

# Fatal Descent

BY LINDA WERFELMAN



**Inadequate weather assessment and weak risk management helped set the stage for a HEMS crash in a cloud-covered, wooded area.**

**T**he pilot of a Maryland State Police Aerospatiale SA 365N1 on a medical evacuation flight was descending to avoid low clouds when the helicopter struck the ground during a late-night instrument landing system approach to Andrews Air Force Base (ADW) in

Camp Springs, Maryland, U.S., on Sept. 27, 2008.

Four of the five people in the helicopter were killed, the fifth suffered serious injuries, and the helicopter was substantially damaged in the crash, one in a cluster of fatal helicopter emergency medical services (HEMS) accidents that

occurred in the United States in 2008, prompting government hearings and industry review boards to examine reasons for the surge in accidents and recommend actions to prevent similar events.

The U.S. National Transportation Safety Board (NTSB), in its final report on the accident, said that the probable

cause was “the pilot’s attempt to regain visual conditions by performing a rapid descent and his failure to arrest the descent at the minimum descent altitude during a nonprecision approach.”

Contributing factors included the pilot’s limited recent instrument flight experience, the “lack of adherence to effective risk management procedures” by the Maryland State Police (MSP) and the pilot’s “inadequate assessment of the weather, which led to his decision to accept the flight.” The report also cited the failure by air traffic control to provide the pilot with current weather information for ADW and the increase in the pilot’s workload because of “inadequate FAA [U.S. Federal Aviation Administration] air traffic control handling by the Ronald Reagan National Airport Tower and PCT [Potomac Consolidated Terminal Radar Approach Control] controllers.”

### ‘We’re Going to Try’

A duty officer at the MSP System Communications Center (SYSCOM) received the request that initiated the flight about 2302 local time and notified the pilot of the accident helicopter that the flight — to transport two victims of a car accident to Prince George’s Hospital Center

in Cheverly — would originate on the property of an elementary school in Waldorf.

Because weather conditions at the time were only slightly better than MSP minimums and forecast to deteriorate, flights were accepted on a “call by call” basis, with pilots required to review weather every two hours.

The pilot told the duty officer, “I don’t know if we can get to the hospital,” and the duty officer replied, “Well, that’s fine. If you can’t make the mission, you can’t make the mission.”

Their conversation continued, and the pilot commented on the reported 800-ft ceiling at College Park Airport, about 1 nm (2 km) from the hospital. After a brief discussion of landing zone coordinates, the pilot said, “Maybe they will change their mind.”

The duty officer then said, “Well, hold on. They ain’t going to change their mind; if you tell them you will go, they want you to go. ... That’s up to you. Do you think you can fly it?”

The pilot again commented on the 800-ft ceiling at College Park and noted that Ronald Reagan Washington National Airport (DCA) had reported a 1,200-ft ceiling. Then he said that another emergency medical services

