OSPREY
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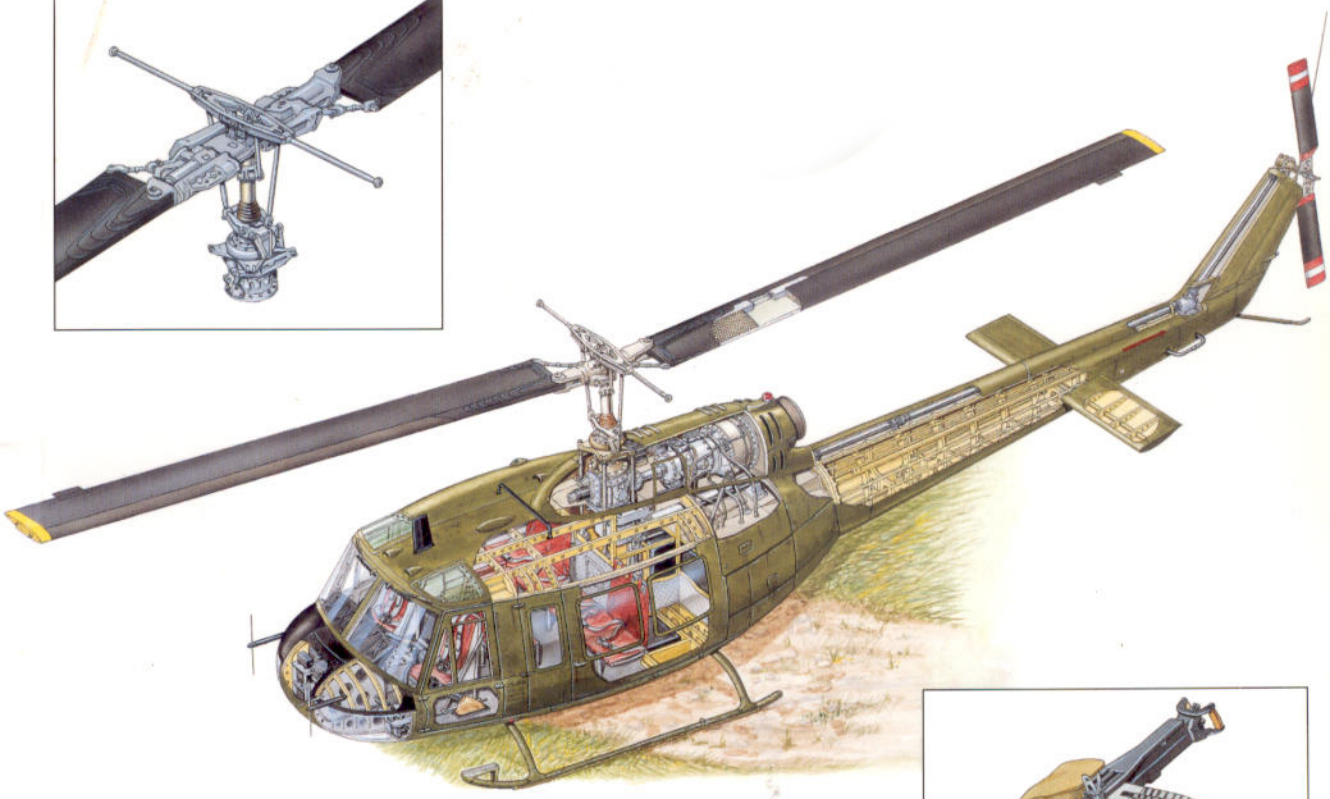
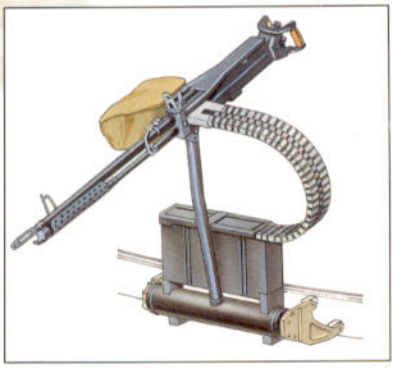
Bell UH-1 Huey "Slicks" 1962–75





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CHRIS BISHOP has worked in book packaging and publishing since the early 1980s. Amongst his many projects are the *Illustrated History of the Vietnam War* and *Vietnam Airwar Debrief*. He currently lives and works in London.

MIKE BADROCKE is one of Osprey's most highly respected and accomplished illustrators, notably in the field of precision "cutaway" artwork, as exemplified in this volume. Over the years he has produced quality artwork for numerous books, magazines and industry publications throughout the world, not only in the field of militaria, but also in the intricate and technically demanding sphere of aviation publishing.

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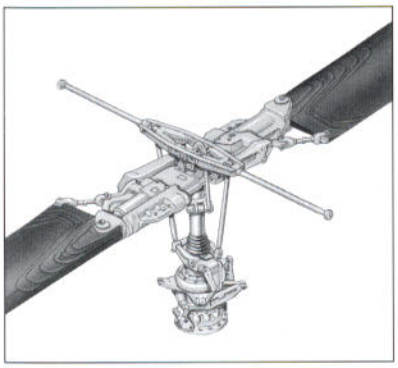

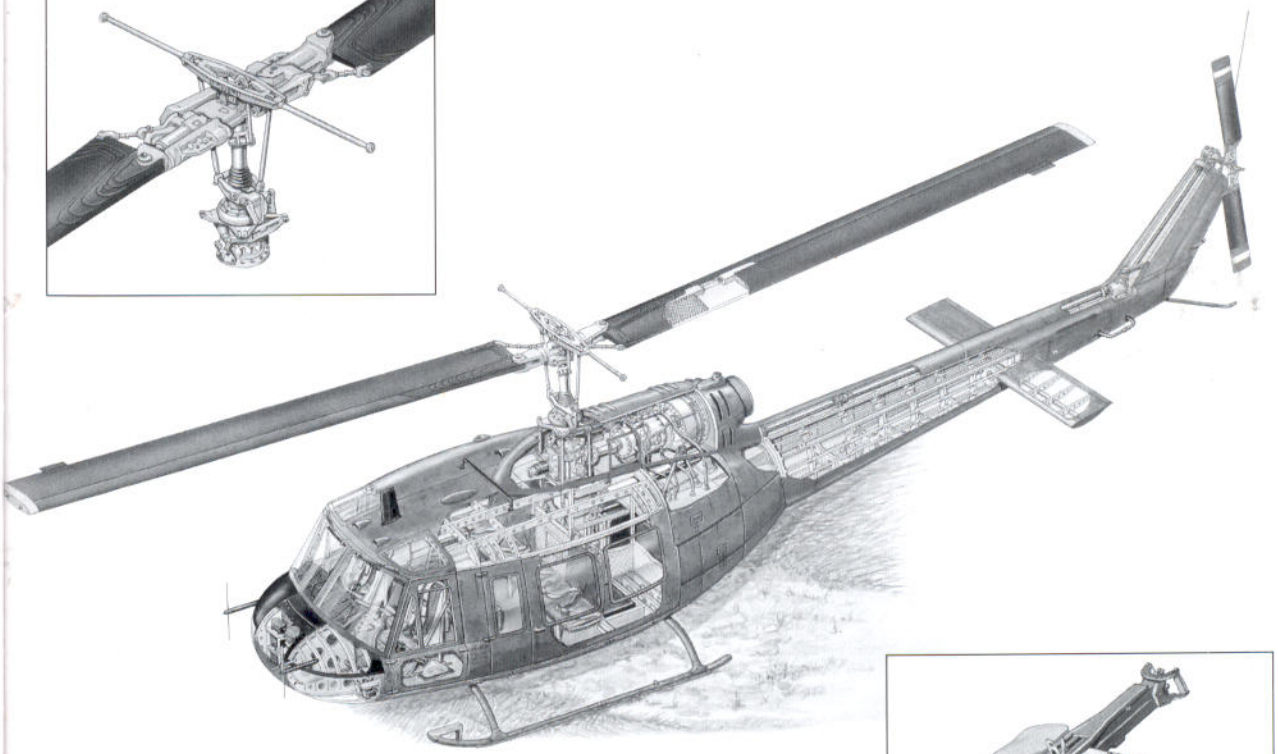

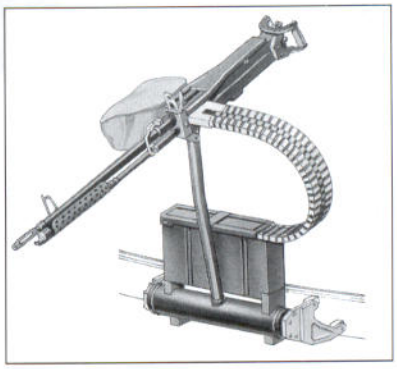

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Mike Badrocke, 37 Prospect Road, Southborough, Tunbridge Wells, Kent, TN4 0EN

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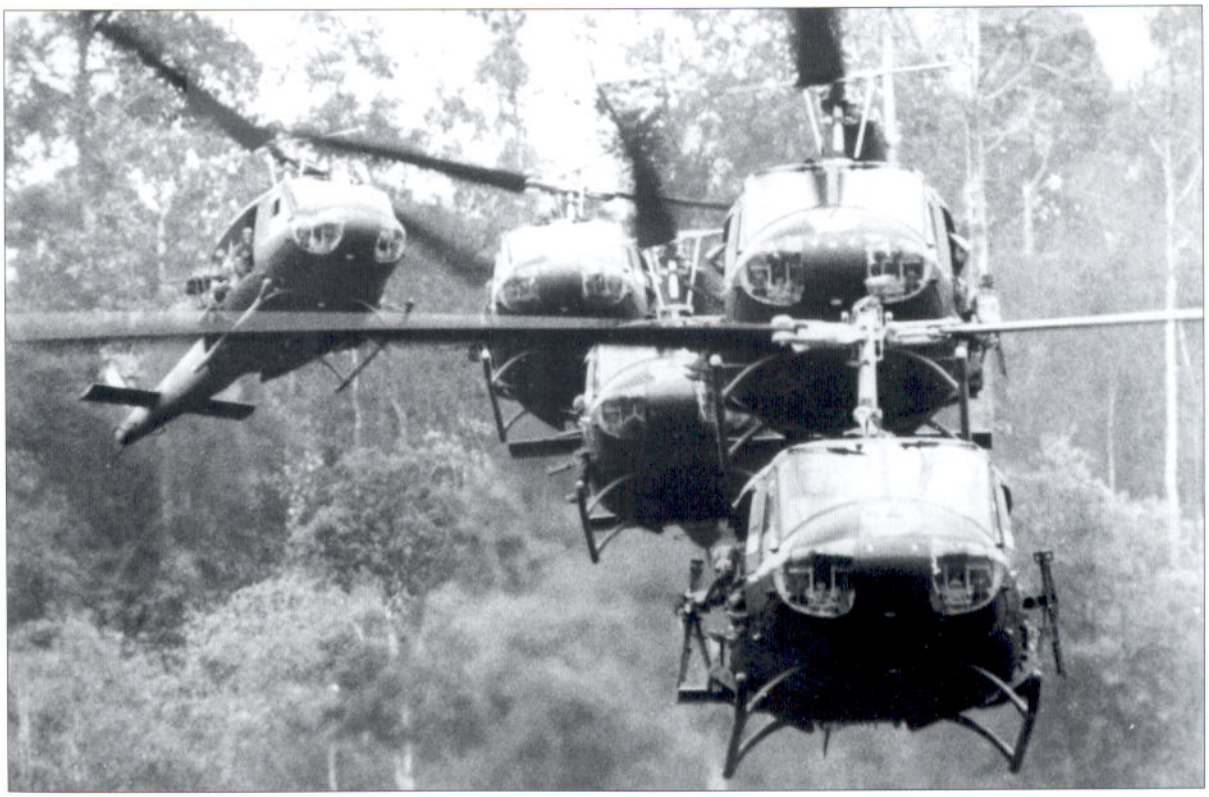
BELL UH-1 HUEY "SLICKS" 1962–75

ORIGINS AND DEVELOPMENT

What the Jeep was to the Allies during World War II, so was the Bell UH-1 Huey to those who experienced America's long conflict in Vietnam. For a time, it was one of the most recognizable aircraft in history. Vietnam was the first television war, and no news broadcast seemed complete without the Huey's instantly recognizable shape, together with the unmistakable whop-whop-whop of the main rotor blade, often audible long before the helicopter came into sight.

Built in larger numbers than any other helicopter, the Huey and its derivatives were used by all branches of the US armed services, and by most Allied nations. Hueys could be seen in action throughout Southeast Asia, from the Mekong Delta through the Vietnamese highlands to the neighboring countries of Cambodia and Laos.

In an unmatched history of product development lasting more than four decades, the Bell Helicopter Company turned a small utility



The Bell UH-1 Huey is one of the most famous aircraft in history. By the time these UH-1s of the US Army's 1st Infantry Division landed near Phouc Vinh in June 1967, the Huey had become the most recognizable symbol of America's involvement in Southeast Asia.

machine of the mid-1950s into a host of offspring, some carrying a payload almost double the laden weight of the original helicopter. Still in service today, aircraft of the Huey family have been built in huge numbers, exceeding those of any utility aircraft since 1945 except for the Antonov An-2. But it was as one of the most instantly recognizable symbols of the Vietnam War that the UH-1 gained its almost iconic status.

