



UNACCEPTABLE RISK  
A POPULAR MECHANICS INVESTIGATION



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# TICAL CONDITION

MEDICAL HELICOPTERS ARE SUPPOSED TO SAVE LIVES.  
TOO OFTEN, THEY PUT BOTH FLIGHT CREW  
AND PATIENTS IN DANGER INSTEAD.

by **CHRISTOPHER MAAG**  
photograph by **TIMOTHY HOGAN**

rooper Stephen Bunker died flying a mission that never should have happened, looking for a hole in the clouds that never appeared. Shortly after 11 pm on Sept. 27, 2008, Bunker's phone rang inside the Maryland State Police aircraft hangar at Andrews Air Force Base. Two young women were injured in a car crash in Waldorf, Md. They needed transport to Prince George's Hospital Center. Would Bunker accept the flight?

It was a warm and soupy autumn night. Weather reports showed thick clouds descending to 800 feet, the minimum for night flights in state police helicopters. The area 1 mile north of Prince George's Hospital was completely fogged in. Bunker hesitated.

"Well, maybe they'll change their minds," he told George Noyes, the state police flight dispatcher.

Noyes had a hunch that wouldn't happen. The call came from Charles County, where a 17-year-old EMT on the scene requested helicopter service. "When I heard it was Charles County, I knew it was gonna be Waldorf," Noyes says, "because those guys never want to



drive to the hospital.”

In Maryland, emergency medical service (EMS) guidelines specify that police helicopters rescue patients from accident scenes, while private air ambulance companies handle runs between hospitals and back up police. Over the radio Bunker heard that MedSTAR Transport, a private company, had just completed a job nearby.

“If they can do it, we can do it,” Bunker said.

He lifted off from Andrews at 11:10 pm. Thirty-four minutes later, with both patients and two paramedics onboard, he radioed air traffic control at Ronald Reagan Washington National Airport. “Uh, yes, sir, we just ran into some heavy stuff,” he said. “I don’t think we’re going to be able to make it all the way to the hospital.”

Blinded by fog, Bunker diverted to Andrews. Three-and-a-half miles short of the runway, flying at 1900 feet, he sent Trooper 2 into a dive. The helicopter was not equipped with flight recorders, so it’s unknown why he descended. But investigators believe that because he was familiar with the surrounding area, and because the sky immediately over Andrews was clear when he took off, Bunker probably thought he could duck under the clouds and land by sight.

There was nowhere to duck. Traveling at 106 mph, Bunker slammed into a tree in Walker Mill Regional Park. One patient, Jordan Wells, fell free of the aircraft and survived. Bunker and three others died.

**M**edical helicopters accept the most dangerous missions in commercial aviation. They fly unplanned routes a few hundred feet above the ground, often below radar. They land on highways, mountains and farms, miles from the nearest airport weather station.

Yet Trooper 2 was typical: Most medical helicopters lack basic safety equipment mandatory on other commercial aircraft. The majority have no autopilot

system or co-pilot to assist the pilot in emergencies. Medical helicopters are not required to have terrain awareness and warning systems (TAWS), night-vision goggles, flight data recorders, detailed weather reporting or ground personnel in charge of flight dispatch and in-flight tracking.

As a result of flying ill-equipped into risky conditions, medical helicopters crash at twice the rate of other air taxis and are exponentially more dangerous than commercial airliners, according to a 2009 study by Ira Blumen, medical and program director of the University of Chicago Aeromedical Network. Air ambulances have crashed 264 times between 1972 and 2008, killing 264 people. The first three months of this year

kicked off with two more fatal crashes, leaving six dead (half of whom died during a military EMS simulation).

In fact, working onboard a medical helicopter is the most dangerous profession in America, Blumen found, with a higher fatality rate than that of fishermen, loggers or steelworkers.

“Most people think medical helicopters are like airliners, that they all meet the same standards,” says Thomas Judge, executive director of LifeFlight of Maine. “Yet here we take injured passengers, with no choice of carrier, and subject them to this huge variation of standards that airline passengers would not accept.”

Often, helicopter evacuations are not even needed to save a life. “Medics call



helicopters just so a ground ambulance can stay on call," says Bryan Bledsoe, an emergency room doctor and a professor at the University of Nevada School of Medicine, who participated in an expert study of Trooper 2's crash. "Helicopters fly medically unnecessary flights every day."

