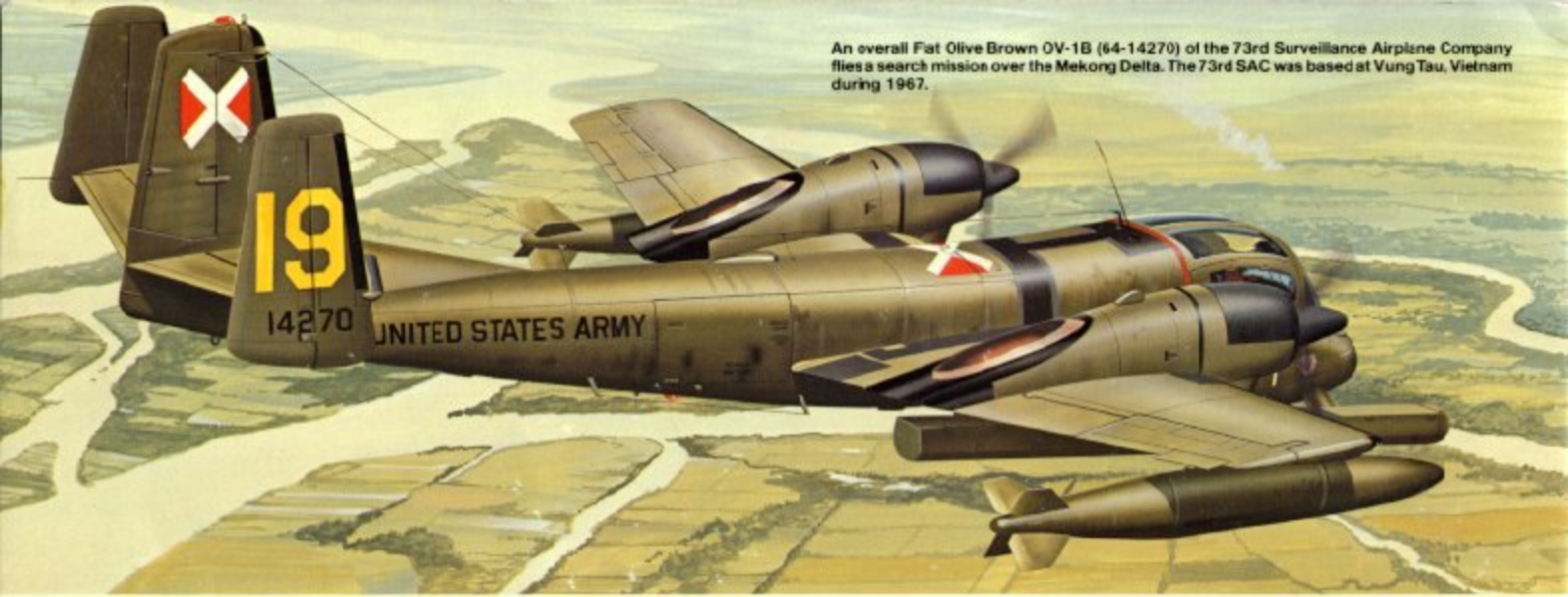


A number of early OV-1 Mohawks, such as these OV-1Bs, are in storage at Davis Monthon Air Force Base and are available for future rebuild programs. These aircraft have all openings sealed with a plastic coating to protect them from dust and moisture. (Tom Garcia via Wayne Mutza)

This National Guard OV-1D (67-18927) is now at the Grumman facility at Stuart, Florida for modernization and upgrading. The two teardrop shaped fairings on the lower forward fuselage are the attachment points for the SLAR pod. (Author)

This OV-1D parked on the ramp at El Paso, Texas on 26 February 1983, is assigned to the 224th Military Intelligence Battalion. The propellers are feathered, a standard practice for Mohawks when parked, to prevent them from windmilling. (LT M.J. Kusiuba)

This RV-1D (64-14238) on the ramp at Wiesbaden, West Germany on 1 August 1984, was destroyed in a crash a short time later. The ELINT pod on the wing is overal Flat Black. (P. Zastrow)



An overall Flat Olive Brown OV-1B (64-14270) of the 73rd Surveillance Airplane Company flies a search mission over the Mekong Delta. The 73rd SAC was based at Vung Tau, Vietnam during 1967.

An overall Flat Light Gray OV-1D (68-15938) of the 73rd Combat Intelligence Company (AS) of the 2nd Military Intelligence Battalion, based at Stuttgart, West Germany during 1988.

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