



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation Report

### Emergency Training for Air Traffic Controllers

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<b>Accident Numbers:</b>	ERA15FA099, ERA14FA192, ERA13FA105, ERA13FA088, and ERA12LA500
<b>Operator/Flight Number:</b>	Multiple
<b>Aircraft and Registration:</b>	Multiple
<b>Location:</b>	Multiple
<b>Date:</b>	2012 through 2015
<b>Adopted:</b>	August 25, 2016

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The National Transportation Safety Board (NTSB) is providing the following information to urge the Federal Aviation Administration (FAA) to take action on the safety recommendations in this report. These recommendations address emergency identification and response training for air traffic controllers and are derived from our investigations of five accidents. As a result of these investigations, the NTSB is issuing two safety recommendations to the FAA.

### Accidents

#### January 13, 2015, New Smyrna Beach, Florida

On January 13, 2015, about 2058 eastern standard time (EST), a Cessna 152, N757ZM, crashed into shallow water at a public beach in New Smyrna Beach, Florida. The commercial pilot died, and the airplane was substantially damaged by impact forces.<sup>1</sup> A review of air traffic control (ATC) data indicated that the pilot had requested assistance from ATC, telling the controller that she could not continue flight under visual flight rules (VFR) and that she wanted to land; night instrument meteorological conditions (IMC) prevailed at the time. FAA Order 7110.65, *Air Traffic Control*, states that air traffic controllers providing assistance to VFR pilots having difficulty flying in IMC should ask if the pilot is qualified for instrument flight rules (IFR) flight. For pilots not requesting an IFR clearance or not qualified for IFR, controllers should provide airports where visual meteorological conditions (VMC) are reported,

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<sup>1</sup> More information about this accident, NTSB case number ERA15FA099, can be found in the Aviation Accident Database at [www.nts.gov](http://www.nts.gov).

provide other available pertinent weather information, and ask if the pilot chooses to conduct VFR flight to such an airport.<sup>2</sup>

Not adhering to this guidance, air traffic controllers from the New Smyrna Beach ATC tower and Daytona Beach International Airport, Daytona Beach, Florida, vectored the pilot toward New Smyrna Beach Airport, an airport that was also under IMC. The pilot was unable to visually acquire that airport and eventually crashed while maneuvering. Airports west of the accident site reported VMC, but the air traffic controllers did not attempt to obtain that information or nearby pilot reports of flight conditions at a higher altitude. The NTSB determined that contributing to the outcome of the accident was the controller's failure to follow published guidance for providing assistance to VFR pilots having difficulty flying in instrument conditions.

### **April 11, 2014, Hugheston, West Virginia**

On April 11, 2014, about 1653 eastern daylight time (EDT), a Piper PA-32RT-300T, N39965, impacted trees and terrain near Hugheston, West Virginia. The commercial pilot and the sole passenger died, and the airplane was destroyed. Daytime IMC prevailed, and an IFR flight plan was filed.<sup>3</sup> An air traffic controller advised the pilot of moderate to extreme precipitation and indicated that the pilot should navigate around the weather. While the pilot was attempting to navigate around the weather, the controller observed significant altitude deviations of more than 3,000 ft, airspeed fluctuations from about 80 to 170 knots, and erratic turns, and repeatedly asked the pilot over the next 15 minutes if he needed assistance. Despite these observations and the pilot sounding confused and distressed on the frequency, both the controller and the controller's supervisor failed to recognize or handle the flight as an emergency. The NTSB determined that the probable cause of this accident was "the pilot's loss of airplane control while operating in [IFR] conditions."

### **January 4, 2013, Palm Coast, Florida**

On January 4, 2013, about 1419 EST, a Beechcraft H35, N375B, experienced a loss of engine power and struck a house while on approach to Flagler County Airport, Palm Coast, Florida. The private pilot and two passengers died, and the airplane was destroyed. IMC prevailed, and an en route IFR clearance was obtained.<sup>4</sup> While in cruise flight, the pilot contacted ATC, reported propeller vibrations and an oil pressure problem, and requested assistance; however, despite the fact that the airplane had lost total power, the pilot did not clearly indicate this fact to ATC. The air traffic controller did not question the pilot further and treated the airplane as if it had at least partial power. Although the failure occurred almost directly over an airport, the air traffic controller vectored the airplane away from the airport, and the airplane

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<sup>2</sup> If these actions are not feasible or declined by the pilot, the controller should provide radar assistance to the pilot if the pilot declares an emergency, or if the pilot refuses to declare an emergency and the controller has determined the exact nature of the radar services the pilot desires.

