

# BLACK WE TRUIS





**On March 10, 2014**, a rock climber was scaling Shortoff Mountain in North Carolina’s Pisgah National Forest when he lost his footing and fell approximately 35 feet down the peak’s steep face, tumbling like a loose stone until he bounced off one mountain ledge and onto another. The climber, who suffered critical injuries—including a concussion, a broken leg, a fractured pelvis, a broken tailbone, three broken ribs and a collapsed lung—clung to the narrow ledge for nearly four hours until he heard the sweet sound of deliverance: the distinctive, rapid-fire “thump-thump-thump” of a Black Hawk helicopter, manned by rescuers from the North Carolina Army National Guard.

“I was in an absurd amount of pain,” the climber, 23-year-old Jackson DePew of Asheville, N.C., told his local newspaper, the *Citizen Times*, after the incident. “It was the most pain I’ve ever been in my life. But I also remember thinking, ‘This is freaking awesome. This is the coolest thing. There’s a Black Hawk helicopter right there.’”

There have been legions of rescues just like DePew’s. Days later, for instance, the Alaska Army National Guard dispatched a Black Hawk helicopter to save an elderly ice fisher who collapsed at a remote camp in southwestern Alaska. The previous summer, the Colorado Air National Guard used a Black Hawk to rescue an injured paraglider from a mountainside west of Denver. And in 2012, the Utah Army National Guard activated two Black Hawks to help rescuers locate and recover six missing rafters on the San Rafael River.

“There are countless stories about folks whose life was saved because of this aircraft,” says Tom Nicolett, director of National Guard business development at Sikorsky Aircraft Corp., which began producing the UH-60 Black Hawk in 1977. “Because it has the ability to fly in high altitudes and extreme weather conditions, it’s really well-suited for performing the diverse war-fighting and state missions the National Guard performs.”

Indeed, the National Guard and the Black Hawk helicopter are perfectly matched in a marriage that still endures—even as the U.S. Army courts a new generation of military aircraft capable of continuing the Black Hawk’s tradition of ruggedness, reliability and performance.

**BETTER, SAFER, STRONGER**

The Black Hawk’s predecessor, the Bell UH-1 Iroquois—or “Huey”—helicopter, was the United States’ signature chopper during the Vietnam War. The first turbine-powered helicopter produced for the U.S. military, it was celebrated for its size, speed and

FORTY YEARS AFTER THE PROTOTYPE’S FIRST FLIGHT, THE SIKORSKY UH-60 BLACK HAWK IS STILL THE NATIONAL GUARD’S MOST TRUSTED HELICOPTER.

*By Matt Alderton*

# AN AWESOME AIRCRAFT

In September 2013, torrential rains deluged 14 Colorado counties with catastrophic flooding spanning nearly 200 miles. Although eight civilians died, the Colorado National Guard rescued more than 1,750 others who were stranded by washed-out roads in Rocky Mountain canyons. During those rescues, the Black Hawk proved indispensable, according to SFC Bryan Scott, a UH-60 MEDEVAC flight medic with the Colorado Army National Guard.

“With the Black Hawk, we were able to get to a lot of places that we couldn’t get to with other aircraft,” Scott says. “Whereas the Chinook, for example, was too large to get into many of the tight spots where people were stranded, the Black Hawk was small enough to safely do both land and hoist missions. We rescued hundreds of people with the Black Hawk.”

“The rotor wash of the Chinook is enough to knock the people we’re rescuing off the

mountain where they’re stuck,” echoes SFC Thomas Castillo, a UH-60 crew chief and enlisted flight instructor at the Colorado Army National Guard’s High-Altitude Army National Guard Aviation Training Site (HAATS) in Gypsum, Colorado. “The Black Hawk gives us a very stable, perfect-sized aircraft for what we do [in the Rocky Mountains].”

Guardsmen like Scott and Castillo revere the Black Hawk not only for its size, but also for its versatility.

