



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: June 10, 2011

In reply refer to: A-11-56 through -59

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The National Transportation Safety Board (NTSB) is an independent U.S. Federal government agency charged by the U.S. 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 recommendations in this letter. The NTSB is making these recommendations because they are designed to prevent accidents and save lives.

These recommendations, which address pilot rest time, instrument flying, and the installation of 406-megahertz (MHz) emergency locator transmitters (ELT) and flight-tracking equipment on aircraft, are derived from the NTSB's investigation of the June 9, 2009, aviation accident in which a New Mexico State Police (NMSP) Agusta A-109E helicopter crashed in mountainous terrain during a public search and rescue (SAR) operation and are consistent with the evidence we found and the analysis we performed. As a result of this investigation, the NTSB has issued 15 safety recommendations, 4 of which are addressed to the Airborne Law Enforcement Association (ALEA). Information supporting the recommendations is discussed below. The NTSB would appreciate a response from you within 90 days addressing the actions you have taken, or intend to take, to implement our recommendations.

On June 9, 2009, about 2135 mountain daylight time,¹ an Agusta S.p.A. A-109E helicopter, N606SP, impacted terrain following visual flight rules flight into instrument meteorological conditions (IMC) near Santa Fe, New Mexico. The commercial pilot and one passenger were fatally injured; a highway patrol officer who was acting as a spotter during the accident flight was seriously injured. The entire aircraft was substantially damaged. The helicopter was registered to the New Mexico Department of Public Safety and operated by the NMSP on a public SAR mission under the provisions of 14 *Code of Federal Regulations* (CFR) Part 91 without a flight plan. The helicopter departed its home base at Santa Fe Municipal Airport (SAF), Santa Fe, New Mexico, about 1850 in visual meteorological conditions (VMC); IMC prevailed when the helicopter departed the remote landing site about 2132.

¹ All times in this letter are mountain daylight time based on a 24-hour clock.

The NTSB determined that the probable cause of this accident was the pilot's decision to take off from a remote, mountainous landing site in dark (moonless) night, windy, instrument meteorological conditions. Contributing to the accident were an organizational culture that prioritized mission execution over aviation safety and the pilot's fatigue, self-induced pressure to conduct the flight, and situational stress. Also contributing to the accident were deficiencies in the New Mexico State Police aviation section's safety-related policies, including lack of a requirement for a risk assessment at any point during the mission; inadequate pilot staffing; lack of an effective fatigue management program for pilots; and inadequate procedures and equipment to ensure effective communication between airborne and ground personnel during search and rescue missions.²

Background

A hiker contacted NMSP personnel to report that she was lost in a wilderness area about 20 nautical miles northeast of SAF. When the pilot was contacted about conducting an aerial search for the hiker,³ he initially declined the mission, citing his concerns about strong and gusty winds in the mountainous search area. However, minutes later, after he checked the weather, he accepted the mission. Subsequently, while SAR personnel were initiating a ground search for the lost hiker, the pilot and the spotter departed SAF in the helicopter to conduct an aerial search for her. According to the spotter, the weather at SAF at the time was warm, sunny, and not very windy.

About 1 hour 20 minutes after they left SAF, the pilot and the spotter located the hiker in a small clearing in the woods. When the pilot landed the helicopter at the nearest suitable landing site, a ridge about 0.5 mile uphill of the hiker, it was getting dark and the weather was deteriorating, with strong, cold winds; clouds; and freezing precipitation. Because the hiker would not walk to the helicopter, the pilot walked down the heavily forested slope, found the hiker, and carried her back uphill to the helicopter. About 9 minutes after the pilot and the hiker reached the helicopter, the pilot took off for the return trip to SAF.

At 2134:10, the pilot radioed the dispatcher, stating that he "...struck a mountainside...going down." Radar data showed that the helicopter flew erratically for about 1 minute before it struck terrain again and tumbled down a steep, rock-covered slope. During this descent, components of the helicopter separated from the fuselage, and the pilot and hiker were ejected. The seriously injured spotter took shelter inside the helicopter's wrecked fuselage overnight and was subsequently located by SAR ground teams about 1155 the next day. SAR ground teams located the helicopter's wreckage about 1816 that day.⁴

² For more information, see *Crash After Encounter with Instrument Meteorological Conditions During Takeoff from Remote Landing Site, New Mexico State Police Agusta S.p.A. A-109E, N606SP, Near Santa Fe, New Mexico, June 9, 2009*, Aircraft Accident Report NTSB/AAR-11/04 (Washington, DC: National Transportation Safety Board, 2011), which is available on the NTSB's website at <<http://www.nts.gov/publicatn/2011/AAR1104.pdf>>.

