Bell OH-58 Kiowa

Role	Observation and reconnaissance helicopter
National origin	United States
Manufacturer	Bell Helicopter
First flight	Bell 206A: 10 January 1966 OH-58D: 6 October 1983 OH-58F: 26 April 2013
Introduction	May 1969
Status	In service
Primary users	United States Army Republic of China Army Royal Saudi Land Forces Croatian Air Force
Produced	1966–1989
Number built	2,200
Unit cost	OH-58D: US$4.9 million (1990) OH-58D KW: US$6.7 million (1990) KW retrofit: US$1.3 million (1990)
Developed from	Bell 206

The **Bell OH-58 Kiowa** is a family of single-engine, single-rotor, military helicopters used for observation, utility, and direct fire support. Bell Helicopter manufactured the OH-58 for the United States Army based on the 206A JetRanger helicopter. The OH-58 has been in continuous use by the U.S. Army since 1969.

The latest model, the *OH-58D Kiowa Warrior*, is primarily operated in an armed reconnaissance role in support of ground troops. The OH-58 has been exported to Austria, Canada, Dominican Republic, Taiwan, and Saudi Arabia. It has also been produced under license in Australia.

Mast mounted sight
The OH-58D introduced the most distinctive feature of the Kiowa family — the Mast Mounted Sight (MMS), which resembles a beach ball, perched above the rotor system. It has a gyro-stabilized platform containing a Television System (TVS), a Thermal Imaging System (TIS), and a Laser Range Finder/Designator (LRF/D). These new features gave the aircraft the additional mission capability of target acquisition and laser designation in both day and night, and in limited-visibility and adverse weather.

Wire Strike Protection System
One distinctive feature of operational OH-58s is the knife-like extensions above and below the cockpit which is part of the passive Wire Strike Protection System. It can protect 90% of the frontal area of the helicopter from wire strikes that can be encountered at low altitudes by directing wires to the upper or lower blades before they can entangle the rotor blade or landing skids. The OH-58 was the first helicopter to test this system, after which the system was adopted by the US Army for the OH-58 and most of their other helicopters.

Development

On 14 October 1960, the United States Navy asked 25 helicopter manufacturers on behalf of the Army for proposals for a Light Observation Helicopter (LOH). Bell Helicopter entered the competition along with 12 other manufacturers, including Hiller Aircraft and Hughes Tool Co., Aircraft Division. Bell submitted the *D-250* design, which would be designated as the *YHO-4*. On 19 May 1961, Bell and Hiller were announced as winners of the design competition.

Light Observation Helicopter (LOH)

Bell developed the D-250 design into the *Model 206* aircraft, re-designated as *YOH-4A* in 1962, and produced five prototype aircraft for the Army's test and evaluation phase. The first prototype flew on 8 December 1962. The YOH-4A also became known as the *Ugly Duckling* in comparison to the other contending aircraft. Following a fly off of the Bell, Hughes and Fairchild-Hiller prototypes, the Hughes OH-6 Cayuse was selected in May 1965.

When the YOH-4A was rejected by the Army, Bell went about solving the problem of marketing the aircraft. In addition to the image problem, the helicopter lacked cargo space and only provided cramped quarters for the planned three passengers in the back. The solution was a fuselage redesigned to be more sleek and aesthetic, adding 16 cubic feet (0.45 m^3) of cargo space in the process. The redesigned aircraft was designated as the *Model 206A*, and Bell President Edwin J. Ducayet named it the *Jet Ranger* denoting an evolution from the popular Model 47J *Ranger*.

YOH-4A LOH in flight.

In 1967, the Army reopened the LOH competition for bids because Hughes Tool Co. Aircraft Division could not meet the contractual production demands. Bell resubmitted for the program using the Bell 206A. Fairchild-Hiller failed to resubmit their bid with the YOH-5A, which they had successfully marketed as the FH-1100. In the end, Bell underbid Hughes to win the contract and the Bell 206A was designated as the OH-58A. Following the U.S. Army's naming convention for helicopters, the OH-58A was named Kiowa in honor of the Native American tribe.