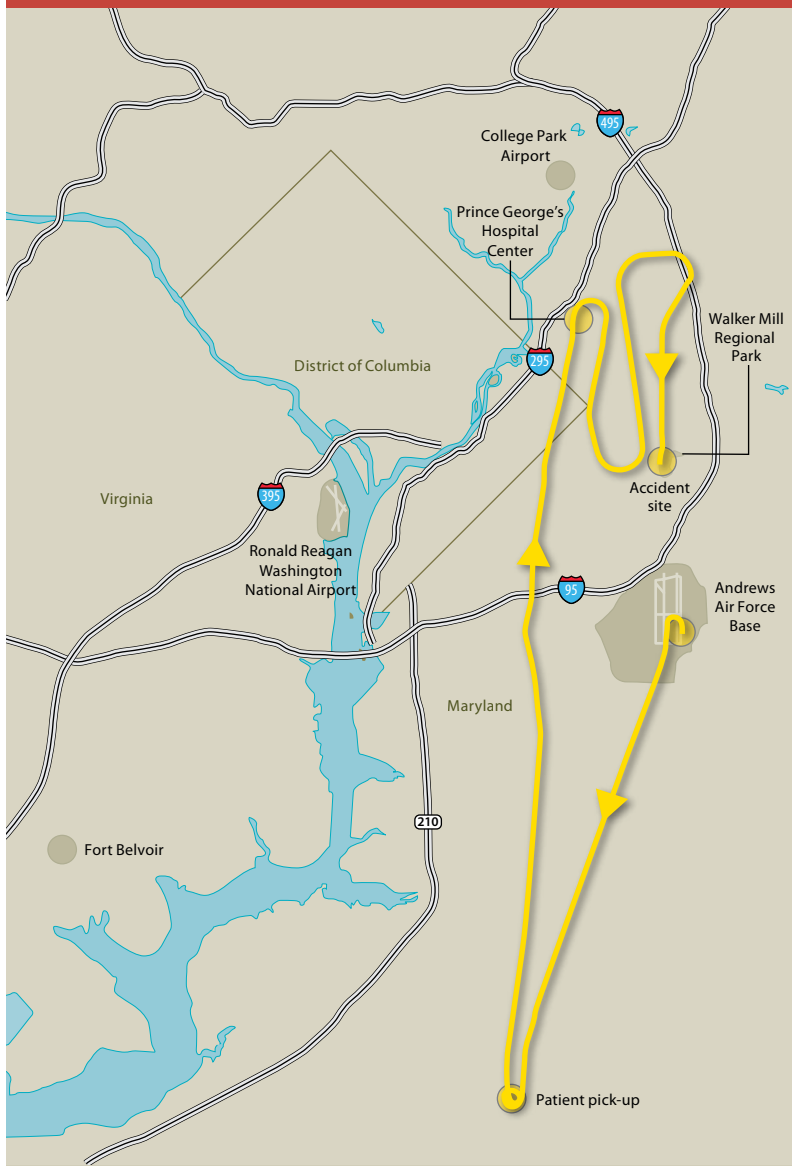


The pilot of the Aerospatiale SA 365N1 was trying to return to visual meteorological conditions when the helicopter crashed in a wooded park.



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Track of Accident Flight



Source: U.S. National Transportation Safety Board

Figure 1

helicopter operated by a private company had completed an interhospital transfer flight in the area, adding, “If they can do it, we can do it.”

The duty officer responded, “OK. It is up to you,” and the pilot said, “Yeah, we ought to be able to do it. ... We’re going to try it.”

The accident helicopter took off from ADW at 2310 for the Waldorf elementary school pickup site, landed there at 2319 and departed about 2337, carrying the two patients, a local

emergency medical technician who boarded the helicopter with the patients, a flight paramedic and the pilot (Figure 1).

The pilot contacted the DCA tower at 2337:45 to report departing from Waldorf en route to Prince George’s Hospital Center. The helicopter entered Class B controlled airspace east of the airport at 2341, headed north at 1,000 ft.

During initial contact, the DCA tower controller told the pilot that he had received a report from another helicopter pilot — the pilot of the same helicopter that the pilot had discussed in his earlier conversation with the SYSCOM duty officer — 30 minutes earlier that described cloud bases at 900 ft and lower to the north.

About 2344, the accident pilot said, “We just ran into some heavy stuff. I don’t think we’re going to be able to make it all the way to the hospital. I’d like to continue on about three more miles and see what happens, and if I don’t see a hole, I’ll have to go IFR (instrument flight rules) back to Andrews.”

The pilot continued north at about 900 ft until the helicopter was about 0.25 nm (0.46 km) east of the hospital. Then, at 2347, he began a 180-degree turn and told the controller that he wanted to climb to 2,000 ft for an instrument approach to ADW. The controller approved the plan and handed the pilot off to PCT.

At 2348, the pilot twice repeated the request to a PCT controller, and the controller began providing vectors for the instrument landing system (ILS) approach to Runway 01R. At the time, ADW was reported to have a broken ceiling at 1,800 ft.