³ An aerial search was deemed advantageous because there were no roads into the search area and ground SAR teams would have to hike in, which would delay the rescue.

⁴ The investigation revealed that the ELT signals received from the accident helicopter's 406-MHz ELT focused searchers on areas near the accident site and helped them locate both the survivor and the helicopter wreckage.

Fatigue, Flight and Duty Time, and Rest Period Limitations

Cellular telephone records, notes in the accident pilot's planner, and information provided by the pilot's wife indicate that the pilot's available sleep time between Sunday evening, June 7, and Monday morning, June 8, totaled 4 hours 6 minutes⁵ and was split into two separate possible sleep periods (2200 to 2326 on June 7 and 0003 to 0243 on June 8) due to work-related phone calls that occurred between 2326 Sunday night and 0003 Monday morning and between 0243 and 0256 Monday morning.⁶ Further, the pilot had to get up earlier than usual because of two missions that he flew between 0300 and 1100 Monday morning.

According to the pilot's wife, her husband normally slept about 8 hours (beginning between 2130 and 2200) in a single consolidated sleep period on a night before a work day. However, the pilot's wife said that he frequently watched television later than usual on Sunday nights; although she did not specifically recall her husband's actions on the Sunday before the accident, he might have still been awake when he began to receive work-related telephone calls at 2326 Sunday night.⁷ If the pilot watched television rather than slept during this earlier available sleep period, his maximum available sleep time would have been only 2 hours 35 minutes (again, assuming he used every minute of available sleep). Because of his work-related sleep disruptions and the fragmented nature of the pilot's sleep during the preceding 24 hours, it is highly likely the pilot experienced acute fatigue on Monday, June 8.

Between Monday evening and Tuesday morning (the day of the accident), the pilot was in bed for 8 to 8.5 hours. Additionally, according to his wife, the pilot likely took a 30-minute nap on Tuesday afternoon. Therefore, the pilot could have received as much as 8.5 to 9 hours of sleep in the 24 hours before the accident. Research shows that fatigue-related effects linger after one night of near-normal recovery sleep (8 hours) that is preceded by a night of acute sleep restriction.⁸ Therefore, the sleep the pilot got Monday night and Tuesday morning probably alleviated some, but not all, of the fatigue resulting from his sleep restriction the day before. It is likely, therefore, that the pilot was still experiencing some residual fatigue on the day of the accident as a result of work-related activities, both public information officer (PIO) duty and flying, that he performed on the preceding day.

At the time of the accident, the pilot had accumulated 11 hours 41 minutes of duty time and 4 hours 30 minutes of flight time in the previous 24 hours. During his normal 8-hour work

⁵ Because people do not normally fall asleep instantaneously, it is likely that the pilot actually slept less than the 4 hours 6 minutes of available sleep time.

⁶ In addition to his full-time helicopter and fixed-wing pilot duties, the accident pilot was the NMSP aviation section's chief pilot and was assigned public information officer (PIO) duties. The telephone calls noted in this text were related to his PIO duties.

⁷ The pilot's wife was working at the time, so she could not be certain about the pilot's actions at home.

⁸ For more information, see (a) M. Sallinen and others, "Recovery of Cognitive Performance From Sleep Debt: Do a Short Rest Pause and a Single Recovery Night Help?," *Chronobiology International*, vol. 25, nos. 2 and 3 (2008), pp. 279–296; (b) G. Belenky and others, "Patterns of Performance Degradation and Restoration During Sleep Restriction and Subsequent Recovery: A Sleep Dose-Response Study," *Journal of Sleep Research*, vol. 12, no. 1 (2003), pp. 1–12; and (c) H.P.A. Van Dongen and others, "The Cumulative Cost of Additional Wakefulness: Dose-Response Effects on Neurobehavioral Functions and Sleep Physiology from Chronic Sleep Restriction and Total Sleep Deprivation," *Sleep*, vol. 26, no. 2 (2003), pp. 117–126.

day (from 0700 to 1500), he spent 2.8 hours flying in the helicopter. Three hours after his normal work day ended, the pilot went back on duty for the accident mission, during which he accumulated an additional 3 hours 41 minutes of duty time and 1 hour 41 minutes of flight time. The accident mission, in addition to the pilot's normal work day, resulted in a long day that approached (and may have eventually exceeded) the aviation section's 12-hour duty time limits.

