

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN22MA034

AIRWORTHINESS

Group Chair's Factual Report

July 12, 2023

A. ACCIDENT

Location: Dallas, Texas
Date: November 12, 2022
Time: 1322 Central Standard Time (CST)
1922 Coordinated Universal Time (UTC)
Airplane 1: Boeing B-17G Flying Fortress, N7227C
Airplane 2: Bell P-63F Kingcobra, N6763

B. AIRWORTHINESS GROUP

Group Chair Clinton R. Crookshanks
National Transportation Safety Board
Aurora, Colorado

C. DETAILS OF THE INVESTIGATION

The group chair responded to the accident site on the evening of the accident to begin the investigation. The debris field was documented, airplane maintenance records were quarantined, and video and photographic evidence were secured. The wreckage from both airplanes were recovered to a Commemorative Air Force (CAF) hangar at the Dallas Executive Airport (RBD), Dallas, Texas, where they were examined. The on-scene work was completed on November 17, 2022. The airplanes were moved from the CAF hangar to a secure storage location from December 12-20, 2022.

D. FACTUAL INFORMATION

1.0 Airplane Overview

1.1 Boeing B-17G Flying Fortress, N7227C

The Boeing B-17G is a four-engine, high-altitude, heavy bomber originally developed in the 1930's for the US Army Air Corps. The airplane is equipped with a conventional tail and retractable conventional landing gear. The airplane is 74 feet, 3.9 inches long, 19 feet, 1 inch tall at the tail on the ground, has a wingspan of 103 feet, 9.4 inches, and has a horizontal stabilizer span of 43 feet. The airplane primary and secondary wing, fuselage, and tail structures are of all metal construction and the ailerons, elevators, and rudder are fabric covered aluminum skeleton structures. The airplane is powered by four Wright Cyclone R-1820 nine-cylinder, reciprocating radial engines that drive Hamilton Standard full feathering 3-blade propellers with a diameter of 11 feet, 7 inches. The accident airplane, designated a B-17G-95-DL, SN 44-83872, was manufactured in 1944 under license from Boeing by the Douglas Aircraft Corporation in Long Beach, California and delivered to the US Army Air Force

on July 12, 1945. The airplane was transferred to the US Navy on July 20, 1945, and given SN 77235. The accident airplane was acquired by the CAF in 1967 and was restored to its original B-17G configuration and given the name Texas Raiders (Figure 1).



Figure 1. Boeing B-17G airplane, Texas Raiders (CAF photo)

1.2 Bell P-63F Kingcobra, N6763

The Bell P-63F is a single engine, low wing fighter airplane originally developed in the early 1940's for the US Army Air Forces. The airplane is equipped with a conventional tail and retractable tricycle landing gear. The airplane is 32 feet, 8 inches long, 12 feet, 7 inches tall at the tail on the ground, and has a wingspan of 38 feet, 4 inches. The airplane primary and secondary wing, fuselage, and tail structures are of all metal construction and the elevators and rudder are fabric covered aluminum skeleton structures. The airplane is powered by an Allison V-1710-135 12-cylinder reciprocating engine that drives an Aeroproducts constant speed 4-blade propeller with a diameter of 11 feet. The accident airplane, designated a P-63F-1-BE, SN 43-11719, CN 296E1-1R, was manufactured in 1943, and was one of only two built. The F model had an enlarged vertical stabilizer and rudder for longitudinal stability increasing the height an unknown amount¹. The accident airplane was acquired by the CAF in 1981 and was restored to its original configuration (Figure 2).

¹ No drawings or manuals could be located to determine the increase in height since only two F model airplanes were built.



Figure 2. Bell P-63F airplane (CAF photo)

2.0 Collision

Photographic and video evidence provided showed that the P-63F airplane impacted the aft fuselage of the B-17G airplane from the aft, left side near the trailing edge of the left wing (Figures 3, 4, and 5). The B-17G was in a left bank about 10° and the P-63F was in a left bank about 53° immediately before the collision. Following the collision, both airplanes broke up in-flight and impacted the ground. See the Airworthiness Image Review in the public docket for additional pre- and post-collision photos.



Figure 3. Airplanes prior to collision showing bank angles (photo from CAF-David Walsh)



Figure 4. Airplanes prior to collision from front left (photo from CAF-Dylan Phelps)



Figure 5. Airplanes prior to collision from front right (photo from CAF-Gary Daniels)

The aft fuselage and tail of the B-17G separated near the trailing edge of the wing and descended to the ground in a nose low attitude. There was extensive damage to the upper fuselage of the B-17G from the wing trailing edge forward to the aft end of the cockpit immediately after the collision. The upper turret was damaged and separated during the collision. The B-17G forward section pitched down after the collision and descended nose down to the ground impacting in a near vertical orientation. All four engines on the B-17G were running at the time of impact and continued running to ground impact. A fire ignited in the wing center section area of the B-17G as it descended to the ground. The B-17G exploded upon ground impact.