The reality is that Trooper 2 did not have to crash. Since 1988, the National Transportation Safety Board (NTSB) has known that most fatal medical helicopter accidents occur when pilots unexpectedly encounter poor visibility or bad weather and become disoriented. Since

then, the board has urged the Federal Aviation Administration (FAA) to require improved safety equipment on medical helicopters, to little effect. "We've been killing ourselves the same way for 30 years," says Ed MacDonald, lead pilot for PHI Air Medical, one of the nation's largest helicopter ambulance operators.



- 1 The medical helicopter industry has more than quadrupled in size, from 200 craft in 1988 to 850 in 2009. The fatal-accident rate has remained the same.
- 2 Three crew barely survived this crash in Chesterfield, Ind., on Feb. 2, 2006. An NTSB report released eight days earlier warned of loose safety standards.

## INDUSTRY SAFETY: HOW TO IMPROVE THE ODDS

*Medical helicopters crash unnecessarily every year. These four technologies could save lives.*

### Terrain Awareness

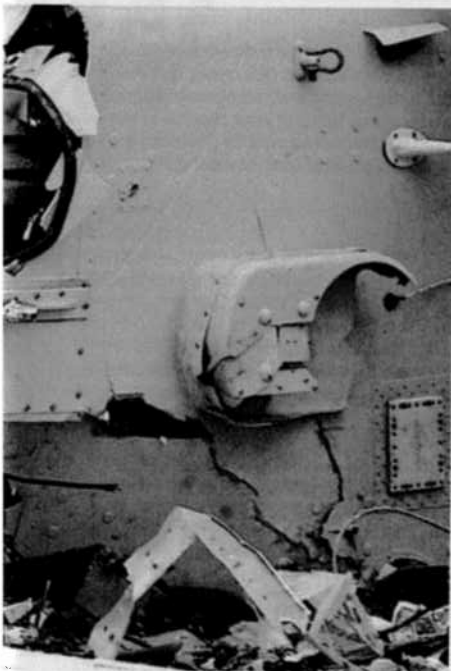
**Incident**  
Ten feet higher and Steve Lipperer would have lived. The night sky over La Crosse, Wis., had fair visibility when Lipperer left La Crosse Municipal Airport on May 10, 2008, with a surgeon and nurse onboard his Eurocopter EC-135. Lipperer flew fast and low, using city lights to see. But dark fog concealed a 1160-foot ridgeline southeast of the airport. The helicopter slammed into trees atop the ridge. All three people aboard died.

**Solution**  
Terrain awareness and warning systems measure the distance to the ground and emit loud warnings if the pilot flies too low. Older models, designed for airliners, gave helicopter pilots too many false warnings. New versions are specialized for low-flying craft; they should be mandatory. "We know these systems save lives," Robert Sumwalt of the NTSB says. "This is not rocket science."

### Night Vision

**Incident**  
Pilots called it the "black void," a section of night sky south of the Woodrow Wilson Bridge in Washington, D.C., where city lights faded into complete darkness. Pilot Joseph Schaefer flew into the void on Jan. 10, 2005, and became disoriented. Seconds later, his Eurocopter EC-135 slammed into the Potomac River. Flight nurse Jonathan Godfrey survived; Schaefer and a paramedic died.

**Solution**  
Medical helicopters often fly at night at low altitudes and in poor weather, with little help from air traffic control. By gathering and amplifying ambient light or using infrared imaging, night-vision goggles help pilots detect and avoid obstacles, even in low-light conditions. "I flew without night vision for 35 years, and now I never fly at night without them," pilot Ed MacDonald says.





preflight weather check “inadequate.”

In other crashes, pilots saw nothing but clear skies before takeoff, only to encounter storms midflight. Suddenly, they had to climb to a safe altitude, hunt for a map or consult GPS, radio for help, plan an escape from the cloud and look out the window for obstacles or a cloud break, all while watching the instruments to maintain steady flight.

Bunker’s accident happened near Washington, D.C., some of the world’s most highly monitored airspace. He depended on air traffic control to assist him in a dangerous situation. But when Bunker called Andrews and asked for turn-by-turn directions after becoming disoriented in fog, the controller told him she wasn’t trained for that. Fifty seconds later he dropped from the radar.