At 2353, the controller told the pilot to turn right to a heading of 170 degrees to intercept the ILS localizer for Runway 19R. That heading, however, would not have resulted in a successful localizer intercept, the report said.

The pilot continued the turn to 210 degrees and intercepted the localizer 1 nm (2 km) from the final approach fix. About 2355, he told an ADW tower controller that he had no glideslope indication. At 2357, he requested an airport surveillance radar approach, but the controller said she was not current and could not provide that service.



There were no further radio communications. The last radar contact occurred about 2357:50 when the helicopter was at 800 ft above Walker Mill Regional Park, and the last automatic dependent surveillance-broadcast (ADS-B) target was at 2358:04 at 325 ft, near the site where the wreckage was found, in a heavily wooded area of the park at an elevation of 200 ft.

### State Trooper Since 1970

The pilot had a commercial pilot certificate for helicopters and an instrument rating, as well as a flight instructor certificate with ratings for helicopters and instrument helicopters and a private pilot certificate for single-engine land airplanes.

He was hired by the MSP in 1970 as a state trooper and began working in the State Police aviation division in 1981. He had 5,225 flight hours, all accumulated during his State Police employment. Of his total flight time, 2,770 hours were flown in the same make and model as the accident helicopter, and 1,920 hours were flown at night. Investigators could not determine his total instrument flight time.

His most recent annual flight evaluation was conducted Oct. 27, 2007, and included an instrument proficiency check in which he flew one ILS approach and one nonprecision approach to Runway 01L at ADW. The instructor conducting the evaluation described the accident pilot's instrument skills as "slightly above average." During the evaluation, the pilot was approved to "act as single pilot PIC [pilot-in-command] for IFR operations, which allowed him to file a flight plan and fly in IMC [instrument meteorological conditions], if necessary, to fly a patient to a trauma center, reposition the helicopter to a maintenance facility, return to base from

a flight, or conduct a VIP (very important person) transport," the report said.

The pilot also completed a subsequent instrument proficiency check on May 13, 2008, conducting an ILS approach, a nonprecision approach and a global positioning system (GPS) approach in Leonardtown, Maryland. The instructor said that the pilot "did pretty well" and had no difficulty with the approaches and that his performance was "above average" compared with other pilots.

In the year before the accident, he recorded 2.1 hours of instrument time and four instrument approaches. During the two years preceding the accident, he completed 25 instrument approaches at ADW, including four nonprecision approaches; three GPS approaches at other airports; and two approaches in a simulator. Before the accident flight, his last recorded night flight was on Sept. 16, 2008, and his last recorded flight in night IMC was Oct. 29, 2006.

The pilot held a second-class medical certificate. Records from his most recent airman's physical examination on Sept. 26, 2008, showed that he was 6 ft 3 in (191 cm) tall, weighed 293 lb (133 kg), and had a body mass index of 36.6, which is considered obese. His obesity — and the loud snoring for which the report said he was notorious among his colleagues — are both common among people with sleep apnea, a disorder that can disrupt breathing hundreds of times during a typical eight-hour sleep period (*ASW*, 9/09, p. 24). The pilot had not been diagnosed with sleep apnea, however.

The accident helicopter was manufactured in 1988 and had accumulated 8,869 total flight hours and 34,575 total landings. It had a night vision imaging system for law enforcement flights, but it was not used during the

accident flight. The helicopter also had a radio altimeter, and an autopilot that could be fully coupled to an ILS; it did not have a terrain awareness and warning system (TAWS).

The helicopter was maintained in accordance with the manufacturer's recommendations under an approved inspection program. Its most recent 100-hour airframe and engine inspection was performed on Sept. 22, about 3.2 flight hours before the accident. The no. 1 (left) engine had 7,077 hours total time and 1,120 hours since overhaul; the no. 2 engine had 7,427 hours total time and 575 hours since overhaul.

The helicopter was within weight and balance limits throughout the accident flight. Instrument approach charts were readily accessible to the pilot, State Police aviation authorities said.