Scientific research and accident investigations have demonstrated the negative effects of fatigue on human performance,⁹ including a breakdown in vigilance, degraded response times, and poor decision-making and risk assessment. As discussed in the NTSB's report on a 1993 accident involving American International Airways flight 808 at Guantanamo Bay, Cuba, fixation on a course of action (for example, the NMSP accident pilot's decision to take off from the remote landing site and fly to SAF¹⁰) while disregarding critical evidence that the course of action is no longer safe is also consistent with the effects of fatigue.¹¹ An NTSB study of flight crew-involved major accidents found that pilots with more than 12 hours (averaging 13.8 hours) of time since waking made significantly more procedural and tactical decision errors (mostly errors of omission) than pilots with less than 12 hours of time since waking.¹² A 2000 Federal Aviation Administration (FAA)-sponsored study found accidents to be more prevalent among pilots who had been on duty for more than 10 hours.¹³ Additionally, a study performed by the U.S. Naval Safety Center found that helicopter pilots who were on duty for more than 10 of the last 24 hours were more likely to be involved in pilot-at-fault accidents than pilots who had not accumulated as much duty time.¹⁴ The U.S. Naval Safety Center study also found that helicopter flights that began between 2100 and 2400 (as the accident flight did) experienced a higher rate of pilot-at-fault accidents than flights originating at other times of day. Therefore, the pilot's time since waking and his substantial cumulative duty time on the day of the accident also increased the likelihood that he was experiencing some fatigue. The pilot's most critical decision during

⁹ For the scientific research, see (a) J.A. Caldwell, "Fatigue in the Aviation Environment: An Overview of the Causes and Effects as Well as Recommended Countermeasures," *Aviation, Space, and Environmental Medicine*, vol. 68, no. 10 (1997), pp. 932-938; (b) D.R. Haslam, "The Military Performance of Soldiers in Sustained Operations," *Aviation, Space, and Environmental Medicine*, vol. 55, no. 2 (1984), pp. 216-221; and (c) G.P. Kruger, "Sustained Work, Fatigue, Sleep Loss, and Performance: A Review of the Issues," *Work and Stress*, vol. 3, no. 1 (1989), pp. 129-141. For accident investigation research, see *A Review of Flightcrew-Involved, Major Accidents of U.S. Air Carriers, 1978 through 1990*, Safety Study NTSB/SS-94/01 (Washington, DC: National Transportation Safety Board, 1994) at <http://www.nts.gov/Publictn/A_Stu.htm>.

¹⁰ The NTSB determined that it was reasonable for the pilot to accept the SAR mission; however, investigators found his decision to land at the remote landing site in windy conditions after sunset was questionable. The pilot's subsequent decision to take off from the relative security of that landing site in mountainous terrain and dark, windy, instrument meteorological conditions was ill-advised and was likely affected by his fatigue (due to his duties as pilot, chief pilot, and PIO), self-induced pressure to complete the mission, and situational stress.

¹¹ See *Uncontrolled Collision with Terrain, American International Airways Flight 808, Douglas DC-8-61, N814CK, U.S. Naval Air Station, Guantanamo Bay, Cuba, August 18, 1993*, Aircraft Accident Report NTSB/AAR-94/04 (Washington, DC: National Transportation Safety Board, 1994) at <http://www.nts.gov/Publictn/A_Acc2.htm>

¹² See NTSB/SS-94/01.

¹³ See GRA, Inc., *Flight and Rest Time Safety and Cost Analysis*, Report prepared for FAA Office of Aviation Policy and Plans under Contract No. DTFA01-98-C-00096 (Washington, DC: GRA, Inc. 2000).

¹⁴ See (a) M.S. Borowsky and R. Wall, "Naval Aviation Mishaps and Fatigue," *Aviation, Space, and Environmental Medicine*, vol. 54, no. 6 (1983), pp. 535-538; (b) M.S. Borowsky and R. Wall, "Flight Experience and Naval Aircraft Mishaps," *Aviation, Space, and Environmental Medicine*, vol. 54, no. 5 (1983), pp. 440-446; (c) M.S. Borowsky, *Pilot Flight Experience and Aircraft Mishaps* (Norfolk, Virginia: U.S. Naval Safety Center, 1986); and (d) D.W. Yacavone and others, "Flight Experience and Likelihood of U.S. Navy Aircraft Mishaps," *Aviation, Space, and Environmental Medicine*, vol. 63, no. 1 (1992), pp. 72-74.

the accident mission—his decision to take off in adverse weather conditions rather than wait on the ground for conditions to improve—was consistent with the effects of fatigue.