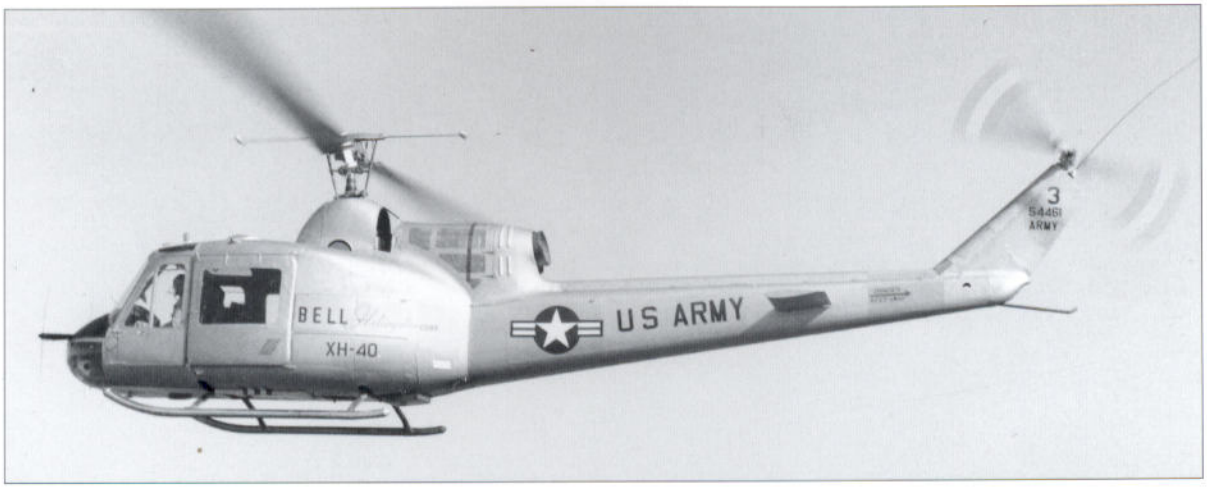
Bell was one of the pioneering helicopter manufacturers. One of its earliest products, the Bell 47, saw extensive military service during the Korean War. Bell was to use that experience in the design of a new helicopter for the US Army, the UH-1.

No single designation really covers this family, except for the colloquial "Huey." The name links a 700hp (522kW) six-seater transport of the 1950s with a modern 20-seater with five times the power, and takes in the lethal HueyCobra gunship family as well. For most of the Huey's production history, the only thing the many variants have in common is that the distinctive rotor slap from the characteristic Bell two-bladed rotor can be heard thumping for several minutes before the machine finally comes into view. Alas, the ultimate variants of the series no longer even have that, since the Model 412 with its smaller four-blade main rotor is much quieter. But they all have one thing in common. They are all Hueys.

The origins of the UH-1 date back to the muddy battlefields of the Korean War, where the original M.A.S.H. (Mobile Army Surgical Hospital) helicopter, the Bell 47, recovered thousands of wounded soldiers and delivered them straight to critical-care units. While the piston-powered helicopters of the time were still far from mature, being slow, noisy, and unreliable, they were effective enough to persuade some planners that they could effect a revolution in warfare.

Experience in Korea had underscored the value of the helicopter in a land battle, not so much as a carrier of weapons but as a versatile utility transport system that could deliver food and ammunition to a front line outpost and evacuate the casualties on its return. The Marines also used helicopters to ferry troops into battle, the first examples of a technique which would eventually evolve into the doctrine of "vertical envelopment." As millions know thanks to the long-running *M.A.S.H.* TV series, Bell Helicopter was in on the ground floor with this work with its Bell 47, but the piston engine of this pioneering machine could deliver little more than 200hp (149kW), which meant that the lightweight helicopter was very limited in what it could carry. Sikorsky's larger S-55 was more capable, but its performance was still limited by its heavy piston powerplant.

The US Army was slower to embrace the helicopter than the Marine Corps, but by the mid-1950s new ideas had evolved into serious



Built to a 1955 US Army requirement for a utility and medical evacuation helicopter, the Bell XH-40 used the distinctive Bell rotor system which had proved so successful on the Bell 47, mated to a larger and more streamlined fuselage.

planning. In 1954, the Army launched a design competition for a new utility helicopter which would serve primarily as a medical evacuation (medevac) machine. The Army specification described an aircraft that weighed 8,000lb (3,600kg), fully laden. It called for a payload of 800lb (360kg) to be carried for a distance of at least 227 miles (365km). The new machine was expected to be able to cruise at 114mph (184km/h), at a service ceiling of 6,000ft (1,824m) or more. In essence, the specification called for an aircraft with three times the power of the Bell 47 and with the lift capacity of the S-55, but wrapped up in a neater and higher performing machine than the Sikorsky design.

The Bell Helicopter Company enjoyed several advantages in competing for this contract. The Army held the company in high regard, based on the excellent service rendered by the piston-engine Bell 47 during the Korean War. Bell was also already flying an H-13D equipped with a French-designed, American-made, Continental XT-51 gas turbine engine. The turbine engine represented a revolutionary step in the development of helicopters, and the Army saw it as a critical component in the new medevac helicopter design. Compared to the reciprocating piston engine, the turbine was lighter, smoother, easier to maintain, and much more reliable.

Bell called the modified H-13D test aircraft the Bell Model 201 but the Army gave it the designation XH-13F. Testing this aircraft gave Bell the confidence to incorporate a turbine engine in the Army's new transport helicopter design. Fortunately, at about this time, the Avco Lycoming Company was developing the XT53 engine with Army backing. Lycoming had not designed this engine for a specific application but Bell engineers saw that it had great potential. They joined with Lycoming to develop the XT53 to Bell Helicopter specifications, and this new engine eventually powered the prototype Huey.

Lycoming's new engine was largely based on German wartime research. The company had employed German engineers after World War II, their skills and knowledge being needed to provide a foundation for the company's move into the new field of turbine engines for aircraft. The T53, a free-turbine shaft engine delivering some 700hp (522kW), was the first US design by a team headed by Dr Anselm Franz, who during the war had masterminded the Jumo 004 program which

Key to the success of the XH-40 was the use of a Lycoming T53 gas turbine engine. It was not the first jet-powered helicopter to fly – Bell's design was beaten into the air by the French Alouette – but the American helicopter was larger and more capable.

produced engines for the Messerschmitt 262, Arado 234, and many other German jet aircraft.

The T53 was a conservative design, which nevertheless promised to mature rapidly. At the same time, it offered the basic turbine advantages of a much better power-to-weight ratio, reduced bulk, greatly improved reliability, reduced fire risk, the ability to run on a wide range of fuels, and the elimination of complicated and power-absorbing cooling systems.

Not surprisingly, Bell won the US Army competition, and in June 1955 was awarded a contract for three prototypes designated XH-40. Bell's designation was Model 204, and the design team under Bartram Kelley was pleased with its clean and efficient offering. A particular advantage of the light and compact turboshaft engine was that it could be installed right next to the gearbox under the main rotor where it was readily accessible, yet did not encroach on the accommodation in the cabin. Compared with the S-55 the XH-40 had roughly the same cabin volume, but the cabin was wider and more efficient, the pilot and five passengers being all on the same low floor level, with side doors at a convenient height.

To minimize weight the fuselage had a tadpole configuration, the large cabin section being joined to a slim boom carrying the fin and tail rotor. The main rotor was rather like a scaled-up Model 47 rotor, with two blades made of light alloy, with an extruded spar, and with the company's patented stabilizer bar set at right angles to the blades. Engineering test pilot Floyd Carlson made the first flights at Fort Worth on October 20 and 22, 1956, and no severe problems were encountered.

By this time Bell was busy building a service-test batch of six YH-40s. These had the pre-production T53-L-1A engine of 700hp (522kW), a cabin extended by some 12in. (305mm) to accommodate four stretchers and a wider crew door, as well as greater ground clearance and modified flight controls.

Nine pre-production machines then followed. By this time the Army had revised its aircraft designation system, and the H-40 became the HU-1. In common with the tradition of naming helicopters after Native American tribes, it was also given the official name of Iroquois. However, the HU designation, which stood for "Helicopter, Utility," gave

The use of a lightweight gas turbine allowed Bell to mount the engine above the fuselage, leaving a clear and spacious cabin. The YH-40 had a similar capacity to the much larger Sikorsky S-55, but in a much more efficient and reliable package.

rise to the unofficial nickname "Huey." This quickly became an almost universal usage—certainly being far more commonly used than the official Iroquois designation.

First delivery of production HU-1As took place on June 30, 1959. The engine was by this time cleared to give 860shp (642kW), but it was flat-rated at 770shp (574kW) in all early Iroquois to give constant output in "hot and high" conditions. Delivered without armament, many early HU-1As were later fitted with various mixes of guns and rockets, while 14 were dual trainers with provision for real and simulated instrument instruction.

In 1959, work began on the improved YHU-1B, which could be powered by the 960shp (716kW) T53-5 or 1,100shp (821kW) T53-11. This jump in power made possible a major increase in gross weight, from 5,800lb (2,631kg) to 8,500lb (3,856kg). The extra power caused difficulty with the all-alloy rotors, and the HU-1B's main rotor blades were redesigned with increased chord and a honeycomb filling aft of the spar.

The cabin was again enlarged to seat the pilot and eight passengers in three rows; or a crew of two and seven armed troops; or three stretchers, two sitting casualties and a medic; or a cargo load of 3,000lb (1,361kg). This was roughly double the load lifted by the XH-40. The HU-1B first flew in 1960. The design had provision for fitting armament and, while some aircraft were flown without, many of the production models did carry weapons. The diverse armament schemes included the carriage of two 30mm cannon, or alternatively two packs each of 24 rockets or quadruple 0.3-in. machine guns, plus a 40mm grenade launcher.

By the time the first service examples were delivered to the US Army at the end of June 1959, the helicopter's designation had been changed from H-40 to HU-1. 183 examples of the initial HU-1A were built.

The production HU-1A was a foot longer than the XH-40 prototype, and had increased ground clearance. The first 14 were powered by a 700hp (522kW) T-53 engine. From the 15th airframe onwards they used the T-53-L-5, delivering 10 percent more power.

The increased power of the new version of the Huey opened up new tactical possibilities. In 1960, representatives from Bell Helicopter met with the Army's General Hamilton Howze. One of the Army's most visionary generals, Howze was a former cavalryman who had become the first Director of Army Aviation. At the time, he was promoting the idea of moving Army infantry around the battlefield using helicopters rather than trucks. It was not a new idea; Marines of the Marine Helicopter Squadron HMX-1 had first tested the concept of moving troops with helicopters in 1948, in exercises along the coast of North Carolina. Helicopter mobility had become an important part of Marine doctrine through the 1950s. The British had also used helicopters to move troops around the jungles in Malaya in the 1950s, and the French in Algeria were using helicopters to help fight the bitter insurgency war taking place there.

In 1961, President John F. Kennedy inspected a Huey during a visit to Fort Bragg, North Carolina. By then, the US Army—encouraged by the new president's fascination with unconventional warfare—was thinking about Howze's proposals. In 1961, General Howze chaired the Tactical Mobility Requirements Board, also known as the Howze board, which was formed to consider and test new tactical theories. During trials initiated by the board, Howze used Hueys to demonstrate the ease of moving a company of infantry (about 100 soldiers) across a river or over rough terrain. He argued that the Army's two airborne divisions—the 82d and the 101st—needed this capability because both units were designed to move quickly to counter battlefield threats.

The board tested the new Bell helicopter in a variety of climates, conditions, and missions. The Cold War could turn hot at any time, so the Army even tried out the Huey as a battlefield taxi for its Honest John, Little John, and Sergeant battlefield nuclear rocket projectiles. Later, when the US Air Force picked up on the potential of the Huey, it ordered the UH-1F model to supply intercontinental ballistic missile sites.

Based on the board's recommendations, the Army created the 11th Air Assault Division to test Howze's theories. The results led the Army to change fundamentally the way it rode into battle, in the process developing a whole new kind of warfare several years later on the other side of the world—in Vietnam.

In 1962, the introduction of the tri-service designation system changed the HU-1 into the UH-1, but people still called it the Huey. By this time Bell was well advanced in flight trials of a larger version of the Huey, which would be much more useful in the new airmobile operations then being developed.

The YUH-1D capitalized on the power of the L-11 engine to drive a 48ft (14.63m) rotor and lift an altogether bigger fuselage able to accommodate the pilot and 12 troops; or six stretchers and a medic; or 4,000lb (1,814kg) of freight. This was the first of the stretched Model 205 family, of which 6,000 were built in the first 10 years. Bell also continued to build more and more variants of the original Model 204 series, but by the early 1970s these had almost completely given way to the more capable Model 205 family. On its introduction the UH-1D became the standard troop carrier of the new airmobile formations then being developed.

Air mobility

The 11th Air Assault Division (Test) at Fort Benning, Georgia, became the testbed organization and the vehicle for extensive tactical training and experimentation. Cadres for the test division were activated on February 15, 1963. The man selected to command the new division was an obvious choice: Major General Harry W.O. Kinnard, a pilot and long time advocate of aviation within the Army. Kinnard organized a single battalion as a start and handpicked a few men to form a skeleton brigade staff. Men for the 11th were transferred from all over the Army, with only a few being airborne qualified, and still fewer having any knowledge of helicopters. Even when the division actually began testing, it was so small that it often had to borrow elements of the 2d Infantry Division, also stationed at Fort Benning, just to conduct exercises.

Concurrently with the organization of the 11th Air Assault Division (Test), the 10th Air Transport Brigade was activated around an existing aviation battalion at Fort Benning. Commanded by Colonel Delbert Bristol, this brigade's aviation assets also came from all over the Army and included many unique organizations and airframes. In the test concept, air vehicles were expected to become as much a part of the ground combat units as existing trucks, armored vehicles, and self-propelled

Work on the improved YHU-1B started in 1959. A major increase in power saw the maximum gross weight increase by 50 percent when compared to the HU-1A, and allowed the new variant to carry heavier loads in a wider variety of climates.

weapons, and provide the functions of all the ground equipment they replaced.

The tests of the air-mobile concept and tactics were to be conducted under the auspices of CONARC (Continental Army Command) as a direct result of studies ordered by Defense Secretary McNamara and the recommendation of the Howze board. The test director, Lieutenant General C.W.G. Rich, was the commanding general of the Infantry Center at Fort Benning. Test units were under the direct control of CONARC for organizational and training purposes. The Army's new Combat Developments Command at Fort Belvoir, Virginia, was given the mission to supervise development and implementation of appropriate tests and evaluations.

The increased power available to the HU-1B offered a number of new options to the US Army, and in 1960 the Army Aviation Board under the leadership of General Hamilton Howze began to look at new ways of using the helicopter in battle.

