National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: August 27, 2009

In reply refer to: A-09-82 through -86

The Honorable J. Randolph Babbitt
Administrator
Federal Aviation Administration
Washington, DC 20591

On August 8, 2009, about 1153 eastern daylight time,[1] a Eurocopter AS350 BA helicopter, N401LH, operated by Liberty Helicopters, and a Piper PA-32R-300 airplane, N71MC, operated by a private pilot, were substantially damaged following a midair collision over the Hudson River near Hoboken, New Jersey. The certificated commercial pilot and five passengers aboard the helicopter and the certificated private pilot and two passengers aboard the airplane were killed. The helicopter flight was a local sightseeing flight conducted under the provisions of 14 *Code of Federal Regulations* (CFR) Parts 135 and 136. The airplane flight was a personal flight conducted under the provisions of 14 CFR Part 91. The helicopter departed West 30th Street Heliport, New York, New York, about 1152. The airplane departed Teterboro Airport (TEB), Teterboro, New Jersey, about 1149, destined for Ocean City Municipal Airport, Ocean City, New Jersey. Visual meteorological conditions prevailed and no flight plans were required or filed for either flight. However, the pilot of the airplane requested flight-following services from TEB air traffic control (ATC).[2]

The National Transportation Safety Board's (NTSB) investigation of this accident is ongoing. However, based on preliminary findings, the NTSB is concerned about the safety of flight in the Hudson River class B exclusion area and the performance of the air traffic controllers at the TEB ATC tower. The NTSB believes that this accident indicates a need for changes to both ATC and flight operations procedures to improve safety in the high-density traffic environment of the Hudson River class B exclusion area.

New York Terminal Airspace

The Federal Aviation Administration (FAA) has designated the area surrounding John F. Kennedy International Airport (JFK), Newark Liberty International Airport (EWR), and

[1] All times in this letter are eastern daylight time and based on a 24-hour clock.

[2] The preliminary reports for this accident, ERA09MA447A and B, are available online at <http://www.ntsb.gov/ntsb/query.asp>.

LaGuardia Airport (LGA) as class B airspace. Class B airspace is intended to provide positive control of flight operations near the nation's busiest airports and to separate aircraft operating under visual flight rules (VFR) from aircraft operating in the airport terminal area. According to 14 CFR 91.131, all aircraft operating within class B airspace are required to obtain ATC clearance before entry and to comply with ATC instructions while operating within the airspace. Pilots who do not have ATC clearance to enter must remain outside the class B boundaries.

Part of the New York class B airspace extends from the surface to 7,000 feet above mean sea level in 4- to 8-mile radiuses around JFK, EWR, and LGA. Some other parts of the class B airspace begin at higher altitudes. This allows aircraft to arrive and depart from satellite airports, such as TEB, without obtaining class B clearance. For example, the floor of the class B airspace overlying TEB is 1,800 feet. Thus, separation between traffic at TEB and aircraft operating within the class B airspace is maintained by requiring aircraft without class B clearance to remain below 1,800 feet.

As mentioned above, the accident occurred in the Hudson River class B exclusion area, which is a combination of class E and class G airspace[3] that provides a passageway through the New York class B airspace. The Hudson River class B exclusion area permits aircraft to fly north and south along the Hudson River between, approximately, the George Washington Bridge to the north and the Verrazano Narrows Bridge to the south without authorization from air traffic controllers. (See figure below.) The Hudson River class B exclusion area extends from the surface of the Hudson River up to and including 1,100 feet above mean sea level.

The FAA has established voluntary procedures for operating within the Hudson River class B exclusion area that are designed to minimize the risk of collision. These procedures are described on the New York VFR Terminal Area Chart and the New York Helicopter Route Chart. They state that pilots operating within the Hudson River class B exclusion area should fly at 140 knots or less; turn on position lights, anticollision lights, and landing lights; and self-announce their position on the common traffic advisory frequency (CTAF),[4] 123.05 MHz. Another accepted procedure for helicopter operations, published in the New York Helicopter Route Chart, is for northbound helicopter flights to follow along the Manhattan shoreline, and for southbound flights to follow the New Jersey shoreline, providing lateral separation between opposite-direction traffic flows.

[3] Class E and Class G airspace each allow pilots to operate under VFR without mandatory service from air traffic controllers. The main practical difference between class E and class G airspace is the minimum ceiling and visibility requirements for flight under VFR. The Hudson River class B exclusion area is class E airspace from 700 feet to 1,100 feet above mean sea level and class G airspace below 700 feet.

