

A U.S. Army UH-60A Black Hawk helicopter is shown in flight against a clear blue sky. The helicopter is viewed from a low angle, looking up at it. The main rotor blades are blurred due to motion. The tail rotor is also visible. The helicopter is painted in a tan or olive drab color. The text "U. S. ARMY" and "UH-60A" is overlaid in blue, bold, sans-serif font in the upper left quadrant. The text "Mission Ready" is overlaid in the same font in the lower right quadrant.

**U. S. ARMY
UH-60A**

Mission Ready

PERFORMANCE

- + RELIABILITY AND MAINTAINABILITY**
- + TRANSPORTABILITY**
- + SURVIVABILITY**

= OPERATIONAL SUITABILITY

UH-60A operational suitability and combat mission effectiveness is optimized through the careful integration of these priority requirements and the respective parameters desired by the U.S. Army.



The sophisticated battlefields of today and tomorrow have ended the era of mass formation medium and low-altitude heliborne combat assaults. To survive in the high threat environment nap-of-the-earth flight will be essential and loose formations of three or fewer aircraft will be the norm. The combat effectiveness of air mobile units must therefore be enhanced by a delivery vehicle — the Utility Tactical Transport Aircraft System — far superior to our existing (UH-1) troop transports. Each UTTAS must be able to deliver a unified combat team — the combat equipped 11 man squad. The UTTAS must perform the Army missions in diverse weather and terrain conditions worldwide.

In addition to combat assault, UTTAS will be called upon to perform a myriad of combat support mis-

sions in the forward areas, missions for which larger helicopters may not be available or where the risk of threat weaponry is too high.

THE SIKORSKY UH-60A IS THE ANSWER. The UH-60A was designed to fulfill the needs of our modern air mobile forces, and prototype testing has proven that the UH-60A will meet or exceed the demanding Army requirements.

Operational Suitability of the UH-60A for Army missions worldwide is the end result of dedicated effort and attention to detail in fulfilling the priority requirements as outlined in the Army-developed UTTAS system specification.



PERFORMANCE + RAM + TRANSPORTABILITY + SURVIVABILITY = OPERATIONAL SUITABILITY

PERFORMANCE

The UH-60A can lift a fully combat-equipped 11 man infantry squad in temperature and altitude conditions likely to be encountered in any theater of operation worldwide – at 4000 ft., in temperature extremes varying from desert heat to arctic cold. Combat loaded, the UH-60A can climb at 480 feet per minute in Army standard hot day conditions. Terrain flight, including extended periods of nap-of-earth (NOE) flying, is vital to the UTTAS missions. The UH-60A has the high maneuverability and immediate control response required for effective NOE and low-level operations. Fifty-knot side-ward and rearward flights illustrate the UH-60A's ability to ignore adverse wind conditions and execute landings along any desired axis of approach.

The UH-60A is one of the smoothest, most vibration-free helicopters ever built. The low vibration level represents the culmination of years of dedicated engineering and development efforts and is attributed to the inherently stable elastomeric rotor

system, the fleet-tested and proven bifilar, and a finely tuned airframe. The aviator is free to exploit the broad flight envelope of the UH-60A – without fear of vibration-induced fatigue in aircraft systems, including the crew – and to realize the full potential of this high performance helicopter.

UH-60A agility also enhances survivability. Superior flying qualities help the UH-60A to avoid detection and escape enemy fire. Generous control ranges, enhanced by a highly responsive rotor system and increased control power margins, afford the UH-60A a high degree of controllability, with excellent low speed stability and performance.

The UH-60A has immediate control and power response to execute swift, agile approaches to quick-stop high flare angle landings in tight LZ's. It has the vertical rate of climb to depart confined areas rapidly – fully combat-loaded.



RELIABILITY-AVAILABILITY-MAINTAINABILITY

The UH-60A is an extremely reliable aircraft that will meet the Army defined RAM goals and establish new highs in availability and unit readiness posture. Design simplicity, modular construction, component and system redundancy all add up to an aircraft bred for the tactical environment, ready around the clock to respond to the demands of the combat soldier.

Reliability is greatly enhanced by the very low vibration levels throughout the UH-60A. Low vibration is the result of proper airframe tuning and use of an efficient bifilar absorber which dampens vibration at the source – the main rotor head – before it feeds into the main transmission and airframe where it would be harmful.