“What I like best about the Black Hawk is that it’s very interchangeable,” says Scott, who cites as major benefits the Black Hawk’s generous cabin space, power to perform at high altitudes, extended fuel range and ruggedness. “You can use it for many different missions—MEDEVAC, search and rescue, firefighting. Even if we had to do a defensive or offensive mission in-country, the Black Hawk could handle it. You can configure it for



Sgt. 1st Class Michael J. Culmone of the NJ ARNG conducts maintenance on the avionics of a UH-60 Black Hawk. (Photo by Master Sgt. Mark C. Olsen)

virtually any need you have.”

The Black Hawk also earns points for easy maintenance. “From a maintenance perspective, the Black Hawk is very good,” Castillo says. “If it breaks hard—if something is wrong with the engine or the flight controls—we’re hurting. But as long as parts are plentiful, we can shuffle them in and out in order to get a downed aircraft back up within a week.”

Guardsmen at HAATS used to fly Hueys. “The problem was, the Huey was just not stable enough. It didn’t have the power we needed to do the things we do,” Castillo concludes. “The Black Hawk does. It’s an awesome aircraft.”

it awarded Sikorsky a \$61 million contract to design and build five prototypes, the first of which had its first flight in October 1974.

“The first production Black Hawk was delivered to the Army in October 1978, which was only six years and nine months from when the Army issued its RFP to industry—

quite a remarkable time period,” recalls the “father” of the Black Hawk, retired Sikorsky engineer Ray Leoni, who says the Black Hawk provided what the Huey could not: reliable airlift, enhanced ballistics protection and improved crash survivability, not to mention superior speed and handling. “Its 140-knots cruise speed, high maneuverability and vertical performance were unmatched by any other utility transport helicopter in the world.”

Numerous design features gave the Black Hawk its edge. Its twin GE T700 turboshaft engines, for example, were known for their small size, sustained high power output, high reliability and light weight. Its bearing-less cross beam tail rotor system, meanwhile, limited torque and assisted with directional control. And then, perhaps most significantly, there was its main rotor system, which utilized blades with titanium spars that could withstand gunfire and elastomeric bearings that dramatically reduced maintenance requirements.

“The main rotors are the heart and soul of any helicopter; they provide all the performance, all the

versatility. During the course of the war, however, it became clear that the Huey had just as many weaknesses as it did strengths. And so the Black Hawk was born.

“The Black Hawk originally was designed to replace the UH-1, which had some significant shortcomings in the Vietnam War,” Nicolett explains.

“The Black Hawk was designed to address those shortcomings.”

Of particular concern were the Huey’s vulnerability to small arms fire, its poor crash survivability and its limited payload capacity.

The Army issued its request for proposal for the Black Hawk in January 1972. Eight months later,

## THE BLACK HAWK AT A GLANCE

Prototype first flight  
**1974**

First prototype model delivery  
**1978**



Number in service  
**2,135**

Number of engines  
**2**



Engine type\*  
**T700-GE-701D**

maneuverability, and are the source of all maintenance and reliability problems,” Leoni says. “In the case of the Black Hawk, our elastomeric rotor system has been extremely successful. In fact, 40 years later the same rotor head is flying on the current production Black Hawks.”

**‘A VERY VERSATILE AIRCRAFT’**

Its superior performance made the Black Hawk the “premier utility aircraft” for both the Army in general and the National Guard in particular, according to Nicolett.

“It’s a very versatile aircraft because you can carry troops, obviously, but you can also pull the troop seats out and haul a lot of different things,” he says. “Probably the best evidence of this is the variety of war-fighting and state missions the National Guard supports with the Black Hawk.”

In performing its traditional combat missions, the Guard utilizes Black Hawks for transporting combat troops, combat re-supply of weapons, ammunition and equipment. For command-and-control missions, Black Hawks are leveraged for situational awareness and communications. And, of course, for MEDEVAC missions the Guard uses Black Hawks to evacuate wounded soldiers from the battlefield. In fact, today’s HH-60M MEDEVAC helicopter was derived from a Guard program funded by Congress to develop the UH-60Q MEDEVAC helicopter.

The Black Hawk’s utility increases even further when you consider the

state missions the Guard performs on a regular basis, primarily search-and-rescue and humanitarian relief. Another of those missions—fire fighting—benefited from another Guard program funded by Congress to produce the UH-60 Firehawk helicopter.