The biggest problem was deciding just what was to be tested. Test groups began immediately developing procedures, detailed tactics, and techniques throughout the testing cycle. Changes occurred on a daily basis, complicated by the need for the testing units to train themselves concurrently with the testing. There were no training texts or standard operating procedures to help the Test and Evaluation Group, just as there were none for the division tapped to execute the test. All these essential baseline documents and elements had to be formulated as the division and testbed grew. Kinnard, aware of this problem and its possible consequences for the test results, established his own board within the division to produce detailed internal organization plans and develop techniques to assimilate as the division grew.

The first phase of the test commenced in September 1963. Air Assault I was a battalion-size operation to test a system of command and control using a flying command post. A helicopter was equipped with ground-capable radios. The helicopter carried the brigade commander, an artillery liaison officer, a forward air controller, and the brigade operations officer to test command and control. Although this concept seems entirely natural in many cases today, at the time (and considering the technology available) it was a revolutionary idea. The troops used in Air Assault I included a battalion in the field and the skeleton brigade headquarters. The brigade headquarters simulated the brigade and division in the exercise. The field part of phase 1 began on April 20, 1964, at Fort Stewart, Georgia.

The main idea being considered in this phase of the test was developing the sequencing necessary to achieve surprise and massive offensive fire power in an air assault. Many new and untried techniques had to be assimilated, including formation flying, the use of aerial artillery to suppress enemy positions around the landing zones, assault doctrine, air lines of communication and control of airspace over the target area, to name just a few. Among the successes culled from this

The HU-1D was the first of a new and enlarged series of Bell helicopters, the Model 205. Larger than the preceding Model 204, the new variant first flew in August 1961. By the time it entered service in 1963, the Huey's designation had been changed to UH-1.

phase was the realization that airmobile brigade and battalion headquarters were capable of handling the jobs required without division control teams to integrate firepower and coordinate air operations.

Further field testing for a brigade-sized force was planned for June 1964, but the success of earlier tests and the full mobilization of the division made this exercise unnecessary. Air Assault II, the full division-sized test, was scheduled for the middle of October 1964. In the six months between the end of Air Assault I and the beginning of Air Assault II, General Kinnard ran eight major practice exercises to get the division ready. This Division also ran a number of functional tests concurrently to collect data and experience in air resupply, executing a variety of reconnaissance missions, and verifying the procedures for packing up and moving the division.

The last phase of the 11th Air Assault Division tests, Air Assault II, began on October 14, 1964, in a leased maneuver area now part of Fort Bragg, North Carolina. The field exercise pitted the 11th Air Assault Division, still short one brigade (which was simulated in the exercise), against the 82d Airborne Division commanded by Major General Robert York. The observer controller/umpire and administrative support for the exercise came from the 2d Infantry Division. In the event a severe storm hit the operational area during the test and played a major part in curtailing air activity for the first five days. The exercise ended on November 12, 1965.

Through the early 1960s, the Army Aviation Board and the Tactical Mobility Requirements Board looked at ways of using the helicopter's unique capabilities to make an entirely new tactical concept possible, a concept which came to be known as airmobility.

Experiments in 1962 and 1963 showed that the helicopter could introduce a quantum leap in battlefield mobility when compared to ground-based transport, allowing men and equipment to be moved over and around enemy positions with unprecedented speed.

At ENDEX all umpires and unit commanders from both sides met to conduct an after-action review. This review concluded that the 11th Air Assault Division had limitations: its ground mobility was poor, the division was extremely vulnerable to armored attack, and operations were severely affected by bad weather and combat over long periods.

However, the strong points shown by the division included the high tempo of its operations, the extremely short reaction times, long-range capability, flexibility to fight in different directions at the same time, and the ability to conduct operations without a reserve, using airmobility to concentrate forces at critical points. A surprising aspect of the test was the division's ability to resupply by air. Air Assault II showed the 11th Air Assault Division could seek out an enemy over a wide area, find him, and then bring all the resources necessary in firepower and troops together to destroy him.

Clearly, in a low-intensity or counter-insurgency war the division's unparalleled tactical mobility would make it an excellent unit for con-

The 11th Air Assault Division became the 1st Cavalry Division (Airmobile) in July 1965, and was ordered to Southeast Asia a month later. By that time, Hueys like this UH-1B of the 117th Aviation Company had already been in Vietnam for more than two years.

trolling large areas of territory. By contrast, in a high-intensity campaign against a fully equipped modern army, a heliborne division would be vulnerable, and the risk of heavy losses would be considerable. However, it would be extremely useful as a screening force or as a mobile reserve.

The test justified to Army planners the cost of setting up an airmobile division. After receiving the recommendation of the Army for the of such a formation, Secretary of Defense Robert McNamara announced the creation of a new division on June 28, 1965. On July 1, 1965, the 1st Cavalry Division (Airmobile) was officially activated pursuant to General Order 185, Headquarters Third US Army. It incorporated components of the 11th Air Assault Division (Test), the 10th Air Transport Brigade, and the 2d Infantry Division.

The new unit had very little time to get itself into shape; the 1st Cavalry Division was ordered to Vietnam beginning July 28, 1965, less than a month after activation. In a matter of three and one half weeks the newly formed division was organized into a 16,000-man formation, using the 11th Air Assault Division (Test) as a template. It had a total of 434 helicopters on strength, mostly UH-1 Hueys. It was about to go into combat, the ultimate test of its capabilities.

With air mobility clearly being the way of the future, Bell could now look to production orders for the UH-1 going well above the 1,000 mark. A company memo noted that the new helicopter "is now almost certain to be regarded everywhere as a success." But even at this late juncture, no one yet knew how much of a success it would, in fact, be.

Over the next decade, the Huey was upgraded and modified based on lessons learned in combat. The UH-1D entered service in 1965 with a wider main cabin, a higher gross weight, and more powerful engine, although at high altitudes in the humid climate of Vietnam, it still lacked sufficient power for some missions.

Bell concentrated instead on sheer capability in utility roles, and with the commercial Model 205A—basically a UH-1D but with the 1,400shp (1,044kW) T53-13 and first flown in 1963—the slung payload went up to 5,000lb (2,268kg), as an alternative to a pilot and 14 passengers. By the mid-1960s the T53-13 was the preferred engine and its use resulted in a designation of UH-1H for the military models. The Army accepted its first UH-1H in September 1967. This was the last major single-engine Huey upgrade. It appeared identical to the UH-1D but beneath the

The Army was not the only service to see the value of the Huey. Here, in a photo taken in 1964, an Army UH-1B flies in formation with the first example of the Air Force's UH-1F, a Marine Corps UH-1E, and an early production Bell Model 205 or UH-1D.

engine cowling Bell installed the improved Lycoming T53-L-13 engine. At last, the Huey had enough power to handle almost any mission in the harsh conditions of Vietnam. The H model was equipped with a 1,400hp T53-L-13B engine and it had 220 cubic feet (6.23 cubic meters) of cargo space. It could carry up to 4,000lb (1,814kg) on its cargo hook or an equal load internally. A 220 gallon (833.8 liter) fuel tank gave the Huey a range of 285 miles (459km) with an extended range of 680 statute miles (1,094km) with auxiliary tanks installed. The Huey mission portfolio now covered troop transport, medevac, gunship, smoke ship, command and control, general service and support, and reconnaissance, and all branches of the US military flew them.

Meanwhile, Bell had been using the UH-1 airframe as a testbed for advanced new ideas. In August 1962, the company flew the Model 533, a YUH-1B extensively modified under US Army contract as a high-speed research vehicle. Fitted with a swept wing and two small jets it reached 254mph (409km/h) and pulled tight turns at over 200mph (322km/h). In 1969, refitted with two 3,300lb (1,497kg) thrust J60 (JT12A) jets, it set a helicopter speed record at a remarkable 316mph (509km/h).

The various experiments taught Bell a great deal, much of which was put to use in the mid-1960s when it was obvious that a specially designed helicopter gunship was needed in Vietnam. Bell had previously flown a gunship Model 47, the Sioux Scout of 1963, but the Huey was the preferred basis for a production machine. The result was the first AH-1G HueyCobra, in which the popular name was accepted as part of the official one.

Long before this, however, the Huey had made its combat debut. In March 1962, soldiers of the 57th Medical Detachment (Helicopter Ambulance) at Fort Bliss, Texas, were alerted to become the first Huey operators sent overseas. At first, they thought they were going to Europe. As recounted by a UH-1B crew chief, they were finally given the word by their commanding officer.

"I know where we're going," the crew chief said to his commander. "It's in the headlines. A real hot spot. They're sending us to the Congo." "That's wrong," the officer replied. "Our helicopters are going to a place I never heard of until last week." He paused and added, "Vietnam."

Development of the Huey continued through the 1960s. The most radically modified variant was the Bell Model 209 or AH-1 HueyCobra gunship. Based on UH-1C mechanicals, it entered production alongside the Models 204 and 205 in 1966.

HUEYS IN COMBAT

Back in January 1963, with just 7,000 American "advisers" stationed in Southeast Asia, no one could have foreseen how crucial the UH-1 would become to the American war effort in just a few months of fighting. The UH-1 was the most important US Army aircraft of the Vietnam War—arguably the most important aircraft of any kind. Hueys flew 36,145,000 sorties during the conflict and left a permanent mark in three roles—as "slicks" (troop transports: called slicks because they were not cluttered with rockets or guns mounted externally), "gunships" (armed), or "dustoffs" (medical evacuation, or medevac). It was in Vietnam that Army and Marine soldiers first tested the new tactics of airmobile warfare, tactics made possible by the widespread adoption of the UH-1.

The Huey became an icon of the Vietnam war. It was a star of prime-time news reports, its distinctive shape and the sound of its twin-bladed rotor becoming more familiar to the world at large than any other aircraft of the time. At the peak of American involvement in 1969 and 1970, the main branches of the US military operated more than 4,000 helicopters in Southeast Asia—and two thirds of them were Hueys.

The impact of the classic Bell design was profound, not only in the new tactics and strategies of airmobile operations, but on the survival rate of battlefield casualties. US Army patients made up 390,000 of the total number of people transported by medevac helicopters in Southeast Asia. Almost one-third of this total (120,000) were combat casualties. The Huey airlifted 90 percent of these casualties direct to medical facilities.

The first Hueys to operate in Vietnam were medevac HU-1As of the 57th Medical Detachment (Helicopter Ambulance), which arrived in April 1962, long before the United States became officially involved in the conflict. These Hueys supported the South Vietnamese Army, but American crews flew them.

In October 1962, the first armed Hueys, equipped with 2.75-in. rockets and .30-cal. machine guns, began flying in Vietnam. The US Army's UTTHCO (Utility Tactical Transport Helicopter Company) lost only one Huey, by now redesignated as the UH-1, in a six-month period ending in March 1963 while introducing an extraordinary arsenal of new weapons. UTTHCO Hueys tested the XM-157 seven-shot rocket pod, the XM-5 grenade launcher, and many other new weapons.

In the summer of 1963, early UH-1B Hueys began

US Cavalrymen leap from a hovering UH-1H. "Headhunters" was the nickname of the 1st Squadron, 9th Cavalry. It is estimated that the 1/9th was responsible for 50 percent of all enemy soldiers killed by the 1st Cavalry Division during the war.

replacing the Piasecki CH-21 Shawnee in five US Army transport companies. Paving the way was the 81st Transportation Company at Pleiku which was redesignated the 119th Aviation Company (Air Mobile Light) on June 14, 1963. By late 1963, the CH-21 "Flying Bananas" were all but gone and the UH-1B was on its way toward becoming the standard US Army helicopter in the war. It also became familiar to the Viet Cong, which issued its troops with a handbook on how to shoot it down.

The first non-medical Hueys in Vietnam were assigned to transport companies, but many, like these UH-1As, were fitted with weapons to fly support missions for Piasecki H-21 transport helicopters. However, Hueys quickly took over the transport role as well.

The UTTHCO took advantage of the UH-1B's performance to introduce a range of heliborne tactics and formations. Building on concepts developed by General Howze and other Army rotary-wing pioneers, Hueys began to operate with a basic fire team of two gunships, flanking a troop transport formation for the trip into the LZ (landing zone). When a target was engaged, the gunships usually kept up a continuous round of machine gun fire during a high-angle, high-speed firing run.

As the slicks approached the LZ, the gunships swooped down and sprayed rockets and machine gun fire into areas that might conceal enemy forces. Troops were dropped in the high elephant grass of a typical LZ only after the area had been "prepped" —hopefully resulting in the forcible removal of any nearby Viet Cong troops. Some Hueys carried equipment to generate a thick cloud of smoke. Smoke was deployed between the LZ and suspected enemy positions to protect the slicks and their valuable cargo.

As the Hueys laden with troops touched down, door gunners aboard the slicks fired machine guns to help cover the soldiers as they jumped to the ground. In seconds, the troops deployed from the aircraft and the pilots accelerated up and away as quickly as possible to clear the LZ to make room for other slicks to land. Helicopters could insert entire battalions into the heart of enemy territory within minutes in a graphic display of the advantages of airmobility.

Getting in and out of the LZ called for all the power and performance the UH-1B could muster. An innocent-looking rice paddy could hide deep water, a minefield or poisonous punji sticks.

As planning evolved, a Huey in each formation became the "Eagle Flight" command aircraft, with both South Vietnamese and American commanders on board, able to assess a battlefield combat situation and ready to direct a safe insertion of troops. These tactics were quickly becoming the standard in Vietnam by November 1964, when every helicopter company in South Vietnam had its own "Eagle Flight lead."

The UH-1C entered service with the Army soon after the B model, but afforded greater fuel capacity, a slightly more powerful engine, and a revised rotor system. In practice, the majority of UH-1Cs operated as

gunships, while UH-1Bs reverted to their original role as slicks. The first UH-1Cs began to reach Vietnam in early 1965, at a time when American participation in the war was growing rapidly. In the short span of two years, the number of US troops had increased tenfold, reaching 181,000 by the end of 1965.

Around this time an article in *Newsweek* attempted to give the conflict a new name, "The Helicopter War." The name did not stick, and Americans continued to refer to it as the Vietnam War, but the very suggestion signified the impact the UH-1 helicopter was having on the war, even as a small guerrilla struggle grew into an ugly, full-scale conflict between main-force units.

