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CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: December 3, 1954 Released: December 8, 1954

AMERICAN AIRLINES, INC., AND U. S. NAVY, COLLISION NEAR PORT COLUMBUS AIRPORT, COLUMBUS, OHIO, JUNE 27, 1954

The Accident

American Airlines Flight 572, a Convair 240, N. 94236, and a United States Navy SNB, Bureau Number 23773, collided 0.6 mile east of the Port Columbus Airport, Columbus, Ohio. The collision occurred at 2015,1/ June 27, 1954, while both aircraft were on final approach to runway 27. The SNB caught fire at impact, crashed and burned, fatally injuring the only two occupants and destroying the aircraft. The Convair continued its approach and landed. During the landing roll the Convair nose gear collapsed and the aircraft slid along the runway on its nose section. None of the 32 passengers, including 1 infant, or 3 crew members was seriously injured. Two small fires in the Convair were quickly extinguished; the aircraft received major damage.

History of the Flight

American Airlines Flight 572 of June 27, 1954, was a scheduled operation between Memphis, Tennessee, and Cleveland, Ohio, with intermediate stops, one of which was Columbus, Ohio. The crew assigned at Nashville, Tennessee, to continue the flight consisted of Captain J. C. Pollard, First Officer J. S. Myrick, and Stewardess M. J. Gunn. Weather conditions were good over the entire route and the flight was conducted in accordance with visual flight rules.

Departure from Dayton, Ohio, the scheduled passenger stop immediately prior to Columbus, was at 1952 with First Officer Myrick flying the aircraft from his right seat position. The aircraft was loaded to a gross weight of 37,664 pounds, 2,709 pounds less than the maximum allowable and the load was properly distributed. About 10 minutes after departure Captain Pollard, performing the duties of copilot, reported to the company radio that he was "in range," and advised he was changing to the Columbus Tower frequency, 121.1 mc. At approximately 2007 the flight contacted the tower advising it was about 6 miles west of the Hilliard fan marker (located 12 miles west of the airport). The tower gave landing information and approved a requested right traffic pattern to runway 27. The flight, at reduced power, began a shallow descent from its cruising altitude of 3,000 feet m. s. l. Its flight path was slightly north of the fan marker and slightly north of the business district of Columbus at an indicated airspeed of 185 knots. First Officer Myrick established a downwind leg 1,200 feet above the ground and approximately 2-1/2 miles northwest of the airport.

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

During the downwind leg the aircraft was slowed to approximately 160 knots with 16 degrees of flaps extended. The tower gave the flight a landing sequence of number 2 following a TWA Martin, Flight 377, which was then making a straight-in approach to runway 27.

In order to establish a normal interval behind Flight 377, First Officer Myrick extended the downwind leg until approximately opposite the TWA Martin. He then began a right descending turn for the approach to the runway. The turn was made gradually slowing the aircraft to 140 knots during the turn. The turn was completed about 850 feet above the ground and about 3-1/2 miles east of the runway threshold. The approach was made in a normal descent and with a continuous reduction of airspeed. The average airspeed for the approach was about 135 knots. When approximately 0.6 mile from the runway and about 300 feet above the ground the crew felt a violent jar and simultaneous yaw of the aircraft to the left. Captain Pollard took control, noticing the left engine was stopped. Together with First Officer Myrick he realigned the aircraft with the runway and landed.

During the landing roll the Convair nose gear, damaged at impact, collapsed and the aircraft continued approximately 4,200 feet on its nose and main gear before stopping on the runway on a heading of 280 degrees.

Stewardess Gunn opened emergency exits at seats 5, 9, and 17, located on the right side of the cabin, and opened the rear service door. Captain Pollard released the forward passenger door but because the nose section of the aircraft was resting on the runway the exit could not be used until First Officer Myrick evacuated through the right cockpit window and pulled the exit stairway ramp outward from the aircraft, thus permitting this exit to be used for passenger evacuation. Stewardess Gunn pulled the emergency rope from its location above the rear service door and dropped it through the opening. Evacuation was then carried out with 16 passengers using the emergency rope, 2 the seat exits and 13 the forward passenger door. The infant was dropped through the rear service door into the arms of a passenger on the ground. The evacuation was accomplished in an expeditious and orderly fashion with only minor injuries resulting to 10 passengers and the stewardess who received rope burns on their hands while sliding down the emergency rope. The emergency evacuation chute, located on the side of the rear service door, was not utilized.

Two small friction fires, one located in the nose wheel well and one in the forward baggage compartment, were quickly extinguished by ground emergency crews alerted by tower personnel before the aircraft had touched the runway and on the scene immediately.