[4] CTAFs allow pilots to exchange traffic information while operating near airports without operating control towers. CTAF procedures may also be established in other circumstances where direct pilot-to-pilot communications will contribute to safety.

Figure. New York VFR Terminal Area Chart depicting class B boundaries, shown as blue lines. The large blue arrow marks the Hudson River class B exclusion area.

Recent FAA traffic estimates indicate that over 200 aircraft a day pass through the Hudson River class B exclusion area. The Hudson River class B exclusion area and associated transition procedures have been in use for more than 30 years, and the safety record for operations in the area has been good. The NTSB has no record of previous collisions between aircraft operating in the Hudson River class B exclusion area. A review of the FAA Near-Midair Collision (NMAC) database and the National Aeronautics and Space Administration Aviation Safety Reporting System (ASRS) database revealed 11 reports of NMACs between aircraft in the area since 1990. Only one report was filed in the past 10 years. Although ASRS reporting is voluntary, the number of reports received is very low relative to the number of flight operations through the Hudson River class B exclusion area. The procedures in use to promote separation between VFR flights appear to have been effective in preventing collisions. Even so, the NTSB believes based on the circumstances of this accident that changes in ATC procedures and aircraft

operational procedures would reduce the likelihood of collisions in the Hudson River class B exclusion area.

ATC

The pilot of the accident airplane contacted the clearance delivery controller in the ATC tower at TEB about 1140:01, requesting departure clearance and VFR radar traffic advisory service en route to Ocean City, New Jersey, at 3,500 feet. The pilot's requested route and altitude required that the flight enter the class B airspace overlying TEB. The clearance delivery controller issued the pilot a discrete transponder code. While the airplane was taxiing to the runway, the TEB ground/local controller offered the pilot the choice of departing TEB straight out or over the river. The pilot elected to fly down the Hudson River, which necessitated eventual coordination with controllers at EWR for authorization to climb into the class B airspace. However, existing procedures did not require TEB controllers to coordinate for class B clearance for the pilot, and the local controller did not do so.

The accident airplane departed TEB about 1149 and was issued a traffic advisory for a helicopter arriving at the airport. The pilot acknowledged the traffic call. The local controller instructed the pilot to remain at or below 1,100 feet. The airplane flew southbound until the local controller instructed the pilot to turn left (southeast) and join the Hudson River. About 1152:20, the pilot acknowledged an instruction from the TEB local controller to change frequencies and contact controllers at EWR. However, a preliminary review of recorded ATC communications showed that the pilot did not contact EWR before the accident. About 1153:17, approximately the time of the accident, the TEB local controller contacted the EWR controller to ask about the airplane and was told that the pilot had not called. There are no known additional ATC contacts with the airplane. The NTSB has not determined what frequency the pilot was monitoring at the time of the accident.

The accident helicopter departed from the West 30th Street Heliport, which is in the Hudson River class B exclusion area, about 1152, for a 12-minute tour. The initial part of the tour was to be flown below class B airspace, so the pilot was not required to contact ATC. Although the nature of any transmissions made by aircraft on the CTAF is not known because the CTAF is not recorded, a Liberty Helicopters pilot waiting to depart from the West 30th Street heliport reported that the pilot of the accident helicopter made a position report on the CTAF just before the collision. The first radar target for the accident helicopter was detected by the FAA's EWR radar about 1152:27, when the helicopter was west of the heliport, approximately mid-river, and climbing through 400 feet. According to recorded radar data, the helicopter flew to the west side of the river and then turned south to follow the Hudson River. The accident helicopter continued climbing southbound until about 1153:14, when the collision occurred at about 1,100 feet.

ATC Procedures

After the accident airplane departed from TEB, the local controller instructed the pilot to remain at or below 1,100 feet and to turn east toward the Hudson River (to avoid the final approach course for runway 22 at EWR). A review of radar data shows that the accident airplane was level at about 1,100 feet for about 2 minutes before the accident, and that, at the time the airplane turned toward the Hudson River, there were no apparent traffic conflicts that would have precluded the airplane from climbing into the class B airspace. Because there was no

coordination between TEB and EWR controllers regarding the pilot's request to climb to 3,500 feet, the airplane could not expeditiously enter the class B airspace. Instead, the airplane continued toward the Hudson River class B exclusion area at about 1,100 feet. About 1152:19, almost 4 minutes after departure, when the TEB local controller instructed the pilot to contact EWR ATC, the airplane was about 2 miles away from the point of collision with the helicopter. Had the pilot received prior clearance and entered class B airspace, the airplane would have been above the Hudson River class B exclusion area reducing the risk of collision with the helicopter.