NMSP aviation section policies limited the pilots to 12 hours of duty time and 6 hours of flight time per day. When the accident pilot accepted the accident mission, he had been on duty 8 hours, with 4.5 hours of flight time in the 24 hours preceding the SAR mission. Because the pilot's total flight and duty times did not approach the aviation section's limits,¹⁵ NMSP policies did not prevent him from accepting the accident mission; however, the accident pilot was likely fatigued as a result of his work-related sleep restriction the preceding day.

The NTSB has issued many safety recommendations related to pilot flight, duty, and rest times.¹⁶ To ensure optimal performance, regulations should not only limit daily flight and duty times but also ensure that pilots are provided with a rest period that provides sufficient time for meals, personal hygiene, and obtaining at least 8 hours of uninterrupted sleep in every 24-hour period. Although NMSP SAR operations are not subject to FAA regulations, the FAA defines a rest period in 14 CFR 91.1057 as follows:

...a period of time required...that is free of all responsibility for work or duty prior to the commencement of, or following completion of, a duty period, and during which the flight crewmember...cannot be required to receive contact from the program manager. A rest period does not include any time during which the program manager imposes on a flight crewmember...any duty or restraint, including any actual work or present responsibility for work should the occasion arise.

A review of NMSP aviation section policies revealed that, although the NMSP had established maximum pilot flight and duty times for a 24-hour period, it had not defined what constituted a pilot "rest period" or established a minimum continuous pilot rest period before being assigned to another flight. NMSP management had assigned the accident pilot multiple duties (full-time pilot, chief pilot of the NMSP aviation section, and part-time PIO), which, in combination, often interfered with the pilot's ability to get adequate rest for flying.¹⁷ For example, the accident pilot had performed work-related duties at various times of the day and night during the preceding 72 hours without adequate opportunity for a contiguous, ensured restful sleep period. As a result, when the pilot reported for duty about 0300 the day before the accident, he was functioning on, at most, 4 hours 9 minutes of interrupted sleep.¹⁸ Thus, the pilot's work duties did not afford him an opportunity for sufficient restful sleep in the days before the accident, even though they were not in violation of the NMSP aviation section's pilot flight and duty policies.

¹⁵ The NMSP policies did not specifically address pilot rest periods.

¹⁶ For example, see *Collision with Trees and Crash Short of Runway, Corporate Airlines Flight 5966, BAE Systems BAE-J3201, N875JX, Kirksville, Missouri, October 19, 2004*, Aircraft Accident Report NTSB/AAR-06/01 (Washington, DC: National Transportation Safety Board, 2006) at <http://www.ntsb.gov/Publictn/A_Acc1.htm>.

¹⁷ The pilot had asked to be relieved of the PIO duties for safety-related reasons; however, his requests were denied, largely because NMSP upper management did not understand how the pilot's PIO duties conflicted with his pilot and chief pilot responsibilities.

¹⁸ The part-time helicopter pilot also reported being called out to fly missions late in the evening after he had worked all day.

Although the accident pilot's schedule during the 2 days leading up to the accident flight was permitted by NMSP flight and duty time policies, the pilot's PIO duties prevented him from obtaining sufficient rest, and NMSP policies did not ensure protected rest periods for its pilots. Fatigue was one of several factors that likely affected the pilot's decisions and actions on the night of the accident. The NTSB concludes that an effective pilot flight and duty time program would address not only maximum flight and duty times but would also contain requirements for minimum contiguous ensured rest periods to reduce pilot fatigue; the NMSP aviation section's flight and duty time policies did not ensure minimum contiguous rest periods for its pilots.