The afternoon of the same day a Navy SNB, 23773, a twin Beech, was dispatched from the Port Columbus Naval Air Station in accordance with Naval training procedures to be flown to Vandalia, Ohio, West Lafayette, Indiana, and return. The flight departed at 1701 under a VFR (visual flight rules) flight plan and arrived at Vandalia at 1727 where one passenger was discharged. The flight continued to West Lafayette where it landed after an uneventful flight. Lieutenant Commander J. Reno, the pilot for this segment,

left the flight. With Lieutenant Commander J. R. Hoerath, as pilot, and Lieutenant Commander D. Edgar, as observer, Navy 23773 departed West Lafayette at 1902 for the return flight. The flight averaged about 150 knots groundspeed and at approximately 2009, when over downtown Columbus, it called the tower for landing information using frequency 142.74 mc. The tower advised the flight to use runway 27. Shortly thereafter the SNB requested and was granted permission to use runway 30 subject to traffic. Navy 773 was observed by the tower controller to enter the downwind leg of a left traffic pattern for runway 30 and was later sighted on base leg for that runway about 2 miles southeast of the tower. The SNB was then advised by the tower controller to follow TWA Flight 377 on runway 27 or make one circle of the field. The SNB turned right, reported it was on downwind for runway 27. It later reported on base leg for that runway and was then advised to continue its approach. The SNB and Convair were soon thereafter seen about 2 miles east of the airport on final approach to runway 27, at which time they appeared to the controller to be close to each other but with the SNB apparently to the right, to the rear and below the Convair. The SNB was instructed to make a three sixty or circle the airport. The landing gear of the SNB was seen to retract and it appeared to make a shallow left turn just before the collision.

Investigation

The investigation and subsequent hearing revealed that at the time of the accident there were three controllers on duty in the tower. A fourth man, a CAA terminal area operations specialist from the New York regional office, was in the tower for the purpose of leaving his local contact point but had no control duties. The regular controllers reported at 1600 for a normal 8-hour shift. Local control, flight data, and ground control were manned as primary positions and under routine procedure they were rotated about every two hours. The local controller had assumed that position approximately 45 minutes before the accident.

Under procedures for the control of air traffic the local controller is responsible, among other things, for the issuance of clearances and information to pilots of aircraft for the purpose of preventing collision between aircraft in the traffic pattern.2/

The Port Columbus Airport served the flying operations of the Naval Air Station located on the field, commercial operations, and North American Aviation production test flights, as well as transient and private flying. The tower personnel were therefore required to control many types of aircraft and regularly approved several types of traffic patterns such as overhead, left, right, and straight-in as permitted by Civil Air Regulations.3/ The personnel on duty were well qualified and thoroughly experienced in this situation. During the critical accident period the tower local controller was busy with ground and air traffic; during the period he made 28 transmissions and received about 43 replies from aircraft, all within 8 minutes before the collisio

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3/ See Civil Air Regulations 60.18.

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The tower was located in the southeast corner of the airport and the runways were as shown in attachment A. Several qualified witnesses stated that the tower was considered marginally adequate. They stated it was originally constructed as a weather observation tower and was not as high as desirable. The windows consisted of approximately 140 small panes of glass with divisions between each. There were eight one-foot wide concrete support columns equally spaced around the octagon-shaped structure and one large solid entrance door in the south wall. A radar installation covered with a canvas tent had been added to the tower several months before the accident. These conditions required the local controller, whose position faced north, to stand and move continuously while observing airport traffic. At the time of the accident a new tower was being constructed.

Investigation revealed that transmissions to the American flight were conducted on 121.1 mc. and to the Navy flight on 142.74 mc., both VHF (Very High Frequency). Jet traffic taxiing used 257.8 mc., UHF (Ultra High Frequency). The local controller transmitted simultaneously on these frequencies thereby enabling the subject crews to hear all transmissions from the tower. The American and SNB crews, however, transmitted on different frequencies to the tower and were thus unable to hear one another. This communications arrangement required the local controller to advise taxiing aircraft using UHF because the ground controller, usually performing this duty, did not have the necessary UHF transmitter available at his position. A recording device was incorporated at the local control position so that all transmissions he made were recorded. The recording was one way, from tower to aircraft.

During the public hearing the tower local controller stated that after having approved the Navy request to use runway 30 for landing, subject to traffic, he first sighted that aircraft when it reported entering downwind leg for runway 30. The controller observed the aircraft flying southeast about 1,500 feet above the ground approximately 2 miles south of the tower, a normal downwind position. The controller answered the report as follows: "Seven seven three, continue approach for runway three zero. Traffic is on final approach and also on right-hand downwind for runway two seven. I'll get you in on three zero as soon as practical." This transmission was then acknowledged. At this time the controller stated that American 572 was northwest of the airport entering right-hand downwind for runway 27 and that TWA Flight 377 was about 5 miles due east making a straight-in approach for runway 27 for which it had been previously cleared. This flight followed a DC-3, 12F, then well ahead on final approach for the same runway.