UH-60A main and tail rotors have no conventional roller bearings and are lubrication free. Fleet proven elastomeric bearings in the main rotor head, and cross-beam bearingless composite paddles in the tail rotor give the UH-60A unprecedented reliability in rotor systems through prudent application of low-risk advanced technology.

UH-60A maintenance support concept is in keeping with AR750-1, Army Materiel Maintenance Concepts and Policies, which calls for replacement of components or modules. "On condition" maintenance concept is extensively applied throughout the UH-60A. Parts will be replaced when condition or wear dictates, thereby providing full life utilization of components. The end result will be greater aircraft availability at lower cost. All major components and modules can be replaced with use of common hand tools and the aid of a portable aircraft-mounted maintenance crane. Components are grouped to avoid queuing of mechanics in one area of the airframe.

These are just a few examples of the many RAM attributes. The UH-60A has a high degree of self-supportability provided by rapid access to systems, functional grouping, hand-tool fault correction, on-board APU power source and an aircraft mountable maintenance crane. It all results in a total system requiring minimum maintenance – easy to administer when needed.



TRANSPORTABILITY

The UH-60A must be capable of rapid strategic deployment worldwide. It is air transportable in C-130, C-141, and C-5A aircraft. One UH-60A can be carried in a C-130, two in a C-141, and six to eight in a C-5A.

Self-deployment over extended ranges is possible when the UH-60A is configured for auxiliary fuel. Within a theater of operation, it is easily deployable on internal fuel only.

Preparation for air transport consists of folding the main and tail blades, removing the mast extender and folding the tail, all of which can be achieved well within the Army's elapsed time requirement.

Preparation for flight is a simple reversal of the process. Blade tracking is not necessary due to the master track indexes determined during manufacture.

Army Elapsed Time Requirement	
Preparation for loading	1.5 hours
Loading	.5 hours
Unloading	.5 hours
Preparation for flight	2.0 hours

Air transportability by C-141 and C-5A was successfully demonstrated during Government Competitive Test (GCT) by Army crews that bettered the elapsed time goals for preparation, loading, unloading and preparation for flight.

Rapid deployability — whether it be by Air Force transport or self-deployment — will make the UH-60A an all-important segment of our strategic strike forces worldwide.



COMBAT SURVIVABILITY

Battlefield survivability will be a major challenge to all aircraft operating in the high threat environment. The UH-60A was designed and built with the anticipated threat firmly in mind. The stringent design requirements for flight maneuverability and agility,

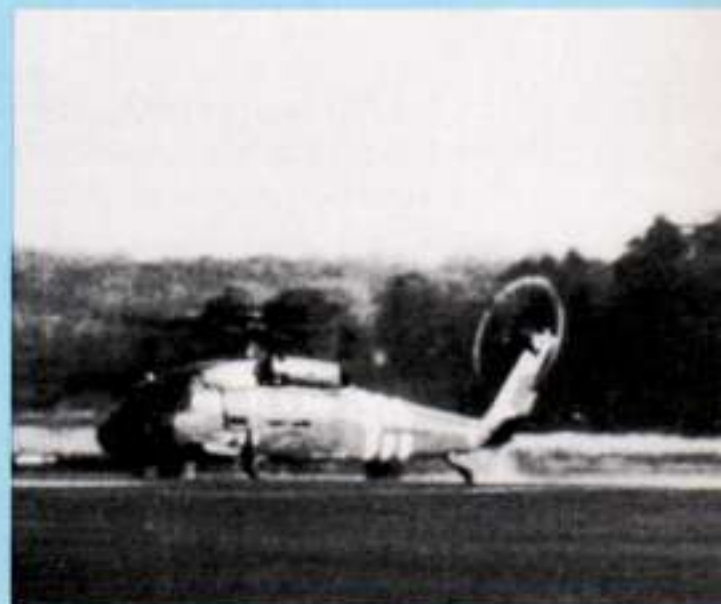
ballistic tolerance, system redundancy, crashworthiness and a host of other parameters have given the UH-60A the needed toughness to support the ground commander's plan of action in the most demanding of conditions.