Air Cavalry

On July 1, 1965, the 1st Cavalry Division (Airmobile) arrived in South Vietnam and set up shop at An Khe—a place where, suddenly, Hueys seemed to stretch from horizon to horizon. Initially, the Air Cavalry's 1st Squadron, 9th Regiment, acted as the "eyes and ears" of the division, much as horse-mounted units had done in the past, flying up to 100 UH-1Bs of the division's eventual total of 400. Operating in conjunction with Bell OH-13 scouts, UH-1B transports and UH-1C gunships began encountering and engaging increasing numbers of enemy troops, not just Viet Cong guerrillas, but also some North Vietnamese regulars. The stage was set for the first major battles between large numbers of troops in a war that would never again be considered to be limited in scale.

The Air Cavalrymen belonged to the "citizen army," filled out by the draft, which had been a part of American life since 1940. No one could have predicted that half a million of these conscripts would eventually reach this previously little-known Asian land—or that half a dozen more Huey models would evolve, principally the longer, more powerful UH-1D and UH-1H.

A number of experts predicted that the inexperienced US soldiers would perform poorly against the battle-hardened North Vietnamese Army (NVA) troops now rapidly replacing the Viet Cong as the immediate enemy. After all, Ho Chi Minh's regulars had held their own against the Japanese in the 1940s and had seized North Vietnam from the French in the 1950s. But Hanoi's foot soldiers had no Hueys. And they had not spent the past decade—as had the Air Cavalrymen and their predecessors—devising a new kind of warfare, in which quick, fluid movements could be made, leapfrogging obstacles, attacking from the rear if necessary, using the mobility offered by the UH-1.

A UH-1B Huey leaves Qui Nonh in February 1964. The first UH-1Bs arrived in Vietnam in May 1963, and immediately their greater power made them more successful in both transport and gunship roles than the pioneering UH-1As.

Late in 1965, the Air Cavalrymen began skirmishing with NVA regulars. By now, An Khe was the largest helicopter base in history, with so many Hueys (450 plus) that one officer called them "locusts." Thus began the first and second

battles of the Ia Drang Valley. Over days that grew into weeks, Air Cavalrymen engaged North Vietnamese regulars in ever-increasing numbers. Despite an elaborate intelligence network, NVA officers could not predict when the next brace of gunships would prep an area, or when the next troop-carrying Hueys would swarm down from the sky. No previous foe had confronted the NVA with the speed, flexibility, and mobility of the Huey. One North Vietnamese officer said he was "insulted" by the impertinence of the new American tactics.

There were also new weapons. "Thumper" was a 40mm grenade launcher carried by some armed UH-1Cs while other Hueys carried the M21 armament system, which combined a 7.62mm Minigun with an XM-158 rocket launcher. For enemy troops, it was bad enough that every Huey spouted fire from M60 door gunners on both sides but, worse still, the Hueys seemed to be everywhere and the Americans seemed able to arrive and depart almost at will.

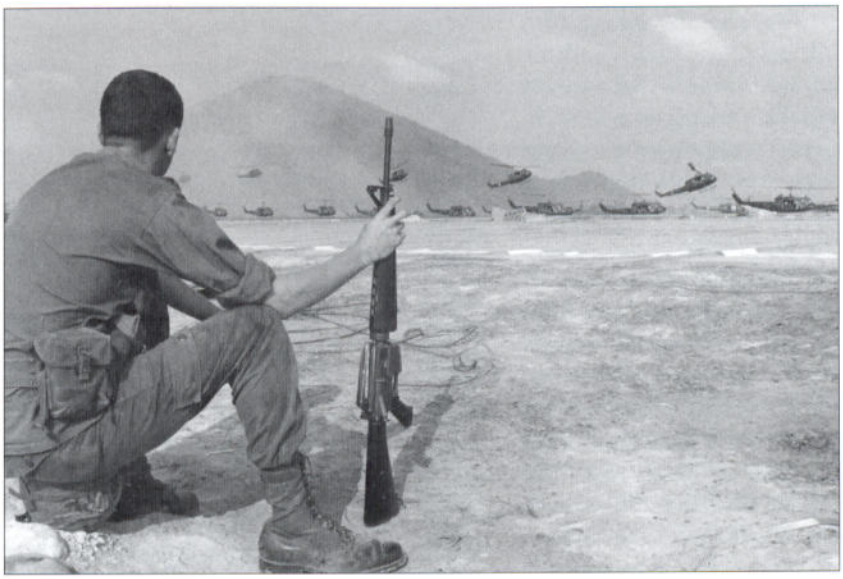
Despite the application of American power, however, the fighting was fierce. Cavalrymen were cut off several times, and it was only the Huey, supported by Huey gunships, which prevented several re-enactments of Custer's last stand. President George W. Bush presented the first (somewhat delayed) Medal of Honor of his presidency to one of the Huey Pilots involved at Ia Drang. In a White House ceremony in July 2001, retired Captain Ed W. Freeman was finally honored for his heroism. Freeman's medal citation read:

The US Navy made extensive use of Hueys in the "brown water" war in the Mekong Delta, using armed UH-1Bs to interdict communist water-borne supply traffic, and unarmed variants as seen here to insert special forces teams deep into enemy-held territory.

"Captain Ed W. Freeman, United States Army, distinguished himself by numerous acts of conspicuous gallantry and extraordinary intrepidity on November 14, 1965 while serving with Company A, 229th Assault Helicopter Battalion, 1st Cavalry Division (Airmobile).

"As a flight leader and second in command of a 16-helicopter lift unit, he supported a heavily engaged American infantry battalion at Landing Zone X-Ray in the Ia Drang Valley, Republic of Vietnam. The infantry unit was almost out of ammunition after taking some of the heaviest casualties of the war, fighting off a relentless attack from a highly motivated, heavily armed enemy force. When the infantry commander closed the helicopter landing zone due to intense direct enemy fire, Captain Freeman risked his own life by flying his unarmed helicopter through a gauntlet of enemy fire time after time, delivering critically needed ammunition, water, and medical supplies to the besieged battalion. His flights had a direct impact on the battle's outcome by providing the engaged units with timely supplies of ammunition critical to their survival, without which they would almost surely have experienced a much greater loss of life.

"After medical evacuation helicopters refused to fly into the area due to intense enemy fire, Captain Freeman flew 14 separate rescue missions,



A member of the 173d Airborne Brigade watches as a gaggle of Hueys takes off during Operation Junction City in February 1967. The sheer size of America's air assault force and the numbers of Hueys involved in operations meant that the airfields at main bases were amongst the busiest air facilities in the world.

providing life-saving evacuation of an estimated 30 seriously wounded soldiers—some of whom would not have survived had he not acted. All flights were made into a small emergency landing zone within 100 to 200 meters of the defensive perimeter where heavily committed units were perilously holding off the attacking elements. Captain Freeman's selfless acts of great valor, extraordinary perseverance, and intrepidity were far above and beyond the call of duty or mission and set a superb example of leadership and courage for all of his peers. Captain Freeman's extraordinary heroism and devotion to duty are in keeping with the highest traditions of military service and reflect great credit upon himself, his unit, and the United States Army."

The Ia Drang Valley actions marked a turning point in helicopter warfare. The Air Cavalrymen inflicted a decisive defeat on the NVA.

By the end of 1965, the war was growing rather than dwindling, and the Huey was becoming of ever increasing importance. As the number of US troops in Vietnam grew dramatically from 1965 onwards, the number of Huey helicopters grew, too. There were 250 Hueys in the war zone in September 1964, rising to nearly 1,800 by 1966. The Navy and Marine Corps followed close behind the Army in using the UH-1 helicopter for everything from direct firefights with the Viet Cong to mundane "ash and trash" cargo-hauling duties.

Wounded US "Skytroopers" are evacuated from the site of an ambush in the Ia Drang Valley in November 1965. The battle saw regular North Vietnamese Army units take on the 1st Cav—and lose. Much of the success of the Cavalry was due to its mobility, provided by hundreds of UH-1s.

Closely following the UH-1B, C, and D helicopters, which had already revolutionized warfare in the tricky jungles of Southeast Asia, the Army introduced the UH-1H with more power, the larger diameter main rotor of the -1D and the capacity to carry two pilots, a crew chief/door gunner, and up to 14 troops. This ultimate single-engined Huey soon became the standard. The sight of this helicopter, the sound of it, even the memory in decades to come, defines the Vietnam experience for the tens of thousands who lived through it.

The new air assault tactics saw huge formations of UH-1s swooping in on Viet Cong positions with devastating speed. These are 1st Cavalry Hueys, delivering troops to a small village near Bong Son during Operation Eagle Claw in February 1966.

Although the Marines were to use the CH-46 Sea Knight as their primary troop transport, they happily replaced their obsolete Sikorsky UH-34Ds with factory-fresh UH-1E Hueys, all-aluminum versions of the Army's UH-1C. Marine Observation Squadron VMO-2 was the first to employ them, as slicks and as gunships, some fitted with a TAT 101 twin 0.3-in. gun mount. The Navy was left to operate with older models, but used them effectively in managing its "brown water" riverine war.

Americans were not the only ones to use Hueys in Southeast Asia. The South Vietnamese Air Force converted from piston-powered Sikorsky H-34s to turboshaft UH-1H Hueys in mid-1969, and boasted

Marine UH-1E slicks of HML-367 land at Fire Support Base Cates to pick up a Marine reconnaissance patrol just before the end of the siege of Khe Sauh in 1968. Based near Hue, the squadron's nickname was "Scarface," and it flew both slicks and gunships in support of 1st and 3d Marine Division operations in I Corps.

The Royal Australian Air Force was one of the first non-American users of the Huey, taking delivery of its first batch of eight aircraft in October 1962. No. 9 Squadron RAAF departed for Vietnam in April 1966, and began operations in the Vung Tau area.

three squadrons by the end of that year. The Royal Australian Air Force operated UH-1s in support of Australia's contribution to the war. Initially, in 1966, UH-1Bs were used, but these were later replaced by larger UH-1Ds and UH-1Hs. South Korea also operated the type.

Tet 1968

By the time US troop strength in Vietnam reached a peak of 536,100 at the start of 1969, the Huey was a familiar sight from one end of the country to the other. It had proved its worth most obviously in the early months of 1968, when a general communist offensive, launched on the Tet or Lunar New Year holiday, erupted in Vietnam's cities. Intense fighting broke out all over the country as the Viet Cong, supported by North Vietnamese regulars, rose up. Particularly vicious urban fighting broke out in Saigon and Hue. By this time, virtually every US Army unit in Vietnam—not just the pioneering 1st Cavalry Division—was equipped with the ubiquitous UH-1.

In a typical operation, armed UH-1C gunships would fly on the flanks while small formations of UH-1D slicks brought troops into an LZ. If the LZ was "hot"—under fire from Viet Cong positions—the gunships would blast away with Miniguns or 2.75-in. rocket projectiles. Tet also saw the introduction of the AH-1G HueyCobra, a dedicated gunship developed from the Huey.

During Tet, the US Embassy in Saigon was attacked by a suicide squad of 15 Viet Cong sappers. A UH-1D rescued some Embassy staff from the roof while the attackers were being hunted down. At nearby Tan Son Nhut airfield, a bizarre battle unfolded in which the ground fighting was done by the Air Force Security Police, equipped with tracked vehicles, mortars, and automatic weapons, while the air cover was provided by the Army with UH-1 helicopters.

The fighting reached the headquarters of the US commander in chief in Vietnam, General William Westmoreland. The clerks, cooks, and office managers were more familiar with typewriters than small arms. Nevertheless, the administrative staff spilled from the office building looking for weapons with which to fight back. The day was saved by UH-1 gunships from the 120th Assault Helicopter Company, the "Razorbacks," which unleashed gun and rocket fire at the VC assailants coming through the wire.

Marine Corps UH-1E Hueys assisted during the street fighting in Hue, amid some of the worst weather in memory. One door gunner fought a 25-minute air-to-ground battle with a North Vietnamese sniper positioned atop a church steeple. A burst from the hand-held M60

machine gun aboard the UH-1E ultimately silenced the unfortunate enemy sharpshooter.

Before, during, and after Tet, the ability of the Huey quickly to deposit or extract soldiers into or from battle remained a key American weapon, one which the dedicated but poorly equipped Viet Cong and North Vietnamese could never counter effectively.

The typical UH-1 pilot of the late 1960s often looked more like a pirate than a US Army warrant officer. A gray Nomex flight suit was supposed to be standard wear, but it was not uncommon to see a pilot taking off dressed only in an undershirt (or no shirt), flak jacket, and fatigue pants. The Model 1911 Colt 0.45 automatic pistol remained standard issue, but pilots often carried extra weaponry—some favored the Danish-built Madsen submachine gun, while others preferred the Swedish Carl Gustav. Uniform patches, like markings on aircraft, were often created "in-country" and enjoyed less than official endorsement.

While many aircrew affected a carefree, confident attitude, most were keenly aware that what they were doing was dangerous. The original Howze board may have been right in saying that the helicopter was ideal for a low-intensity conflict, but the machines were also vulnerable. There were few pilots, crew chiefs, or door gunners who never worried about bouncing around at low level, over a jungle potentially full of hostile automatic rifles and machine guns, in a craft that resembled a dragonfly and which seemed to have nothing holding it up. Door gunner Specialist 4 Sidney Reeder of the 1st Cavalry remembers his crew's devastation when a maintenance error caused the main rotor to fly off, turning the helicopter into a ballistic projectile that slammed into a ridgeline with a rending crunch.

Most of the threat to helicopters in South Vietnam came from small arms. The Huey showed itself to be remarkably resilient when pounded by 7.62mm or even 12.7mm fire from Viet Cong weapons. However, holes punched in the thin aluminum of the fuselage meant that holes could equally easily be punched in its contents. Pilots at least were protected by armor plate, but to the infantryman in the back the nearest thing to protection was sitting on his helmet!

Some crews were fortunate. *Kinnie*, a Marine UH-1E assigned to VMO-2 at the Marble Mountain base, returned from a gunfight on January 2, 1969, riddled with 247 bullet holes—but remarkably had no hydraulic leaks. Several bullets were rolling around on the floor, but only one crew member suffered a single minor wound.