The NTSB is concerned that the ATC transfer-of-communications procedures applied to the accident airplane may have inadvertently caused the pilot not to follow the traffic awareness procedures established for flights through the area, thereby increasing the chance of a collision. Aircraft operating in the Hudson River class B exclusion area depend on CTAF reports to maintain traffic awareness. However, because the pilot of the accident airplane was in contact with TEB ATC awaiting further instructions and was then instructed to contact EWR, the pilot may not have been making and monitoring the CTAF position reports. Instead, the pilot likely expected to continue to receive flight-following services from ATC. Making and monitoring CTAF reports while remaining in contact with ATC would have required the pilot to be actively transmitting and receiving on two different radios at the same time, which is especially difficult in a busy ATC environment such as the New York area. Even if the pilot had attempted it, his monitoring of CTAF would likely have been hindered by his simultaneous monitoring of ATC communications. Consequently, it is likely that the pilot did not hear any transmissions from the accident helicopter, including the helicopter pilot’s self-announcement that the aforementioned witness reported hearing. In addition, the NTSB notes that the pilot was not advised to use the CTAF as he entered the Hudson River class B exclusion area, nor were such advisories required.

After the initial postdeparture traffic call, ATC did not advise the accident airplane pilot of potential conflicts with other aircraft ahead in the Hudson River class B exclusion area. Because the first radar target for the accident helicopter was detected about 1152:27, the helicopter was not yet visible on radar when the TEB local controller issued the frequency change to the airplane’s pilot. Therefore, before the frequency change, the TEB local controller could not have detected the impending conflict between the accident airplane and the accident helicopter or issued a warning to the airplane pilot about the helicopter. However, radar detected other aircraft in the Hudson River class B exclusion area that were potential conflicts at that time. The TEB local controller did not advise the airplane pilot of the other traffic ahead. The pilot of the airplane had requested radar traffic advisories before departure, and was advised of "radar contact" by TEB after departure, indicating that, workload permitting, the service was being provided. According to FAA Order 7110.65, *Air Traffic Control*, providing traffic advisories to VFR aircraft is an additional service that, as the FAA order states, “is required when the work situation permits.” The TEB local controller's ATC workload was light at the time of the frequency change, so it appears that nothing should have prevented him from providing the service. The EWR tower controller observed the existing traffic in the Hudson River class B exclusion area and called the TEB local controller to ask that he instruct the airplane pilot to turn toward the southwest to resolve the situation. The call overlapped the pilot’s acknowledgment of the radio frequency change instruction from the TEB local controller. The TEB controller did not hear the EWR controller’s instruction clearly and requested that it be repeated. The TEB controller then attempted to contact the airplane, but the pilot did not respond, likely because he

had already changed frequencies. The collision occurred about 1 minute after the frequency change and 26 seconds after the TEB local controller's last attempt to contact the pilot.

There are no procedures or instructions directing controllers to prevent, where possible, aircraft from entering the Hudson River class B exclusion area while remaining in communication with ATC or to ensure, traffic permitting, that aircraft requesting class B clearances receive approval to climb before entering the Hudson River class B exclusion area. Effective communication on the CTAF is a fundamental component of the safety procedures established for VFR operations in the Hudson River class B exclusion area. The NTSB concludes that New York ATC facilities must account for the importance of CTAF communications and ensure that aircraft operating near the Hudson River class B exclusion area are either cleared into class B airspace before reaching the Hudson River class B exclusion area or are directed to switch to the CTAF in time to engage in effective communications with other pilots operating in the Hudson River class B exclusion area. Further, if circumstances require that an aircraft in communication with ATC enter the Hudson River class B exclusion area, controllers should place a high priority on providing the pilot with timely traffic advisories and safety alerts, as required by FAA Order 7110.65, *Air Traffic Control*, because the pilot is less likely to be communicating on CTAF and receiving traffic information directly from other pilots.