<sup>3</sup> More information about this accident, NTSB case number ERA14FA192, can be found in the Aviation Accident Database at [www.nts.gov](http://www.nts.gov).

<sup>4</sup> More information about this accident, NTSB case number ERA13FA105, can be found in the Aviation Accident Database at [www.nts.gov](http://www.nts.gov).

crashed about 1 mile short of the runway. The NTSB determined that “contributing to the accident was the pilot’s failure to clearly state that the aircraft had lost all power and the air traffic controllers’ incomplete understanding of the emergency, which resulted in the controllers vectoring the airplane too far from the airport to reach the runway.”

### **December 16, 2012, Parkton, North Carolina**

On December 16, 2012, about 1532 EST, a Piper PA-28-160, N5714W, crashed into a wooded area near Parkton, North Carolina. The private pilot died, and the airplane sustained substantial damage. IMC prevailed at the time of the accident, and an IFR flight plan was filed.<sup>5</sup> While conducting an instrument approach, the instrument-rated pilot began experiencing directional control issues with the airplane and eventually advised ATC that he was “no gyro.”<sup>6</sup> The air traffic controller did not understand that the loss of these primary flight instruments would make it extremely difficult for the pilot to maintain the correct attitude and that the pilot would need to reach VMC to control the airplane and land safely.<sup>7</sup> The pilot asked ATC if he could proceed to the filed alternate airport, which was in VMC; however, the controller instead prompted the pilot to leave VMC and attempt another approach into IMC, during which the pilot lost control of the airplane and crashed. The NTSB determined that contributing to the accident, in part, was “the inadequate assistance provided by FAA ATC personnel, and the inadequate recurrent training of FAA ATC personnel in recognizing and responding to in-flight emergency situations.”

### **August 11, 2012, Effingham, South Carolina**

On August 11, 2012, about 1310 EDT, a Beechcraft V35B, N11JK, performed a forced landing near Effingham, South Carolina. The private pilot and the passenger were uninjured; the airplane was substantially damaged.<sup>8</sup> While en route, an air traffic controller provided the pilot with information on an area of moderate to extreme precipitation along the route of flight. The airplane continued toward the extreme precipitation, and the controller provided no further weather updates to the pilot despite numerous flight deviation requests by air carriers to avoid the same area. The pilot entered the area and encountered severe turbulence that caused a loss of control. During the upset, the pilot reported to the controller that the airplane’s “AHRS” (attitude and heading reference system) had failed, but the controller did not know what that meant.<sup>9</sup> The pilot managed to regain control and land the damaged airplane in a field. The controller failed to recognize the possible consequences of the pilot’s continued flight into severe weather that was

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<sup>5</sup> More information about this accident, NTSB case number ERA13FA088, can be found in the Aviation Accident Database at [www.nts.gov](http://www.nts.gov).

<sup>6</sup> Specifically, when the pilot indicated that he was “no gyro,” he was likely referring to the inoperative state of the gyroscopic flight instruments consisting of the attitude indicator and directional gyro or heading indicator.

<sup>7</sup> Without these primary flight instruments, the pilot was flying “partial panel” and was required to maintain control of the airplane by referencing the electrically operated turn coordinator and airspeed indicator. Unaffected flight instruments consisting of the altimeter and vertical speed indicator were still available.

<sup>8</sup> More information about this accident, NTSB case number ERA12LA500, can be found in the Aviation Accident Database at [www.nts.gov](http://www.nts.gov).

<sup>9</sup> AHRS was the primary instrument to help the pilot keep control of the airplane. The controller did not know that the loss of AHRS would affect the pilot’s ability to maintain control of the airplane in IMC.

being avoided by all of the other traffic in his sector and did not understand the reported loss of attitude information. Although the NTSB determined that the probable cause of the accident, in part, was “the pilot’s failure to avoid an encounter with known adverse weather conditions,” the controller could have helped the pilot sooner by identifying the need to vector the pilot around the adverse weather.