Advanced Scout Helicopter

In the 1970s, the U.S. Army began evaluating the need to improve the capabilities of their scout aircraft. The OH-58A lacked the power for operations in areas that exposed the aircraft to high altitude and hot temperatures, areas where the ability to acquire targets was a critical deficiency in the tactical warfare capabilities of Army aviation.

The power shortcoming caused other issues as the Army anticipated the AH-64A's replacement of the venerable AH-1 in the Attack battalions of the Army. The Army began shopping the idea of an Aerial Scout Program to industry as a prototype exercise to stimulate the development of advanced technological capabilities for night vision and precision navigation equipment.

The stated goals of the program included prototypes that would possess an extended target acquisition range capability by means of a long-range stabilized optical subsystem for the observer, improved position location through use of a computerized navigation system, improved survivability by reducing aural, visual, radar, and infrared signatures, and an improved flight performance capability derived from a larger engine to provide compatibility with attack helicopters.

In early March 1974, the Army created a special task force at Fort Knox to develop the system requirements for the Aerial Scout Helicopter program, and in 1975 the task force had formulated the requirements for the Advanced Scout Helicopter (ASH) program. The requirements were formulated around an aircraft capable of performing in day, night, and adverse weather and compatible with all the advanced weapons systems planned for development and fielding into the 1980s. The program was approved by the System Acquisition Review Council and the Army prepared for competitive development to begin the next year. However, as the Army tried to get the program off the ground, Congress declined to provide funding for it in the fiscal year 1977 budget and the ASH Project Manager's Office (PM-ASH) was closed on 30 September 1976.

While no development occurred during the next few years, the program survived as a requirement without funding. On 30 November 1979, the decision was made to defer development of an advanced scout helicopter in favor of pursuing modification of existing airframes in the inventory as a near term scout helicopter (NTSH) option. The development of a mast-mounted sight would be the primary focus to improve the aircraft's ability to perform reconnaissance, surveillance, and target acquisition missions while remaining hidden behind trees and terrain. Both the UH-1 and the OH-58 were evaluated as NTSH candidates, but the UH-1 was dropped from consideration due to its larger size and ease of detection. The OH-58, on the other hand demonstrated a dramatic reduction in detectability with an MMS.

On 10 July 1980, the Army decided that the NTSH would be a competitive modification program based on developments in the commercial helicopter industry, particularly Hughes Helicopters development of the Hughes 500D which provided significant improvements over the OH-6.

Army Helicopter Improvement Program (AHIP)

The Army's decision to acquire the NTSH resulted in the "Army Helicopter Improvement Program (AHIP)". Both Bell Helicopter and Hughes Helicopters redesigned their scout aircraft to compete for the contract. Bell offered a more robust version of the OH-58 in their model 406 aircraft, and Hughes offered an upgraded version of the OH-6. On 21 September 1981, Bell Helicopter Textron was awarded a development contract. The first prototype flew on 6 October 1983, and the aircraft entered service in 1985 as the OH-58D.

Initially intended to be used in attack, cavalry and artillery roles, the Army only approved a low initial production level and confined the role of the OH-58D to field artillery observation. The Army also directed that a follow-on test be conducted to further evaluate the aircraft due to perceived deficiencies. On 1 April 1986, the Army formed a task force at Fort Rucker, Alabama, to remedy deficiencies in the AHIP. As a result of those deliberations, the Army had planned to discontinue the OH-58D in 1988 and focus on the LHX, but Congress approved $138 million for expanding the program, calling for the AHIP to operate with the Apache as a hunter/killer team; the AHIP would locate the targets, and the Apache would destroy them in a throwback to the traditional OH-58/AH-1 relationship.

The Secretary of the Army directed instead that the aircraft's armament systems be upgraded, based on experience with Task Force 118's performance operating armed OH-58D helicopters in the Persian Gulf in support of Operation Prime Chance, and that the aircraft be used primarily for scouting and armed

reconnaissance. The armed aircraft would be known as the OH-58D Kiowa Warrior, denoting its new armed configuration. Beginning with the production of the 202nd aircraft (s/n 89-0112) in May 1991, all remaining OH-58D aircraft were produced in the Kiowa Warrior configuration. In January 1992, Bell Helicopter received its first retrofit contract to convert all remaining OH-58D Kiowa helicopters to the Kiowa Warrior configuration.