### 'Below the Clouds'

Weather at ADW three minutes before the accident included visibility of 4 mi (6 km) in mist, scattered clouds at 200 ft and broken clouds at 500 ft. The fire chief at ADW said that visibility at the time of the accident was about ¼ mi (0.4 km). A man who lived 1.8 mi (2.9 km) southwest of the accident site said that he saw a helicopter flying over his house "below the clouds in a descending attitude" and estimated that the clouds were 100 to 150 ft above the trees.

The pilot had obtained a weather briefing about 1851 from the FAA direct user access terminal (DUAT) service, including weather radar data, terminal forecasts and winds aloft forecasts. The ADW terminal forecast valid from 1800 through 0100 the following morning called for visibility of 7 mi (11 km) and scattered clouds at 2,000 ft. By 0200, however, the forecast was for visibility of 3 mi (5 km) in mist, a broken ceiling at 500 ft and overcast at 1,000 ft.

## Aerospatiale SA 365N Dauphin



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The Aerospatiale (now Eurocopter) SA 365N, first flown in 1979, is a twin-engine helicopter designed to carry two pilots and up to eight passengers. The accident helicopter had two front seats with dual controls and an aeromedical interior with four seats and two litters.

The SA 365N1 is equipped with Turbomeca Arriel 1C1 engines, each rated at 540 kW (724 shp) for takeoff.

Empty weight is 4,764 lb (2,161 kg) and maximum takeoff weight is 9,039 lb (4,100 kg). Maximum cruising speed at sea level is 153 kt, maximum rate of climb is 1,300 fpm and service ceiling is 11,810 ft. Maximum range, with standard fuel at sea level, is 460 nm (852 km).

Sources: *Jane's All the World's Aircraft*, U.S. National Transportation Safety Board

The pilot did not request information on weather hazards; if he had, the DUAT briefing would have included an airman's meteorological information (AIRMET) for IFR conditions in an area north and east of ADW, and including the hospital's landing area, valid until 2300.

This apparently was the pilot's last use of DUAT, the report said.

Subsequent weather information, issued later the night of the accident, contained forecasts of visibilities less than 3 mi (5 km) for the entire route of the accident flight. Another pilot saw, when he arrived at the hangar at 0310 the morning after the accident, that the pilots' computer was turned on and an experimental HEMS weather tool — authorized for use only in visual meteorological conditions (VMC) — was on the screen.

The duty officer said that the weather tool indicated that marginal VMC prevailed in most

of the state and that all State Police aviation bases were operating "call by call" — an indication that weather was near the agency's minimums.

Current surface weather observations for ADW and nearby Fort Belvoir were not available at 2300 because of a technical problem affecting U.S. Defense Department weather dissemination. As a result, the ADW weather being reported on non-Defense Department weather outlets was from 1855, about five hours before the accident.

"It appears that the pilot based his decision to launch solely on the weather observations at College Park and DCA and the suitable conditions implied by the other medevac helicopter's completed flight," the report said. "Other pertinent weather data — the low temperature/dew point spreads at ADW and College Park, the AIRMET for IFR conditions encompassing the route of flight and the continuing deterioration of the weather conditions as the evening progressed — were either discounted by the pilot or not obtained. If the pilot had thoroughly obtained and reviewed all of the available weather information, it is likely he would have realized that there was a high probability of encountering weather conditions less than MSP minimums on this flight and this would have prompted him to decline the flight."

The report quoted the MSP Aviation Command safety officer as saying that, at the time of the accident, MSP did not have a formal risk management program but instead provided optional guidance with a "risk assessment matrix" that said pilots should consider a flight to be of medium risk if it was conducted with a temperature/dew point spread of less than 2 degrees C. However, the matrix provided no guidance about pilot actions concerning medium risk flights, the report said, adding that there was no indication that the pilot had consulted the matrix before the flight.

"Even if he had referred to it, the pilot might not have changed his decision to accept the flight, since the matrix did not provide clear guidance on medium risk flights," the report said. If the MSP had used a formal risk evaluation program,

however, it might have led to cancellation of the flight, the report said.

