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16. Abstract American Airlines, Inc., Flight 30 (AA 30), a Boeing 707-323, N7595A, and a Linden Flight Service, Inc., Cessna 150, N60942, collided at about <u>2,975</u> feet above the township of Edison, New Jersey, on January 9, 1971, at approximately 1620 eastern standard time. The collision occurred while the Boeing 707 was being radar vectored for an Instrument Landing System approach to Runway 04 Left at Newark Airport, Newark, New Jersey. The 707 subsequently landed at Newark Airport without injury to its 14 passengers and crew of seven. The Cessna 150, N60942, occupied by a flight instructor and a student pilot, was on a training flight. The Cessna 150 was derolished by the collision and subsequent ground impact. Both of its occupants received fatal injuries. *This report is a revision of the Board's report of May 10, 1972, and reflects new evidence drawn to the attention of the Board by American Airlines in their "Request for Reconsideration or Modification," dated July 6, 1973. The new evidence consisted of revised calibration data which affected the readout of the flight data recorder record. All revised material in the report is underlined.			
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AIRCRAFT ACCIDENT REPORT

**AMERICAN AIRLINES, INC.,
Boeing 707-323, N7595A**

And A

Linden Flight Service, Inc.,

Cessna 150, N60942

Over Edison, New Jersey

January 9, 1971

Adopted: May 10, 1972

NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D. C. 20591

REPORT NUMBER: NTSB-AAR-72-16

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NATIONAL TRANSPORTATION SAFETY BOARD
REVISED*
AIRCRAFT ACCIDENT REPORT

ADOPTED: July 3, 1974

AMERICAN AIRLINES, INC., BOEING 707-323, N7595A
AND A
LINDEN FLIGHT SERVICE, INC., CESSNA 150, N60942
OVER EDISON, NEW JERSEY
JANUARY 9, 1971

SYNOPSIS

American Airlines, Inc., Flight 30 (AA 30), a Boeing 707-323, N7595A, and a Linden Flight Service, Inc., Cessna 150, N60942, collided at about 2,975 feet above the township of Edison, New Jersey, on January 9, 1971, at approximately 1620 eastern standard time.

The collision occurred while the Boeing 707 was being radar vectored for an Instrument Landing System approach to Runway 04 Left at Newark Airport, Newark, New Jersey. The 707 subsequently landed at Newark Airport without injury to its 14 passengers and crew of seven.

The Cessna 150, N60942, occupied by a flight instructor and a student pilot, was on a training flight. The Cessna 150 was demolished by the collision and subsequent ground impact. Both of its occupants received fatal injuries.

The surface visibility in the Newark area at the time of the accident was 8 miles. However, reports from pilots, who were operating in the area at the time of the collision, indicated that there was a substantial diminution of flight visibility at the collision altitude.

The National Transportation Safety Board determines that the probable cause of this accident was the inability of the crews of both aircraft to see and avoid each other while operating in a system which permits VFR aircraft to operate up to 3,000 feet on random headings and altitudes in a congested area under conditions of reduced visibility. An additional causal factor was the designation of a student flight training area in a congested control area under marginal flight visibility conditions.

*This report is a revision of the Board's report of May 10, 1972, and reflects new evidence drawn to the attention of the Board by American Airlines in their "Request for Reconsideration or Modification dated July 6, 1973." The new evidence consisted of revised calibration data which affected the readout of the flight data recorder record. All revised material in the report is underlined.

INVESTIGATION

American Airlines Inc., Flight 30 (AA 30) was a regularly scheduled flight from San Francisco, California, to Newark, New Jersey. The flight departed from San Francisco International Airport at 1151 1/ on an instrument Flight Rules (IFR) flight plan. The en route portion of the flight was uneventful.

Newark Approach Control received a radar handoff from the New York Air Route Traffic Control Center while AA 30 was descending to 4,000 feet 2/. At 1615:57 Newark Approach Control cleared AA 30 to descend to 3,000 feet on a vector heading of 160°.

At 1619, the approach controller directed AA 30 to "turn right heading 180." The controller later stated that his purpose in turning AA 30 was to assure adequate spacing behind preceding IFR traffic.

The approach controller then transmitted the following:

Approach Control

1620:05 American 30, traffic at 12 o'clock less than a mile, northeast bound slow.