MAPS OH-58A – Serial Number 69-16153

The airframe at the MAPS Air Museum is an OH-58A version (Serial # 69-16153) spent much of its service life assigned to units in Germany as part of the NATO forces structure.

The initial assignment for this Kiowa was with Headquarters and Headquarters Troop of the 2nd Armored Cavalry Regiment based in Nurnberg, Germany (APO 09093). The assignment with HHT, 2nd ACR lasted until October 24, 1980 when the airframe was transferred to Company D, 3rd Aviation Battalion (Combat) located in Kitzingen, Germany (APO 09031). On February 10, 1982, the Kiowa was reassigned to Company A of the 3rd Aviation Battalion (Combat) then stationed in Giebelstadt, Germany (APO 09182). That assignment lasted until February 1, 1985 when the OH-58A was reassigned to the 225th General Support Aviation Company (GSAC) also located in Giebelstadt.

The assignment to the 225th GSAC ended on December 9, 1986 when the airframe was again reassigned, this time to Company B, 70th Transportation Battalion, stationed in Sandhofen, Germany (APO 09028). This tour of duty lasted less than a year (June 6, 1987) at which time the Kiowa was assigned to Headquarters and Headquarters Troop, 4th Squadron, 4th Cavalry Regiment. When the 4/4 rotated back to CONUS on January 29, 1989, the OH-58A was transferred to Headquarters and

Headquarters Troop, 3rd Squadron, 4th Cavalry Regiment and remained in place at APO 09702.

On September 11, 1992, 69-16153 came home with an assignment to the Corpus Christi Army Depot in Texas for refit. The reconditioning took less than two months and then the airframe was transferred on November 5, 1992 to the Indiana Army National Guard and assigned to Headquarters and Headquarters Company of the Aviation Brigade, 38th Infantry Division in Shelbyville, Indiana.

The Kiowa came to Ohio on June 6, 1995 when it was reassigned to the 4th Squadron, 107th Armored Cavalry Regiment of the Ohio Army National Guard stationed at the Akron-Canton Regional Airport.

The aircraft was transferred for static display to MAPS on September 27, 1996 when the 4/107th ACR was inactivated and removed from the force structure. The authorization for this donation was per AMSAT-I-SPWS Letter of Authority dated 8 July, 1996. 69-16153 had 3952.7 flight hours on the date of it's decommission.

Variants

OH-58A
The *OH-58A Kiowa* is a 4-place observation helicopter. The Kiowa has two-place pilot seating, although the controls in the left seat are designed to be removed to carry a passenger up front. During its Vietnam development, it was fitted with the M134 Minigun; a 7.62 mm electrically operated machine gun. A total of 74 OH-58A helicopters were delivered to the Canadian Armed Forces as *COH-58A* and later redesignated as *CH-136 Kiowa* helicopters.

OH-58A

In 1978, OH-58A aircraft began to be converted to the same engine and dynamic components as the OH-58C. And, in 1992, 76 OH-58A were modified with another engine upgrade, a thermal imaging system, a communications package for law enforcement, enhanced navigational equipment and high skid gear as part of the Army National Guard's (ARNG) Counter-Drug RAID program.

OH-58C

Equipped with a more robust engine, the *OH-58C* was supposed to solve many issues and concerns regarding the Kiowa's power. In addition to the upgraded engine, the OH-58C had unique IR suppression systems mounted on its turbine exhaust. Early "C" models featured flat-panel windscreens as an attempt to reduce glint from the sun, which could give away the aircraft's location to an enemy. The windscreens had a negative effect of limiting the forward view of the crew, a previous strength of the original design.

OH-58C operated by the National Test Pilot School at the Mojave Airport. The flat windscreen and the IR suppressors on the exhaust can be clearly seen.

The aircraft was also equipped with a larger instrument panel, roughly a third bigger than the OH-58A panel, which held larger flight instruments. The panel was also equipped with Night Vision Goggle (NVG) compatible cockpit lighting. The lights inside the aircraft are modified to prevent them from interfering with the aircrews' use of NVGs. OH-58C aircraft were also the first U.S. Army scout helicopter to be equipped with the AN/APR-39 radar detector, a system which allowed the crew to know when there were anti-aircraft radar systems in proximity to the aircraft.