Not all Huey crews were so lucky. On January 8,

Australian Hueys of No. 9 Squadron flew operations in support of the Australian Army, the US Army and the Army of the Republic of Vietnam, but its specialty was working with the Australian SAS, inserting and extracting fighting patrols deep into and from Viet Cong territory.

Door gunners were a vital part of the crew of any Huey slick, especially when operating into and out of "hot" landing zones. Typically, each of the M60 machine guns was provided with 1,200 rounds of ammunition; an M79 grenade launcher was also carried.

1968, Pfc (later Specialist 4) Gary Wetzel was a door gunner aboard a Huey of the 173d Assault Helicopter Company, landing a ground force near Ap Dong An. Enemy fire was intense, and the insertion force was trapped. Wetzel's pilot had been wounded on the ground, and the young soldier was going to his aid when two Vietnamese rockets exploded close by.

In the words of his Medal of Honor citation:

"Although bleeding profusely due to the loss of his left arm and severe wounds in his right arm, chest, and left leg, Sp4c. Wetzel staggered back to his original position in his gun-well and took the enemy forces under fire. His machine gun was the only weapon placing effective fire on the enemy at that time. Through a resolve that overcame the shock and intolerable pain of his injuries, Sp4c. Wetzel remained at his position until he had eliminated the automatic weapons emplacement that had been inflicting heavy casualties on the American troops and preventing them from moving against this strong enemy force. Refusing to attend his own extensive wounds, he attempted to return to the aid of his aircraft commander but passed out from loss of blood. Regaining consciousness, he persisted in his efforts to drag himself to the aid of his fellow crewman. After an agonizing effort, he came to the side of the crew chief who was attempting to drag the wounded aircraft commander to the safety of a nearby dike. Unswerving in his devotion to his fellow man, Sp4c. Wetzel assisted his crew chief even though he lost consciousness once again during this action. Sp4c. Wetzel displayed extraordinary heroism in his efforts to aid his fellow crewmen. His gallant actions were in keeping with the highest traditions of the US Army and reflect great credit upon himself and the Armed Forces of his country."

By the end of 1969, with H-13, H-23, and H-34 helicopters withdrawn from use, it was difficult to find a utility-sized helicopter anywhere in Vietnam that was not a Huey. The UH-1 had genuinely transformed Vietnam into "the Helicopter War."

"Dustoff"

That year alone, UH-1 "dustoffs" accomplished 29,114 medical evacuations. Named after the call sign of the first medevac unit, the dustoff units included what were probably the most admired Huey crews in Vietnam.

Medical evacuation helicopters revolutionized the treatment of soldiers wounded in battle. During World War II, 29 percent of all wounded US soldiers died. Advances in medical technology and the use of medevac helicopters reduced that number to 26 percent during the war in Korea. In Vietnam, the percentage of soldiers who died from wounds sustained in combat fell to 19 percent, about a 25 percent drop from the Korean War fatality rate.

Perhaps a more compelling statistic is the total number of people transported by medevac helicopters, nearly 400,000 in Vietnam compared to 17,700 in Korea. Curiously, the percentage of men who died from their wounds after reaching hospital rose in Vietnam. This was not through any deficiency in treatment, it was simply that the dustoff crews were bringing many more seriously wounded soldiers into the medical facilities, soldiers who would have died on the battlefield in previous wars.

A pair of UH-1Ds lift off from a landing zone after picking up an infantry patrol. The larger D model Huey is easy to distinguish from earlier variants; apart from the longer body, the doors have two windows rather than one.

Emergency dustoff missions were often dangerous, since they occurred when a unit was taking casualties from enemy fire. Dustoff crews were willing to take the risk of flying into a firefight, if it meant saving lives. The Medal of Honor mission flown by Chief Warrant Officer Michael J. Novosel testifies to that fact.

CWO Novosel was a pilot with the 82d Medical Detachment, 45th Medical Company. An experienced pilot in his mid-40s, Novosel was serving in Kien Tuong Province on October 2, 1969, when he and his crew received a call to rescue a group of wounded Vietnamese soldiers. The South Vietnamese had strayed into a Viet Cong training area and were pinned down by a large enemy force.

All communications with the beleaguered troops had been lost, so CWO Novosel repeatedly circled the battle area, flying at low level under continuous heavy fire, to attract the attention of the scattered friendly troops. Novosel had no gunship or other cover, and was exposed to intense machine gun fire; the South Vietnamese troops recognized this display of courage as a signal to assemble for evacuation. On six occasions Novosel and his crew were forced to retire by the intense enemy fire, only to circle and return from another direction to land and extract additional troops. Near the end of the mission, a wounded soldier was spotted close to an enemy bunker. Fully realizing that he would attract a hail of enemy fire, CWO Novosel nevertheless attempted the extraction by hovering the helicopter backward. As the man was pulled on board, enemy automatic weapons opened fire at close range, damaged the aircraft and wounded CWO Novosel. He momentarily lost control of the aircraft, but quickly recovered and departed under the withering enemy fire. In all, 15 extremely hazardous extractions were performed in order to remove wounded personnel. As a direct result of his selfless conduct, the lives of 29 soldiers were saved.

A: US Army UH-1B, HU-1 Flight Section, 45th Transportation Battalion, Tan Son Nhut, July 1963

A

B: UH-1D "Dustoff," 57th Medical Detachment, Vietnam, 1967

C: US Marine Corps UH-1E "Slick," HML-367 "Scarface," Hue, 1969

D: US ARMY UH-1D, 1ST BATTALION, 7TH CAVALRY, 1ST AIR CAVALRY DIVISION, PLEIKU, 1966–67

KEY

1 Avionics compartment
2 VHF homing aerials
3 Downwards vision window
4 Rudder pedals
5 Instrument console
6 Windscreen
7 Windscreen wipers
8 Co-pilot seat
9 Collective pitch control
10 Cyclic pitch control column
11 Central control pedestal
12 Co-pilot door
13 Cockpit step
14 Troop compartment
15 Port landing light
16 Bulkhead with soundproof trim
17 Landing skid
18 Cabin floor construction
19 Port sliding door
20 Baggage compartment hatch
21 Tailboom frame and stringer construction
22 Tailplane control linkage
23 Tailplane
24 Tail rotor transmission shaft
25 VHF navigation aerial
26 Bevel drive gearbox
27 Tail skid
28 Right angle gearbox
29 Tail rotor
30 FM communications aerial
31 Main rotor blade
32 Fixed tab
33 Exhaust nozzle
34 Anti-collision light
35 Cooling air intake louvres
36 Lycoming T-53-L-11 turboshaft
37 Engine-gearbox shaft coupling
38 Glass-reinforced plastic blade skin
39 Stainless steel leading edge anti-corrosion strip
40 Extruded aluminum spar
41 Honeycomb core
42 Rotor stabilizing bar
43 Blade-root attachment joints
44 Laminated joint stiffeners
45 Main gearbox
46 Rotor head swashplate
47 Blade pitch control rods
48 Main rotor mast
49 DF loop aerial
50 Starboard upper navigation light
51 VHF aerial
52 "Eyebrow" windows
53 Cockpit fresh air intakes
54 Pilot's seat

SPECIFICATIONS:

Type: Single rotor utility helicopter

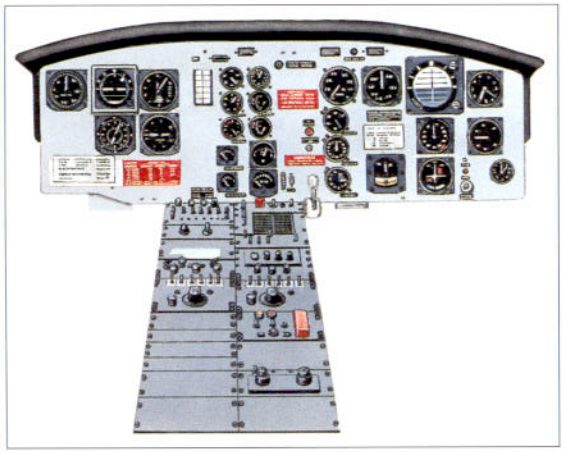
Dimensions:
Length overall (rotor fore-and-aft): 57ft 1in. (17.4m)
Length of fuselage: 41ft 10.75in. (12.77m)
Height: 14ft 6in. (4.42m)
Rotor diameter: 48ft (14.63m)
Rotor blade chord: 21in. (53.3cm)
Rotor disc area: 1,809sq. ft (168.06m^2)
Tail rotor diameter: 8ft 6in. (2.59m)
Tail rotor blade chord: 8.4in. (21.3cm)
Tail rotor disc area: 56.7sq. ft (5.27m^2)

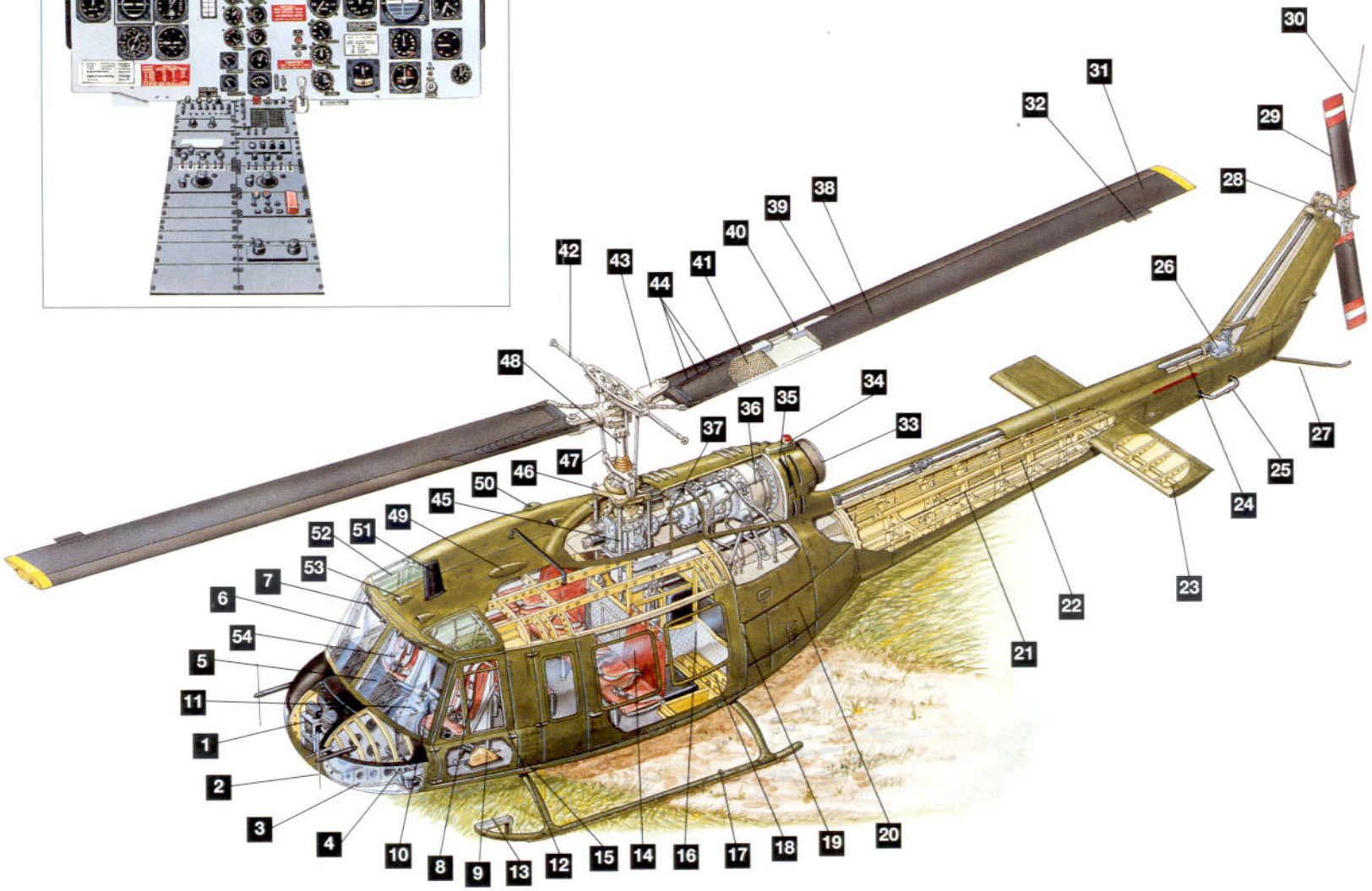
Weights:
Empty weight: 4,939lb (2240kg)
Maximum take-off weight: 9,500lb (4309kg)

Payload:
220 cubic foot (6.23m^3) cabin, capable of housing 12 troops, or six litters and a medical attendant, or 4,000lb (1,815kg) of freight

Powerplant:
One Lycoming T-53-L-11 turboshaft delivering 1,100shp

Performance
Never exceed speed: 138mph (222km/h)
Normal max speed: 127mph (204km/h)
Service ceiling 12,600ft (3840m)
Hovering ceiling in ground effect: 13,600ft (4145m)
Hovering ceiling out of ground effect: 1,100ft (335m)
Range at sea level: 318 miles (511km)

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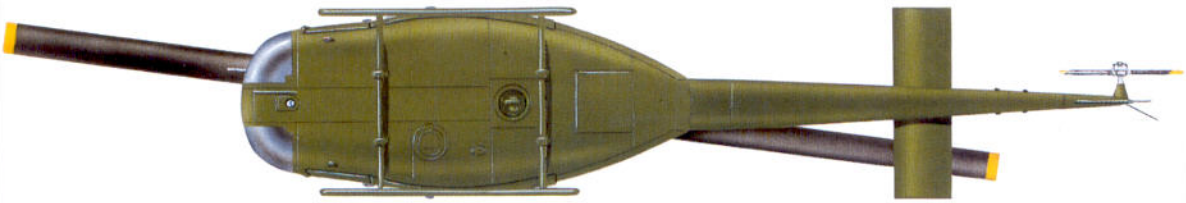
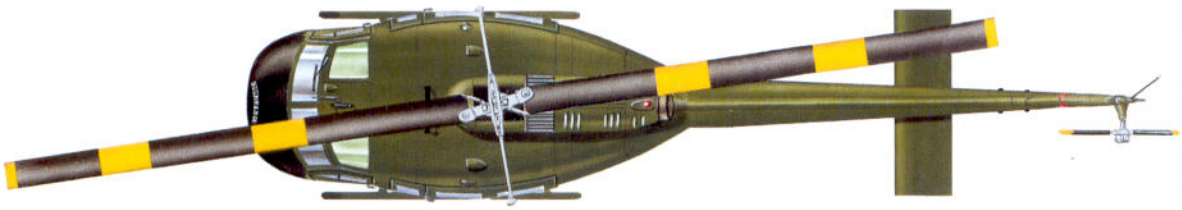
E: Royal Australian Air Force UH-1H, No. 9 Squadron, Nui Dat, 1969–1970

