

AIRCRAFT ACCIDENT REPORT 

ADOPTED: August 15, 1962**RELEASED:** August 21, 1962

NORTHEAST AIRLINES, INC , VICKERS VISCOUNT, N 6592C, AND
NATIONAL AIRLINES, INC., DOUGLAS DC-6B, N 8228H, LOGAN INTERNATIONAL
AIRPORT, BOSTON, MASSACHUSETTS, NOVEMBER 15, 1961

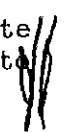
SYNOPSIS

On November 15, 1961, at approximately 1710 a.s.t., 47 minutes after sunset, a ground collision occurred at Logan International Airport, Boston, Massachusetts, between a National Airlines DC-6B, N 8228H, attempting a takeoff on runway 9 and a Northeast Airlines Viscount N 6592C, during its landing roll on runway 4R. National Airlines Flight 429 originated at Boston. Its destination was Norfolk, Virginia, with five intermediate stops. Northeast Airlines Flight 120 originated at Washington, D. C. Its destination was Boston, Massachusetts, with an intermediate stop at LaGuardia Airport, New York

There were no serious injuries to either the crew or passengers of the DC-6; however, four passengers of the Viscount received minor cuts and abrasions while deplaning. There was major damage to both aircraft.

As a result of this accident the Board recommended to the Federal Aviation Agency that consideration be given to requiring that all restrictive clearances or instructions issued by air traffic control be acknowledged by pilot repetition.

The Board determines that this ground collision accident occurred as the result of commencement of takeoff by National 429 without clearance.

Contributing factors were the failure of tower personnel to provide adequate surveillance of the active runways and to issue an appropriate warning message to the pilot of National 429 alerting him to the impending traffic confliction. 

Investigation

Northeast Flight 120, a Vickers Viscount, N 6592C, originated at Washington, D. C. Its destination was Boston, Massachusetts, with an intermediate stop at New York, New York. Scheduled arrival time at Boston was 1712.1/ The crew consisted of Captain Charles Liebman, First Officer Dwight E. Chapin, and Stewardesses Sandra Knehr and Janet Ostberg.

Northeast 120 departed from New York in accordance with Visual Flight Rules (VFR) for Boston at 1615. An instrument flight plan had been filed by the crew but was canceled prior to takeoff because of improved en route as well as terminal weather conditions. The gross takeoff weight of the aircraft was 56,137 pounds; this weight, together with the center of gravity of the aircraft, was within prescribed limits.

1/ All times herein are Eastern Standard based on the 24-hour clock.

Over Woonsocket, Rhode Island, the flight contacted company radio, reported in range, and received the latest Boston weather which was 3,000 feet scattered, 8,000 feet scattered clouds, visibility 12 miles; temperature 48°; dewpoint 42°; wind east-southeast 5 miles per hour; altimeter setting 30.23. At approximately 1701, Flight 120 reported to Boston Approach Control over Franklin intersection VFR, and was given information concerning the landing runway, wind direction and velocity, and the altimeter setting. Approach Control further advised the flight to contact the Boston Tower (local controller) when passing Blue Hills (a visual checkpoint). At approximately 1704, Flight 120 transmitting on 118.3 mcs., called the local controller reporting its position over Norwood, Massachusetts, and was advised to report passing the outer marker for a possible straight-in approach to runway 4R. At approximately 1707 the local controller initiated a call to Flight 120 and cleared it to land on runway 4R.

At approximately 1708.41 the Boston Local Controller advised Northeast 120 as follows: "No need to acknowledge, your turnoff is down at runway 33, the central's 2/ closed." The copilot, sitting in the right seat, was flying the aircraft and the captain was operating the radio and performing the duties generally assigned to the copilot. A normal landing was made, with touchdown at a point about 1,000 feet past the threshold of runway 4R.

At approximately 1709:36 2/, while on the landing roll on runway 4R, Northeast 120 and National 429 collided at the intersection of runways 4R and 9. The speed of the Northeast aircraft at the time of collision was estimated to be 80 knots. After the collision the Northeast Viscount lurched to the left. Full right brake, rudder, and aileron were applied but this did not correct the swerve to the left as the aircraft veered through the runway lights and came to rest approximately 1,000 feet beyond the runway intersection and approximately 90 feet to the left of runway 4R 4/. The aircraft was damaged in such a manner that the left wing outboard from the No. 1 engine nacelle and the empennage aft of Station 731 were severed from the aircraft. 5/ Although fuel poured from the ruptured tanks, there was no fire.

The Viscount was properly secured by the crew except for the No. 1 engine which the crew was unable to shut down. Eventually this engine was stopped by the injection of foam into its air intake by the Boston crash rescue crew.

A majority of the passengers evacuated the aircraft through the forward passenger door on the left side which was opened by the copilot. Since the No. 1 engine continued to run, the captain directed the passengers away from the turning propeller. Approximately 12 passengers deplaned by climbing from the severed empennage with the aid of a rope notwithstanding the fact that they were advised by the first officer that the forward door was available for exit. Four passengers deplaning from the rear of the aircraft received minor cuts and abrasions. The crew left the aircraft through the forward passenger door.

