VISIBILITY STUDY OF TBM AND RV-6

The NTSB IIC conducted a visibility study of a TBM and RV-6 at the Addison Airport, Addison, Texas, on February 21, 2007. The persons participating in the study included the following persons:

1. Jim Silliman: NTSB IIC

2. Doug Jeanes: Director of Maintenance of the Cavanaugh Flight Museum at Addison, Texas. The Cavanaugh Flight Museum provided the TBM Avenger used in the visibility study.

3. Ross Burgess, Bedford, Texas: Owner/pilot of the RV-6 used in the visibility study.

4. Doug Reeves, Lewisville, Texas: RV-6 owner and pilot.

5. Danny King, Southlake, Texas: RV-6 owner and pilot.

Conduct of the Visibility Study

The TBM and RV-6 were positioned on taxiway B that parallels runway 33 at Addison Airport (ADS), Addison, Texas. The front pilot's seat of the TBM was positioned on the centerline of the 35-foot wide taxiway with the longitudinal axis of the airplane at three different angles to the taxiway's centerline: 0 degrees, 10 degrees, and 15 degrees, to the right of centerline, respectively.

The TBM remained stationary during the study. Mr. Doug Jeanes, an experienced TBM pilot, sat in the pilot's seat (PS), and Mr. Reeves sat in the rear seat (RS) of the TBM, and together they provided their observations of the RV-6 during the study.

The RV-6 was positioned on the centerline of the taxiway and was moved along the taxiway's centerline at varying distances measured from the front of the TBM's propeller. The TBM pilots' observations of the RV-6 were written down as the RV-6 was positioned along the taxiway's centerline. The pilot observations were taken when the TBM's longitudinal centerline was positioned at the 0, 10, and 15 degree angles to the right of the taxiway centerline.

Both pilots positioned themselves in the TBM cockpit to observe the taxiway and the RV-6 in front of the TBM in three different observation positions. Their first position was when they sat straight up and looked straight down the centerline of the taxiway. In the second position, they turned their heads about 5 degrees to the left. In the third observation position, the pilots leaned to the left of the cockpit with their heads near the open windows. The pilot's referred to this

position as the "aggressive" observation position. The PS pilot raised himself out of the front seat about 2 inches and leaned back against the seat back with his head straight up. The PS pilot reported that this seating position provided him the optimal observation position while taxiing.

The RS pilot reported that his field of view was often restricted to the area of the front seat open window. He reported that if the window had been closed, or the PS pilot had put his arm on the side of the window ledge, then the field of observation would have been completely obscured.

The observed portions of the left and right wings were measured from the outboard wingtips. The observations were recorded, as follows:

TBM's Longitudinal Axis at 10 degrees to the taxiway centerline

At 0 feet: The PS could see 6 inches of the left wing when in the straight position, 18 inches of the left wing with his head turned, and 34 inches in the aggressive position. The RS could not see the RV when in the straight position, 12" of the left wing with his head turned, and 34 inches in the aggressive position.

At 35 feet: The PS could see 6 inches of the left wing when in the straight position, 33 inches of the left wing with his head turned, and 49 inches of the wing in the aggressive position. The RS could not see the RV-6 when in the straight position, 12 inches of the left wing with his head turned, and 12 inches of left wing in the aggressive position.

At 52 feet: The PS could not see the RV-6 when in the straight position, 18 inches of the left wing with his head turned, and 37 inches of the wing in the aggressive position. The RS could see 12 inches of left wing in the aggressive position.

At 70 feet: The PS could see a "sliver" of the wing of the RV-6 when in the straight position, 6 inches of the left wing with his head turned, and 44 inches of the wing in the aggressive position. The RS could see 4 feet of left wing with his head turned.

At 87 feet: The PS could see the top of the cockpit canopy when in the straight position, a "little bit" of the left wing with his head turned, and 4 inches of the wing in the aggressive position. The RS could see 5 feet of the left wing with his head turned.

At 105 feet: The PS could see the complete canopy and the top of the rudder when in the straight position, could not see the left WT with his head turned, and 22 inches of the wing in the aggressive position. The RS could see three feet of the left wing tip.

At 122 feet: The PS could see the complete cockpit fuselage to where the horizontal stabilizer attaches to the fuselage, and 1/2 of the right wing walk when in the straight position, and 26 inches of the left wing and 86 inches of the right wing in the aggressive position. The RS could see three feet of the left wing tip.

At 140 feet: The PS could see the whole propeller and the complete cockpit and fuselage to where the horizontal stabilizer attaches to the fuselage when in the straight position. The PS could see entire canopy and the left edge of the fuselage and 47.5 inches of the left wing and 46 inches of the right wing with his head turned. The PS could see 74 inches of the right wing and 90 inches of the left wing, but the fuselage could not be seen in the aggressive position. The RS could see 2 feet of the left wing.

TBM's Longitudinal Axis at 15 degrees to the taxiway centerline

At 0 feet: The PS could see 14 inches of the left wing when in the straight position, 33 inches of the left wing with his head turned, and 62 inches of the left wing in the aggressive position.

At 35 feet: The PS could see 45 inches of the left wing when in the straight position, 64 inches of the left wing with his head turned, and 93.5 inches of the left wing in the aggressive position. The RS could see 4 feet of the left wing with his head turned 5 degrees, and 9 feet of the left wing in the aggressive position.

At 52 feet: The PS could see 65 inches of the left wing when in the straight position, 85.5 inches of the left wing with his head turned, and 105 inches of the left wing in the aggressive position. The RS could see 1/2 of the left wing in the straight position, and almost the whole left wing in the aggressive position.

At 70 feet: The PS could see 79 inches of the left wing when in the straight position, 91 inches of the left wing with his head turned, and the entire left wing and part of the cockpit in the aggressive position. The RS could see 1/3 of the left wing in the straight position, and the whole left wing and the side of the fuselage in the aggressive position.

At 87 feet: The PS could see 69 inches of the left wing when in the straight position, 99 inches of the left wing with his head turned, and the entire left wing, the entire cockpit, and the left horizontal stabilizer in the aggressive position. The RS could see all of the left wing, 1/2 of the aileron, and 1/2 of the fuselage in the aggressive position.

At 105 feet: The PS could see 102 inches of the left wing and part of the canopy when in the straight position, the entire left wing with his head turned, and the entire left wing, the left horizontal stabilizer, and the canopy in the aggressive

position. The RS could see 2/3 of the fuselage and the entire cockpit in the aggressive position.

TBM's Longitudinal Axis at 0 degrees to the taxiway centerline

The RV-6 was not visible from the cockpit of the TBM until the RV-6 was positioned about 140 feet from the TBM, except for a small portion of the RV-6's wingtip when the RV-6 was positioned directly in front of the TBM. Between 0 to 140 feet, the RV-6 could not be seen. At 140 feet, the top of the canopy bow and one foot of the leading edge of the airplane's wingtip was visible. At 220 feet, the entire RV-6, except the tailwheel, could be seen.