



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: November 13, 2009

In reply refer to: A-09-138

[Organizations whose members are involved in search and rescue operations, see attached list]

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge your organization to take action on the safety recommendation in this letter. The NTSB is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

This recommendation addresses the lessons learned from the emergency response to the crash during approach to landing of a Maryland State Police (MSP) helicopter in District Heights, Maryland, on September 27, 2008. As a result of its investigation, the NTSB has issued nine new safety recommendations and reiterated three previous recommendations. One of the new recommendations is addressed to your organization and five other organizations whose members are involved in search and rescue operations. Information supporting this recommendation is provided below. The NTSB would appreciate a response from you within 90 days describing the actions you have taken or intend to take to implement our recommendation. The NTSB also issued safety recommendations to the Federal Aviation Administration (FAA), MSP, 40 public helicopter emergency medical services operators, and Prince George's (PG) County, Maryland.

On September 27, 2008, about 2358 eastern daylight time, an Aerospatiale (Eurocopter) SA365N1, N92MD, call sign Trooper 2, registered to and operated by the MSP as a public medical evacuation flight, impacted terrain about 3.2 miles north of the runway 19R threshold at Andrews Air Force Base (ADW), Camp Springs, Maryland, during an instrument landing system (ILS) approach.¹ The commercial pilot, one flight paramedic, one field provider, and one of two automobile accident patients being transported were killed. The other patient being transported survived with serious injuries from the helicopter accident and was taken to a local hospital. The helicopter was substantially damaged when it collided with trees and terrain in Walker Mill Regional Park, District Heights, Maryland. The flight originated from a landing zone at Wade Elementary School, Waldorf, Maryland, about 2337, destined for Prince George's Hospital

¹ The National Transportation Safety Board's full report, *Crash During Approach to Landing of Maryland State Police Aerospatiale SA365N1, N92MD, District Heights, Maryland, September 27, 2008* (NTSB/AAR-09/07), will be available online at <http://www.nts.gov/publicn/A_Acc1.htm>.

Center, Cheverly, Maryland. Night visual meteorological conditions prevailed for the departure; however, Trooper 2 encountered instrument meteorological conditions en route to the hospital and diverted to ADW. No flight plan was filed with the FAA, and none was required.

When the pilot was unable to reach Prince George's Hospital Center due to deteriorating weather conditions, he appropriately made the decision to divert to ADW and request ground transport for the patients. When the pilot contacted ADW tower, he reported to the controller that he was "on the localizer for runway 19R." At this time, the helicopter was about 6 nautical miles from the runway and tracking the localizer course at an altitude of 1,900 feet mean sea level (msl). Approximately 1 minute and 20 seconds after his initial call to ADW tower, the pilot reported that he was "not picking up the glideslope." The controller responded that her ILS equipment status display was indicating no anomalies with the equipment.

Radar and automatic dependent surveillance-broadcast (ADS-B)² data indicated that, at the time of the pilot's transmission, the helicopter was maintaining a descent consistent with following the glideslope. Additionally, a postaccident flight test conducted by the FAA revealed no anomalies with the instrument approach equipment, and NTSB testing of the helicopter's navigation equipment found no deficiencies that would have precluded the pilot from capturing the glideslope. The NTSB was unable to determine which navigational frequencies the pilot had selected or what the pilot was seeing on his instruments. No evidence was found that suggests that the glideslope was not functioning properly.

Even if the glideslope had failed, the accident pilot could have continued the approach, following the localizer-only guidance and assuring terrain clearance by remaining at or above the localizer-only minimum descent altitude of 680 feet msl. However, the pilot requested a surveillance radar approach, which the controller stated that she was unable to provide because of her lack of currency on the procedure.³ There were no further communications with Trooper 2. The last radar target for Trooper 2 was detected about 2357:50, at 800 feet msl over Walker Mill Regional Park. The last ADS-B target for Trooper 2 was detected about 2358:04, at 325 feet msl near the accident site.