Therefore, the NTSB recommends that the FAA revise standard operating procedures for all ATC facilities, including those at TEB, LGA, and EWR, adjoining the Hudson River class B exclusion area in the following ways:

a) establish procedures for coordination among ATC facilities so that aircraft operating under VFR and requesting a route that would require entry into class B airspace receive ATC clearance to enter that airspace as soon as traffic permits,

b) require controllers to instruct pilots with whom they are communicating and whose flight will operate in the Hudson River class B exclusion area to switch from ATC communications to the CTAF and to self-announce before entering the area,

c) add an advisory to the Automatic Terminal Information Service broadcast, reminding pilots of the need to use the CTAF while operating in the Hudson River class B exclusion area and to self-announce before entering the area, and

d) in any situation where, despite the above procedures, controllers are in contact with an aircraft operating within or approaching the Hudson River class B exclusion area, ensure that the pilot is provided with traffic advisories and safety alerts at least until exiting the area.

Controller and Supervisor Performance

On the day of the accident, the TEB tower was staffed with five controllers. At the time of the accident, there were two controllers in the tower cab: one controller was working the ground control, local control, and arrival radar positions and also acting as the controller in charge of the facility; a second controller was working the flight data and clearance delivery position. The two other controllers were on a break, and the frontline manager had left the facility temporarily about 1145.

The NTSB is concerned with the complacency and inattention to duty evidenced by the actions of the TEB local controller and the supervisor during the events surrounding this accident. The local controller initiated a telephone conversation unrelated to his work about 1150:31, about 2 minutes after he cleared the accident airplane for takeoff. The conversation continued until 1153:13, with the local controller dividing his attention between the telephone conversation and his ATC tasks. The controller was not fully engaged in his duties.

Following the accident, the TEB controller attempted to locate the ATC supervisor on duty, who had left the tower cab for a break, to tell him what had occurred. The supervisor could not be found in the building. The controller attempted to contact the supervisor by cell phone, but there was no response. The supervisor later stated that he had left the premises to run a personal errand. He did not tell the local controller, who was the controller-in-charge in the absence of the supervisor, that he would be leaving the facility. This adversely affected the mandatory and time critical accident notification and reporting process. The supervisor's unannounced absence is also of concern because of the local controller's inappropriate telephone conversation that likely would not have been permitted if the supervisor had been on duty in the tower cab. Therefore, the NTSB recommends that the FAA brief all air traffic controllers and supervisors on the ATC performance deficiencies evident in the circumstances of this accident and emphasize the requirement to be attentive and conscientious when performing ATC duties.

Establishment of a Special Flight Rules Area

Safe operations within the Hudson River class B exclusion area are dependent on pilot compliance with the operational and communications procedures that have been published by the FAA on the New York VFR Terminal Area Chart, along with commonly followed procedures such as remaining to the right side of the corridor to provide lateral separation from opposite-direction traffic, as published in the New York Helicopter Route Chart. It is critical that all pilots operating within the Hudson River class B exclusion area share a common understanding of applicable operating practices, airspace boundaries, traffic flows, position reporting points, and reporting procedures used within the area.

The NTSB is concerned that the voluntary measures, such as recommended procedures annotated on the New York VFR Terminal Area Chart and the New York Helicopter Route Chart, currently in use to educate pilots on safe operations within the area may not be sufficient to achieve this objective. The NTSB notes that, in other situations where enhanced pilot awareness and compliance with special procedures has been necessary for safety, such as operations near Los Angeles International Airport and in the Washington, DC, security zone, the FAA has implemented special flight rules areas (SFRA)[5] under 14 CFR Part 93. The FAA has also required that pilots who fly in some of these SFRAs complete training in those SFRAs' operational procedures.[6] The NTSB believes that similar action regarding the Hudson River class B exclusion area would improve safety of flight operations in the corridor.

[5] An SFRA is airspace of defined vertical and lateral dimensions where the FAA has established special operational rules and restrictions under 14 CFR Part 93.

[6] In response to improper flight operations incidents near the DC SFRA, for example, the FAA created a mandatory online training program for pilots operating in the DC area. Topics included definition and location of the DC SFRA, standard operating requirements for flights in the DC SFRA, airport operating requirements and

Further, a review of NMAC reports filed with the ASRS shows at least four near collisions involving aircraft en route to or near the Statue of Liberty, including one report from 2006. The areas surrounding the Statue of Liberty and Ellis Island are popular flight destinations attracting significant numbers of sightseeing aircraft. Because the Hudson River class B exclusion area is near these attractions, and many of the aircraft in the area arrive or depart via the Hudson River class B exclusion area, the NTSB believes that the designation of these areas as SFRAs would be beneficial to safety. Therefore, the NTSB recommends that the FAA amend 14 CFR Part 93 to establish an SFRA including the Hudson River class B exclusion area, the East River class B exclusion area, and the area surrounding Ellis Island and the Statue of Liberty; define operational procedures for use within the SFRA; and require that pilots complete specific training on the SFRA requirements before flight within the area. The NTSB notes that the SFRA training developed by the FAA for pilots operating near Washington, DC, may be a suitable model.

