

Air and Space this Week

Item of the Week

THE BELL UH-1 IROQUOIS HELICOPTER (AKA “HUEY”)

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The Huey helicopter is one of the iconic symbols of the Viet Nam War, and for good reason. There were a lot of them and they flew just about everywhere on a variety of missions, from medivac, to troop carrier, to gunship, and more. After Viet Nam, the Huey saw service in many civilian pursuits (we used them in the 1983-84 Antarctic field season). Some are still in service today, and at least 133 of them are on static display, in museums, or otherwise out in the public. The original design allowed for a lot of customization, and the development of improved versions.

INCEPTION TO PROTOTYPE

Development of the technology that would enable vertical flight began in earnest in the 1930s. Experimental models had been built in the 20s, but most were sometimes-comical failures, although there was a successful 1-km flight in 1926. It was the work of Igor Sikorsky, however, that led to practical helicopters. His XR-4 Hoverfly model was used on occasion by the U.S. Army for medivac and other purposes. During the Korean War, more advanced helicopters were used to rescue downed pilots, perform reconnaissance, and more.

The Army was convinced of the military value of the helicopter, based on prior experience in action. In 1952, they foresaw a lot of uses for the next generation of helicopters, and put out a request for bids, looking for a helicopter that would allow for internal transfer of more medical cases, and be more useful for general utility purposes. Twenty aircraft manufacturing companies submitted a design and bid. The Bell Aircraft Company, famous for their “cobra” line of fighter planes in WWII and their X-1 rocket plane that “broke the sound barrier,” got the initial contract, which was awarded on **February 23, 1955, 69 years ago this week**. It was for Bell to build three copies of their Model 204 helicopter, which would wear the evaluation designation, “XH-40.”

The first XH-40 test flight occurred on October 20, 1956, at Fort Worth, Texas. The Army was so enamored with the design and their need for a good helo that they had ordered another six XH-40s even before the first test flight. The flight test program and resulting minor changes led to Bell receiving a production contract for 182 helicopters. The “XH” and “YH” designations for the prototypes gave way to “HU-1A,” with “Iroquois” as the helicopter’s name. Iroquois wasn’t

as popular as “Huey,” derived from the “HU,” so most continued to call it Huey, even after the designation was altered to be “UH-1A.”

PRODUCTION

Truth be told, the piston-engined UH-1A model was underpowered, barely able to meet the contract requirements. A larger engine went into the UH-1B variant, but the value of its greater power was at least partially offset by “aerodynamic deficiencies,” especially when the helicopter was fitted out for combat rather than medivac. The basic Huey design did, however, have some attractive features. Its metal fuselage was a semi-monocoque design, where much of the strength of the airframe comes from its skin, not a heavy frame (think soda can). The design also made the early models easy to upgrade.

The Huey hit its stride with the UH-1C variant. Its engine, a Lycoming T53-L-11, was a turboshaft type, without traditional pistons, which gave it a lot more power. The 1Bs still in service would be retrofitted with this same engine when possible. The rotor system and tail configuration were also improved considerably in the 1C variant. Better, redundant, hydraulic controls, larger fuel capacity, and other improvements made the Huey very effective. Production of the 1C variant began in June, 1966; a total of 766 were produced, all but ten earmarked for the Army.

The Army was pleased with the performance of the UH-1C. The 1C could carry six medical cases plus a medic with ease. However, the Army foresaw situations where a greater carrying capacity might be needed, either more stretchers or troops or supplies. The engineering solution was to extend the middle of the aircraft 3.5 feet, enough space for an additional four seats or two stretchers. Thus was born the UH-1D model, and the Army pre-ordered 205 of them in 1963. Bell created a variant akin to the 1D, but with a larger engine, and the result was designated the UH-1H model. The 1H proved to be a gem; 5,435 were built.

And what of the variants between UH-1D and UH-1H? Well, the Army wasn’t the only buyer looking favorably at the Huey design. The Marines wanted to get in on it, too, but they needed a Huey that was different than the Army’s. Since Marines fly and fight over/on saltwater, corrosion would be a concern, necessitating construction of aluminum. Marine communications gear would need to be accommodated, and Marine helos need to have a provision for a hoist system. The Marine Huey received the designation UH-1E and began arriving in service in early 1964.