AA 30

1620:11 No contact.

The cockpit voice recorder revealed the following:

Everything sure is murky up here.
Boy it is, and I suppose it's VFR.
Well, another thousand feet down is, but I
hope nobody

1620:25 (Sound of object striking airplane)

AA 30 then transmitted the following:

AA 30

1620:30 We have been hit by that airplane, American 30.

Statements submitted by the flightcrew of the Boeing 707 indicated that they were all scanning ahead for the reported traffic when the head-on

1/ All times used herein are eastern standard based on the 24-hour clock.

2/ All altitudes used herein are mean sea level.

silhouette of a small airplane became suddenly visible through the haze. The small airplane contacted the left wing of the Boeing 707 before evasive action could be initiated.

The Boeing 707 sustained substantial damage to the No. 1 engine nacelle strut, and to the leading edge of the wing outboard of the No. 1 engine. Impact marks indicated that the aircraft were headed toward each other when the collision occurred.

After the collision, the Boeing 707 executed a series of shallow turns to determine the response of the airplane to flight controls and to assess damage. At 1638, the Boeing 707 landed safely at the Newark Airport.

The small airplane involved was a Cessna 150, N60942. It departed from Linden Airport at approximately 1530 on a local training flight. A student pilot occupied the left seat and an instructor pilot occupied the right seat. Linden Airport, located approximately 6 miles southwest of Newark Airport, is not serviced by a control tower.

There was no record of air-ground communications between the Cessna 150 and air traffic control (ATC) facilities located in the general area. No flight plan had been filed. There was no requirement for two-way radio communications by Visual Flight Rules (VFR) training flights, nor was there a requirement to file a flight plan if the pilot's intent was to operate in visual meteorological conditions.

The Cessna 150 was owned and operated by Linden Flight Services, Inc., a Federal Aviation Administration (FAA) approved pilot training school. The collision occurred within an area designated by the school as a student training area. The training area was located west of Linden Airport and training flights in this area had been advised by the school to remain below 3,000 feet.

No regulatory authority had been exercised by the FAA in the establishment of the student training area. The final vector controller at Newark Approach Control, whose sector encompassed the student training area, had no official documents or charts apprising him of the location or boundaries of the student training area as designated by Linden Flight Services, Inc.

Matching impact marks and damage to both aircraft disclosed that the collision occurred between the left wing, outboard of the No. 1 engine nacelle of the Boeing 707 and the nose gear, horizontal tail surfaces, and lower aft fuselage of the Cessna 150. The horizontal tail surfaces separated from the main fuselage of the Cessna 150, causing the airplane to become uncontrollable. The two passengers received fatal injuries from the ensuing ground impact.

A private residence in Edison Township, New Jersey, was slightly damaged by a control counterweight which separated from the right elevator of the Cessna 150, and penetrated the roof of the house.

Edison Township, New Jersey, is located approximately 18 statute miles southwest of the Newark Airport. The Newark Airport is the nearest location to the accident site from which official weather observations are obtainable. The Newark Airport special weather observation recorded at 1629 on the day of the accident was, in part: measured ceiling 2,300 feet broken clouds, 8,000 feet overcast, surface visibility 8 miles, wind from 360° at 7 knots and altimeter setting 30.12 inches.

Reports obtained from pilots operating in the area at the time of the collision contained estimates of cloud bases ranging from 3,500 feet to 2,000 feet, with flight visibility restricted below the cloud ceiling. Estimates of the flight visibility below the clouds ranged from 3 miles to less than 1/2 mile, and varied both horizontally and vertically. These reports also indicated that there was a general improvement in flight visibility near ground level, where surface visibilities were estimated to have been about 8 miles as reported in the Newark Airport 1619 special weather observation. There was no indication that the pilot of the Cessna 150 attempted to obtain available weather reports.

Information from the flight data recorder installed on the Boeing 707 was analyzed by the Safety Board. One minute 35.6 seconds prior to the midair collision, the altitude trace indicated 2,975 feet. Correlation of the altitude, heading, airspeed, and vertical acceleration traces on the flight data recorder graph indicated that the collision occurred at an altitude of 2,975 feet, while the aircraft was on a magnetic heading of 178°, and at an indicated airspeed of 176 knots.