- The UH-60A is invulnerable to the 7.62 mm AP primary threat, and extensive ballistic and laboratory tests have illustrated the UH-60A's ability to continue flight for a minimum of 30 minutes after sustaining ballistic damage from projectiles as large as 23 mm HEI. Redundant systems, "fail-safe" designed devices and ballistically tolerant materials provide the UH-60A with unprecedented staying power.
- Completely drained of oil, the UH-60A main transmission can operate—at full flight loads—for the required 30 minutes, and then some! Successful zero-lubrication testing saw the UH-60A modularized transmission perform for 1 hour and 5 minutes—without any backup lubrication assist.
- Low detectability and excellent threat avoidance capability greatly enhance battlefield survivability of the UH-60A. An IR suppression system has been developed for the UH-60A, which will defeat heat seeking weaponry. The UH-60A noise signature is dramatically lower than that of current helicopters and will enable the UH-60A to operate in much closer proximity to enemy forces without fear of aural detection.

CRASH SURVIVABILITY ILLUSTRATED

YUH-60A inadvertent hard landing sequence captured on 16mm film during contractor testing illustrates protection provided by rugged tail gear. Tail wheel was replaced and aircraft returned to flight status the following day.



CRASHWORTHINESS

UH-60A crashworthiness design features will substantially reduce crew and passenger injuries and airframe damage in all categories of accidents.

- A 2500 ft/minute impact is survivable in the UH-60A.
- A crashworthy fuel system with engine mounted suction feed greatly reduces the hazard of fuel spillage and associated post-crash fires.
- Crew and troop seats limit g-loading on occupants to non-injurious levels in survivable impacts.
- The cabin structure is designed to prevent parallelogramming and can resist deformation under simultaneous 20g forward and 10g downward inertia loads.
- Wheeled landing gear absorbs the energy of most survivable impacts. Each main strut consists of two oleos, one above the other, which absorb the energy in high sink speed impacts. The tail wheel strut is of similar structure and demonstrated its durability in the film sequence to the right.

THE MACHINE: UH-60A



UTILITY TACTICAL TRANSPORT AIRCRAFT SYSTEM

The UH-60A is designed primarily as a tactical assault helicopter for delivery of the 11-man infantry squad in high threat combat conditions worldwide. It is built to live in the Army combat environment.

Twin GE-T700 engines power the UH-60A, producing up to 1560 hp each. Auxiliary and start pneumatic power is produced by an on-board Solar APU.

The UH-60A cockpit was designed to comfortably accommodate the 5th through 95th percentile avia-

tor. All controls can be manipulated even with safety harnesses locked. The aircraft is instrumented with tactical and IFR equipment that permits operation in almost any weather conditions. Solid state color-coded fiber optic vertical scale instruments provide a quick easy-to-interpret indication of system status. Pilot and copilot panel displays are identical, simplifying in-flight control transition, training, and IFR hand-off from pilot to pilot. Center console controls are within easy reach of both pilots so that the UH-60A can readily be flown by a single pilot, even in IFR conditions.

PERFORMANCE + RAM + TRANSPORTABILITY + SURVIVABILITY = OPERATIONAL SUITABILITY

Performance at Mission Gross Weight

Max Cruise Speed (MCP)

4000' 95° 147 Kt

SLS 160 Kt

V_{NE} 195 Kt

Vertical Rate of Climb (95% IP)

4000' 95° 480 fpm

SLS 2,460 fpm

Service Ceiling 19,100 ft

Hover Ceiling (IP-OGE)