### Confusing Information

Almost immediately after loss of radar contact, the ADW airport traffic controller began trying to contact the pilot. At 2359:50, she notified the ADW fire department chief, who contacted the State Police and the Prince George's County communications center.

The SYSCOM duty officer mistakenly believed that the helicopter had landed at ADW. The report quoted the State Police as saying that the equipment installed on their helicopters for ADS-B tracking “does not function well at low levels” and that police personnel had been conditioned to assume that when an ADS-B signal was lost, the helicopter had landed safely.

Confusion surrounded information exchanged by the State Police, the ADW controller and the Prince George's County Police about the last reported location of the helicopter. The wreckage was found after the pilot and medic assigned to another State Police helicopter talked by phone with the ADW controller, who said radar contact was lost when the helicopter was “about 2 miles out on approach to Runway 19R.” The pilot drew a line on a map to correspond with the extended runway centerline; the line intersected the spot where they had plotted the original coordinates for the last contact. The two drove to the area and then walked toward the spot, where they located the wreckage and the survivor at 0158.

### Fatigue

The report said that, considering the time of day, the pilot's risk factors for sleep apnea and his decision to deviate from published approach procedures, he probably was “less than alert” during the

flight and fatigue “may have contributed to his deficient decision making.”

The report said that the pilot might have been encouraged to “deviate below the glideslope and attempt to duck under the cloud ceiling” because of his “expectation that he could descend below the cloud ceiling at an altitude above the minimum descent altitude for the approach, his familiarity with [ADW] and the reduction in workload a return to visual conditions would have provided.”

Nevertheless, he “failed to adhere to instrument approach procedures when he did not arrest the helicopter's descent at the minimum descent altitude,” the report said, adding that the pilot probably did not monitor cockpit instruments because he was preoccupied with looking for the ground.

The report said that the pilot's workload had increased “substantially and unexpectedly” after the helicopter entered IMC and that, although he met the recent-experience requirements to serve as PIC under IFR, he was “not proficient in instrument flight.” Changes in the MSP instrument training program about 10 months before the accident — eliminating the requirement for six instrument approaches every six months and replacing it with two instrument proficiency checks every year — “did not promote instrument proficiency,” the report said.

If the helicopter had been equipped with a TAWS, the device would have generated a “glideslope” aural alert about 24 seconds before the initial impact, followed by terrain warnings that would have begun seven seconds before impact, the report said.

The report cited air traffic services provided by the DCA airport traffic control tower and the PCT for “numerous procedural deficiencies, including

unresponsiveness, inattention and poor radar vectoring. These deficiencies were a distraction to the pilot and increased his workload by requiring him to compensate for the poor services provided.”

In addition, the approach controller did not give the pilot current weather information for ADW, an omission that “likely led the pilot to expect that he could descend below the cloud ceiling and establish visual contact with the ground at an altitude well above the minimum descent altitude for the approach,” the report said.

The report also challenged the FAA's classification of all medical evacuation flights involving government-owned aircraft as public operations,<sup>1</sup> noting that the classification “creates a discrepancy in the level of FAA safety oversight of [HEMS] aircraft operations carrying passengers and is contrary to the intent of [the law that] states that aircraft carrying passengers are excluded from operating as public aircraft.”

Six months after the accident, the MSP told NTSB accident investigators of a number of changes, including development of a new mission-specific flight risk assessment tool; implementation of new pilot training requirements, including completion of at least two instrument approaches per month; and training all aviation command personnel and MSP field personnel in the use and interpretation of geographic coordinates. 🌀

This article is based on NTSB Aircraft Accident Report No. AAR-09/07, *Crash During Approach to Landing of Maryland State Police Aerospatiale SA 365N1, N92MD, District Heights, Maryland, September 27, 2008.*

### Note

1. Aircraft used in public operations — including those operated by state governments for non-commercial purposes — generally are exempt from U.S. Federal Aviation Regulations.