The New York Common Instrument Flight Rules Room (NYCIFRR) 3/ is programmed to display alpha-numerics 4/ and has the capability to identify and track discretely coded beacon targets by manual or automatic acquisition; however, AA 30 did not have automatic altitude reporting capability.

The approach controller stated that he advised AA 30 of the unidentified traffic as soon as he became aware of the primary target. The controller did not remember whether the primary target was visible on the radarscope prior to the time that the target was called as traffic for AA 30.

There was no other unidentified traffic in the immediate vicinity at the time of the collision. Because of the presence of other IFR traffic in his sector, the controller diverted his attention from AA 30

3/ New York area approach control facility.

4/ Used for automatic altitude reporting.

after issuing the traffic advisory and consequently, did not observe the primary (N60942) and secondary (AA 30) targets merge on the radarscope. He could not recall being able to detect the primary target after he was advised of the collision by AA 30.

Post-mortem medical examination of the occupants of the Cessna 150 disclosed no evidence of physical incapacitation prior to the collision.

Laboratory analysis of an instrument flying hood (visor type) found in the wreckage disclosed that it contained hair and blood samples which matched the hair and blood type of the student pilot.

ANALYSIS

The collision between the Boeing 707 and the Cessna 150 occurred within controlled airspace which extends upward from 700 feet above the surface of the earth.

The Cessna pilot was unrestricted as to his choice of headings since there was no requirement to maintain an altitude appropriate to the direction of flight when conducting VFR operations below 3,000 feet above the surface.

Federal Aviation Regulation 91.105, current at the time of the accident, required 3 miles flight visibility and distances from clouds of 500 feet below, 1,000 feet above, and 2,000 feet horizontally for VFR operations within controlled airspace.

The Board is aware that, without a point of reference, a reasonable estimate of in-flight visibilities is difficult, particularly when a pilot is conducting local operations based on surface visibilities which are obviously well in excess of VFR minimums.

The weather observer at Newark Airport reported the cloud ceiling as it was measured by the ceilometer at the time of the observation. Considering the broken cloud condition there could have been a significant variation between the cloud ceiling over the weather station and the cloud ceiling over the accident site some 18 statute miles distant.

Because of these factors, as well as the disparity in the weather assessments by those individuals from whom statements were obtained subsequent to the accident, the Board is unable either to ascribe a specific altitude or to ascertain the specific distance the Cessna pilot was maintaining from clouds when the collision occurred.

Examination of the altitude trace on the flight data recorder graph of the Boeing 707, indicated that the collision occurred at an altitude of about 2,975 feet. Postaccident examination of the Pitot static systems

for the flight data recorder and the cockpit instruments showed that both systems are accurate within + 100 feet. This indicates that the Boeing 707 crew did not deviate from the assigned altitude of 3,000 feet.

Although the New York Approach Control facility is programmed to display alphanumerics, the Boeing 707 did not have automatic altitude reporting capability. Consequently, the approach controller relied upon the pilot of the Boeing 707 to maintain the assigned altitude of 3,000 feet.

The presence of hair and blood on the Cessna 150's instrument flying hood which matched those of the student pilot suggests the probability that he was operating under the hood at the time of the collision. The current integrated method of flight instruction introduces the student pilot to flight by instrument references beginning with his initial training flight. The attention of the instructor was probably divided between monitoring the performance of the student and scanning for other traffic. The instructor's forward visibility would not have been obstructed by the instrument flying visor worn by the student.

Whereas some FAA General Aviation District Office personnel were aware of the existence and location of the student training area, as designated by Linden Flight Service, Inc., Air Traffic Service personnel had not received notification of those facts prior to the accident. The Board considers that establishment of a student training area in an approach path to a major airport is not commensurate with safe operating practices.

The weakness of the see-and-avoid concept of collision avoidance has been illustrated once again by this accident. The collision hazard between IFR and VFR traffic operating in controlled airspace was critical in this instance as a result of marginal flight visibility.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the inability of the crews of both aircraft to see and avoid each other while operating in a system which permits VFR aircraft to operate up to 3,000 feet on random headings and altitudes in a congested area under conditions of reduced visibility. An additional causal factor was the designation of a student flight training area in a congested control area under marginal flight visibility conditions.

