CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: May 14, 1953 Released: May 20, 1953

LAKE CENTRAL AIRLINES, INC., DC-3 and CESSNA 170 - RICHMOND, INDIANA, DECEMBER 15, 1952

The Accident

An air collision occurred between a Lake Central Airlines' DC-3 aircraft, N 21716 and a Cessna 170 aircraft, N 3131B, at 0952[1/], December 15, 1952, at the Richmond Municipal Airport, Richmond, Indiana, when these aircraft were landing on intersecting runways. The pilot, the only occupant of the Cessna, was killed and that aircraft was demolished. None of the nine occupants of the DC-3 were injured and that aircraft received only minor damage.

History of the Flights

Lake Central Airlines' Flight 21 of December 15, 1952, originated at Grand Rapids, Michigan, with its destination Cincinnati, Ohio, and with scheduled intermediate stops among which were Indianapolis, Indiana, and Richmond, Indiana. At Indianapolis routine aircraft and crew changes were made. The new crew consisted of Captain Valentine Prose, First Officer Neal Payton and Stewardess June Silverthorn. Thomas Cotter, employed by the company as a relief dispatcher and occupying the jump seat, was listed as the fourth member of the crew.

The following weather information was available to the crew at the time of departure from Indianapolis: Richmond at 0820 - ceiling estimated 600 feet overcast, light snow showers and fog, visibility 5 miles, temperature 23 degrees and wind from the southwest at 16 miles per hour; Indianapolis at 0828 - scattered clouds at 1100 feet, ceiling measured 2500 feet overcast, visibility 10 miles and wind from the west at 12 miles per hour. The regional forecast for the period involved in this flight indicated that light to moderate rime and clear ice would be encountered in the clouds over Illinois, Indiana, and Ohio with freezing drizzle in the extreme northeast portion of Indiana.

Flight 21 departed Indianapolis at 0918 and was cleared in accordance with Instrument Flight Rules (IFR) direct to Richmond at a cruising altitude of 2300 feet. There were five passengers. The gross weight of the aircraft was 23,017 pounds, which was within the allowable certificated limit and the load was properly distributed with respect to the center of gravity of the aircraft.

At 0927 - nine minutes after take off - the flight requested a change in cruising altitude from 2300 feet to 3000 feet. This was approved by ARTC (Air

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1/ All times referred to herein are Central Standard and based on the 24-hour clock.

Route Traffic Control) and the flight climbed to the new altitude. At the 3000-foot level the aircraft was between two layers of clouds, however, a short time later the cloud layers merged and flight was continued on instruments.

At 0940 the flight advised the company at Richmond that it was in range and requested the local weather which was given as: Ceiling estimated 500 feet overcast, light snow showers, fog, visibility 5 miles and wind from the southwest at 18 miles per hour. Flight 21 reported over the Richmond "MH" marker (a non-directional homing beacon) at 0944 and proceeded outbound on a heading of 234 degrees. A standard D/F approach was immediately begun.2/ A few minutes prior to and during the approach the aircraft began picking up ice; accordingly the propeller and windshield deicers and the windshield wipers were turned on. A normal approach was made and the aircraft became visually contact approximately one mile southwest of the airport at an altitude of about 400 feet above the ground.3/

The company's agent, who from the ground was monitoring the approach,4/ advised the flight that he had it in sight and that there was no other traffic.

Because the tetrahedron showed the wind to be from the southwest and nearly aligned with Runway 23, the captain made a right and then a left turn to make a close-in approach to this runway. When starting flare-out for the landing a few feet above the ground the company's relief dispatcher seated on the jump seat (between and to the rear of the two pilots' seats) momentarily observed an aircraft approaching from the left. He immediately shouted to the captain to look out. Power was applied at once, but almost instantly thereafter the two aircraft collided.

The DC-3 yawed to the right and for a few seconds was difficult to control; however, the right main landing gear wheel made contact with Runway 23 some distance from the collision point and the aircraft rolled off the runway onto the grass. After rolling approximately 800 feet the captain was able to return the aircraft to the runway and stop. All occupants immediately deplaned; there was no fire.