## Discussion

FAA Order 7110.65, *Air Traffic Control*, chapter 10, provides general guidance about how air traffic controllers should handle emergencies. Although pilots may not always specifically declare an emergency, as in the accidents above, paragraph 10-1-1, “Emergency Determinations,” includes the following:

- d. Because of the infinite variety of possible emergency situations, specific procedures cannot be prescribed. However, when you believe an emergency exists or is imminent, select and pursue a course of action which appears to be most appropriate under the circumstances and which most nearly conforms to the instructions in this manual.

In addition, paragraph 10-1-2, “Obtaining Information,” indicates that controllers should “[o]btain enough information to handle the emergency intelligently. Base your decision as to what type of assistance is needed on information and requests received from the pilot because he/she is authorized by 14 CFR [*Code of Federal Regulations*] Part 91 to determine a course of action.” However, this guidance provides no context or details that would help controllers recognize an emergency situation, ask appropriate questions to fully understand the problem, and participate fully with the pilot to identify and follow a course of action that leads to a safe resolution.

Because the guidance contained in FAA Order 7110.65 is general, scenario-based training is critical to provide controllers with specific examples to help them identify unstated emergencies and handle aircraft in the safest manner possible. Current FAA training on emergency handling is formulaic, based on the general guidelines described above in FAA Order 7110.65, and does not necessarily incorporate lessons learned from actual events on a national level. Although the FAA’s training guidance for controllers does not mention emergency training for specific situations or use real-life scenarios as examples, it does indicate that “each facility” must maintain an annual refresher training plan that includes training on “unusual situations” and instructs that “training on emergency situations should be based on real-life incidents and aircraft accidents, stressing a lessons-learned approach.”<sup>10</sup> As part of the local refresher training, 2 hours of evidence-based simulation training must occur; however, because this training is specific to each facility and therefore developed on a local level and not a national level, the training is largely dependent on the equipment and manpower available in each

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<sup>10</sup> The FAA’s training guidance for controllers is contained in Joint Order (JO) 3120.4N, *Air Traffic Technical Training*. Chapter 4, “Training Requirements for Air Traffic Control Specialists,” references recurrent “collaboratively-developed national safety training” and includes topics of “Safety Culture” and “Threat and Error Management.”

facility.<sup>11</sup> The NTSB notes that controllers have indicated in interviews that the quality of local refresher training can vary widely; a national ATC training program including specific, real-life emergency situations would ensure consistency throughout the country.

On September 24, 2001, the NTSB issued Safety Recommendations A-01-35 through -40 regarding inadequate air traffic controller response to and awareness of emergency situations.<sup>12</sup> Specifically, Safety Recommendation A-01-36 asked the FAA to do the following:

Develop and ensure that air traffic controllers receive academic and simulator training that teaches controllers to quickly recognize and aggressively respond to potential distress and emergency situations in which pilots may require air traffic control (ATC) assistance, including but not limited to (1) recognition of situations in which visual flight rules aircraft may be encountering instrument meteorological conditions; (2) an understanding of common aircraft system failures that may require ATC assistance or special handling; and (3) the application of specific techniques for assisting pilots that encounter such weather difficulties and aircraft system failures. Further, this training should be based on actual accidents or incidents, include a comprehensive review of successful flight assists and the techniques used, and be reviewed annually to ensure that the training materials remain current and effective.

To address this recommendation, the FAA developed, distributed, revised, and redistributed computer-based instruction (CBI) course 57098, “Recognizing and Responding to Aircraft Emergencies,” which all controllers were required to take.<sup>13</sup> The FAA also revised Order JO 3120.4, *Air Traffic Technical Training*, so that it directs that facilities’ annual refresher training includes relevant real-life scenarios; addresses unusual situations and weather conditions affecting flight, such as VFR aircraft that encounter IMC; and uses simulators, if available, for at least 2 hours of training. On June 21, 2012, the NTSB classified Safety Recommendation A-01-36 “Closed—Acceptable Action.”

The NTSB is concerned that, despite the FAA’s actions in response to Safety Recommendation A-01-36, the air traffic controllers we interviewed in the investigations described above did not provide effective emergency assistance or protect against the deterioration of problems into emergencies. During the course of the investigations, NTSB investigators noted inconsistencies in air traffic controller training and examined the training that the controllers received to determine if the training was effective.