The NTSB reviewed the NMSP aviation section's staffing level of two full- and one part-time helicopter pilots to determine whether this level of staffing was sufficient to support helicopter availability 24 hours per day, 7 days per week, while also ensuring that each pilot could receive a protected rest period of at least 10 consecutive hours per 24 contiguous hours (a rest period sufficient to allow for adequate sleep, meals, and personal hygiene) and could be afforded 2 full days off per week. (In its evaluation, the NTSB also took into account the fact that the accident pilot had additional duties and responsibilities associated with his chief pilot and PIO assignments, which imposed unpredictable demands on his time and interfered with his ability to obtain adequate rest.) The NTSB found that it was not possible to devise such a schedule with this level of staffing. The NTSB further noted that NMSP aviation section staffing levels also limited its ability to assign two pilots to potentially high-risk missions (such as the accident flight) in an effort to mitigate the potential risks during such missions.¹⁹

A recent study sponsored by the U.S. Air Force assessed the minimum number of flight crews required to provide 24-hour availability for an aircraft; the study found that four flight crews provided the optimal balance between "the work, health, social, and safety demands placed upon the shiftworker (in terms of hours worked per unit time...) and personnel cost to the employer for safe and productive system operation."²⁰ Thus, based on this study, the NMSP aviation section would be unable to support an appropriate 24 hours per day, 7 days per week schedule under existing staffing levels. The NTSB concludes that at the time of the accident, the NMSP aviation section staffing level was insufficient to allow helicopter operations 24 hours a day, 7 days a week without creating an unacceptable risk of pilot fatigue.

The NTSB also reviewed ALEA's requirements for organizations operating public aircraft under its accreditation program. ALEA's program specifies that participating operators must establish a maximum number of flight and duty hours that a pilot may work in a 24-hour period with a specified rest period, specifically taking into consideration the type of operation and the environmental conditions (for example, challenging weather or night operations). However, ALEA standards do not require an operator's flight and duty time policy to define rest, establish minimum rest periods, or prevent the assignment of additional, conflicting duties. Because public aircraft operators who are members of ALEA base their operating policies and procedures on the standards set forth by ALEA and because protected rest periods are critically important to minimize fatigue, ALEA policies regarding pilot flight and duty time should define

¹⁹ A two-pilot operation would allow for additional monitoring and reduces an individual pilot's workload.

²⁰ See J.C. Miller, *Fundamentals of Shift-Work Scheduling*, Technical Report No. AFRL-HE-BR-TR-2006-0011 (Brooks City Base, Texas: U.S. Air Force Research Laboratory, Human Effectiveness Directorate, Biosciences and Protection Division, Biobehavioral Performance Branch, 2006), p. 26.

rest and establish minimum, protected rest periods. Therefore, the NTSB recommends that ALEA revise its standards to define pilot rest and ensure that pilots receive protected rest periods that are sufficient to minimize the likelihood of pilot fatigue during aviation operations.

Instrument Flying

According to the spotter, when the pilot departed the mountain for SAF, he pointed out the right-side window and then flew in that direction. The spotter stated that he thought the pilot intended to maneuver toward lower and more open terrain in VMC. However, the low clouds and snow likely obscured the mountains and led to an inadvertent IMC encounter shortly after takeoff. Although the pilot had a fixed-wing instrument rating and met instrument currency and proficiency requirements for that rating, he did not have a helicopter instrument rating. The pilot's lack of a helicopter instrument rating was not technically an issue when he accepted the accident mission because VMC prevailed and NMSP aviation section pilots were not required to have instrument ratings for helicopter operations. NMSP management personnel explained that the section helicopters were not expected to operate in IMC because the nature of those operations (for example, SAR missions) required VMC. Further, NMSP helicopter pilots were expected to stay clear of clouds.

As a result of its 2009 public hearing on helicopter emergency medical services (HEMS) safety and the investigative results of several 2008 HEMS accidents, the NTSB issued Safety Recommendation A-09-97, which recommended that public HEMS operators conduct scenario-based training, to include inadvertent flight into IMC, frequently enough to ensure proficiency. Although the accident flight was not a HEMS flight, if the accident pilot been trained in how to exit inadvertent IMC in a helicopter, he might have followed different procedures (for example, he might have climbed to a safe altitude and contacted air traffic control for assistance) or a different route (with potentially better results) when the helicopter departed the landing site and thus avoided the subsequent collision with terrain. The NTSB concludes that, because the accident pilot did not have a helicopter instrument rating, experience in helicopter instrument operations, or training specific to inadvertent helicopter IMC encounters, he was not prepared to react appropriately to the loss of visual references that he encountered shortly after takeoff. Because ALEA has the broadest membership of public operators and can affect the most pilots and operators, the NTSB recommends that ALEA revise its accreditation standards to require that all pilots receive training in methods for safely exiting inadvertently encountered IMC for all aircraft categories in which they operate.