The helicopter impacted terrain about 3.2 miles from the threshold of runway 19R and along the extended runway centerline in a heavily wooded area of Walker Mill Regional Park at an elevation of about 200 feet msl.

The NTSB determined that the probable cause of this accident 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 to the accident were (1) the pilot's limited recent instrument flight experience, (2) the lack of adherence to effective risk management procedures by the MSP, (3) the pilot's inadequate assessment of the weather, which led to his decision to accept the flight, (4) the failure of the Potomac Consolidated

² ADS-B is a surveillance system in which an aircraft is fitted with cooperative equipment in the form of a data link transmitter. The aircraft periodically broadcasts its global positioning system-derived position and other information, such as velocity, over the data link, which is received by a ground-based transceiver for use by air traffic control and other users.

³ The FAA requires controllers to complete three airport surveillance radar approaches every quarter, including one no-gyro approach, to remain current (qualified) for that type of approach.

Terminal Radar Approach Control (PCT) controller to provide the current ADW weather observation to the pilot, and (5) the increased workload on the pilot due to inadequate FAA air traffic control handling by the Ronald Reagan National Airport Tower and PCT controllers.

The ADW controller noticed that Trooper 2 was missing almost immediately after radar contact was lost, and she began attempting to contact the pilot. At 2359:50, she also advised the ADW fire department chief, who was expecting to meet the helicopter, that she had lost radar contact with Trooper 2. The chief then contacted the PG County Communications Center and MSP Forestville barrack about the missing helicopter, and he then engaged in a ground search of ADW and the MSP hangar to locate Trooper 2.

The MSP System Communications Center (SYSCOM) was tracking the flight using global positioning system (GPS) data transmitted with an experimental ADS-B communications link. However, the SYSCOM duty officer (DO) lost situational awareness of the accident helicopter during the final minutes of the flight. The ADS-B trip history report indicated that the DO logged Trooper 2 as landed at ADW at 0002:02. When he received a call at 0014:11 from MSP Forestville inquiring about the whereabouts of Trooper 2, the DO immediately responded, “they landed at Andrews.” When informed by MSP Forestville that the ADW tower controller had lost Trooper 2 off radar, he was surprised. He then attempted to contact Trooper 2 by radio and got no response. The DO provided MSP Forestville with Trooper 2’s last ADS-B coordinates.

About 0021:45, the DO provided PG County dispatchers with Trooper 2’s last ADS-B coordinates by reading a string of numbers, “three eight five two one seven, north was seven six five two two six.” The DO did not indicate that the numbers were in the form of degrees, minutes, seconds. The DO also added that the location of the coordinates was approximately 2 nautical miles southwest of FedEx Field.⁴

PG County dispatchers responded by sending patrol vehicles to the area southwest of FedEx Field. They also plotted the coordinates using an online mapping program, but the dispatchers assumed the coordinates were in the form of degrees, decimal minutes, because that is the format to which they were accustomed. They entered the coordinates in that format. The location returned by the software program was near Calvert Cliffs, Maryland, located about 30 miles southeast of the accident site. This location caused confusion among PG County personnel and, about 0032:02, a county dispatcher called SYSCOM to verify the location. An operator at SYSCOM responded, “okay I don’t know where the duty officer got those [coordinates]...” The operator did not communicate with the DO to verify the coordinates given to PG County dispatchers. Had the SYSCOM operator done so, the misunderstanding about the format of the coordinates might have been discovered, ending the misperception that the helicopter was near Calvert Cliffs.

NTSB investigators found evidence indicating that MSP personnel, apart from those working at SYSCOM, were not familiar with latitude and longitude coordinates. Interviews with MSP personnel at the Forestville barrack clearly indicated a complete lack of knowledge at the time of the accident regarding latitude and longitude coordinates and how they could be used.

⁴ FedEx Field is a football stadium located in Landover, Maryland, in PG County.