The American Convair crew testified that they were entering downwind or had turned onto downwind when TWA reported over the outer marker (6.2 miles east of the threshold of runway 27). The American crew sighted TWA immediately thereafter just inside the outer marker.

The next pertinent transmission from the tower was to American when the flight was on its downwind leg for its right-hand approach pattern. The tower instructed the flight as follows: "Five seventy-two will be number two to land on runway 27, traffic is a TWA Martin about three out ..."

The Navy flight then reported that it was on base leg for runway 30 and the controller testified that this call, to his best recollection, included a report that the aircraft landing gear was down. He stated that at this time he saw the aircraft flying northeast about 2 miles southeast of the tower, a normal base leg for runway 30. This Navy report was answered by the controller as follows: "Navy seven seven three, I have you in sight. I suggest that you follow the TWA Martin or make one circle of the field. I have traffic taxiing on runway 30 and two on downwind for that runway." The controller testified that he meant on downwind for runway 27. The Navy flight acknowledged his transmission advising it was on downwind for runway 27. The controller continued, "Continue your approach for runway 27, seven seven three." In explanation of these instructions the controller said it was no longer feasible to continue the SNB to runway 30 because that runway and runway 27 intersect and spacing of these aircraft was insufficient to enable either to clear the intersection before the other landed as required by controlling procedures. He also said there seemed to be adequate spacing for the Navy flight to land after the TWA aircraft before American 572 because 572 was still eastbound north of the tower on its right pattern downwind leg. The controller stated he expected and planned for the SNB to follow TWA from its observed position rather than turn right and establish a downwind leg for runway 27. He observed the SNB, about 800 feet above the ground, turn right about 30 degrees for the downwind leg. The controller did not advise the American flight of his instructions given the SNB to follow TWA because he stated it was then necessary to turn, view the TWA flight about 1-1/2 miles east of the threshold, and clear it to land.

The SNB flight then reported that it was on base leg for runway 27. The controller was unable to locate it visually although other tower personnel helped at his request. He advised the aircraft to continue its approach. The controller stated that at this time he was unable to revise the existing sequence because the SNB was not in sight. Shortly after the SNB's base leg report the Convair was observed to make a right turn to the south for its base leg. At this time the controller stated he did not offer advisory information or instructions to either aircraft although he knew, by radio report, the SNB was on base leg and the Convair, by visual observation, was on base leg. He stated that he did not revise the existing sequence at this time, again because the Navy aircraft was not in sight and he felt that by altering either aircraft's position with instructions might create a hazard. At this time the controller did not ask the SNB for its position or ask the Convair if it had the SNB in sight but instead issued taxi instructions to aircraft on the airport.

The controller next observed the SNB on a final approach about 250 feet above the ground, and approximately 2 miles east of runway 27. At the same time it appeared to him to be below, to the right, and behind the Convair. He made the following transmission, "Navy seven seven three, I have two aircraft on the final approach, one is American Convair high and you appear to be slightly behind and to the right, is that correct?" The witness stated the Navy crew transmitted, "Roger (or affirmative) I have him in sight, shall I go around?" The controller then said, "Navy seven seven three, affirmative, make a three sixty or make a circle of the field and follow the American Convair." The controller stated the SNB appeared to be sufficiently behind the Convair that collision did not seem imminent. He then cleared the

American flight to land and saw the SNB's landing gear retract. The witness believed 20 to 25 seconds passed between the circling instruction and the collision which followed.

The investigation included an exhaustive search for eyewitnesses to the accident. Many saw both aircraft during final approach and saw them collide. The witnesses observed the accident from four locations. Two boys, composing the first group, were located about 2 miles east of the runway threshold. They saw both aircraft during the last portion of their turns onto the final approach. They stated the Navy plane was ahead of and lower than the airliner. Those of the second group were at positions varying between 3/4 and 1-3/4 miles directly east of the runway threshold. Several of this group saw the aircraft pass nearly overhead on the final approach and at that time stated the SNB was below the Convair and slightly to its right. These witnesses were in conflict as to which aircraft was ahead; however, the majority stated the SNB was ahead. The third group was located near the east end of runway 27. This group was mainly composed of air crews who were in aircraft waiting to taxi or take off and who saw the aircraft which collided coming nearly directly toward them. When these two aircraft were first seen these observers stated that the Convair was 200 to 300 feet above the SNB and that the SNB appeared to be to the right and behind. Several of these witnesses saw the landing gear of both aircraft extended. They then saw the SNB gear retract, the aircraft climb slightly, begin a left turn with the collision following immediately thereafter. The last group of witnesses was located in or near the tower. They were in accord that when first sighted the Navy aircraft was lower than normal for its position approximately 2 miles east of the runway on approach, and was 300 to 400 feet below the Convair. The SNB flew nearly straight and level while the Convair descended normally. These persons stated that the SNB appeared well behind and slightly to the right of the American flight. Several witnesses from all positions observed that the Convair's position and anti-collision (a red flashing light located on top of the vertical stabilizer) lights were on; however, none noticed whether or not the SNB's position lights were on.