The nation’s aviation system was designed for high-altitude flights along planned routes. Traffic controllers help decide when it’s safe to fly. They use GPS and radar to warn pilots about bad weather ahead and can guide planes to

safe landings. But the system wasn’t built to track small weather events at low altitudes and in remote locations, where medical helicopters sometimes fly, says John Allen, director of the FAA’s Flight Standards Service. Air ambulances may land in canyons 50

miles from the nearest airport weather station, where intense storms have room to hide and air traffic controllers are powerless to help.

A 2006 NTSB report analyzing all air-ambulance crashes between January 2002 and January 2005 (air ambulances include small fixed-wing planes) found that improved flight risk assessment and dispatch and tracking systems could have prevented nearly half. “There’s universal agreement that we built a really safe flight system that goes airport to airport and flies high in the sky,” Judge says. “In the air medical world, we don’t have that.”

Every year the NTSB releases a “Most

**WORKING ONBOARD A MEDICAL HELICOPTER IS THE MOST DANGEROUS JOB IN AMERICA. “WE’VE BEEN KILLING OURSELVES THE SAME WAY FOR 30 YEARS,” ONE PILOT SAYS.**

Wanted” list detailing critical changes needed to make the nation’s waterways, railroads, highways and airways safer. Since 2008, mandating flight dispatch and tracking systems for medical helicopters has been on that list.

Although the FAA doesn’t require medical helicopter companies to install advanced safety technology or hire trained dispatchers, some operators choose to do it anyway. Voters in Maine have agreed to spend \$4 million since 2003 to install remote weather stations and GPS-based instrument approaches, improving safety for the state’s LifeFlight system. It has never had a serious crash.

Air Methods, the nation’s largest

In-Flight Tracking

Data Recorders

**Incident**

The cloud that killed Wayne Kirby didn’t appear on radar. When Kirby left Huntsville Memorial Hospital in east Texas on June 8, 2008, the sky was clear. Two minutes later, he flew into small, dense clouds hovering over Sam Houston National Forest. With Kirby flying blind and disoriented and without an exit plan, the Bell 407 helicopter crashed, killing Kirby, a patient and two medical crew members.

**Solution**

Flight tracking centers can help pilots escape dangerous situations. Staff are equipped with direct data feeds from inside the helicopter, weather information overlaying digital topographical maps and the FAA’s HEMS Weather Tool, which tracks storms at airport weather stations and interpolates conditions in between. “We can see what’s going on and tell pilots exactly how to get out of there,” says Dennis McCall, aviation compliance manager of Air Methods.

**Incident**

No one saw the helicopter carrying flight nurse Erin Reed crash into Puget Sound. The Agusta A109A hit a cold front as it flew north from Seattle on Sept. 29, 2005. But an investigation couldn’t determine whether the crash was caused by weather or some other factor, because the helicopter was not equipped with a black box to record flight data. Three people died. “We’ll never know what really happened,” says Stacey Friedman, Reed’s sister.

**Solution**

Black boxes record aircraft data such as airspeed and angle of flight. Some also capture video and audio from inside the cockpit. With this information, crash investigators could determine exactly what causes each crash and improve pilot training to avoid similar accidents in the future.

**PERSONAL SAFETY: WHAT YOU SHOULD KNOW**

**+ Should you turn down a rescue flight? Probably not. In a crisis, questioning the judgment of trained personnel could waste time, hurting your chance of survival. But you can take steps to protect yourself now, before disaster strikes.**

Find out who provides helicopter emergency medical services (HEMS) in your community. Call the providers to ask if they use night-vision goggles, terrain awareness and warning systems and other safety gear recommended by the NTSB and if they’re accredited by the Commission on Accreditation of Medical Transport Services. If not, it may be wise to go by ground ambulance if you have a choice.

Check your insurance plan to make sure it covers ambulance and helicopter services. Also check the limits on coverage. If you decide to buy a special plan to cover air medical evacuation, find the company with the best safety record and equipment.

Before going on vacation, make sure your insurance covers emergency care where you will be traveling. Vet the HEMS provider at your destination with the questions above.