The Air Force was also interested in the Huey. They had a fleet of HH-3 “Jolly Green Giant” rescue helicopters, and a large stock of the GE T38 turboshaft engines for them. They wanted a model of the Huey into which the GE T38 could be installed. Bell accommodated them (even though it wasn’t easy). [BTW, the HH-3 became rather famous, too, see [here](#).]

Numerous variants followed, due to changes in propulsion and/or other relatively-minor engineering changes. Not only were variants in all branches of the U.S. military, a number of foreign governments wanted them, too!

IN SERVICE: VIET NAM

The Huey's most famous service was in Viet Nam, where it would serve a variety of roles: troop transport, cargo transport, medevac, aerial attack, and ground support. Bell manufactured over 16,000 Huey helicopters of all variants from 1955-1976; over 7,000 of them saw action in Viet Nam, mostly UH-1H models.

But the Huey was not the first attack helicopter used in Viet Nam. The Marines had a helicopter designated the Sikorsky H-34, originally developed for Navy's anti-submarine warfare effort. It would be the last piston-engine helicopter used by the Marines, and was in primary use in the mid-1950s. In August, 1965, the Marines mounted up 5,500 troops under WWII veteran Lew Walt for Operation Starlite, an assault against the 1st Viet Cong Regiment, at Van Tuong. The mission was to eliminate a threat to the Chu Lai Air Base.

Starlite included naval artillery support and an amphibious landing in addition to the troops carried in by helicopter. The Marines outnumbered the Cong 3-1, but their AK-47s were better than the Marines' M-14s. Even though the loss ratio was strongly in the Marines' favor, they still took significant losses, especially in materiel. The lessons of the battle were clear: tracked vehicles were useless in jungle combat, and the Marines needed a more capable helicopter.

The Army embraced the Huey a lot faster than did the Navy and the Marines. The lessons of Starlite were just sinking in when the infamous battle of A Shau Valley occurred in March, 1966.

An Army Special Forces unit was surrounded by an entire division of the North Viet Nam Army, and they were frantically calling for aerial support and extraction. The Marines sent in an A-4 Skyhawk, but it was shot down. The Air Force sent in an AC-47; it was shot down. The Army sent in a UH-1E; it was shot down. Marines hearing the need sent in a group of H-34s under Captain Norm Urban. The H-34s were mobbed by ARVN and Army personnel when they arrived; they took as many as they could, but many of our guys remained behind. Capt. Urban went back to the area the next day to rescue a downed USAF pilot. He could not land near the pilot, and had to go to high altitude to burn off some fuel, and dumped supplies he was taking in, both to reduce weight enough to be able to use a cable to extract the pilot. It worked, but between the problems the day before, and the gyrations Urban had to go through to save one pilot, it was clear to the Marines that they needed the Huey, pronto. And at least some of them would need to be armed with heavy machine guns.

Quoting from the Warfare History Network, "According to Steve Maxham, director of the U.S. Army Aviation Museum at Fort Rucker, Alabama, 'With the creation of the UH-1 Huey, there was a quantum leap in rotorcraft. After the invention of the turbine engine, it changed rotary wing aircraft forever and it allowed the helicopter to go higher, farther, and faster.' Maxham concludes that Vietnam was 'the helicopter war.' Without the advent of the Huey, he says, the war would have been impossible to fight. 'It changed how we conducted the war,' Maxham observes. 'It was used as a troop carrier, medevac platform, gunship, command and control, and the first TOW missile platform.'"

Hueys provided direct support to ground combat operations, usually in the form of covering fire. But not all of the support needed involved shooting up landing zone defenses. Keeping defenders from seeing incoming aircraft was important, too. So the Army developed a smoke-laying variant of the Huey, with a large smoke generator taking up much of the interior space. They could lay down lines of smoke that would obscure the ground combat area, reducing the reaction time and effectiveness of defenders. It was tough duty, because the almost-blinded defenders could see the smoke-laying helicopters, which as a result suffered a lot of damage and a lot of losses. The UH-1H in the collection of the National Air and Space Museum, “Smokey III,” started life as a UH-1D in 1966 and served four combat tours in Viet Nam, three of which was as a smoke-layer, getting upgraded to UH-1H and acquiring a lot of patched over bullet holes.

[I always got a kick showing this particular artifact to visitors at the Udvar-Hazy Center. Most of them had seen a Huey before, at least on TV, but they didn’t make the combat connection. At least until I asked them what they thought the many patches on the undercarriage of *Smokey III* might be!]

A total of 2,591 Hueys were combat losses in Viet Nam.