MSP road troopers performed their daily duties by referencing ADC grid maps⁵ and were not aware that those maps contained latitude and longitude coordinates. Some MSP patrol cars were equipped with laptop computers and software that allowed users to enter latitude and longitude coordinates, but none of the troopers interviewed had received training on how to use this function. Therefore, the NTSB concludes that MSP troopers and SYSCOM personnel were insufficiently equipped and trained to conduct a search involving GPS coordinates, and that this hindered their ability to locate the site of the wreckage. In the memo detailing postaccident changes, the MSP indicated that it has provided instruction to all Aviation Command personnel and all MSP field personnel on the use and interpretation of latitude and longitude.

At the time of the accident, the software on the SYSCOM DO's console provided a view of the ADS-B data overlaid on an aviation sectional chart. There was no ability to overlay the data on other types of maps, such as a topographic map or a road map, which would have provided the DO with more information about Trooper 2's last known position. For example, had the DO known that Trooper 2's last known position was in Walker Mill Regional Park, he would have provided this information to the incident commander at Forestville barrack, who would have undoubtedly sent more units to that location immediately. This would have obviated the need for MSP road troopers to know anything about GPS coordinates and given them a firm location with which to begin the search. It also would have ended the confusion about the helicopter being near Calvert Cliffs. MSP informed the NTSB that the software for ADS-B monitoring has been upgraded and is now capable of overlaying the data on ADC street maps, terrain maps, satellite photos, and aviation sectional charts.

According to MSP operational policy at the time of the accident, the troopers at each barrack were responsible for managing any incident that happened in their geographic area of responsibility. Therefore, the shift supervisor on duty at the Forestville barrack became the incident commander for the search for the helicopter until the barrack commander arrived about 0100 and took over. The shift supervisor was not familiar with the flightpath to ADW and was unable to tailor the search to the area directly along the flightpath. The shift supervisor relied on ADW tower controllers and SYSCOM to provide him with the last known location of the helicopter. However, he said that he did not plot the coordinates that the SYSCOM DO gave him because he did not know "what the coordinates meant." When the MSP Forestville barrack commander arrived at the barrack, she took over from the shift supervisor as the incident commander and set up a command post in the barrack's parking lot. About 0154:39, the barrack commander called MSP Forestville to request an aviation command unit to respond to the command post at Forestville, saying "we've got questions that we need them to answer about how things work." If these Forestville troopers had been more knowledgeable about aviation, it is likely that MSP resources could have been used more effectively in searching for the missing helicopter. The NTSB concludes that the incident commander's lack of aviation knowledge diminished the effectiveness of search and rescue activities.

About 0044:42, the medic of Trooper 8, based in Norwood, Maryland, about 20 miles northwest of the accident site, called SYSCOM and requested and received the last known ADS-B coordinates of Trooper 2. The medic stated that since Trooper 8 was "down for

⁵ ADC, of the Langenscheidt Publishing Group, publishes a popular series of maps, atlases, and guidebooks in the Mid-Atlantic region that are often used by Maryland troopers.

weather,”⁶ he and the Trooper 8 pilot were going to drive to the area where Trooper 2 was thought to have crashed. The medic said in a postaccident interview that he “used the computer and plotted the coordinates near the north entrance to Walker Mill Regional Park.” He and the pilot arrived at the park’s north entrance about 0100.

During the search, PG County dispatchers initiated an offer to “ping” the cell phones of the troopers who had been on the helicopter and, thus, to possibly identify their location more accurately. MSP SYSCOM accepted the offer, and at 0036:19, the SYSCOM DO provided two cell phone numbers, one for the pilot and one for the medic. PG County dispatchers contacted the cellular service provider and went through the emergency process of finding the closest cell phone tower. At 0114:47, the cellular provider gave the street address of the tower but did not provide a distance or bearing from the tower. The street address location was immediately provided to PG County officers and MSP Forestville barrack troopers, and numerous officers responded to that location. Releasing the street address of the cell phone tower to all units without a distance and bearing only served to distract and confuse units that were already searching a more accurate location. The NTSB concludes that neither PG County nor MSP dispatchers fully understood the importance of obtaining distance and bearing information, as well as the cell tower location, before releasing a location obtained from cell phone “pinging;” this lack of understanding led dispatchers to provide a simple street address of the cell phone tower without context to all units involved in the search. This distracted and confused units already searching a more likely location.