Some OH-58C aircraft were armed with two AIM-92 Stingers. These aircraft are sometimes referred to as OH-58C/S, the "S" referring to the Stinger installation. Called Air-To-Air Stinger (ATAS), the weapon system was intended to provide an air defense capability.

OH-58D

The *OH-58D* (Bell Model 406) was the result of the Army Helicopter Improvement Program (AHIP). An upgraded transmission and engine gave the aircraft the power it needed for nap-of-the-earth flight profiles, and a four-bladed main rotor made it much quieter than the two-bladed OH-58C. The OH-58D introduced the distinctive Mast-Mounted Sight (MMS) above the rotor system, and a mixed glass cockpit, with traditional instruments identified as "standby" for emergency use.

OH-58D Kiowa. Note the lack of weapons pylons.

The *Bell 406CS* "Combat Scout" was based on the OH-58D (sometimes referred to as the *MH-58D*). Fifteen aircraft were sold to Saudi Arabia. A roof-mounted Saab HeliTOW sight system was opted for in place of the MMS. The 406CS also had detachable weapon hardpoints on each side.

The *AH-58D* was an OH-58D version operated by Task Force 118 (4th Squadron, 17th Cavalry) and modified with armament in support of Operation Prime Chance. The weapons and fire control systems would become the basis for the Kiowa Warrior. AH-58D is not an official DOD aircraft designation, but is used by the Army in reference to these aircraft.

The *Kiowa Warrior*, sometimes referred to by its acronym *KW*, is the armed version of the OH-58D Kiowa. The main difference that distinguishes the Kiowa Warrior from the original AHIP aircraft is a universal weapons pylon found mounted on both sides of the aircraft. These pylons are capable of carrying combinations of AGM-114 Hellfire missiles, air-to-air Stinger (ATAS) missiles, 7-shot 2.75 in (70 mm) Hydra-70 rocket pods, and an M296 .50 caliber machine gun. The Kiowa Warrior upgrade also includes improvements in available power, navigation, communication and survivability, as well as modifications to improve the aircraft's deployability.

General characteristics (OH-58A)

- **Crew:** 1 pilot, 2 pilots, or 1 pilot and 1 observer
- **Length:** 32 ft 2 in (9.80 m)
- **Rotor diameter:** 35 ft 4 in (10.77 m)
- **Height:** 9 ft 7 in (2.92 m)
- **Empty weight:** 1,583 lb (718 kg)
- **Max takeoff weight:** 3,000 lb (1,360 kg)
- **Power plant:** 1 × Allison T63-A-700 turbo-shaft, 317 shp (236 kW)
- **Fuselage length:** 34 ft 4.5 in (10.48 m)

Performance

- **Maximum speed:** 120 knots (222 km/h, 138 mph)
- **Cruise speed:** 102 knots (188 km/h, 117 mph)
- **Range:** 299 mi (481 km, 260 nmi)
- **Service ceiling:** 19,000 ft (5,800 m)

Armament

- **Guns:**
  - One M134 7.62 mm Mini-gun mounted on the M27 Armament Subsystem, *or*
  - One M129 40 mm Grenade Launcher mounted on the XM8 Armament Subsystem

General characteristics - OH-58D Kiowa Warrior

- **Crew:** 2 pilots
- **Length:** 42 ft 2 in (12.85 m)
- **Main rotor diameter:** 35 ft 0 in (10.67 m)
- **Height:** 12 ft $10\frac{5}{8}$ in (3.93 m)
- **Main rotor area:** 14.83 ft^2 (1.38 m^2)
- **Empty weight:** 3,829 lb (1,737 kg)
- **Gross weight:** 5,500 lb (2,495 kg) **Power plant:** 1 × Rolls-Royce T703-AD-700A or 250-C30R/3 turbo-shaft, 650 hp (485 kW) each

Performance

- **Maximum speed:** 149 mph (241 km/h)
- **Cruise speed:** 127 mph (204 km/h)
- **Range:** 345 miles (555 km)
- **Service ceiling:** 15,000 ft (4,575 m)

Armament

- AGM-114 Hellfire anti-tank missiles
- Hydra 70 rockets
- M296 or M3P .50 cal (12.7 mm) machine gun.
- AIM-92 Stinger air-to-air missiles (no longer used)