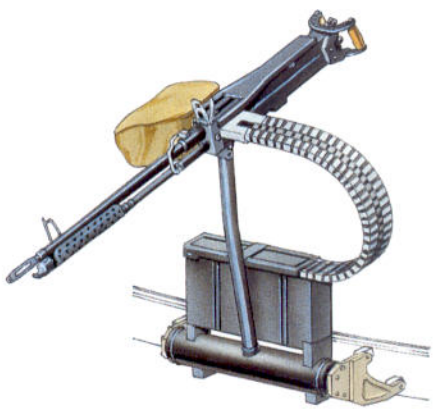




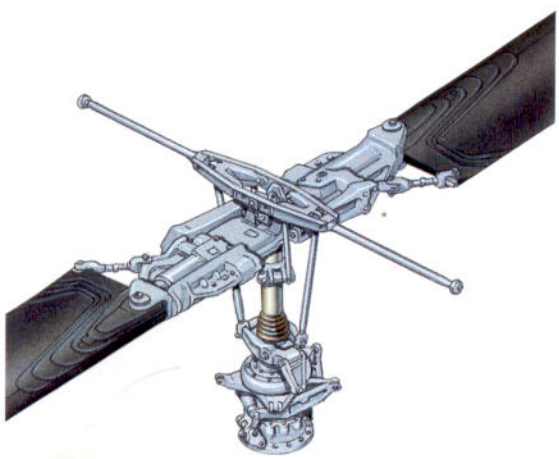
F: USAF UH-1F, 20th Special Operations Squadron, Nha Trang, 1967–68

G1: Air America Model 204B, Operation Frequent Wind, 1975

G2: Vietnamese Air Force UH-1H, South Vietnam, 1973–74



G3: M23 Armament Sub-system



G4: Main Rotor System

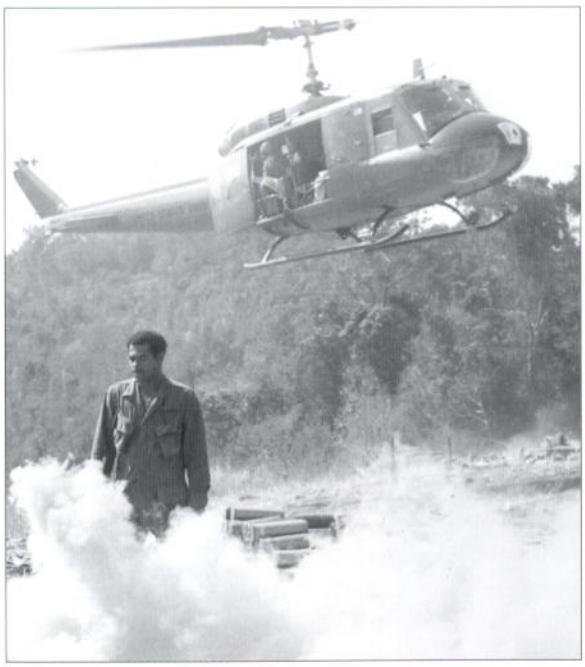
"Dustoff Hueys" were so called in honor of the radio callsign of Major Charles Kelly, commander of the original US Army medical evacuation unit. Kelly was killed in action in 1964, attempting to pick up wounded soldiers under fire.

Vietnamization

In August 1969, President Richard Nixon announced the first steps toward a reduction of US forces and an eventual pullout. When the US commitment started to "wind down," the Huey became more important than ever as a key weapon in Saigon's continuing war. The South Vietnamese Air Force was to take over the burden of combat operations and was, by then, well advanced toward a goal of fielding 500 UH-1s in 16 squadrons.

The remarkable genius that went into the Bell UH-1 Huey made it one of the most versatile weapons of the Vietnam War. It remained so during the relentlessly deteriorating years from 1970 to 1975. American troops were leaving (their numbers were down to 69,000 by June 1972), but a beefed-up South Vietnamese military—much of it transported about by the Huey—was thought capable of defending itself.

Even though the US Army began to disengage from Vietnam in 1969, American Hueys were still used extensively to support the South Vietnamese infantry and their US support units. Here a UH-1D resupply mission touches down at a 4th Infantry Division artillery firebase.



However, combat for US Army Hueys was far from finished. On April 30, 1970, President Nixon went on national television to announce that he was ordering a major incursion into Cambodia, to "clean out the bases that the enemy has been using in his increasing military aggression." The Cambodian incursion, Operation Toan Thang 43, has been described as a "lightning stroke" based on the concept of mobility. The 1st Cavalry Division, 11th Armored Cavalry Regiment, and 25th Infantry Division, along with several South Vietnamese units, engaged in operations for two months, beginning in May 1970. The results were mixed. The Cambodian incursion was successful in fulfilling Nixon's political objectives, but only at the tactical and, arguably, operational levels—not at the strategic level, where truly decisive results occur.

The next major combat operation involved American troops only in peripheral roles. During the 1971 Operation Lam Son 719, assault Hueys supported operations in Laos by more than

70,000 South Vietnamese troops. During the campaign 120 UH-1H slicks made an air assault on Tchepone, about 25 miles (40km) west of the old firebase at Khe Sanh, and captured the town, incurring light casualties. The operation did some damage to North Vietnamese supply routes, but success proved temporary and elusive, and casualties were high.

In 1971, large numbers of Hueys were used in Lam Son 719, a major South Vietnamese incursion into Laos. US ground troops were not involved in the main cross-border operations, but Army helicopters were used to transport Vietnamese infantrymen.

The American withdrawal gained impetus. Navy Hueys were gone from Vietnam by January 1972 and Marine Hueys disappeared soon afterwards. The small number of Hueys used by the Air Force's 20th Special Operations Squadron for trans-border insertions were also withdrawn in that year.

When North Vietnam launched its April 1972 invasion of the South, it introduced the SA-7 "Strela" surface-to-air missile, also known by the NATO reporting name of "Grail." The SA-7 could be launched from the shoulder of a single soldier, and several Hueys were bagged before pilots—nearly all of them now South Vietnamese—began to devise evasive tactics.

Afterwards, when experts looked at the period between 1972 and 1975, they would acknowledge that plenty of mistakes were made. The South Vietnamese Air Force was somewhat short on pilots, and desperately undermanned in maintenance and armament specialties. The Vietnamese air arm had more than 500 Hueys in 1972, but could boast only 91 operational UH-1H helicopters by the end of 1973. Saigon's officers never matched the Americans in their ability to use air-mobile tactics to link scattered outposts. The UH-1 helicopter retained its critical importance as a "force multiplier" and a versatile tool of war, but Saigon simply lacked the infrastructure and technical maturity to use the Huey to its greatest effect.

There were some successes, however. The first major battle of Kontum took place on May 14, 1972, but advancing North Vietnamese units were scattered by fighters and three UH-1B gunships equipped with the new TOW (Tube-launched, Optically tracked, Wire-guided) anti-tank missile. Hueys armed with the missile later exacted a heavy toll on North Vietnam's PT-76 light tanks, also introduced during the 1972 offensive.

The US pullout, accompanied by heavy air fighting, ultimately led to the January 27, 1973, armistice in Vietnam. American combat operations in Cambodia ended on August 15, 1973. Many believed that South Vietnam had got what it deserved—a solid chance for survival. However, with American troops gone, the US military shifting from the draft to an all-volunteer force, and American pubic and political opinion taking on a definite anti-war stance, Saigon did not receive the necessary help that might have assured its survival. In 1974 and again in 1975, the US

A South Vietnamese UH-1H delivers a patrol of Biet Hai Sea Commandos of the Coastal Security Service into the Mekong Delta. By this time, at the end of 1971, the Vietnamese Air Force was nearing its peak strength of 500 Hueys.

Congress voted against modest appropriations that might have saved the day. The Huey was still in production and twin-engined versions were becoming standard in US forces, but South Vietnam continued to have to "make do" with older, war-weary, single-engined models. Other weapons, which were badly needed in the South, were simply not forthcoming from the United States.

In 1975, another North Vietnamese offensive began. This time, Saigon was on its own. When the end came in April, the Huey helicopter joined other aircraft types as the vehicle of escape for thousands who fled. Operation Frequent Wind, the April 30, 1975, evacuation of Saigon, saw Hueys flying out and landing on US Navy ships at sea, sometimes in such rapid succession that they had to be pushed overboard as soon as they were unloaded to make room for new arrivals.

The US Army alone lost 2,590 Huey helicopters during the Vietnam war, the Marine Corps another 101, and the Air Force 19. As the evacuation proceeded, a remarkable number of Hueys and other aircraft were saved. After Saigon fell, more than 100 Hueys were transported by sea to Guam, where the fate of aircraft salvaged from the war was decided.

When the US began its adventure in Vietnam, a handful of brilliant strategists—chiefly, the Army's General Hamilton Howze—had seen the importance of introducing the helicopter. No one, however, could have

Only three years after the American withdrawal, the South Vietnamese Air Force had less than 100 operational Hueys. Many of these were used in the final evacuation of Saigon in 1975, when aircraft were pushed off the decks of US Navy ships to make room for more refugee flights.

foreseen that the helicopter would change warfare so profoundly. Shortly after they overran Saigon, claimed victory, and established a new socialist Republic of Vietnam, Hanoi's leaders pondered what to do with the hundreds of aircraft they had captured. Not surprisingly, they found the Huey a practical tool in their efforts to unify and pacify the nation they had won. One report says that Hanoi's air arm at one time operated 56 Hueys. Victorious in the 20th century's longest war, the North Vietnamese recognized that they had an invaluable asset in their hands.

A North Vietnamese soldier moves through a graveyard of wrecked UH-1 Huey gunships, abandoned after the US pullout in 1972 and never salvaged by the South Vietnamese. North Vietnam used captured UH-1s for some time after the fall of Saigon in 1975.

UH-1 VARIANTS

XH-40 and YH-40

Three XH-40 prototypes were built after Bell's Model 204 won the US Army competition to find a new utility helicopter in 1955. Aeromedical evacuation, general utility, and instrument training were among the roles envisaged for the H-40 which was powered by an 825hp (615kW) Lycoming XT53 turboshaft. These machines (the first of which made its maiden flight on October 20, 1956) were followed by six YH-40 service test aircraft, which were tested by both the Army and Air Force during 1957. These differed from the original aircraft in having a 12in. (30cm) cabin stretch, increased ground clearance and other changes. The YH-40 featured a T53-L-1A engine derated to 770hp. The YH-40 was flown by a pilot and copilot and could carry six passengers, or two stretchers and a medical attendant.

HU-1A (UH-1A from 1962)

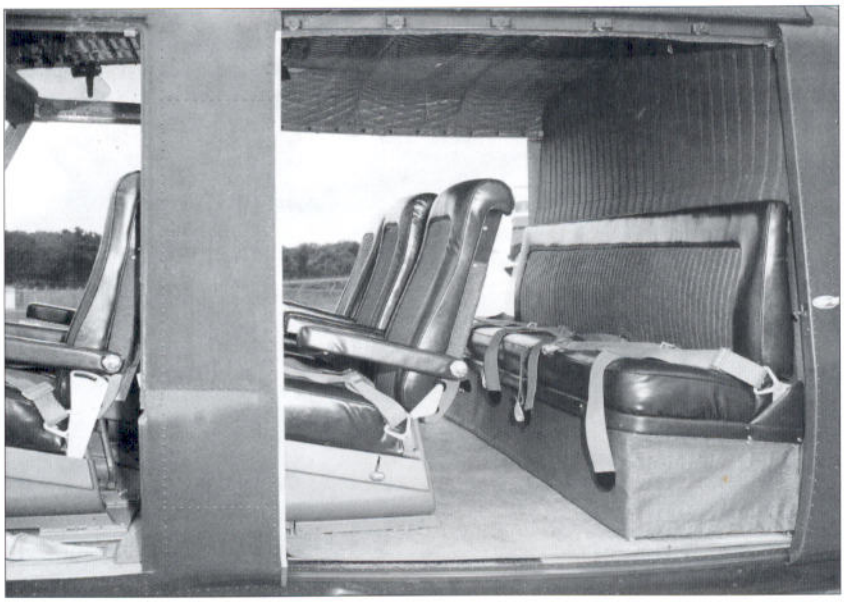
From 1956 the H-40 was redesignated as the HU-1 Iroquois under a new Army system. The HU designation gave rise to the "Huey" nickname that was to be applied across the entire Iroquois range. Production HU-1As were delivered to the US Army beginning in 1959, the first 14 of 182 being powered by a 700 hp (522 kW) T53-L-1A, the remaining examples having a 860hp (641.3kW) T53-L-5 derated to 770hp (574kW). The Army used the type for medevac duties in Alaska, Europe, and Korea. The HU-1 would later be deployed to Vietnam as American involvement in the war there grew. The HU-1A was the first variant to see combat, equipping the 57th Medical Detachment (Helicopter Ambulance) and the Utility Tactical Transport Company in Vietnam from 1962. A number

of aircraft in the latter unit were field modified as armed escorts, carrying rockets and machine guns in various combinations—typically a pair of forward-firing machine guns or forward-firing packs of 2.75-in. unguided rockets, with eight rockets per pack for a total of 16. Fourteen aircraft were converted as TH-1A instrument trainers in 1962, while a single aircraft became an XH-1A testbed for a gunship variant. A number of HU-1As were field-fitted with a single Browning 0.30-cal. or M-60 7.62mm machine gun on a fixed mount next to each side door, a practice which would become almost universal on military helicopters in Vietnam and in most conflicts since.