While all of these missions are important, the Guard’s bread-and-butter state mission is emergency and disaster response. While search-and-rescue is a mainstay during such missions, Black Hawks also transport troops and supplies during floods, fires, tornadoes, hurricanes and earthquakes. In February 2014, Black Hawks were utilized in the aftermath of a massive mudslide in Washington State. And every summer, across dozens of Western states, Black Hawks perform water drops on forest fires, supporting U.S. Forest Service suppression efforts. “If you talk to anybody who has commanded emergency response operations in the Guard, they’ll tell you that in the vast majority of those missions they need the capabilities of the Black Hawk to execute that mission,” Nicolett says.

Perhaps the largest state emergency response in recent National Guard memory was Hurricane Katrina in 2005. “Within 24 hours after the storm had passed, more than 90 Black Hawks from virtually all 54 states and territories arrived in Mississippi and Louisiana to begin rescue missions,” Nicolett continues. “At one point there were more than 120 Black Hawks in New

Orleans alone, flying in a circular path directed by the Louisiana National Guard’s 244th Aviation Battalion, which had recently returned from a deployment in support of Operation Iraqi Freedom.”

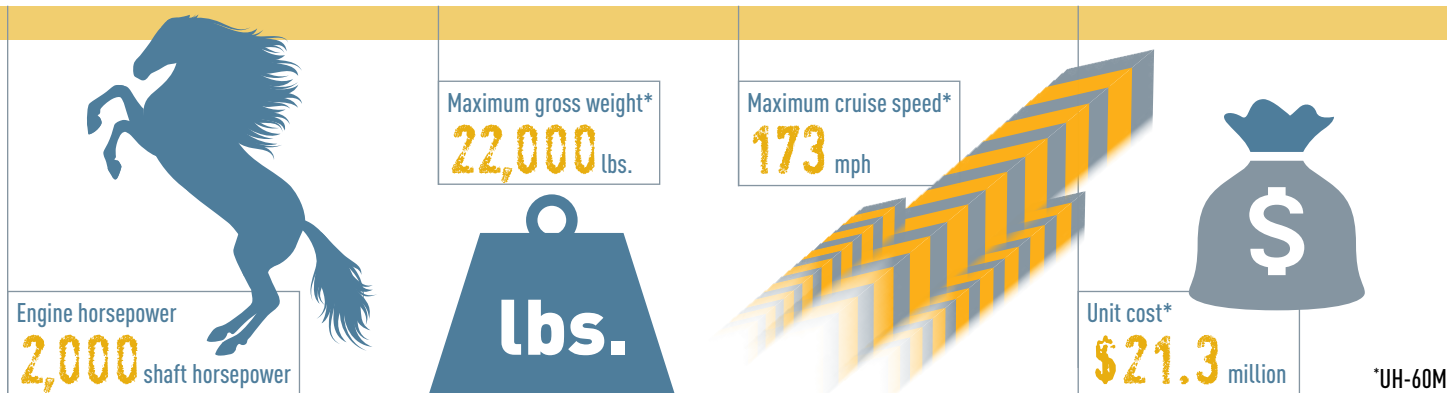
The Louisiana Guard’s headquarters at Jackson Barracks and flight field at Lakefront Airport were under water, so the 244th set up a tactical operations center and makeshift helicopter staging area on the rooftop of the Louisiana Superdome’s parking garage to coordinate air operations. “Over the 15 days that they flew, those Black Hawks flew more than 4,000 hours and rescued more than 30,000 people,” Nicolett says. “Many of those Mississippi and Louisiana Guard soldiers had lost their homes and were dealing with significant personal challenges, yet they reported for duty to help their fellow citizens in need.”

**ALL IN THE FAMILY**

Since entering production in 1977, the original Black Hawk, the UH-60A, has spawned two major upgrades: the UH-60L and the UH-60M. The L model, initiated in 1987, has a more powerful engine and an upgraded transmission system.

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The M model began development in 2001 and features fully coupled digital flight controls and new active vibration control, not to mention wide-chord all-composite rotor blades and another engine upgrade, collectively increasing the aircraft's lift capacity by 1,000 pounds.