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<sup>11</sup> FAA Order JO 3120.4N defines evidence-based training as “training based on an analysis of safety data.”

<sup>12</sup> The safety recommendation letter can be found by accessing the Safety Recommendations link at [www.nts.gov](http://www.nts.gov).

<sup>13</sup> The revised course discusses the potential domino effects of common in-flight mechanical problems; introduces a scenario of a VFR aircraft encountering IMC; explains a front-line manager’s role in handling an emergency; and contains an example based on the October 14, 2004, crash of Pinnacle Airlines flight 3701 near Jefferson City, Missouri.

Although NTSB investigators were not able to review the specific simulations that the controllers received because they are not recorded, the investigations did review the existing/current simulations and determined that the development of evidence-based simulations is handled individually by each ATC facility. The training review suggested that the effectiveness of the evidence-based simulation training depended on the ability of the local training specialist to develop simulations and CBIs that benefited controllers and that the controllers could recall. Accordingly, while the FAA is providing the training recommended in A-01-36, the NTSB's review of the training conducted in these accident investigations indicates that it is not consistent and that no effective mechanism exists "to ensure that the training materials remain current and effective," as recommended.

For example, in the New Smyrna Beach, Florida, accident, the air traffic controllers interviewed did not recall receiving the evidence-based simulation training on emergencies as required by FAA Order JO 3120.4. In the Hugheston, West Virginia, accident, the controllers believed the emergency handling training that they received as part of the annual refresher training was redundant, and they could not remember specifics of the training. In the Palm Coast, Florida, accident, the air traffic controller did not apply the required provisions of FAA Order 7110.65, paragraphs 10-1-1 and 10-1-2. Effective emergency handling training would have reinforced the need to "obtain enough information to handle the emergency intelligently." In the Parkton, North Carolina, accident, the air traffic controller did not obtain enough information to handle the emergency effectively and did not understand the implications of the airplane's failed gyro, a common aircraft system failure that may require ATC assistance or special handling. In postaccident interviews, the air traffic controller could not recall any specific information about the refresher training involving emergencies, unusual situations, or aircraft systems. Finally, in the Effingham, South Carolina, accident, more assertive actions by the controller, such as reiterating the precipitation hazard to the pilot, rerouting the flight, and understanding the implications of losing AHRS, could have reduced the likelihood of an accident.

One of the specific items included in Safety Recommendation A-01-36 was an understanding of common aircraft system failures that may require ATC assistance or special handling. The gyro failure in the Parkton, North Carolina, accident and the AHRS failure in the Effingham, South Carolina, accident involved important airplane systems whose failures likely put pilots into distress and in need of ATC assistance. However, our investigation of these accidents indicated that the emergency response training the controllers received did not adequately prepare them to understand these systems and the safety implications of their failures, as envisioned in the recommendation.

On June 26, 2011, the FAA indicated in response to Safety Recommendation A-01-36 that, while CBI course 57098 is a refresher course, annual refresher training in the areas highlighted in the recommendation is accomplished through training developed locally by the ATC facilities. Since updating the CBI course annually could be a lengthy and time-consuming process, the FAA believed the annual event-based training developed by the individual ATC facilities was a more effective and efficient way to address annual recurrent training needs. However, for many of the training scenarios, the same resources to update the training annually would be required at each facility; the NTSB notes that sharing resources or using a single resource at the national level would be the most efficient way to address these common training

needs. Specific, locally developed training could then supplement the standardized training common to multiple facilities. While each emergency has its unique circumstances, the NTSB has identified recurrent groups of emergencies with common characteristics that can be used as learning experiences, including the following:

- (1) power loss and fuel emergencies,
- (2) control difficulties,
- (3) impaired navigational capability,
- (4) loss of flight instruments,
- (5) encounters with hazardous meteorological conditions,
- (6) VFR flight into IMC, and
- (7) pilot medical issues.

A situation encountered by a controller in one facility can occur elsewhere; however, currently, there is no assurance that other facilities will be advised about such an event, much less learn anything from it. In addition, national training on specific, real-life examples could help satisfy the FAA's requirement in Order JO 3120.4 for refresher training based on real-life aircraft incidents and accidents.