YHU-1B and HU-1B (UH-1B from 1962)

Early experience with the A model suggested that it might have problems handling "hot and high" conditions while carrying heavy loads. The Army requested improvements to the Huey, and the result was the HU-1B, production models first being delivered in March 1961. The HU-1B had a slightly stretched fuselage to provide accommodation for seven passengers; or three stretchers, two sitting casualties, and a medical attendant; or 3,000 pounds (1,360kg) of cargo. Powered by 960hp (716kW) T53-L-5s, the four pre-production YHU-1Bs had increased chord main rotor blades, an enlarged rear cabin, weapons attachment points, wiring for gunnery control systems and other detail changes. Evaluated during 1960, the four prototypes were followed by 1,014 production HU-1Bs for the US Army, later examples of which had 1,100hp (821kW) T53-L-11 engines. These were delivered between 1961 and 1965, the first examples (a mixture of armed gunships and troop-carrying slicks) arriving in Vietnam in May 1963. Some UH-1Bs were supplied to Australia and Norway. A single example became an NUH-1B in 1963 for test purposes.

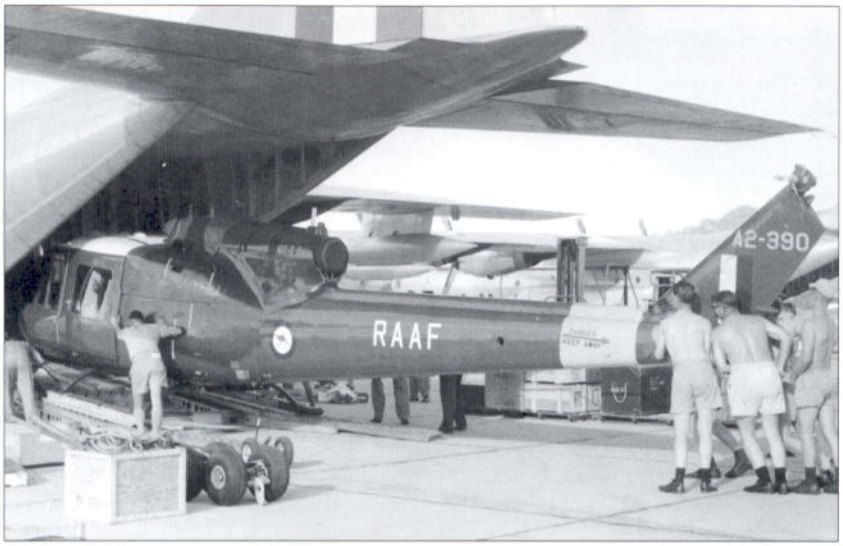
Bell developed a civil version of the Model 204 in the late 1950s. It was basically an HU-1A with leather upholstery and extra sound insulation. Bell's sales efforts were cut short by increasingly large US Army orders for military variants.



UH-1C

The UH-1B gunship lacked the power necessary to carry weapons and ammunition and keep up with less heavily laden transport Hueys, and so Bell designed yet another Huey variant, the UH-1C, intended strictly for the gunship role. It featured an uprated T-53-L-11 engine, increased fuel capacity, and a new "Model 540" rotor system, which eliminated Bell's distinctive "teetering bar" and replaced it with an electro-mechanical stabilization scheme. The Model 540 rotor system was known as the "door-hinge" rotor or the "Stability Control Augmentation Scheme" (SCAS). The new rotor also

had a wider chord, and was both lighter and provided increased maneuverability. The UH-1C was introduced in September 1965, but only about 750 were built, as by that time Bell was getting ready to introduce the dedicated AH-1 HueyCobra gunship, which was based on UH-1C technology. The Army took delivery of the first 67 examples from 1965. A number were passed to Australia and Norway, already users of the UH-1B.



The UH-1B was the first version of the Huey to be sold to overseas air forces. The Royal Australian Air Force took delivery of 24 helicopters in three batches of eight. These were replaced by UH-1Hs in the late 1960s.

YUH-1D and UH-1D

Even as Bell was working on improved versions of the Model 204, the company was developing a new series of stretched Hueys, with the company designation of Model 205. Bell proposed the concept to the Army in 1960, leading to award of a contract in July 1960 for seven YUH-1D prototypes.

The Model 205 first flew on August 16, 1961 and was introduced into service in August 1963 as the UH-1D. Aside from the extra length of its cabin, it is easily distinguished from the Model 204 by the fact that the side doors have two windows, rather than one.

The UH-1D had the same powerplant as the UH-1C, but featured an enlarged cabin capable of carrying 12 troops or six stretcher cases. UH-1D Hueys could be armed with M60D door guns, plus quad M60Cs on the M6 aircraft armament subsystem or a 20mm cannon or 2.75-in. rocket launchers, and a 40mm grenade launcher in the M5 helicopter chin-turret. Up to six NATO-standard AGM-22B (formerly SS-11B) wire-guided anti-tank missiles could be carried on the M11 or M22 guided missile launcher.

Seven YUH-1Ds were built, the first flying in August 1961. Two years later, the first production examples for the US Army were delivered. The Army eventually bought a total of 2,008 UH-1Ds.

The Model 205 became the Army's primary combat transport and medevac helicopter in Vietnam. Because the UH-1D had a larger carrying capacity, the Army made the decision during configuration reviews to designate the UH-1D primarily as a utility helicopter, with the gunship role being relegated to the smaller UH-1B/UH-1C helicopters. In 1968, a number of helicopters were converted for the Air Force as HH-1D rescue aircraft. Many examples were later re-engined to UH-1H standard.

UH-1H, HH-1H and UH-1V

Equipped with a more powerful T53-L-13 engine, rated at 1,400hp (1,044kW), the UH-1H was otherwise similar to the UH-1D and was the last new-production UH-1 single-engine variant. The UH-1H had a two-

bladed semi-rigid seesaw bonded all-metal main rotor and a two-bladed rigid delta hinge bonded all-metal tail rotor. The first examples reached Army units in 1968; by the time the last had been delivered in 1976, production for the US Army had reached 5,435. The USAF also received 30 HH-1H base rescue aircraft, ordered in FY1970.

A number of UH-1Hs were converted for specialized roles. The UH-1H Nighthawk gunship was equipped with a xenon searchlight and a pintle-mounted M134 7.62mm Minigun for use during night interdiction missions. The Nighthawk was also armed with one .50-cal. machine gun and two M60D 7.62mm machine guns. The AH-1G Cobra was often flown on night "Firefly" missions using the UH-1H Nighthawk to locate and illuminate targets. At least three EH-1Hs carried jamming and monitoring gear under the codename "Quick Fix." A developed variant designated EH-1U was cancelled in favor of the EH-60A Blackhawk. Four JUH-1H test aircraft were equipped with the SOTAS stand-off radar system intended for the EH-60B; VH-1H was an apparently unofficial designation for a number of aircraft converted as staff transports; as the type was retired during the 1990s, a number of UH-1Hs were reworked as QUH-1H target drones.

Many H models remain in service with Army Reserve/National Guard units. They have been kept current with new avionics, improved composite rotor blades and countermeasures equipment such as chaff-flare dispensers and infrared jammers.

The final UH-1 variant to enter US Army service, introduced in the early 1980s, the UH-1V, was a conversion of about 220 UH-1H airframes. Advanced avionics for all-weather, low-level flight were added to these aircraft, most of which are assigned a dedicated medevac role and also carry high-speed hoists and sophisticated on-board life support systems.

UH-1E

In March 1962, Bell won a Marine Corps contract to supply the service with an assault support helicopter, the UH-1E. The Marines ordered 250 UH-1Es, though total production only reached 192 aircraft, plus 20 TH-1E trainers. The UH-1E was similar to the UH-1C but was fitted with an external rescue hoist, a rotor brake to keep the rotor in place during shipboard stowage, aluminum construction as an anti-corrosion measure for shipboard use, an alternating

Medevac was always a key Huey mission. The stretched UH-1D could carry six stretchers lengthways in its longer fuselage, compared to the two or three stretchers athwartships of the UH-1A and the UH-1B.

current electrical system, and a Marine-optimized avionics fit incorporating air-to-ground and air-to-air radios.

First flight of the UH-1E was in February 1963. Deliveries began in February 1964. The Model 540 rotor system, used on the Army UH-1C, was introduced into UH-1E production in 1965. The Marines also obtained 20 TH-1E trainers. Primary missions of Marine Hueys included command and control, liaison, observation, gunship, and medevac duties.

The longer cabin of the Model 205 variants of the Huey could carry 12 troops. In Vietnam, however, they were used for carrying everything from mail and food through ammunition and spare parts to senior officers and (as seen here) war dogs.

XH-48A and UH-1F

In June 1963, Bell won a US Air Force contract for a helicopter to perform missile site support duties, a prototype being ordered under the designation XH-48A. The UH-1F, a derivative of the UH-1B, had a longer 48ft (14.63m) diameter rotor and a General Electric (GE) T58-GE-3 turboshaft engine nominally delivering 1290hp (962kW) but derated to 1,000hp (746kW). The first UH-1F flew on February 20, 1964, with deliveries beginning in September 1964. A total of 146 were built. Able to carry 10 passengers, the UH-1F entered service in late 1964, 120 being delivered to the USAF. A handful were deployed to Vietnam where some were converted as gunships for use by the 20th Special Operations Squadron (SOS) "Green Hornets," though these machines did not undergo a change of designation. Aircraft from a follow-on order for 26 TH-1Fs were employed for instrument and rescue training.

UH-1P

The USAF converted around 20 UH-1Fs to UH-1P standard for classified psychological warfare tasks in Vietnam. They were operated exclusively by the 20th SOS in Vietnam and had rocket and manually-aimed Minigun armament. Some sources have referred to an HH-1P variant, possibly a conversion of UH-1Ps for a rescue role.

HH-1K/TH-1L/UH-1L

Bell developed a variant of the UH-1B designated the HH-1K for the US Navy, with 27 built for search and rescue (SAR) duties. This variant was fitted with a Lycoming T53-L-13 engine derated to 1,400 horsepower and had Navy-specified avionics. Initial deliveries were in 1970. The K model was based on the UH-1E airframe. A further 90 advanced training helicopters were built for the Navy under the designation TH-1L

Seawolf, the first of which was delivered to NAS Pensacola in late 1969. These aircraft shared their airframe and engine with the HH-1K; a batch of eight similar utility UH-1Ls was also constructed for the Navy.

UH-1M

The continuing development of the Huey as a gun platform spawned the UH-1M, a conversion of the UH-1C equipped with the INFANT (Iroquois Night Fighter and Night Tracker) night vision system, produced by Hughes and comprising two nose-mounted IR seekers and IR searchlights either side of the cabin. 36 UH-1 Cs were fitted with T53-L-13 engines, as well as weapons slaved to the INFANT system, the first examples being deployed to Vietnam in October 1969. The aircraft remained in Southeast Asia for the duration of the war; a number were handed to the government of El Salvador in the early 1980s, though without INFANT equipment. A handful of surplus US Army aircraft ended up as QUH-1M target drones.

UH-1N

In 1965, Bell built a single twin-engine Model 208 "Twin Delta" Huey prototype. A UH-1D airframe was fitted with a Continental XT67-T-1 engine module made up of two T72-T-2 turboshafts driving a common gearbox. This experiment was built using company funds. In 1969, after discussions with the Canadian government and Pratt & Whitney Canada (PWC), Bell agreed to build a twin-engine version of the Model 205. Drawing on its earlier experience, Bell flew a UH-1D fitted with a new PWC "Twin Pac" engine, consisting of two PT6 turbines driving a common gearbox. This prototype led to the production Model 212 "Twin Huey." This was in essence a UH-1H fitted with the PWC T400-CP-400 (PT6T-3) Twin Pac. Each of the PT6 turbines could deliver over 900hp, but this was too much for the Huey's rotor system to handle, so they were derated to just over 765hp for a total off 1,530hp. However, in the event of a failure of one of the turbines, the other could be boosted to its full 900hp output. The UH-1N entered the Air Force inventory in 1970 as a special forces helicopter and to provide search and rescue capabilities, with missions being expanded to include missile base support, VIP transport, and survival school support. HH-1Hs and UH-1Fs supporting the missile wings were eventually replaced by the UH-1N due to the greater safety and capability offered by the twin engine. The UH-1N was the foundation of the post-Vietnam line of twin Hueys.

The UH-1M was equipped with infrared sensors in the nose. It was one of the first combat helicopters to be able to fly and fight in almost total darkness.

UH-1 PRODUCTION

Model 204

XH-40:

Three initial prototypes, with Lycoming T53-L-1 engine (700hp) and teetering-bar rotor.

YH-40:

Six evaluation rotorcraft, with T53-L-1A engine (770hp) and 1ft (30cm) fuselage stretch.

HU-1:

Nine pre-production rotorcraft, similar to YH-40.

UH-1A (HU-1A):

Initial full-production rotorcraft, similar to YH-40. 182 built.

UH-1B (HU-1B):

Stretched variant with wider-span rotor. Early production fitted with T53-L-5 engine (960hp), later production with T53-L-11 engine (1,100hp). At least 1,033 built.

Model 204B:

Commercial version of UH-1B.

UH-1C:

Gunship-optimized UH-1B with T53-L-11 engine, Model 540 rotor, and greater fuel capacity. About 750 built.

UH-1E:

USMC version of UH-1C, with rescue hoist, rotor brake, and USMC avionics. 192 built.

TH-1E:

Same as UH-1E but with dual controls for training. 20 built.

UH-1F:

USAF version of UH-1B, with General Electric T58-GE-3 engine (1,290hp) and wider rotor. 146 built.

TH-1F:

Trainer version of UH-1F, built in small numbers.

HH-1K:

US Navy SAR variant of UH-1B, with T53-L-13 engine and Navy avionics. 27 built.

TH-1L Seawolf:

Trainer version of HH-1K, 90 built.

UH-1L:

Utility version of HH-1K, 8 built.

UH-1M:

Night combat derivative of UH-1C with sensor systems and T53-L-13 engine (1,400hp). Built in small numbers, some converted from UH-1Cs.

UH-1P:

Psychological warfare conversion of UH-1F, with loudspeaker system.