On December 14, 1952, Mr. Sherman S. Graves, manager of the Helicopter Division, Cessna Aircraft Company, departed Wichita, Kansas, for Dayton, Ohio, in a Cessna 170 aircraft, N 3131B. Although no flight plan was filed it is

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2/ Special authorization from the Administrator of Civil Aeronautics is required for anyone to use an "MH" facility as a means of making an instrument approach to an uncontrolled airport if the instrument approach procedure is not published in the Flight Information Manual. Lake Central Airlines was the only party authorized to make such an approach at Richmond, Indiana.

3/ The company's minimums at Richmond are, ceiling 400 feet and one mile visibility.

4/ The Richmond Municipal Airport does not have a control tower.

known that sometime that day Mr. Graves stopped at Alton, Illinois, where the aircraft was refueled. The flight was delayed at this point for a few hours because of unfavorable weather conditions; however, later in the afternoon flight was continued to Effingham, Illinois, where an overnight stop was made.

The following morning, December 15, the Cessna pilot departed Effingham, again without filing a flight plan,[5/] and at 0729, when five miles east of Effingham, called the Vandalia, Illinois, communications station requesting the Indianapolis and Dayton weather. The 0628 weather sequence was given as follows: Indianapolis - ceiling measured 1100 feet broken, 2000 overcast, visibility 7 miles, temperature 24, dew point 20, wind west 16 miles per hour; Dayton - ceiling measured 1000 overcast, visibility 10 miles, temperature 22, dew point 19, wind west-southwest 15 miles per hour. Mr. Graves was also told at this time that a later sequence report would be available to him in six or seven minutes. This was the last known contact with the Cessna pilot.

At approximately 0951, the Cessna was observed approaching the airport close-in and from a southwesterly direction at an altitude between 300 and 400 feet and then to turn left for a landing on Runway 28. A few seconds later, at the intersection of this runway and Runway 23 the Cessna and the DC-3 collided. The pilot and sole occupant of the Cessna was killed and that aircraft was demolished by impact and fire.

Investigation

Examination of Runways 23 and 28 revealed a seven foot long left-curving scar made by the propeller of the Cessna on Runway 23. This mark was located 45 feet southwest of the intersection of the runways. The Cessna came to rest in an inverted position on Runway 23, a distance of 245 feet from this propeller mark. On the right side of the runway near where the Cessna stopped, a tire mark was found which was identified as being made by the right landing wheel of the DC-3. No other marks on the runways could be identified as having been caused by these aircraft.

The main portions of the Cessna wreckage were lying close together on the runway. The fuselage lay in an inverted position and was badly damaged by impact and fire. The right wing which was destroyed at first impact by the right propeller and landing gear of the DC-3 was severed from the fuselage and demolished. The empennage was in an upright position and had been severed from the fuselage by the right propeller and right landing gear of the DC-3, approximately two feet forward of the horizontal stabilizer. The left wing, although damaged to some extent, was intact and attached to the fuselage. A section of the plexiglass windshield was found on the runway with a formation of ice on its outer surface.

The DC-3 suffered only minor damage, most of which was in the nature of nicks and slight abrasions to its propeller blades. There were a few scratches on the right landing gear strut. The left side of the right tire

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5/ Filing a flight plan was optional.

was scuffed and there were a few shallow cuts both on this side of the tire and on the tread. A shallow formation of ice was found on the leading edges of both wings and the horizontal stabilizer.

Examination of the wreckage of the Cessna and the marks on the DC-3 disclosed that at the time of impact the aircraft were on courses converging at an angle of about 50 degrees with the Cessna to the left of the DC-3. (Runways 23 and 28 intersect at an angle of 50 degrees.)

There was no evidence that either aircraft was malfunctioning prior to the accident.

On the morning of December 15, 1952, there was a low pressure center southeast of James Bay, Canada, with a weak trough extending southeastward across Michigan, Indiana, and into southwest Kentucky. This trough was accompanied by low ceilings and light precipitation (ranging from snow showers to freezing drizzle) in eastern Indiana and Ohio. By 0630, precipitation had stopped in western Indiana, ceilings had improved and it was clearing in Illinois. There were no fronts in the area and the low clouds and precipitation were caused by very weak wind convergence plus a gradual up slope wind. The entire system was moving eastward.

Freezing drizzle was not reported by the weather observer at Richmond and, therefore, no broadcasts of freezing drizzle for that station were made. However, the weather forecaster at Indianapolis stated that pilots who were briefed at the Weather Bureau Office on the morning of December 15, were cautioned against flying eastward in an aircraft not having deicing equipment. At 0920 a weather report was made at Richmond which contained light drizzle and a surface temperature of 24 degrees. With that temperature, it is obvious that "freezing drizzle" should have been reported instead of "drizzle". Icing conditions below the cloud ceiling would have been encountered at a point about 25 miles west of Richmond. Ground witnesses in the vicinity of Richmond reported that at about the time of the accident automobile windshields were accumulating moderate to heavy ice.