The NTSB concludes that, based on the accidents discussed above, the current training provided to air traffic controllers is not effective in preparing them to provide appropriate assistance to aircraft in distress.<sup>14</sup> The NTSB further concludes that recurrent national training for controllers specifically addressing the identification of common emergencies such as those listed above, illustrated with current, real-life examples, and explaining how best to help pilots facing such events would ensure that controllers are well equipped to help pilots in emergency situations.

The NTSB believes that when developing the topics covered and the content of the emergency response training for controllers, the FAA would benefit from coordinating with the offices within its Air Traffic Organization, Flight Standards Service, and Accident Investigation and Prevention organizations that investigate aviation accidents and incidents, and also with organizations familiar with the challenges facing pilots confronting emergency situations, such as the Aircraft Owners and Pilots Association and the General Aviation Joint Steering Committee. These organizations should be consulted to determine the situations in which pilots would benefit from the assistance of controllers and the most appropriate and valuable assistance controllers could provide to resolve the emergency. These organizations can also provide valuable information on common aircraft system failures and common ways that a pilot might characterize these failures to a controller. Therefore, the NTSB recommends that the FAA develop, in collaboration with its internal offices that investigate aviation accidents and incidents and also organizations familiar with the challenges facing pilots confronting an emergency situation, and require recurrent national training for air traffic controllers, including

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<sup>14</sup> The NTSB acknowledges that pilots should not hesitate to declare an emergency to ATC and should be as specific as possible about their situation. The NTSB has therefore issued a safety alert (SA-055) to heighten pilot awareness of this issue. This safety alert can be accessed from the NTSB's [Aviation Information Resources](#) web page.

scenario-based training, to instruct them on identifying and responding to emergency situations to include the following:

- (1) recognizing emergencies,
- (2) determining what help is needed, and
- (3) taking actions that help pilots safely resolve the situation.

The NTSB also recommends that the FAA, in collaboration with its internal offices that investigate aviation accidents and incidents and also organizations familiar with the challenges facing pilots confronting an emergency situation, annually revise the required training described in Safety Recommendation A-16-18 at the national level to ensure that the training is current and relevant and includes lessons learned from recent events throughout the National Airspace System that address best practices for helping pilots who are experiencing problems such as (but not limited to) the following:

- (1) partial or total power loss and fuel emergencies;
- (2) control difficulties;
- (3) impaired navigational capability;
- (4) loss of flight instruments or other critical aircraft systems (including attitude information);
- (5) encounters with hazardous meteorological conditions;
- (6) inadvertent flight into instrument meteorological conditions by visual flight rules pilots; and
- (7) pilot medical issues, such as hypoxia.

In addition to national training, ATC facilities would continue to provide training for controllers on issues specific to their geographic areas of responsibility. NTSB investigators have visited several ATC facilities to discuss some of these real-life emergency situations with controllers, who indicated that the examples helped them better understand how to handle such situations in the future.



## Recommendations

### To the Federal Aviation Administration:

Develop, in collaboration with your internal offices that investigate aviation accidents and incidents and also organizations familiar with the challenges facing pilots confronting an emergency situation, and require recurrent national training for air traffic controllers, including scenario-based training, to instruct them on identifying and responding to emergency situations to include the following:

- (1) recognizing emergencies,
- (2) determining what help is needed, and
- (3) taking actions that help pilots safely resolve the situation. (A-16-18)

In collaboration with your internal offices that investigate aviation accidents and incidents and also organizations familiar with the challenges facing pilots confronting an emergency situation, annually revise the required training described in Safety Recommendation A-16-18 at the national level to ensure that the training is current and relevant and includes lessons learned from recent events throughout the National Airspace System that address best practices for helping pilots who are experiencing problems such as (but not limited to) the following:

- (1) partial or total power loss and fuel emergencies;
- (2) control difficulties;
- (3) impaired navigational capability;
- (4) loss of flight instruments or other critical aircraft systems (including attitude information);
- (5) encounters with hazardous meteorological conditions;
- (6) inadvertent flight into instrument meteorological conditions by visual flight rules pilots; and
- (7) pilot medical issues, such as hypoxia. (A-16-19)

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**Adopted: August 25, 2016**