IN SERVICE: POST VIET NAM

Huey helicopters and newer helos derived from the Huey design played an important role in military and civilian service long after the Viet Nam War, up to the present day. When terrorists bombed Marine barracks in Beirut, Hueys evacuated the injured. Hueys were used to good effect in Operation Desert Storm. And when Hurricane Katrina devastated New Orleans, many people were rescued by Hueys.

The Huey base design allowed for specialized variants to be made, such as the AH-1 Cobra gunship, originally used to support hot Landing Zone attacks/extractions by regular Hueys in Viet Nam. The lead time necessary for the development of complex weapons systems, combined with the desire to remain “current,” requires planning for new weapons while the present generation of weapons is just coming into service, and military helicopters are a good example of this scheduling.

The Army is prohibited from owning fixed-wing attack aircraft; that’s the other Service’s gig. The Huey was a great helo, for its time, but Army brass were looking ahead for an even more-capable helicopter as Viet Nam was winding down. The Army issued a request for proposals for the next generation combat helicopter in January 1972, requiring significant advances in performance, survivability, and reliability. They also wanted a new, common engine for all its future helos, and, most importantly, the new helicopters proposed had to fit into a C-130 transport plane.

Boeing-Vertol and Sikorsky submitted proposals, and Sikorsky won. They created four prototypes, dubbed YOH-60A. The UH-60 was selected in December, 1976, and the UH-60 Black Hawk entered service in June, 1979. By then, work on the next generation of military

helicopters was well underway. The AH-1 Cobra led directly to the creation of the AH-64 Apache attack helicopter, which went into full production in 1982.

While all this new development was going on, the military had recognized as early as 1960 the need for a small, fast helicopter for scouting and reconnaissance. The request for proposals for a Light Observation Helicopter that could transport/evacuate a few soldiers and conduct observation, escort, and attack missions netted a dozen candidates. Three were chosen to build prototypes, Hughes, Bell, and Fairchild-Hiller. Hughes won the contract in May, 1965. The initial order was for 714 Hughes Model 369 helicopters; the order was soon increased to 1,300. Its military designation was OH-6.

The taking of American hostages in Iran and the subsequent failed multi-service rescue attempt in April, 1980, convinced Army planners that they needed to be able to perform special operations in all kinds of adverse conditions, and undertook strenuous efforts to acquire the necessary hardware and train a special unit for such ops, including a second attempt to rescue the hostages. They chose to beef up the existing OH-6 design, resulting in the “Little Bird,” a very small helo that could land just about anywhere but could carry serious firepower. It would be a great complement to the larger Huey.

The release of the hostages on January 21, 1981, reduced the time pressure on the development of the Little Bird, but the Army prudently kept intact the special ops unit that would use it, and developed a more-heavily armed variant, the AH-6. All of the (then) modern helicopters saw duty in Grenada, Nicaragua, the Iran-Iraq War, Operation Just Cause, the Somali Civil War (“Black Hawk Down”), and more. Later versions of the Little Bird carried a very significant firepower, up to and including a pair of mini-guns, automatic grenade launchers, small rockets, and even Hellfire missiles, making the Little Bird an effective tank-killer.

The technology innovations that the Huey begat showed up in a series of successively-modern multi-purpose military helicopters. But that technology proved valuable in non- or quasi-military applications, too. Examples include Coast Guard and Police search-and-rescue operations and the DEA’s use of small, quiet helos for drug traffic interdiction.

Forty-four countries have used or are using the UH-1 Huey in one or more of its variants! At least *133* Hueys are on static display or are in museums.

CODA

In the 1980s, American research in Antarctica was supported by the U.S. Navy, with C-140 and C-151 cargo planes to get supplies and personnel to and from the U.S. base at McMurdo Sound, and Huey helicopters to move science teams from base to field sites. The Huey pilots were mostly Viet Nam veterans, who flew reconnaissance out of Pt. Mugu in the northern hemisphere summer, then went south for the Antarctic field season [I strongly suspect the pilots were part of Helicopter Attack Squadron (Light) Five, the “Blue Hawks.”] The pilots loved the duty; they could make their own call signs, they flew in uncontrolled airspace, and they could say “sorry sir, I can’t do that” when a junketing VIP wanted to fly over those few spots in

Antarctica deemed off-limits by international treaty to any sort of visit. The enlisted guys, not so much. I know, and I was there.

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