According to recorded radar data, at the time of the accident, the accident airplane was in level flight at about 1,100 feet, at a groundspeed of approximately 150 knots. The accident helicopter was climbing almost all the way to the point of impact, and the helicopter's groundspeed was approximately 93 knots when the collision occurred. Preliminary review of the radar data and witness statements indicate that the accident helicopter was overtaken and struck from behind by the accident airplane. The nearly 60-knot speed difference between the aircraft, as well as climb and descent rate differences, differing flight profiles, and other performance differences, may have reduced the time available for the accident airplane pilot to visually acquire the accident helicopter ahead and avert the collision. The NTSB concludes that segregation of helicopters from airplanes in the Hudson River class B exclusion area may provide an additional margin of safety by limiting the number of encounters between aircraft with significant performance differences. Therefore, the NTSB recommends that the FAA, as part of the SFRA procedures requested in Safety Recommendation A-09-84, require vertical separation between helicopters and airplanes by requiring that helicopters operate at a lower altitude than airplanes do, thus minimizing the effect of performance differences between helicopters and airplanes on the ability of pilots to see and avoid other traffic.

Because of the potential for similar concentrations of air traffic within other published VFR corridors near class B airspace, the NTSB also recommends that the FAA conduct a review of all class B airspace to identify any other airspace configurations where specific pilot training and familiarization would improve safety, and, as appropriate, develop SFRAs and associated training for pilots operating within those areas.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration

> Revise standard operating procedures for all air traffic control (ATC) facilities, including those at Teterboro airport, LaGuardia airport, and Newark Liberty International airport, adjoining the Hudson River class B exclusion area in the following ways:

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procedures, traffic pattern procedures for towered and nontowered airports, and requirements and procedures for transiting the DC SFRA.

a) establish procedures for coordination among ATC facilities so that aircraft operating under visual flight rules and requesting a route that would require entry into class B airspace receive ATC clearance to enter the airspace as soon as traffic permits,

b) require controllers to instruct pilots with whom they are communicating and whose flight will operate in the Hudson River class B exclusion area to switch from ATC communications to the common traffic advisory frequency (CTAF) and to self-announce before entering the area,

c) add an advisory to the Automatic Terminal Information Service broadcast, reminding pilots of the need to use the CTAF while operating in the Hudson River class B exclusion area and to self-announce before entering the area, and

d) in any situation where, despite the above procedures, controllers are in contact with an aircraft operating within or approaching the Hudson River class B exclusion area, ensure that the pilot is provided with traffic advisories and safety alerts at least until exiting the area. (A-09-82)

Brief all air traffic controllers and supervisors on the air traffic control (ATC) performance deficiencies evident in the circumstances of this accident and emphasize the requirement to be attentive and conscientious when performing ATC duties. (A-09-83)

Amend 14 *Code of Federal Regulations* Part 93 to establish an special flight rules area (SFRA) including the Hudson River class B exclusion area, the East River class B exclusion area, and the area surrounding Ellis Island and the Statue of Liberty; define operational procedures for use within the SFRA; and require that pilots complete specific training on the SFRA requirements before flight within the area. (A-09-84)

As part of the special flight rules area procedures requested in Safety Recommendation A-09-84, require vertical separation between helicopters and airplanes by requiring that helicopters operate at a lower altitude than airplanes do, thus minimizing the effect of performance differences between helicopters and airplanes on the ability of pilots to see and avoid other traffic. (A-09-85)

Conduct a review of all class B airspace to identify any other airspace configurations where specific pilot training and familiarization would improve safety, and, as appropriate, develop special flight rules areas and associated training for pilots operating within those areas. (A-09-86)

In response to the recommendations in this letter, please refer to Safety Recommendations A-09-82 through -86. 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 these recommendations.

[*Original Signed*]

By: Deborah A.P. Hersman
Chairman