As far as is known, Pilot Graves made no request for weather information other than that which was given him shortly after departing Effingham. However, weather information was available to this pilot through scheduled broadcasts transmitted every 15 and 45 minutes after the hour although none of these broadcasts indicated freezing drizzle in the Richmond area.

Lake Central Airlines' station agents at Richmond are accredited U. S. Weather Bureau observers and as such make weather observations. These are transmitted at irregular periods to the Indianapolis weather office.

The DC-3 crew testified that during the approach to the airport it was necessary to use windshield wipers, windshield deicers and propeller deicers and that after contact was established windshield deicing fluid was turned off. However, a rapid accumulation of ice on the windshields made it necessary to immediately turn the deicing fluid on again. They said also that the rear one-third of the cockpit side windows were covered with a heavy frost and this together with alcohol swirls obscured their vision approximately 25 percent. Both pilots said that throughout the entire approach they were on the alert for other aircraft.

The Richmond Municipal Airport has three hard-surfaced runways varying in length from 4600 to 5500 feet. The distance from the approach end of Runways 23 and 28 to their intersection is approximately 750 feet. Lake Central Airlines' office is in the Administration Building which is located on the west side of the airport and faces in an easterly direction. A view from the window of this office encompasses the approach end of Runways 23 and 28.

The Richmond station agent stated that he was the only company employee on duty at the time Flight 21 was making its approach, and that after talking to the flight during the initial stages of its approach he went outside and stood on the ramp approximately 15 to 20 feet in front and to the side of the Administration Building. From this vantage point, he watched the DC-3 break through the clouds and proceed in a generally easterly direction. He then returned to the office and told the flight it was in sight and that there was no other traffic. Following this conversation he again returned to the ramp and observed that the DC-3 was then on the downwind leg of the traffic pattern and no other traffic being in sight, he returned to the office to perform other duties. A short time later he glanced through the office window and saw the DC-3 over Runway 23, between the boundary of the airport and the intersection of the runways. Suddenly he saw the Cessna about to land on Runway 28. He reached for the microphone to advise Flight 21 of the presence of the small aircraft. However, collision occurred before the message could be transmitted.

According to the company's Operations Manual, the agent is instructed to use a sixty-foot microphone extension located on the outside of the building during the monitoring of the flight in the local area.6/ This was not done.7/

6/ Operations Manual - Lake Central Airlines .. Part 4.520 - B. When approaching Station on Instruments (RID and OKK) ... "2. Approximately 10 minutes before estimated time of approach over a station not having a range or tower facility, the Captain shall contact the LCA ground station giving his ETA over the station in a manner similar to that in the above procedure; however, advising also the trip's intention to make an approach to the field. NO APPROACH WILL BE INITIATED OR EFFECTED UNLESS TWO WAY RADIO CONTACT IS ESTABLISHED PRIOR TO APPROACH, AND SUCH APPROACH WILL BE DISCONTINUED SHOULD SUCH TWO WAY CONTACT BE LOST.

3. Upon receipt of the information that the flight anticipates instrument approach, the ground agent will utilize the outside microphone extension made available for this use, and place himself in a position to view the approach from the let-down facility and notify the flight that his path from the facility to the field appears to be clear for the approach. Should conditions arise that make the let-down hazardous in the estimation of the ground agent, the flight will be immediately contacted, and the approach abandoned."

7/ CORRECTIVE ACTION: As a result of this accident Lake Central Airlines is now instructing its personnel at uncontrolled airports to monitor all instrument approaches from the time the aircraft first approaches the facility until it is actually on the ground. VFR flights are to be monitored in a similar manner if the prevailing visibility is 5 miles or less. In order that the agent may make no error as to his position during the monitoring of flights, microphones have been placed at locations where the entire horizon is visible.

A number of ground witnesses at or near the airport stated that they saw the DC-3 approaching the airport at a low altitude from the southwest. A short time later they observed the Cessna approaching approximately from the same direction and at about the same altitude or possibly lower. (See attachment.)