Emergency Locating Equipment

The accident helicopter was equipped with an ELT that transmitted on both the 406- and 121.5-MHz frequencies. The ELT's signal was not received by the two geostationary operational environmental satellites most likely because of the topography of the crash site and the relative positions of the two satellites. However, ELT signals were received by low-Earth polar orbiting satellites. Within about 1 hour of the accident, SAR personnel had an ELT location that allowed them to focus their search efforts in the region where the accident occurred instead of the helicopter's last known location (near the hiker's location). The SAR ground teams' use of the information provided by the accident helicopter's 406-MHz ELT allowed them to identify and

reach the accident location as soon as practical, especially given the challenging conditions (for example, the remote location, rugged and snowy/icy terrain, adverse weather, and nighttime conditions) under which the SAR efforts were conducted. The NTSB concludes that the 406-MHz ELT signals received from the accident helicopter's 406-MHz ELT were primarily responsible for focusing searchers on areas near the accident site and for eventually locating both the survivor and the helicopter wreckage. Because of the benefits of 406-MHz ELTs, the NTSB recommends that ALEA encourage its members to install 406-MHz ELTs on all of their aircraft.

At the time of the accident, the NMSP did not use a flight-following system to ensure consistent tracking of its aircraft. The NTSB has advocated the installation and use of such systems. For example, as a result of its 2006 special investigation of emergency medical services (EMS) operations,²¹ the NTSB recommended that the FAA require EMS operators to use formalized dispatch and flight-following procedures. Additionally, in its report on the September 27, 2008, accident involving a Maryland State Police helicopter,²² the NTSB expressed concern that HEMS operators may not have dispatch and flight-following procedures and issued a related recommendation.

Low-cost units that use satellite-based technology to follow flights are commercially available. The satellite tracking data obtained by these units can be downloaded as frequently as desired by the operator (depending on the supporting program's subscription) and can be viewed on a communications or dispatch center computer.²³ Given the remote locations of many of the NMSP SAR missions and the possibility that the location of the accident helicopter and its occupants could have been identified more rapidly if it had been equipped with a flight-following technology, such a system would be invaluable to the NMSP. Since the accident, the NMSP purchased a portable flight-following unit, which it primarily intends for use in its helicopter. The flight-following unit service plan purchased by NMSP automatically provides updated helicopter position information at 5-minute intervals and every time the helicopter stops. The NTSB concludes that, although it is unlikely that the use of flight-tracking systems would have resulted in a different outcome in this case, the use of such systems, which provide real-time information regarding an agency's assets, could shorten search times for downed public aircraft and their occupants. Therefore, the NTSB recommends that ALEA encourage its members to install flight-tracking equipment on all public aircraft that would allow for near-continuous flight tracking during missions.

Therefore, the National Transportation Safety Board makes the following recommendations to the Airborne Law Enforcement Association:

²¹ For additional information, see *Special Investigation Report on Emergency Medical Services Operations*, Special Investigation Report NTSB/SIR-06-01 (Washington, DC: National Transportation Safety Board, 2006) at <http://www.nts.gov/Publictn/A_Stu.htm>.

²² For more information, see *Crash During Approach to Landing of Maryland State Police Aerospatiale SA365NI, N92MD, District Heights, Maryland, September 27, 2008*, Aircraft Accident Report NTSB/AAR-09/07 (Washington, DC: National Transportation Safety Board, 2009) at <http://www.nts.gov/Publictn/A_Acc1.htm>.

²³ Flight-following devices transmit self-contained global positioning system coordinates to satellites instead of relying on signal triangulation as occurs with an ELT.

Revise your standards to define pilot rest and ensure that pilots receive protected rest periods that are sufficient to minimize the likelihood of pilot fatigue during aviation operations. (A-11-56)

Revise your accreditation standards to require that all pilots receive training in methods for safely exiting inadvertently encountered instrument meteorological conditions for all aircraft categories in which they operate. (A-11-57)

Encourage your members to install 406-megahertz emergency locator transmitters on all of their aircraft. (A-11-58)

Encourage your members to install flight-tracking equipment on all public aircraft that would allow for near-continuous flight tracking during missions. (A-11-59)

The National Transportation Safety Board also issued three safety recommendations to the governor of the state of New Mexico, four safety recommendations to the National Association of State Aviation Officials, and four safety recommendations to the International Association of Chiefs of Police.

In response to the recommendations in this letter, please refer to Safety Recommendations A-11-56 through -59. 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 Tumbleweed secure mailbox procedures. 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 Members SUMWALT, ROSEKIND, and WEENER concurred with these recommendations.

[Original Signed]

By: Deborah A.P. Hersman
Chairman