RECOMMENDATIONS

The Board on November 16, 1971, recommended that the FAA establish procedures whereby all operators of civil flying training schools will

formally advise appropriate FAA personnel of the locations and dimensions of their designated practice areas and, additionally, that such information be disseminated to all affected services within the FAA. (See Attachment 2.) The Safety Board further recommends to all pilots that visibility and separation from cloud distances should be assessed conservatively in VFR operations, and that VFR flight should be continued only when visibility is unquestionable.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JOHN H. REED
Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ LOUIS M. THAYER
Member

/s/ ISABEL A. BURGESS
Member

William R. Haley, Member, did not participate in the adoption of this report.

July 3, 1974

Crew Information

American Airlines Flight 30

Captain Robert W. Harrington, aged 52, possessed Airline Transport Pilot Certificate 90388-41 and was type rated in Boeing 707 aircraft and several other transport aircraft. Captain Harrington held a first-class medical certificate, dated December 17, 1970, with the limitation that he wear correcting glasses for near vision while operating an aircraft. He was wearing these glasses at the time of the accident. Captain Harrington's total flight time prior to the accident was 17,300 hours, of which 2,100 hours were in Boeing 707 aircraft.

First Officer William H. Williams, aged 36, possessed Airline Transport Pilot Certificate 145186 and was type rated in Boeing 707 aircraft and several other transport aircraft. First Officer Williams held a first-class FAA medical certificate, dated September 8, 1970, with no limitations. Prior to the accident, he had accumulated a total of 4,400 hours of flight time, of which 1,798 hours were in Boeing 707 aircraft.

Flight Engineer George R. Isley, aged 31, held Flight Engineers Certificate 1727481 and was rated in turbo-jet aircraft. Mr. Isley also held Commercial Pilot Certificate 1563038. His first-class FAA medical certificate was issued October 15, 1970, with no limitations. At the time of the accident Flight Engineer Isley had accumulated a total flight time of 3,287 hours, of which 1,127 hours were in Boeing 707 aircraft.

Cessna N60942

Mr. William K. Squires, aged 43, right seat occupant of the Cessna 150, held Commercial Pilot Certificate 1150231 with airplane single- and multiengine land, instrument and flight instructor ratings. Mr. Squires held a second-class medical certificate dated July 16, 1970, with the limitation that he wear correcting glasses while exercising the privileges of his airman's certificate. At the time of the accident Mr. Squires had accumulated a total flight time of 1,215 hours, 383 of which were in Cessna 150 aircraft.

Mr. Edmund Ascolese, aged 18, was the left seat occupant of the Cessna 150. He was receiving dual instruction prior to solo. Mr. Ascolese was in his fifth hour of dual instruction at the time of the accident.

UNITED STATES OF AMERICA
NATIONAL TRANSPORTATION SAFETY BOARD
 WASHINGTON, D.C.

ISSUED: November 16, 1971

Adopted by the NATIONAL TRANSPORTATION SAFETY BOARD
 at its office in Washington, D. C.
 on the 21st day of October 1971

 FORWARDED TO:)
 Honorable John H. Shaffer)
 Administrator)
 Federal Aviation Administration)
 Washington, D.C. 20591)

SAFETY RECOMMENDATION A-71-58

Our investigation of the midair collision between the American Airlines Boeing 707, and the Cessna 150, over Edison Township, New Jersey, on January 8, 1971, disclosed that there was a lack of coordination among Air Traffic Service, the General Aviation District Office, and the civil operators of the pilot training school (which owned the light aircraft) relative to the establishment of the practice area for student flight training. Consequently, IFR aircraft were routinely vectored, and VFR flight training operations were being conducted simultaneously within common airspace.

The Board believes that, because of this lack of coordination, an unwarranted hazard was created for all of the parties involved in the accident.

We have reviewed your Facility Management Handbook 7210.3, Part I, Chapter 3, Section 3, dated October 1, 1969, and have found that this directive is not sufficiently definitive relative to the establishment of procedures for coordination between pertinent Federal Aviation Administration operational authorities and nongovernment authorities.

In view of the above, the Board recommends that:

The Administrator establish procedures whereby all operators of civil flying training schools will formally advise appropriate Federal Aviation Administration authorities of the locations and dimensions of designated practice areas for student flying training, and that such information be disseminated to all affected services within the FAA.

This recommendation will be released to the public on the issue date shown above. No public dissemination of the contents of this document should be made prior to that date.