Model 205

YUH-1D:

Prototype/evaluation version of Model 205, with stretched fuselage, T53-L-11 engine (1,100hp), wider rotor.

UH-1D:

Production Model 205, similar to YUH-1D. 2,008 built.

UH-1H:
Definitive Model 205 version, with T53-L-13 engine (1,400hp) and improved avionics. 3,573 built for US Army and 1,372 built for export sales.
EH-1H:
Three experimental UH-1H conversions to the SIGINT role.
UH-1V:
UH-1H conversion for medevac role, with rescue hoist and other small changes. 220 conversions.
HH-1D/HH-1H:
USAF version of Model 205 for SAR role, with rescue hoist. 30 built.
Model 212
UH-1N:
Twin-engine UH-1 used in small numbers by US Special Forces in the early 1970s. Later built in large numbers, replacing most single-engine Hueys in US service after the war.

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COLOR PLATE COMMENTARY

A: US ARMY UH-1B, HU-1 FLIGHT SECTION, 45TH TRANSPORTATION BATTALION, TAN SON NHUT, JULY 1963

Following President Kennedy's 1961 decision to increase support to the government of President Ngo Dinh Diem, the US Army began sending helicopters to Vietnam. The original transport companies flew twin-rotor Piasecki H-21 Shawnee machines, but in May 1962, these were joined by five Bell HU-1A Iroquois of the 57th Medical Detachment (Helicopter Ambulance). It was clear that the HU-1 was a much more capable transport than the piston-powered Shawnee, and in July, 15 more HU-1As arrived for operations with the US Army's Utility Tactical Transport Helicopter Company (UTTHCO) flying out of Tan Son Nhut Air Base near Saigon. These were modified in the field to become the first Huey gunships.

The first purely transport HU-1s were flown by the HU-1A Flight Section of the 45th Transportation Battalion (Transport Aircraft). Based at Tan Son Nhut from July 1962, the unit supported US advisors all over South Vietnam. The original HU-1As were replaced by UH-1Bs in July 1963. The flight's aircraft were painted gloss olive drab (FS 14087) and carried standard Army high-visibility markings. These consisted of a red-white-blue "Stars and Bars," white-lettered "Army" on the tail boom, and yellow Army serial numbers on the tail. Serial numbers used on the flight's UH-1Bs included 60-3554, 62-1893 and 62-1897, (which would have appeared on the tail as 03554, 21893, and 21897.

The aircraft of the UH-1 Flight Section had an additional marking underneath the serial number, namely the unit's "Indian Chief" insignia.

B: UH-1D "DUSTOFF," 57TH MEDICAL DETACHMENT, VIETNAM, 1967

The 57th Medical Detachment was the first aeromedical evacuation unit deployed to the Republic of Vietnam, arriving in-country with five HU-1As on 26 April 1962 and remaining until deactivation at Tan Son Nhut Air Base, on March 14, 1973. It was the first unit to use the UH-1 helicopter in combat operations. During the 57th Medical Detachment's service in Vietnam the unit, and its successors, combined with an excellent medical support system, contributed to the lowest mortality rate for the United States Armed Forces of any conflict in military history. Eventually, all aeromedical evacuations became known by the 57th Medical Detachment's original radio callsign, "Dustoff."

Early medevac UH-1s carried standard US Army high-visibility colors, with the addition of prominent red crosses on the nose and doors. Some aircraft also had "Dustoff" painted in yellow along the bottom of the windows. Later aircraft were delivered in low-visibility color schemes, the red crosses being applied in the field.

At the height of the war in 1969, the nine medical detachments in service in Vietnam had an official strength of

Infantrymen board a UH-1B at Fort Benning, Georgia. The 11th Air Assault Division (Test) was established at Fort Benning in February 1963 to explore the concept of airmobility, developing the tactics and techniques which would revolutionize infantry warfare.

61 UH-1D and UH-1H aircraft. 31 aircraft were lost in that year, and 138 missions saw Hueys returning to base with more or less serious combat damage.

C: US MARINE CORPS UH-1E "SLICK," HML-367 "SCARFACE," HUE, 1969

The US Marine Corps made considerable use of the UH-1E Huey. The E model was an aluminum version of the Army's UH-1C. Flown by Marine Observation Squadrons, the UH-1E was used both as a gunship and as a slick. Slicks were used on liaison, forward air control and medical evacuation missions, but not for air assault, where the twin-rotor CH-46 Sea Knight was preferred. Like the Army UH-1s, early Marine Corps Hueys were finished in gloss olive drab paint with high-visibility markings. Later examples lost the gloss and wore toned-down insignia.

Originally Marine Observation Squadron VMO-3, reactivated in August 1966, the unit was renamed Marine Squadron HML-367 "Scarface" in March 1969. The squadron identification code "VT" was carried in black along with the Huey's squadron number on the doors. Before switching to flying AH-1 Cobra gunships at Da Nang at the end of 1969, the squadron flew UH-1Es. Based at Phu Bai near Hue, VMO-3/HML-367 initially had 18 UH-1Es, rising to 24 aircraft in 1969. Most were gunships; the few unarmed "slicks" were used by the squadron for command and control, visual reconnaissance and numerous other utility missions. The standard paint scheme for Scarface Hueys in 1968 and 1969 was unusual: the tail boom was painted black, to which was added the squadron emblem, a yellow circle surrounding a cobra poised to strike.

D: US ARMY UH-1D, 1ST BATTALION, 7TH CAVALRY, 1ST AIR CAVALRY DIVISION, PLEIKU, 1966–67

The Bell Model 205 became the Army's primary combat transport and medevac helicopter in Vietnam. The smaller Model 204 variants were generally assigned to the gunship role. The aircraft depicted is seen as it would have been used by the 1/7th Cavalry during the battle of the Ia Drang valley in 1965. This, the 1st Cavalry Division's initial major operation in Southeast Asia, was the first occasion in which the US Army's new airmobile concept was tested.

E: ROYAL AUSTRALIAN AIR FORCE UH-1H, NO. 9 SQUADRON, NUI DAT, 1969–1970

No. 9 Squadron, Royal Australian Air Force departed for Vietnam on HMAS *Sydney* in April 1966, with eight UH-1B Iroquois aircraft and the ground crew who would service and look after them en route. No. 9 Squadron flew many operations in support of the Australian Army as well as the US Army and ARVN, but its specialty was special operations with the Australian Special Air Service (SAS) Regiment. Insertions and extractions deep into enemy territory were common, with a large number being hot, with the patrol, aircraft and crew coming under enemy fire. Many other operations were flown, including medevac, resupply, psy-

One of the original roles envisaged for the Huey was as a medical evacuation helicopter and in that role it saved thousands of lives in Vietnam. Here, a US Army UH-1D evacuates wounded from an armored troop carrier during the riverine campaign in the Mekong Delta.

At the height of American involvement in Southeast Asia in 1968 and 1969, the US Army operated more than 4,000 helicopters, at least 3,000 of which were UH-1 Hueys. Here, members of the 173d Airborne Brigade deploy from a UH-1D near Pleiku.

chological warfare using loudspeakers mounted on the side of the helicopter's fuselage, defoliant spraying, and troop lifts.

The Australian "Roo" emblem was located aft of the RAAF title on the tail boom and again under the nose number. The albatross on the squadron crest, which dated back to the 1920s, commemorated the unit's previous role in flying from Royal Australian Navy cruisers during WWII. It was located on the pilot doors. The olive drab on Australian Hueys was the same as that used on US Army Hueys — X34087 in the FS 595 system of paint designations.

The Bravo models were sent back to Australia in mid-1968 when the larger and more powerful Iroquois UH-1H came on line. Just prior to the introduction of the UH-1H, two UH-1D models were used and later upgraded to UH-1H standard.

F: USAF UH-1F, 20TH SPECIAL OPERATIONS SQUADRON, NHA TRANG, 1967–68

While the aircraft were originally purchased for missile site support, the US Air Force also used the UH-1F Huey for staff transport, cargo delivery, security, and rescue. A number of UH-1Fs served with the 606th Air Commando Squadron in Thailand during the early 1960s. Hueys from this unit were later used to form the 20th Special Operations Squadron (20th SOS) known as the "Green Hornets," which relocated to Vietnam in 1966. The primary function of the 20th SOS UH-1Fs was to serve as transports for highly classified Special Operations Group (SOG) teams, which conducted clandestine cross-border operations. These Hueys were fitted with armored seats, rope ladders or hoists, and M60 machine guns suspended from cords in the cargo doorways. However, they were also used for psychological warfare operations, as seen here, carrying leaflet dispensers or loudspeaker systems. As a security measure, the Air Force used the psywar operations as a cover for the squadron's more clandestine work.

The AFSOC (Air Force Special Operations Command) had its own paint scheme for the 20th Special Operations Squadron. Helicopters were finished in a three-color camouflage that consisted of dark green, medium green and a tan color over a light gray undersurface. Due to the classified nature of their missions, these Hueys only carried the serial number and the Green Hornet insignia on the tail fin. Later the UH-1Fs were modified to UH-1P standard before being replaced by the UH-1N.

G1: AIR AMERICA MODEL 204B, OPERATION FREQUENT WIND, 1975

Air America, an airline secretly owned by the CIA, was a vital component in the agency's operations in Laos. By the summer of 1970, the airline had some 50 fixed-wing aircraft and 30 helicopters dedicated to operations in Laos. Air America crews transported tens of thousands of troops and refugees, flew emergency medevac missions and rescued downed airmen throughout Laos, inserted and extracted road-watch teams, flew nighttime airdrop mission over the Ho Chi Minh Trail, monitored sensors along infiltration routes, conducted a highly successful photo reconnaissance program, and engaged in numerous clandestine missions using night-vision glasses and state-of-the-art electronic equipment. Air America aircraft carried a plain metallic finish with civil registrations. About 12 Bell 204Bs were used in Southeast Asia, and some ten survived the war. Air America helicopters carried some of the last Americans out of Vietnam in 1975, flying refugees out of Saigon to the evacuation armada off the coast. N8514F was one of them. Along with five other ex-Air America Bell 204Bs, it was sold to a Danish operator after the war, and continued in use for many

years before being returned to the USA. In 1994, it was seriously damaged in New Mexico, whilst being used to fight a bushfire.

G2: VIETNAMESE AIR FORCE UH-1H, SOUTH VIETNAM, 1973–74

The Vietnamese Air Force began to operate UH-1H Hueys in the late 1960s, eventually fielding some 14 squadrons of the type. All the aircraft had been handed down by the US Army as America began to withdraw from Southeast Asia. The VNAF had begun helicopter operations in 1958 with a handful of Sikorsky H-19s, expanding in the 1960s with the delivery of more than 80 Sikorsky H-34s. However, deliveries of ex-US Army UH-1Hs dwarfed all other types in the inventory, more than 830 having been nominally taken on strength by the beginning of 1973. VNAF UH-1Hs retained their US Army paint finish with the addition of Vietnamese national and squadron markings. As the North Vietnamese pressed farther into South Vietnam in 1974 and 1975, lack of spare parts and aviation fuel forced much of the VNAF's inventory to stay on the ground. Many crews took their aircraft out of the country to Thailand, Laos, and to the US Seventh Fleet, which lay off the coast. However, scores of aircraft were left to the enemy as base after base was overrun, and many UH-1s were pressed into service by the North Vietnamese after the end of the war.

G3: M23 ARMAMENT SUB-SYSTEM

The M23 sub-system is attached to external stores hard point fittings on both sides of the helicopter. The two flexible 7.62mm M60D machine guns are free pointing but limited in traverse, elevation, and depression by cam surfaces and stops on pintles and pintle post assemblies of the two mount assemblies on which the guns are mounted. An ejection control bag is attached to the right side of each machine gun.

G4: MAIN ROTOR SYSTEM

The Huey propulsion system consists of a gas turbine engine, main driveshaft, transmission and mast, main rotor, and the tail rotor with driveshafts and gearboxes. The engine drives the transmission through the short main driveshaft, rotating the mast and main rotor. The unique Bell stabilizer bar is a weighted, rotating unit mounted above and across the main rotor suspended in pivotal bearings on supports bolted to the rotor hub trunnion. The supports also contain the stops that limit bar travel. The main rotor blades are metal, bonded assemblies. Each blade is attached in the hub with a retaining bolt assembly and is held in alignment by adjustable drag braces. A system of linkages transmits movement from cyclic control sticks to the swashplate, which actuates rotating controls to the main rotor, controlling the direction of the helicopter. Fore and aft lateral control are independent linkages from the control stick to an intermixing bellcrank.

Small numbers of USAF UH-1F helicopters were converted to UH-1P standard for use by the 20th Special Operations Squadron in Vietnam. Intended for psychological warfare operations, they were also used as gunships.

The UH-1H was the definitive single-engined Huey. Based on the UH-1D, it was fitted with a more powerful engine for better performance in "hot and high" conditions. Over 5,400 examples were delivered to the US Army between 1968 and 1976.

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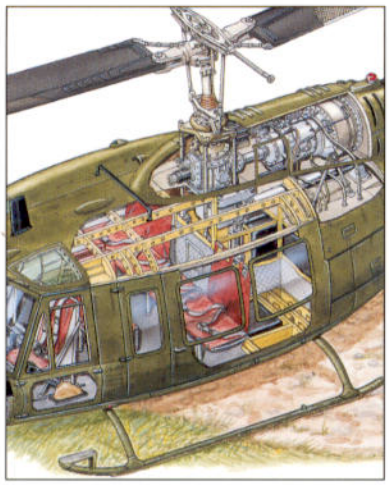

Cutaway artwork

Photographs

Bell UH-1 Huey "Slicks" 1962–75

The US Army requirement for a light utility helicopter was formulated after the Korean War. Bell's Model 204 design won a competition in 1955, and was given the military designation H-40, later renamed the HU-1 Iroquois. The original design called for a helicopter that could be used for transport, airborne battlefield command and control, medical evacuation, fire support co-ordination and search and rescue. Later, its missions would be expanded to include troop insertion and extraction, armed escort and special operations. This title details the technological background behind the development and use of the Huey "Slick" in Vietnam, as well as covering all the major combat uses that this transport aircraft was put to.

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