Flight nurse Jonathan Godfrey, who survived a crash in 2005, at a public hearing to review medical helicopter safety.



medical helicopter company, tracks all 313 to 330 of its aircraft from an operations control center in Englewood, Colo.

Operational control specialists watch flights using weather reports overlaid on digital topographical maps. If pilots experience weather or other problems, the staff can zoom in for a 360-degree look, patch themselves into pilots' headsets and discuss alternative routes.

"Once pilots get into a flight, there's really no way for them to get ongoing updated info," says Dennis McCall, aviation compliance manager of Air Methods. "We want to look over their shoulders and help them make decisions."

**W**hen the helicopter landed in his yard, Larry Strittmatter didn't think about the cost. His wife Dana had accidentally burned her leg with boiling water. Instead of driving her to one of six hospitals within 15 miles of their house near Fort Worth, Texas, paramedics called a helicopter to fly Dana to the Parkland Hospital Burn Center in Dallas.

Shortly after Larry arrived, the doctors gave his wife a bandage, a prescription for Tylenol with codeine and a swift escort to the lobby. The hospital refused to admit her for such minor injuries, leaving the Strittmatters with a \$17,000 flight bill. "The doctors said they were shocked and dismayed when they saw a helicopter landing," Strittmatter says. They had been in touch with EMTs at the scene, and after hearing Dana's injuries described had advised that she should be transported by ground ambulance.

In Arizona, 43 percent of patients transported by helicopter to hospital ERs were discharged within 24 hours, suggesting most didn't need a helicopter at all. In Maryland, the 24-hour discharge rate for patients transported by state police helicopters was 41 percent prior to 2008.

After Trooper 2 crashed, Maryland barred all but seriously injured patients from state helicopters, which it predicted would reduce the number of flights by 67.2 percent without affecting patient mortality. "If you're getting close to a 50 percent discharge rate within 24 hours, I think that's too high," says Dan Hankins, an emergency-medicine physician at the Mayo Clinic and president of the Association of Air Medical Services.

Academic studies disagree on whether medical helicopters improve EMS response times and patient survival rates. Besides severity of injury, the key factor may be flight time. Helicopters are significantly faster than ground ambulances when retrieving patients more than 45 miles away from a hospital, according to a study published in the *Journal of Trauma* in 2005. But closer than 45 miles, ground vehicles are just as fast—or faster—than helicopters, because helicopter crews need more time to start engines and secure equipment.

Efforts are under way to improve training for paramedics on whether or not to request helicopter transports, Bledsoe says. Meanwhile, industry insiders say that medical helicopters are over-used because, in too many cases, money

trumps medicine. There were 330 medical helicopters in the United States in 1997 when Congress mandated new Medicare reimbursement rates for air ambulances. Since then, the number of helicopters has nearly tripled, to 850. The industry's explosive growth is a direct result of Medicare's pay raise, says Deborah Hersman, chairman of the NTSB.

Missouri has 5.9 million people and 33 medical helicopters. Canada has 33.4 million people and 20 medical helicopters. "In many places, the [motivation] isn't medical necessity," LifeFlight of Maine's Judge says. "It's to find ways to put more people in helicopters, because otherwise we're not going to make enough money to stay in business."

**O**n Jan. 10, 2005, Jonathan Godfrey was on duty as a flight nurse when his Eurocopter EC-135 medical helicopter, flying low and fast over Washington, D.C., entered a dark area south of the Woodrow Wilson Bridge that pilots referred to as the "black void." Twenty seconds later, he woke up on the bottom of the Potomac River, still strapped to his seat. After groping for the belt, Godfrey popped to the surface, and an hour later Trooper 2—the same helicopter that would crash near Andrews in 2008—picked him up, a broken bone poking through the arm of his flightsuit. Two others, the pilot and a flight paramedic, died.

Night-vision goggles, scheduled for installation on Godfrey's helicopter, hadn't yet been delivered. Pilots agree that goggles make a difference. In a 2008 survey by the National EMS Pilots Association, 88 percent of 382 pilots said using night-vision goggles "provides a significant safety advantage." But 40 percent said their companies didn't supply them. In the survey's comment section, one pilot says of the years he spent flying at night over the mountains of Kentucky, "We must have been out of our minds."

Of the 55 crashes reviewed in the 2006

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