In the course of investigation three incandescent position lamps were recovered from the SNB, one from the fuselage position and two from the tail light unit. These lamps were sent to the National Bureau of Standards to determine if the lights were on or off at the time of the collision. All filaments were broken when examined. The fuselage lamp, a 2-filament type, indicated that at least one of the filaments failed with voltage applied to it, however, it could not be determined whether failure occurred during the accident or at some other time prior to the accident. The other filament and the filaments from the tail lamps presented no conclusive evidence regarding whether or not these lights were on or off at the time of failure. As a result it could not be determined from the laboratory examination whether or not the SNB lights were on or off at the time of the inflight collision.

The TWA crew stated that at the time the SNB was instructed to make a three sixty or go around they had just landed and saw the collision immediately after clearing the runway.

The American crew stated that while in the Port Columbus traffic pattern they were aware that an SNB was being controlled as airport traffic. They believed it was going to land on runway 30 and did not know it had been changed to runway 27. The crew testified that they were fully cognizant of their visual responsibilities under VFR conditions.4/ Although they stated that they maintained a careful lookout the SNB was never seen.

The official weather report at the time of the accident was: scattered clouds at 20,000 feet, visibility 15 miles, wind north at 6 m. p. h. Official sunset was 2005, 10 minutes before the accident.

The accident occurred during twilight when the sun was below the horizon and a rapid transition was taking place between daylight and darkness. Witnesses varied in their estimates of the existing visibility from 3 to 15 miles. All pilots who were flying at this time agreed that vertical visibility was decreasing with approaching darkness and that it was becoming increasingly difficult to see objects from above. The existing light above the horizon permitted aircraft flying above it to be easily seen in all directions but somewhat easier in the western quadrant.

The most significant of the many inflight impact markings was a series of six propeller cuts in the left wing of the SNB. The structural integrity of the wing was so affected by the cuts to cause the left wing outer panel to separate in flight. This portion of the wing was found east of the main wreckage area. The cuts progressed forward from the left wing trailing edge across the left engine nacelle centerline. Study of the individual cuts disclosed that in each case the cut was made inboard to outboard with downward directional indications at the start of the cuts and upward directional indications at the outboard end. Further study revealed the cuts were made by the left Convair propeller while it was passing forward over the wing. The pattern of the propeller damage indicated that the aircraft closed both laterally and vertically; both closures were at small acute angles.

The Convair nose gear drag link was fractured by forces mainly in a rearward direction. Although not conclusive, evidence indicated the nose gear tire struck the SNB in the area of the right wing center section and right nacelle. Gash marks and impressions on the sidewall and rim of the left Convair nose wheel appeared to have been inflicted by a glancing blow of the SNB right propeller, a tip of which was found east of the wreckage area.

Although the SNB reported no difficulty careful examination was made to ascertain if any structural or mechanical failure occurred prior to the collision. From the damaged components there was no evidence found to indicate that structural or mechanical failure occurred prior to impact. The American crew substantiated that the Convair was operating normally prior to impact.

The investigation included a careful study of the flight paths and position reports of the four principal aircraft which were flying in the Port Columbus traffic pattern during the accident period. These factors together with witness testimony were incorporated into an engineering study, attachment A, and indicate the probable flight paths of the aircraft which collided

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4/ See Civil Air Regulations, Part 60, Sections 60.12, 60.14, 60.15.

as well as the TWA Martin and the Douglas DC-3 which preceded them. Considering all available data and the probable flight paths a study was made to determine so far as possible the visual limits of each crew member afforded by the cockpit structure of the Convair and SNB. The limits were applied to each crew member throughout the last two minutes of the flight path in consideration of the aircraft attitudes. It was learned that the SNB first entered the cockpit angular limits of vision for the Convair captain when the Convair was on the base leg. At this time the SNB was approximately 40 degrees to the right of the Convair's longitudinal axis and was about 3 miles away. The SNB remained within the visual limits of the captain's position until both aircraft were on the final approach and the Convair was approximately 1/2 mile behind the Navy aircraft. The total time that the SNB was in the visual limits of the captain's position was approximately 1-1/4 minutes. At the start of this period the SNB blended into the horizon and then continued below it for the remaining time.