95° day 5,600 ft

Std. day 10,400 ft

Engines

(2) T700-GE-700 Turboshaft 1,560 hp

Weights

Weight Empty 10,900 lbs

Mission Gross Wt. 16,450 lbs

Max Alternate G.W. 20,250 lbs

Dimensions

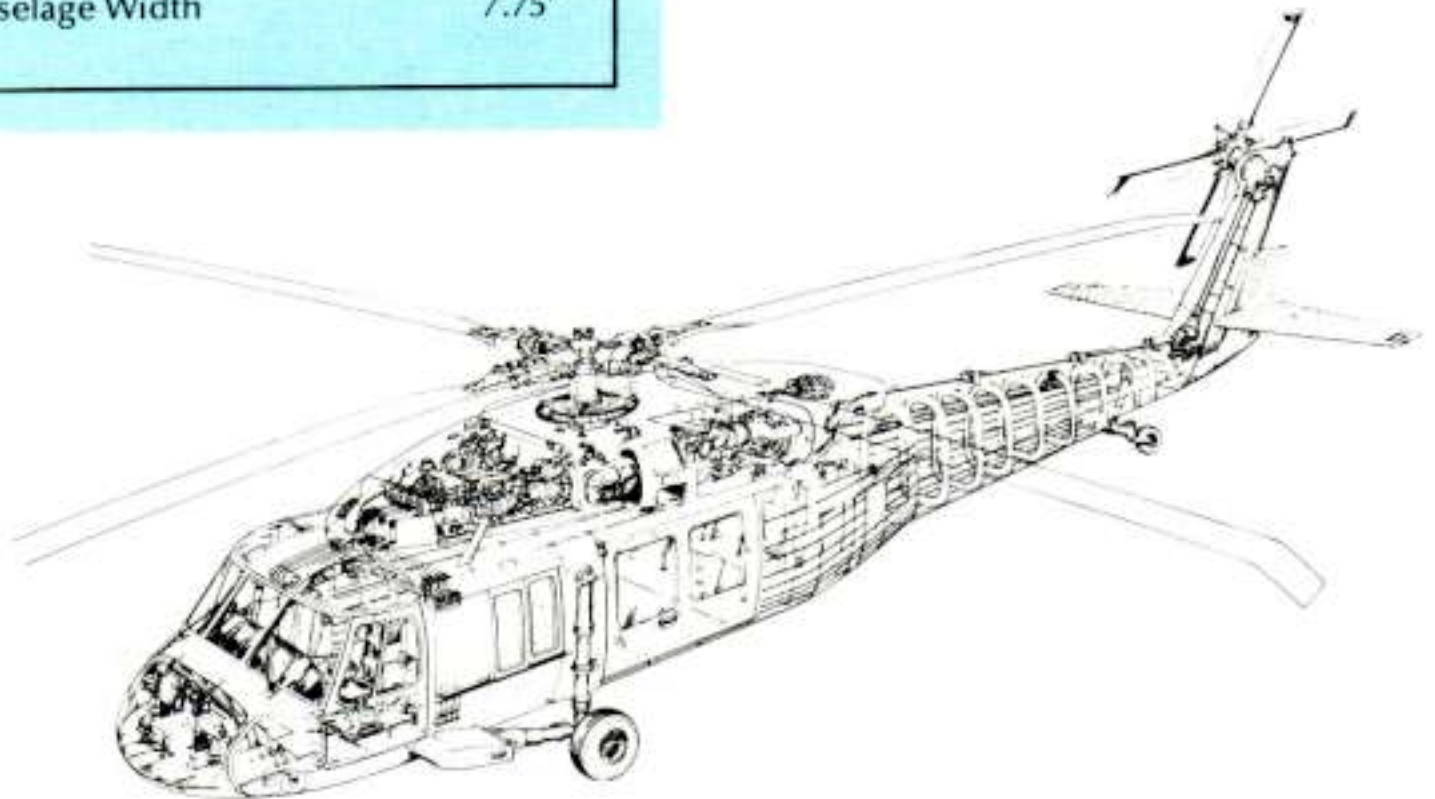
Main Rotor Diameter 53.7'

Tail Rotor Diameter 11.0'

Overall Length (Rotor Turning) 64.8'

Maximum Height 16.8'

Fuselage Width 7.75'





THE MISSIONS

TACTICAL TROOP MOVEMENT

- deliver 11 man combat-equipped squad in Army hot standard day conditions (4000', 95°F).
- rapidly deploy TOW and Dragon teams as part of the combined anti-armor force.



MEDICAL EVACUATION

- evacuate 4 to 6 patients.



TACTICAL RESUPPLY

- provide logistical support in forward areas, close to FEBA's, where large cargo helicopters become too vulnerable to threat weaponry.



The UH-60A is capable of performing the Army missions under any condition likely to be encountered worldwide. Survivable against expected threat weapons, reliable in forward tactical areas, and easily maintainable in the field, the UH-60A is a tough, rugged weapons system with the staying power to support the ground commander in the most severe battlefields environments.



SIKORSKY AIRCRAFT  Division of
UNITED TECHNOLOGIES