Two passengers on board the DC-3, who were seated on the left side, stated that when the aircraft was near the approach end of Runway 23 they saw the Cessna at a lower altitude turning left to land on Runway 28.

Mr. Graves, the Cessna pilot, had been employed by the Cessna Aircraft Company since 1936. He held an airman certificate with a private pilot rating and an aircraft and engine mechanic certificate. At the time of the accident he had accumulated approximately 939 flying hours and a large portion of this flying experience had been in cross-country flying. As far as is known he had not had any instrument training or experience. Persons who knew him considered him a careful and conservative pilot.

The Cessna, N 3131B, was a four-place, single-engine, high-wing monoplane type aircraft with a normal cruising speed of 120 miles per hour. It had a fuel capacity of 42 gallons with a fuel consumption of between eight and nine gallons per hour. The aircraft was a 1953 model and had a total of approximately 43 flying hours. It was equipped with a cabin heater with a windshield defrosting (not deicing) attachment. The radio equipment consisted of a VHF transmitter and receiver, a low frequency receiver and omni.

Analysis

The evidence indicates that when the two aircraft approached the airport the Cessna was behind the DC-3 and possibly slightly lower. The distance between the aircraft (not accurately known) and the shorter radius of turn to Runway 28 made by the Cessna brought them together at the intersection of Runways 23 and 28.

Under normal conditions the pilot of the Cessna should have seen the other aircraft when approaching the airport and prior to turning on final. It is probable, however, that his windshield was partially covered with ice, impairing forward vision. Several things point toward this conclusion. There is a discrepancy of forty minutes in the time of the Cessna's flight from Effingham to Richmond. It took two hours and twenty-three minutes to fly a distance of 203 miles which at normal cruising speed (120 miles per hour) should have been flown in one hour and forty-three minutes, with zero wind or even less with the prevailing quartering tail wind. Where the pilot was during that time is not known, but it is possible that he was in the icing area for a considerable time. Also, Runway 28 was chosen by the Cessna pilot for his landing despite the fact the tetrahedron clearly indicated that a landing on Runway 23 would be into the 18 miles per hour wind. If ice did obscure his forward vision appreciably the pilot would look through his left side window most of the time and therefore might not see the DC-3.

What is not known is why the pilots of both aircraft did not see each other. With the Cessna to the rear of the DC-3, the crew of the latter aircraft would not be apt to see the other aircraft until their turn to final or on final approach. It is difficult to explain why the smaller aircraft

was not seen by the crew of the DC-3 during this turn and on final approach except for the fact that the DC-3 pilots must, at that time, have been concentrating exclusively on the imminent landing. The fact that they had been advised by the station agent that there was no other traffic, together with the fact that with such a low ceiling traffic would not normally be expected, may have created a sense of false security. This may have contributed to some extent; however, there were three persons in the DC-3 cockpit and all said they did not see the approaching Cessna aircraft until it was too late to avoid the collision. The rear one-third portion of the side cockpit windows being opaque from frost or ice did not prevent the pilots from having complete coverage of their normal field of vision during the final approach.

The instructions to the station agent pertaining to the ground monitoring of an approach to the Richmond Airport, as set forth in the company's operation manual, are there solely in the interest of safety and to cover situations such as existed this day. The fact that these instructions were not strictly adhered to in that the agent did not properly scan the entire area and did not use the outside extension cord and microphone and therefore did not contact the aircraft from outside the Administration Building may have contributed to his non-observance of another aircraft in the immediate area. Since the collision occurred at the intersection of runways converging at 50 degrees and since ground witnesses observed the Cessna closely following the DC-3 when these aircraft were approaching the airport, it is evident that at the time the agent monitored his flight, the Cessna must have been close by and should have been visible to him.

As a result of this accident, the Civil Aeronautics Board and the Civil Aeronautics Administration are making a study of both IFR/VFR traffic conditions at uncontrolled airports so that corrective action can be taken to better control such traffic.

Findings

On the basis of all available evidence the Board finds that:

1. The carrier, both aircraft and the three pilots were properly certificated.

2. Both aircraft were in an airworthy condition prior to the collision.

3. When both aircraft approached the airport the cloud ceiling was estimated to be 500 feet, visibility 5 miles, and icing conditions existed both in and below the clouds.

4. During the approach to the airport and prior to final approach to the runways the Cessna was to the rear of the DC-3 and therefore in a better position to see the DC-3.