The SNB first entered the visual limits afforded from the seat of the Convair first officer shortly after he had begun the turn from the downwind leg onto the base leg. When the turn was begun the SNB was approximately 90 degrees to the right of the Convair's longitudinal axis and was about 3-3/4 miles away. The SNB remained within visual limits of the first officer's position except when momentarily obstructed by two vertical windshield formers until the Convair was approximately 1/2 mile behind the SNB on the final approach. The total time during which the SNB was within the visual limits was about 1-1/2 minutes. At the beginning of this period the SNB blended with the horizon and then continued below it for the remaining time.

The Convair first entered the visual limits afforded by the SNB's cockpit structure from the pilot's position immediately after the SNB started to turn from the downwind leg onto the base leg for runway 27. At this time the Convair was approximately 3 miles away at an angle of approximately 20 degrees to the left of the SNB's longitudinal axis. The Convair remained within the pilot's visual limits above the horizon approximately 15 seconds except when momentarily obstructed by a windshield former. At the end of this time the Convair was about 30 degrees to the right and was approximately 2 miles away and the SNB had progressed to and was on the base leg.

The Convair first entered the visual limits afforded from the observer's seat immediately prior to the start of the turn onto the base leg. At this time the Convair was approximately 70 degrees to the left and was about 3-3/4 miles away. The Convair remained above the horizon from this position and was within the visual limits of the observer approximately 1/2 minute except when obstructed by two windshield formers and upper cockpit structure for about 15 seconds. At the end of this time the Convair was approximately 30 degrees to the right and was about 2 miles away. The SNB was then on the base leg at which time the opportunity to see the Convair terminated as the Convair was obscured by the SNB cockpit structure and was behind the crew's visual limits. The 15 second period during which the Convair was within the cockpit visual limits occurred nearly simultaneously for both crew members.

Three days after the accident, at approximately the same time of day as the accident, several preplanned flight tests were conducted. These tests were made using an R5D (DC-4) and an SNB flying in general proximity, with the SNB varying its position, according to prearrangement, relative to the R5D. The R5D is somewhat larger than the Convair 240. Qualified ground observers positioned in the tower and on the airport watched, noting their impressions of the aircraft positions relative to one another while they were on the final approach. Although the SNB changed its position, including being ahead of the R5D, the observers concurred that the difference in sizes of the aircraft gave the illusion that the smaller was always behind. As the aircraft flew closer toward the runway the smaller aircraft appeared to also overtake the larger.

Analysis

It should be recognized that the engineering study of all the available evidence, "The Probable Flight Paths," contains certain variables. These variables which include altitudes, distances and airspeeds were carefully considered and the flight paths as shown are the most accurate commensurate with the physical evidence and testimony.

In determining whether or not the crews of the two aircraft should have observed the other, several other factors must be considered. The first is the angular limits of cockpit vision. This factor is the opportunity to see an object afforded by the physical cockpit structure only. A second factor is visual range. This is the maximum distance at which an object can be seen. This distance is influenced by variable factors including contrast of the object and background, its angular size and shape, the degree of lighting and atmospheric visibility. Finally, the physiological factors affecting the ability of a human being to see an object must be considered. It can be expected a person may best see an object when it is within the angular limits of his sensitive or focal field of vision, 1 to 2 degrees wide. An object will also be seen through the peripheral portion of the eye if there is sufficient movement or contrast, otherwise it is necessary to search for the object.

As shown by investigation the SNB crew's opportunity to observe the Convair existed while the SNB was turning from the downwind leg onto the base leg and for a portion of the base leg. This opportunity existed nearly simultaneously for the crew members and lasted approximately 15 seconds during which the Convair was high on the windshield for both the pilot and the observer. During this time, however, had the SNB crew looked in the direction of the Convair, then on the base leg, they should have seen both the Convair's anti-collision light and the aircraft itself which were clearly visible above the horizon under the existing light conditions. During the last part of base leg the opportunity to see the Convair terminated and it was not possible again to see it.