The P-63F wings and nose separated during the collision. The aft fuselage of the P-63F fractured near the trailing edge of the wing but the empennage did not fully separate. The P-63F tumbled to the ground and impacted in a nose low vertical orientation. The empennage was rotated 180° along the longitudinal axis from the wing center section and forward fuselage at the time of ground impact.

3.0 Debris Field

The wreckage from both airplanes was mostly located on airport property in a grassy area south of the approach end of runway 31. Some smaller, lightweight

debris was located on and adjacent to US Hwy 67 that ran along the southeast end of the airport property. There were three main concentrated wreckage locations with smaller items scattered between them. The full debris field was about 1,880 feet long northwest-southeast by about 410 feet wide northeast-southwest.

The southernmost debris area contained the aft fuselage and empennage of the B-17G that was lying upside down. It was located about 410 feet south of the corner of runway 31. There was no evidence of fire. The fuselage was partially intact with extensive crushing and impact damage and spanned from the trailing edge of the wing to the tip of the tail. The vertical stabilizer, horizontal stabilizer, rudder, and both elevators remained attached but were extensively damaged.

The central debris area contained the fuselage, cockpit, engine, wing center section, and empennage of the P-63F and was located about 690 feet northwest of the B-17G tail. The fuselage was fractured aft of the engine and wing center section. The engine, wing center section, and cockpit were upside down. The empennage was laying upright. There was no evidence of fire. The fuselage was partially intact with extensive crushing and impact damage and spanned from the forward end of the cockpit to the tip of the tail. The scoop and much of the engine cowling were separated. The engine remained partially installed in the fuselage but was mostly separated from the wing center section. The vertical stabilizer, horizontal stabilizer, rudder and both elevators remained attached. The Garmin GPS Map 496 unit was recovered from the P-63F wreckage and was separated from its mount. The propeller, gearbox, and nose landing gear separated from the forward fuselage during the collision and were found about 105 feet south of the fuselage.

The northernmost debris area contained the wings and forward fuselage of the B-17G with extensive fire damage. The initial impact point was located about 410 feet northwest of the tail. This debris field measured about 525 feet long by about 225 feet wide. The left wing was lying on its lower surface with much of the inboard portion exhibiting significant fire damage. The outboard portion of the left wing was mostly intact with little fire damage. The right wing was highly fragmented and had extensive fire damage. Large sections of the right wing upper skin, lower skin, and spars were identified in the debris field. The forward fuselage was highly fragmented and extensively fire damaged. The four engines and both main landing gear were separated from the wing and found at the north end of the debris field. The Avidyne IFD-540 unit was recovered from the B-17G wreckage and was separated from the instrument panel.

The left and right wings separated from the P-63F during the collision and were located in the debris field. The right wing was lying on its upper surface and was located about 480 feet southeast of the P-63F fuselage. The right main landing gear was attached and in the retracted position. The right aileron remained attached. The left wing was lying on its lower surface and was located about 530 feet southeast of the P-63F fuselage. The left main landing gear was attached and in the retracted

position. The left aileron remained partially attached. The left and right wings were separated by about 150 feet. The left cockpit door was recovered mostly intact and undamaged between the wings.

4.0 Wreckage Examination

4.1 B-17G Airplane

The B-17G airplane was highly fragmented and had extensive fire damage to the forward half. It was impossible to establish flight control continuity due to the damage. Photographic and video evidence showed that the airplane was intact and operating as designed prior to the collision.

4.2 P-63F Airplane

The P-63F airplane broke up in flight during the collision. Both wings, the propeller, gearbox, nose landing gear (NLG), and several pieces of the fuselage separated from the airplane. The right wing forward spar was fractured about 18 inches outboard of the center section to outboard wing joint and the rear spar was fractured about 24 inches outboard of the joint. The right flap separated from the wing and was fractured into two pieces. There were green paint transfer marks on the lower surface of the right wing at the separation point. The left wing forward spar was fractured about 36 inches outboard of the center section to outboard wing joint and the rear spar was fractured about 55 inches outboard of the joint. The inboard portion of the left flap, about 36 inches long, remained attached to the inboard left wing. The outboard portion of the left flap was not identified in the recovered wreckage. About 36 inches of the inboard leading edge structure and water injection tank were separated from the left wing. Several pieces of the leading edge were identified in the wreckage and had significant crushing and mechanical damage. The pieces exhibited linear scrapes, gouges, and paint transfer marks that were oriented about 60° from the longitudinal axis.