5. The relative positions of the two aircraft on final approach were such that each could have been seen from the other.

6. The DC-3 was landing into the wind on Runway 23.

7. The Cessna cut in and landed on Runway 28 which intersects Runway 23 at a 50 degree angle.

8. Windshield ice may have prevented the Cessna's pilot from seeing the DC-3.

9. The company agent did not adequately scan the area during the approach of the DC-3 as prescribed in the company's operations manual.

10. The aircraft converged at an angle of approximately 50 degrees, and collided a few feet above the airport.

Probable Cause

The Board determines that the probable cause of this accident was the failure of the pilots of both aircraft to observe and avoid each other. The action of the Cessna pilot in cutting in and attempting to land contrary to the prevailing wind direction, and the inadequate monitoring of the DC-3's flight from the ground contributed to the accident.

BY THE CIVIL AERONAUTICS BOARD:

/s/ OSWALD RYAN

/s/ HARMAR D. DENNY

/s/ JOSH LEE

/s/ JOSEPH P. ADAMS

/s/ CHAN GURNEY

SUPPLEMENTAL DATA

Investigation and Hearing

The Civil Aeronautics Board was notified of this accident at 1040, December 15, 1952, by the Chicago CAA Regional office. An investigation was immediately initiated in accordance with the provisions of Section 702 (a)(2) of the Civil Aeronautics Act of 1938, as amended. A public hearing was ordered by the Board and was held in the Leland Hotel, Richmond, Indiana, on January 7 and 8, 1953.

Air Carrier

Lake Central Airlines, Inc., successor company to Turner Airlines, Inc., is a Delaware corporation and maintains its general offices at Weir Cook Municipal Airport, Indianapolis, Indiana. The company possesses a certificate of public convenience and necessity issued by the Civil Aeronautics Board and an air carrier operating certificate issued by the Civil Aeronautics Administration for operations over the route described in this report.

Flight Personnel

Sherman S. Graves, age 39, held an airman certificate with private pilot rating for single-engine land aircraft. He also possessed an aircraft and engine mechanic certificate. Mr. Graves had accumulated 939 flying hours, 300 hours of which were in Cessna 170 type aircraft. His last CAA medical examination was given on March 12, 1952. He had been employed by the Cessna Aircraft Company since July 1936, and was manager of the Helicopter Division.

Captain Valentine L. Prose, age 31, was employed by Lake Central Airlines on February 1, 1950, and was promoted from First Officer to Captain on March 26, 1950. He possessed a valid airman certificate with an air transport rating. Captain Prose had a total of 6,417 flying hours, of which 3,762 were in DC-3 equipment. His last six-months check was accomplished on August 3, 1952. His last 1st class CAA medical examination was taken on September 15, 1952.

First Officer Neal D. Payton, age 31, was employed by Lake Central Airlines on April 21, 1952. He possessed a valid airman certificate with a commercial pilot, single and multi-engine land, single-engine sea, instrument, and flight instructor ratings. His last six-months instrument check was successfully completed on November 12, 1952. First Officer Payton had a total of 3,490 flying hours, of which 549 were in DC-3 equipment. First Officer Payton last received a 2nd class CAA physical examination on June 2, 1952.

Thomas L. Cotter, age 24, was employed by Lake Central Airlines on October 4, 1950, and had served in several capacities with the company. At the time of the accident he was a relief dispatcher. Mr. Cotter held a CAA Aircraft Dispatcher Rating (temporary), issued on November 25, 1952.

The Aircraft

N 3131B, a Cessna 170, was owned by the Cessna Aircraft Company, Wichita, Kansas. It had a total of approximately 43 flying hours at the time of the accident and was currently certificated by the Civil Aeronautics Administration. The aircraft was equipped with a Continental C-145 engine and a McCauley propeller.