From only the standpoint of cockpit angular limits of vision the Convair crew was first in position to see the Navy aircraft when the Convair was turning onto the base leg. In respect to the Captain the SNB remained within visual limits from this time until the Convair was on final approach and was

approximately 1/2 mile behind the SNB. The Navy aircraft remained within the visual limits of the first officer's position throughout this period and until the Convair was approximately 1/2 mile behind the SNB on the final approach. While the SNB turned onto the base leg and then onto the final approach it descended until it was approximately 250 feet above the ground and when first seen by witnesses, on final approach, it was estimated to be as low as 200 feet. While the American flight was on its base leg considering the factors affecting visual range (threshold visibility factor, the dark terrestrial background. the fading light condition, the size and the view presented by the SNB) it is considered improbable that the SNB, which was below the horizon could have been seen from above by the Convair crew. When on the final approach had the Convair crew scanned ahead within the cockpit visual limits, the target presented by the SNB was within their focal field of vision. Although during the first part of the Convair final approach the SNB was low, against a poor background, and with little relative motion or contrast to attract the attention of the Convair crew, it was also within visual range and could have been seen by the Convair crew under the existing conditions.

During the period when the flights which collided were being flown in the Port Columbus traffic pattern all transmissions made from the tower to them were "simulcast" (transmitted simultaneously on all frequencies then in use). This arrangement enabled the crews of both aircraft to hear all transmissions from the tower. Although many extraneous transmissions were made and only the transmissions from the tower could be heard, it is difficult to understand why the conflicting approach sequence, both to approach behind TWA Flight 377, was not heard by either crew. The conflicting approach clearances were pertinent to each flight and directly affected their traffic sequences. Had both crews maintained radio vigilance the conflicting instructions could have been detected and an immediate clarification requested. It is also difficult to understand why the American crew did not request from the tower the position of the SNB when they were searching for that aircraft and were unable to locate it.

It will be recalled that when the SNB reported on the base leg for runway 30, the tower controller observed the flight approximately 2 miles southeast of the tower. The controller, realizing that he could no longer continue the Navy approach to runway 30, advised it to follow the TWA flight on runway 27 or circle the field. This traffic control clearance was given without advising American of it or altering its sequence which was also number 2 to land after the TWA flight. The controller knew that the SNB was going to continue to runway 27 and not circle. This situation continued to exist unaltered until both aircraft were seen on final approach. Both aircraft were advised to take the same sequence from opposite sides of the traffic pattern onto a common approach path to the same runway.

The controller stated that the SNB did not follow his instructions as he had planned. Instead of following TWA 377 from its observed position it turned right, establishing a downwind leg for runway 27. In planning its spacing behind TWA it is believed the SNB crew necessarily took the action it did to establish a correct interval. The spacing which existed behind TWA on final approach was normal. If the SNB's action were not in accord with the controller's planning there was sufficient opportunity to issue other instructions to the SNB and to clarify the sequence between it and American 572. A

nonconflicting sequence should either have been given initially or the conflicting sequence revised immediately after the controller turned, viewed the TWA flight and cleared it to land.

The SNB then reported that it was on base leg for runway 27 but the tower personnel were unable to see it. At this time the controller advised it to continue its approach without asking its position or advising it that it was not in sight. No advisory information was given when the Convair was seen shortly thereafter to turn onto its base leg although the controller knew the Convair was being flown into an area where another aircraft was known, by radio report, to be operating. The controller stated he could not give instructions because the SNB was not in sight and any instructions might result in conflict between the two aircraft. The Board believes that advisory information should have been given alerting the crews to the situation. The Board also believes that when simultaneous left and right traffic patterns are being used the controller should assume greater responsibility for effecting traffic separation.

When both aircraft were sighted on the final approach the controller thought that the SNB was behind, to the right, and below the Convair. Considering reasonable speeds for the two aircraft, the physical evidence presented by the Convair propeller cuts in the SNB wing and testimony of some eyewitnesses positioned nearly below the aircraft, the Convair was then above and behind the SNB. The controller's error in judgment of relative distance was a normal reaction shared by the other tower controllers, pilots who were awaiting takeoff or taxi clearances, and confirmed by the experimental flight tests made after the accident under similar conditions. The error was caused by the difference in size of the aircraft when viewed at a considerable distance from nearly head-on angles under the fading daylight conditions. It is reasonable to assume that had the controller known the true positions of the aircraft he would have given other instructions which might have prevented the collision.

When the controller advised the SNB of its apparent position relative to the American flight the Navy flight reported that it had "him" in sight. Although the controller's information was clear, under the circumstances, it is believed the SNB crew misinterpreted it and responded with reference to the TWA Martin which, according to its crew, was just landing or on its landing roll when the information was given. In all probability the SNB crew mistakenly identified the Martin as the Convair; both are twin-engined aircraft and look very much alike.

Findings

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

1. American Airlines, its crew, and its aircraft were properly certificated and the flight was properly dispatched.

2. The Navy aircraft was properly dispatched in accordance with Naval procedures and its crew was qualified for the subject flight.