When the Trooper 8 medic and pilot heard from the dispatchers about “pings” from one of the trooper’s cell phones, they left Walker Mill Regional Park. Because they believed these “pings” were giving a more accurate location, they drove to the address provided by the PG County police officers, arriving at a mall parking lot near the cell phone tower.

About 0103:02, the DO called ADW tower and asked the controller for the time of the last contact with Trooper 2. The ADW controller stated that the time was about midnight. The DO asked, “do you have a particular location, a north or west location?” The controller responded that she could not provide latitude and longitude coordinates and reported Trooper 2’s last known position as 2 miles north of the runway. Again the DO asked, “there’s no way to get any kind of a bearing on what his location was, as far as north and west?” The ADW controller responded, “I don’t know how to do that.”⁷

About 0134, both PG County and MSP search efforts began to focus on a construction area, located about 1.25 miles east of the accident site, where a witness reported seeing something come down. Visibility in the unlighted area was reported to be approximately 50 feet. About 0143:37, PG County personnel at the construction area reported needing “true 4-wheel drive vehicles to search the area.”

⁶ Trooper 8 had been notified by the SYSCOM DO about 0025 that Trooper 2 was missing and requested to launch and head toward ADW. Trooper 8 departed Norwood, encountered low-level clouds about 2 miles south of Norwood, and aborted the flight.

⁷ The ADW controller had not received training on how to use a program that could have been used to obtain the coordinates of Trooper 2’s last radar position.

While the search of the construction area was proceeding, the pilot and medic of Trooper 8 met an MSP Aviation Command sergeant who had also responded to the mall parking lot. The sergeant asked them if anyone had talked to ADW tower. About 0142, Trooper 8's pilot called and spoke with the ADW tower controller, who reported losing radar contact with the helicopter about 2 miles out on approach to runway 19R. The pilot took out an ADC map and drew a straight line out from runway 19R; the line intersected with Walker Mill State Park, the same location where Trooper 8's medic had plotted the original coordinates. They immediately drove back to the park, arriving at the south end of the park about 0155. About 0158, the two troopers proceeded into the park on foot and located the wreckage and the survivor.

Given the darkness, fog, and delay in obtaining four-wheel drive vehicles, it would likely have taken several hours to thoroughly search the construction area. Until this area was searched, it is unlikely that Walker Mill Regional Park would have been searched. Therefore, the NTSB concludes that had two MSP aviation employees not pursued their own search effort, locating the accident site would likely have taken several more hours than it did.

The NTSB concludes that knowledge of the disjointed search and rescue efforts and the techniques eventually employed to locate the accident site could provide valuable lessons to agencies, such as helicopter emergency medical services dispatch centers, 911 dispatch centers, and fire, police, and sheriff's departments, involved in search and rescue efforts.

Therefore, the National Transportation Safety Board recommends the following to your organization:

Inform your members through your websites, newsletters, and conferences of the lessons learned from the emergency response to this accident, particularly emphasizing that search and rescue personnel need to understand how to interpret and use both global positioning system coordinates and the results of cell phone "pinging." (A-09-138)

In response to the recommendation in this letter, please refer to Safety Recommendation A-09-138. If you would like to submit your response electronically rather than in hard copy, you may send it to the following e-mail address: correspondence@ntsb.gov. If your response includes attachments that exceed 5 megabytes, please e-mail us asking for instructions on how to use our secure mailbox. To avoid confusion, please use only one method of submission (that is, do not submit both an electronic copy and a hard copy of the same response letter).

Chairman HERSMAN, Vice Chairman HART, and Member SUMWALT concurred in this recommendation.

[Original Signed]

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