Photographic evidence showed that the nose of the P-63F airplane separated from the fuselage at the forward end of the cockpit during the collision and the NLG extended. The NLG assembly and propeller/gearbox separated from each other during ground impact. All four propeller blades were bent, had some leading edge chunking, and exhibited chordwise scratching, gouging, and paint transfer marks.

The P-63F fuselage, center wing, engine, and empennage were mostly intact and partially attached after the collision based on photographic evidence. The fuselage and engine remained partially attached to the wing center section by wires. The empennage remained partially attached to the fuselage by a rudder cable after ground impact. All were separated fully during recovery. The empennage was mostly intact with some impact damage noted to the outboard left horizontal stabilizer and elevator. The elevator flight controls were intact from the surfaces to the quadrant at

the trailing edge of the wing. The rudder flight control cables were intact from the surface to the trailing edge of the wing. One rudder cable had a splayed, broomstraw appearance consistent with tension overload and the other was cut during recovery. The rudder trim and elevator trim control cables were intact from the surfaces to the trailing edge of the wing. All four cables had a splayed, broomstraw appearance consistent with tension overload.

The control stick was fractured from the quadrant fitting below the cockpit floor. The elevator and aileron quadrant below the cockpit was intact but the aft bearing housing was fractured. The elevator and aileron push-pull tubes were intact from the quadrant to the bulkhead at the forward end of the engine compartment. The right aileron control was intact over the wing center section through the bellcrank out to the right wing separation point. The right aileron controls were intact from the wing separation point to the surface. The left aileron control was intact from the forward engine bulkhead through the bellcrank at the trailing edge of the wing, but the assembly was separated from the center wing. The left aileron push-pull tube between the trailing edge bellcrank and the wing separation point was fractured and not identified in the recovered wreckage. The left aileron controls were intact from the wing separation point to the surface. The center elevator push-pull tube was fractured into multiple pieces between the forward engine bulkhead and the quadrant at the trailing edge of the wing. The elevator and rudder trim cables were intact from the cockpit to the fuselage separation point.

5.0 Maintenance Records

5.1 B-17G Airplane

The B-17G completed 3 flights on November 12 prior to the accident flight, two rides for hire and a flight in the Tora Tora Tora demonstration. Prior to the accident flight the airplane had accrued 9,239.0 hours total time and 804.0 hours Hobbs time. The Hobbs meter was found in the debris field and indicated 804.2 hours.

The airplane was maintained under an Approved Airplane Inspection Program (AAIP) that was approved on October 27, 2020. Revision 1 to the AAIP was approved on February 25, 2021. The AAIP consisted of 4 sequenced inspections to be performed at 25-hour intervals. All 4 inspections were to be completed every 12 months and at least 2 were to be completed every 6 months. The AAIP also contained a list of 6 special inspections with varying compliance times. The most recent AAIP inspection of the airplane was a No. 1 inspection completed on November 1, 2022, at an airplane total time of 9,228.0 hours. The last No. 2 inspection was completed in June 2022 at a total time of 9,165.3 hours, the last No. 3 inspection was completed in August 2022 at a total time of 9,189.7 hours, and the last No. 4 inspection was completed in September 2022 at a total time of 9,206.2 hours. Special inspections 1-6 were last completed in March 2022 at a total time of 9,116.7 hours.

There were 3 Federal Aviation Administration Airworthiness Directives (AD) for inspection of the wing structure, 2001-22-06, 77-17-11, and 73-20-02, that were all complied with through alternative methods of compliance (AMOC) approved in November 2017. The propeller ADs 81-13-06 R2 and 51-12-01 had been complied with for all 4 Hamilton Standard 23E50-473 propellers. The oil was last changed on all 4 Wright R-1820 engines in October 2022 at a total time of 9,223.1 hours.

See Attachment 1 for the pertinent maintenance records.

5.2 P-63F Airplane

The P-63F arrived at RBD airport on October 31 in preparation for the show and did not fly until the accident flight. The airplane had accrued 1,211.6 hours total time and 212.3 hours Hobbs time as of March 23, 2022. The Hobbs time entered in the flight logs did not change from March 24, 2022, until the accident though there was flight time entered. Adding the reported flight times in the log indicated the airplane had accrued 1,232.0 hours total time and 232.7 hours Hobbs time prior to the accident flight.

The airplane was maintained as an experimental aircraft and the operating limitations required a condition inspection every 12 months. The most recent condition inspection of the airplane was completed on March 23, 2022, at an airplane total time of 1,211.6 hours. The Allison V1710-135 engine had a condition inspection performed at the same time and the engine time was listed as 217.3 hours. The Aero products A6425-E1 propeller also had a condition inspection at the same time and the propeller time was listed as 171.7 hours. The records indicated that all ADs were checked through the date of the inspection.

See Attachment 2 for the pertinent maintenance records.

Submitted by:

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