"The digital flight controls incorporated into UH and HH-60M models currently in production enable pilots to fly the aircraft like they would fly a fixed-wing aircraft," Nicolett says. "You can program a mission and basically let the aircraft fly for you, which significantly reduces fatigue and enables the crew to have better situational awareness."

Because L and M models are not only more powerful than A

models, but also more efficient—requiring less money, equipment and man-hours for maintenance—the Army is currently modernizing its Black Hawk fleet of more than 2,000 helicopters.

The ultimate goal is to replace A models across the entire Army, explains Nicolett, although it lacks the funding needed to modernize its Guard fleet as quickly as its active-duty fleet. "Right now, analysis shows the Guard will be flying the A model until about 2026, and the active Army until about 2021."

The National Guard Association and EANGUS are working to accelerate modernization and retire the Guard's A models more quickly, according to Nicolett. "Really,

though, a lot depends on what happens with the significant budget issues the government faces in the next four to six years."

Beyond 2030, the Army plans to replace the Black Hawk with a Future Vertical Lift aircraft that boasts hover, speed, range, payload and fuel efficiency far exceeding that of current rotorcraft. At that point, the Black Hawk will have relinquished its crown—but not its influence.

"The Black Hawk has significant ballistic tolerance, superior crash survivability and extreme maneuverability; that's its legacy," Leoni says. "Its successor may not look like a Black Hawk, but it will embody many of the features that have made the Black Hawk so successful." ■



A U.S. Air Force HH-60G Pave Hawk helicopter approaches for landing at Bagram Air Field, Afghanistan, Jan. 15, 2012. Known as the Pedros, the 83rd ERQS is tasked with combat search and rescue. (Photo by Tech. Sgt. Matt Hecht)

## GOING THE DISTANCE

**The Black Hawk is more of a sprinter** than a marathon runner. When it needs to execute long-range missions, therefore, the National Guard turns to a Black Hawk variant that entered service with the U.S. Air Force in 1982: the HH-60G Pave Hawk.

Although it originally was designed to recover special-operations personnel in hostile environments, the Pave Hawk has several unique features

that make it ideally suited to the National Guard's mission set, including civil search-and-rescue. For one, it incorporates the U.S. Air Force PAVE electronic systems program, which includes upgraded communications and navigation capabilities. It also has an automatic flight-control system that reduces pilot fatigue, a forward-looking infrared imaging system for night flying, an engine/rotor blade anti-ice system that assists in extreme weather conditions, and a retractable in-flight refueling

probe that extends the aircraft's range and flight time.

Three units in the Air National Guard—California, Alaska and New York—currently fly the Pave Hawk. "When these units are not deployed in support of operations in Afghanistan, Iraq or elsewhere throughout the world, they are supporting rescue operations in their states," says Tom Nicolett, director of National Guard business development at Sikorsky Aircraft Corp., which manufactures both the Pave Hawk and the Black Hawk. "The California and New York units are called to respond to over-water rescues in the Atlantic and Pacific, while the Alaska unit—the busiest of the three—works in conjunction with Coast Guard HH-60 units and Army National Guard HH-60 units to cover the vast land and water areas in Alaska. In Alaska, both Army and Air National Guard rescue crews regularly fly in extreme weather conditions, in degraded visual environments and sometimes at higher

altitudes to rescue citizens stranded on the ice, in the mountains or in the unforgiving Arctic Ocean, Bering Sea, Gulf of Alaska or Pacific Ocean."

Indeed, its range makes the Pave Hawk well suited for remote land and ocean rescues, while its technology suite makes it especially useful in adverse weather conditions.

The Pave Hawk fleet is among the highest demanded rotary wing asset in the DoD inventory today; so the fleet's helicopters have significantly higher flight hours per airframe according to Nicolett, who says Sikorsky recently won an Air Force contract to replace the military's aging Pave Hawk fleet with a variant of the most recent Black Hawk: the UH-60M. "[Although] budget pressures are causing a restructure to a slower procurement than originally planned ... this program [ultimately] will replace the Guard's tired HH-60Gs with new/improved H-60M models," he says.