3. Both aircraft were properly maintained and there was no evidence of structural failure or malfunction prior to the collision.

4. The control tower was properly manned with certificated controllers.

5. The accident occurred in good weather, 10 minutes after official sunset.

6. When the accident occurred the SNB was making an approved left approach pattern to runway 27 and the American flight was making an approved right approach pattern to runway 27.

7. Both flights were advised to make their approaches following the same aircraft. This situation continued to exist unaltered until after both aircraft were on final approach.

8. The SNB was not observed by the tower after it established a downwind leg for runway 27 until it was sighted on final approach for that runway.

9. No advisory information was given either aircraft with respect to the other's position until after the SNB was observed in close proximity to the Convair on its final approach.

10. The controller's incorrect clearances, which permitted both aircraft to follow the TWA flight, should have been detected by the flight crews.

11. The SNB crew should have seen the Convair under the existing conditions while turning onto and for the first portion of its base leg.

12. The Convair crew should have seen the SNB through normal vigilance during the first portion of its final approach.

Probable Cause

The Board determines that the probable cause of this accident was a traffic control situation created by the tower local controller which he allowed to continue without taking the necessary corrective action.

A contributing factor was the failure of both crews to detect this situation by visual and/or aural vigilance.

BY THE CIVIL AERONAUTICS BOARD:

/s/ CHAN GURNEY

/s/ HARMAR D. DENNY

/s/ OSWALD RYAN

/s/ JOSH LEE

/s/ JOSEPH P. ADAMS

S U P P L E M E N T A L D A T A

Investigation and Hearing

The Civil Aeronautics Board was notified of this accident at approximately 2115, June 27, 1954. 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 Columbus, Ohio, on July 27, 28, and 29, 1954.

Air Carrier

American Airlines, Inc., is a scheduled air carrier incorporated in the State of Delaware with its principal offices in New York, New York. The carrier operates under a currently effective certificate of public convenience and necessity issued by the Civil Aeronautics Board, and an air carrier operating certificate issued by the Civil Aeronautics Administration. These certificates authorize the company to transport by air, persons, property and mail between various points in the United States, Mexico, and Canada.

Flight Personnel

American Airlines

Captain J. C. Pollard, age 33, held a valid airline transport certificate and rating for the Convair 240. Captain Pollard was employed March 12, 1943. He had a total of 7,032 flying hours of which 1,861 were in the Convair 240. He had completed his last instrument check January 11, 1954, and his last CAA physical examination March 18, 1954.

First Officer James S. Myrick, age 31, was the current holder of a commercial and instrument rating. He was employed by the company March 12, 1951. First Officer Myrick had accumulated 3,732 hours with 2,632 in the equipment involved. His last instrument check was March 18, 1954, and his last required physical January 27, 1954.

Stewardess M. J. Gunn was employed January 5, 1953. She had received an emergency procedures review November 12, 1953.

United States Navy

Lt. Comdr. John R. Hoerath, USNR, age 36, was designated a Naval Aviator July 23, 1942. At the time of the accident he was assigned to the Columbus Naval Air Station, Squadron VR 691. Commander Hoerath had 3,313 flight hours of which 118 were in the SNB. His last physical examination was completed September 10, 1953.

Lt. Comdr. Donald Edgar, USNR, age 48, occupied an associate billet in the Naval Air Reserve Transport Squadron 691, Columbus, Ohio. Commander Edgar was a qualified naval navigator.

The Aircraft

American Airlines

N. 94236, a Convair 240, was manufactured May 6, 1948, and delivered to American Airlines May 23, 1948. It bore manufacturer's serial number 69 and had accumulated a total of 12,337 flying hours. The aircraft was currently certificated by the Civil Aeronautics Administration. It was equipped with Pratt and Whitney model R-2800-83 AM4A engines and Hamilton Standard 43E60 propellers.