Reed, Chairman; Thayer and Burgess, Members, concurred in the above recommendation. Laurel and McAdams, Members, were absent, not voting.

/s/ John H. Reed
By: John H. Reed
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20590



OFFICE OF
THE ADMINISTRATOR

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26 NOV 1971

Honorable John H. Reed
Chairman, National Transportation
Safety Board
Department of Transportation
Washington, D.C. 20591

Dear Mr. Chairman:

Thank you for forwarding National Transportation Safety Board *Safety Recommendation A-71-58*, recommending the establishment of procedures for the reporting and coordination of practice areas used by all civilian flying schools for flight training.

We question that a regulation to restrict flight training, in either general or air carrier operations, to specified areas would be feasible or enforceable. Most pilot training is now operational in nature, rather than drill on flight test maneuvers, so less than half the flight training conducted can be adequately conducted in practice areas. This is especially true of instrument flight instruction, and the increasing training now being conducted by air taxi, commercial, and executive operators.

As a matter of fact, we are advised that the Cessna cited in your safety recommendation was on an instrument training flight, which undoubtedly involved the use of radio navigation or approach aids. We estimate that more than one-half of the private, commercial, and instrument pilot training consists of cross-country, airport traffic pattern operations, and IFR flight procedures instruction. None of these are appropriate to an assigned area away from normal enroute air traffic lanes.

Our General Aviation District Offices regularly request certificated pilot schools to post and report the flight training areas they use for instructional and practice flights on flight maneuvers. These are coordinated by the school operators with other schools in the area, and

with Federal Aviation Administration air traffic facilities directly affected, such as an approach control in neighboring terminal areas.

We propose to continue to advocate the posting of areas for local training flights by certificated pilot schools and other large flight training agencies, and to coordinate these areas with airport arrival and departure routes. However, we should bear in mind that a majority of civil pilot training is conducted by certificated flight instructors not affiliated with a certificated training school. Therefore, it would not be feasible to establish discrete training areas for each certificated flight instructor.

Sincerely,

(signed)

J. H. Shaffer
Administrator



DEPARTMENT OF TRANSPORTATION
NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20591

OFFICE OF
THE CHAIRMAN

Apr 3, 1972

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Honorable John H. Shaffer
Administrator
Federal Aviation Administration
Washington, D. C. 20591

Dear Mr. Shaffer:

This is in acknowledgement of your letter dated November 26, 1971, replying to the National Transportation Safety Board's Recommendation A-71-58.

That safety recommendation was not intended to restrict those training operations which are conducted by air taxi, commercial, and executive operators; nor was it intended to limit instrument training operations by general aviation and air carrier operators.

The student pilot who was flying the Cessna, cited in our earlier letter, was in his 5th hour of flight training and was engaged in a local training flight of the type associated with basic visual and instrument flying techniques. He would not have been conducting any instrument training activities associated with en route or terminal instrument training procedures, and he did not have to be on the approach paths to a major terminal area to practice the specific maneuvers he was engaged in at the time of the accident.

We recognize that more than one-half of the private, commercial, and instrument pilot training consists of cross-country, airport traffic pattern operations, and IFR flight procedures instruction. However, it is the remaining portion of pilot certification flight training which causes us concern, since the maneuvers involved, as in the instant case, are practiced generally in locally designated training areas. We believe that these local training areas should be separated from the approach paths to major terminal areas to reduce the risks of conflicts of the type that resulted in this accident.

Your letter states that the use of local training areas is routinely coordinated with affected GADO's and ATC facilities. However, our investigation disclosed that the Federal Aviation Administration air traffic facility directly affected had no knowledge of the existence of the

Honorable John H. Shaffer

locally designated training area when the accident occurred. For this reason, we still believe you should review your procedures to verify that this was only an isolated deviation from standard practice.

We hope that this information will clarify the intent and purpose of our recommendation and that you will reconsider the need to establish procedures whereby all operators of civil flying training schools will formally advise appropriate Federal Aviation Administration authorities of the locations and dimensions of designated practice areas for this phase of student flying training. Such notification should make it possible for affected ATS units to discuss the propriety of such proposed training areas with the party submitting the proposal in the light of established terminal approach and departure routes.

Sincerely yours,

Original signed by
John H. Reed

John H. Reed
Chairman