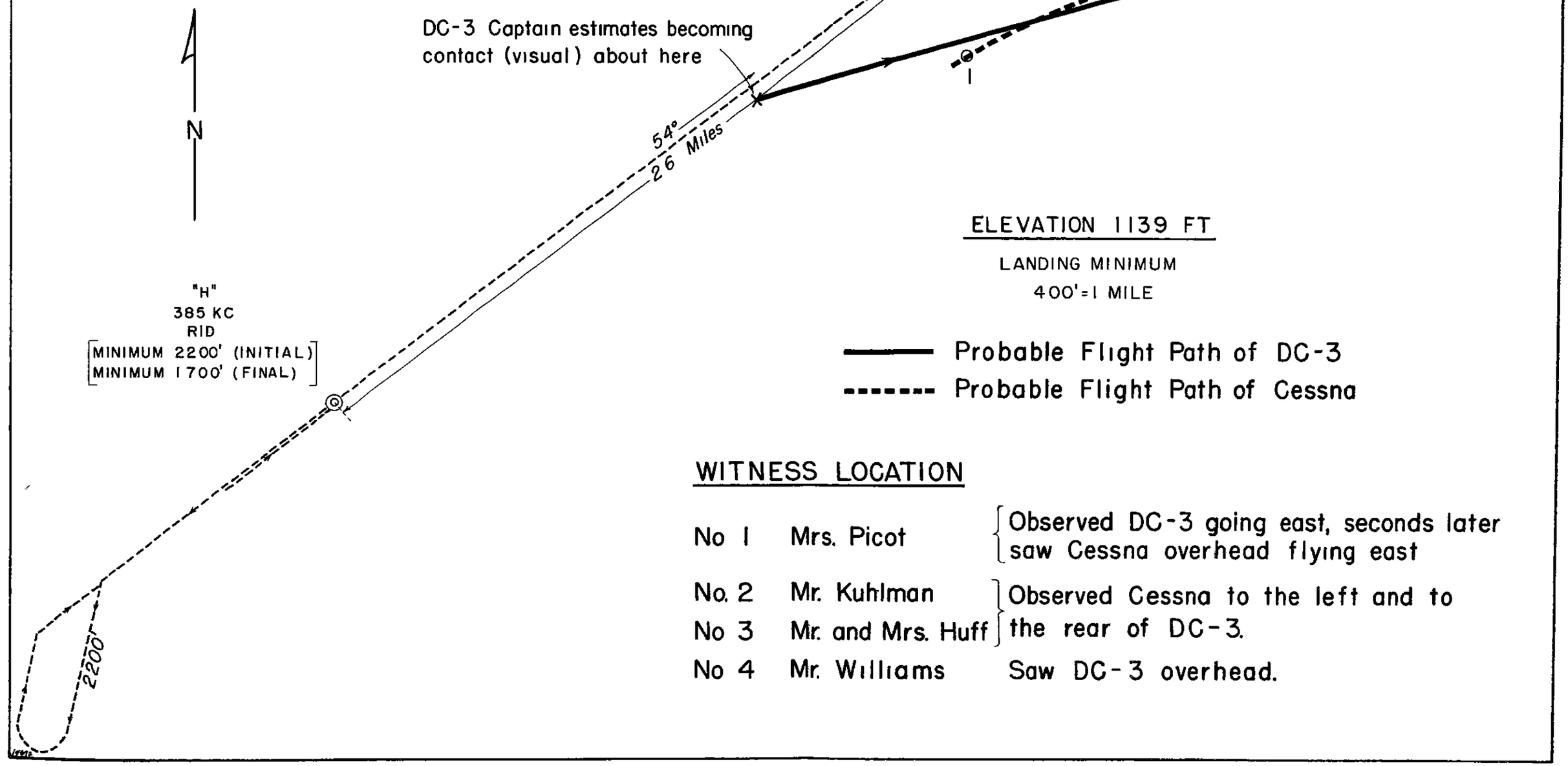
N 21716, a Douglas DC-3, was owned by Lake Central Airlines. It had a total of 28,567 flying hours and was currently certificated by the Civil Aeronautics Administration. The aircraft was equipped with two Pratt and Whitney R-1830-90D engines and Hamilton Standard 23E50 propellers. It underwent a No. 1 check on December 3, 1952.

AIR-COLLISION

LAKE CENTRAL AIRLINES, INC. DC-3 AND CESSNA 170

RICHMOND, INDIANA

DECEMBER 15, 1952



ELEVATION 1139 FT

LANDING MINIMUM

400'=1 MILE

——— Probable Flight Path of DC-3

- - - - - - - Probable Flight Path of Cessna

WITNESS LOCATION

No 1	Mrs. Picot	Observed DC-3 going east, seconds later saw Cessna overhead flying east
No. 2	Mr. Kuhlman	Observed Cessna to the left and to the rear of DC-3.
No 3	Mr. and Mrs. Huff	
No 4	Mr. Williams	Saw DC-3 overhead.