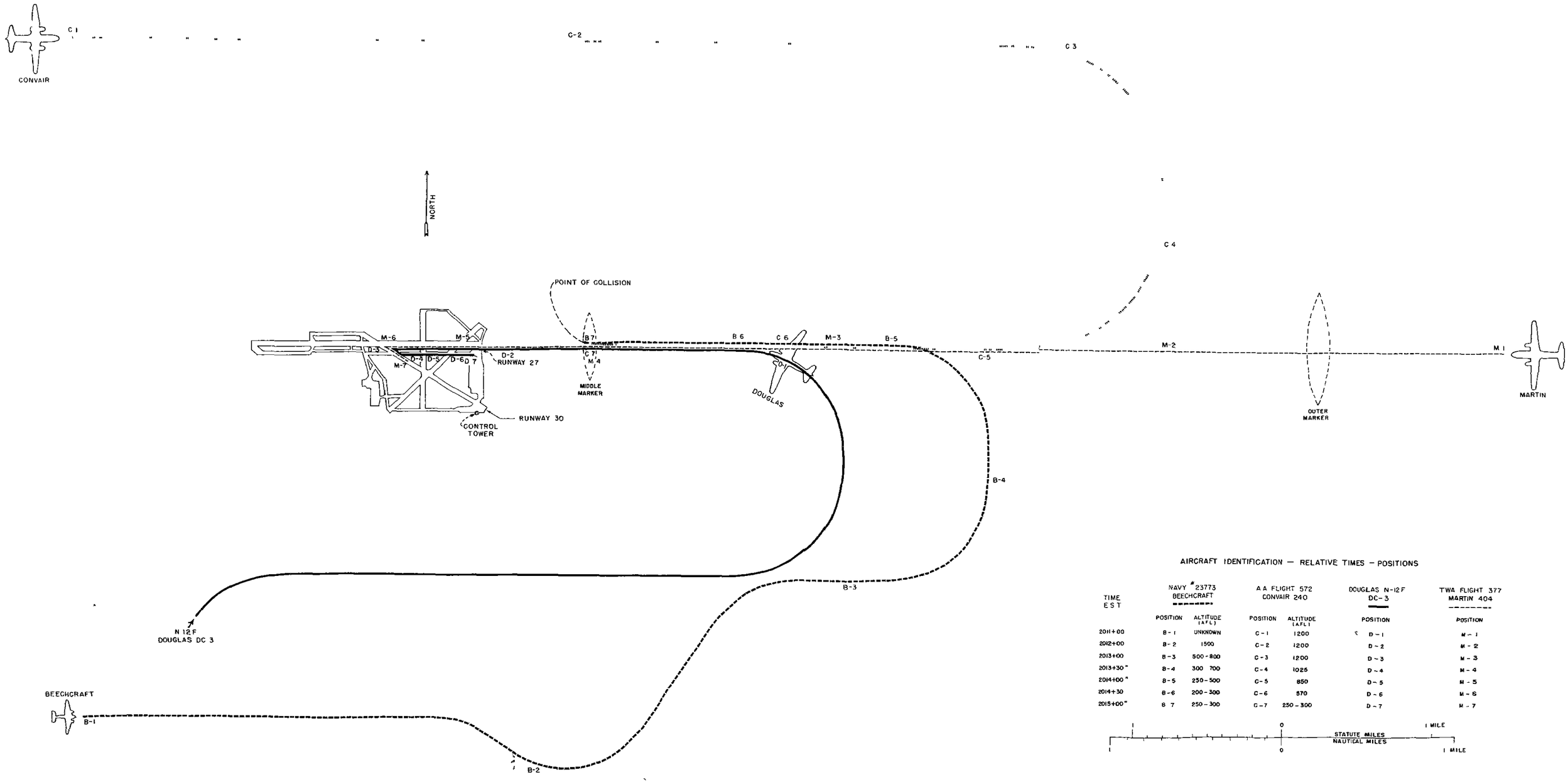
United States Navy

The Navy aircraft was a twin-Beechcraft SNB-B and bore Bureau Number 23773. The aircraft had a total of 2,028 flight hours and it was equipped with R-985-AN-14B Pratt and Whitney engines with Hamilton Standard Hydromatic propellers, model 22D30-201.

PROBABLE FLIGHT PATHS OF AIRCRAFT IN RELATION TO PORT COLUMBUS AIRPORT

JUNE 27, 1954

ATTACHMENT A



AIRCRAFT IDENTIFICATION — RELATIVE TIMES — POSITIONS

TIME EST	NAVY #23773 BEECHCRAFT		AA FLIGHT 572 CONVAIR 240		DOUGLAS N-12F DC-3	TWA FLIGHT 377 MARTIN 404
	POSITION	ALTITUDE (AFL)	POSITION	ALTITUDE (AFL)	POSITION	POSITION
2011+00	B-1	UNKNOWN	C-1	1200	D-1	M-1
2012+00	B-2	1500	C-2	1200	D-2	M-2
2013+00	B-3	500-800	C-3	1200	D-3	M-3
2013+30"	B-4	300 700	C-4	1025	D-4	M-4
2014+00"	B-5	250-500	C-5	850	D-5	M-5
2014+30	B-6	200-300	C-6	570	D-6	M-6
2015+00"	B 7	250-300	C-7	250-300	D-7	M-7

1 0 1 MILE
STATUTE MILES
NAUTICAL MILES
1 0 1 MILE