Testimony indicated a lack of concern or awareness of passengers to a dangerous situation. More concern was evidenced regarding the recovery of personal effects than to the urgency for rapid evacuation of the aircraft. Neither urging nor explanation by crew members seemed to convince the passengers that an emergency existed.

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- 2/ Central Taxiway
 - 3/ 17 minutes after the end of Civil Twilight
 - 4/ See Attachment No. 2
 - 5/ See Attachment No. 1

The crew of the Northeast aircraft stated that when approaching the outer marker they overheard American Flight 291 call the local controller for takeoff clearance and heard the controller reply as follows: "American 291 cleared for immediate takeoff or hold runway 9, traffic a mile and a quarter on final runway four right." They stated that it was this clearance to American 291 which alerted them to the fact that runway 9 was in use for aircraft taking off. They stated further that they saw American 291 taxi into position on runway 9, commence its takeoff roll, and cross the intersection of runways 9 and 4R. In addition, they also observed at least two other aircraft, one on either side of runway 9 in the runway position. Neither the captain nor copilot of Northeast heard a warning message from the control tower nor did they see the National aircraft in time to take evasive action.

National Flight 429, a DC-6B, N 8228H, originated at Boston, Massachusetts. Its destination was Norfolk, Virginia, with five intermediate stops. The crew consisted of Captain Clarence F. Hofer, First Officer Robert H. Harder, Flight Engineer Edward J. Nadeau, and Stewardesses Betty Jean Cataldo and Patricia Kikola. An Instrument Flight Rules (IFR) flight plan was filed by the crew for a flight to New York International Airport. Flight 429 was scheduled to depart from Boston at 1700 and arrive at New York at 1810. The gross weight of the aircraft was 77,578 pounds which was below the allowable takeoff weight of 91,260. The center of gravity of the aircraft was within prescribed limits.

At approximately 1700-05 National 429 contacted the Boston Ground Controller on 121.9 mcs. for taxi instructions and was informed that runway 9 was the takeoff runway. Flight 429 left the gate area and proceeded toward the takeoff runway.

Eastern Flight 471, one of several departing aircraft, taxied out ahead of National 429. American Flight 425 and American 291 were behind in that order. At approximately 1702, the Boston Ground Controller advised National 429 "Center can't seem to find your flight plan, what altitude did you request?" National 429 replied "8,000." One minute later National 429 was instructed to change to clearance delivery frequency on 121.7 mcs. to receive its Air Route Traffic Control clearance. National 429 made the required frequency change. Since National 429 was in the No. 1 position for takeoff and was waiting for IFR clearance, the first officer, at approximately 1706, transmitted the following message to the clearance delivery controller, "aircraft behind me are ready; would you like us to cross runway 9?" After the clearance delivery controller checked with the local controller, he advised National 429 as follows: "National 429 cross runway 9 and will work on your clearance with the Center." The flight proceeded to the south side of runway 9 where the aircraft was positioned at a 45-degree angle to the runway for completion of the pre-takeoff checklist.

American 425 moved into the position vacated by National 429. American 425 then called for and received clearance from the local controller on 118.3 mcs. to taxi into position and hold on runway 9. Seconds later American 425 was cleared for takeoff, and then departed. American 291 then requested takeoff clearance and was also instructed to taxi into position and hold runway 9. An instant later the local controller cleared American 291 for "immediate takeoff or hold runway 9, traffic a mile and a quarter on final - four right." American 291 departed at approximately 1708. After receiving its IFR clearance, National 429 changed to the local control frequency of 118.3 mcs. at approximately 1708.33 and requested takeoff clearance. At approximately 1708-36 the local controller instructed National

429 on 118.3 mcs. to "taxi into position and hold runway 9." National 429 acknowledged this transmission at approximately 1708:37 by giving its trip number as "429." Believing a takeoff clearance had been received, the captain of National 429 turned on landing lights and maneuvered the aircraft into the takeoff position on runway 9, where he stopped and there transferred control of the aircraft to the first officer who commenced the takeoff run. At approximately 1709:36 the collision occurred. The speed of the National aircraft at the time of collision was estimated to be 60 knots. After the collision the captain took over the controls and attempted unsuccessfully to maintain directional control of the aircraft. The aircraft swerved to the left and came to rest approximately 800 feet beyond the runway intersection and approximately 150 feet to the left of the runway. Despite ruptured fuel tanks, there was no fire.

When the aircraft came to rest one of the stewardesses assisted by the flight engineer set up the emergency escape chute. The first officer, who had left the aircraft through a cockpit window, together with a passenger who had evacuated through a window emergency exit, anchored the ground ends of the chute. While most of the passengers used the chute to deplane, two other passengers left the aircraft through a window exit over the left wing. The remaining crew members used the escape chute to leave the aircraft.

After the evacuation had been completed, a passenger accompanied by a state trooper and the flight engineer re-boarded the aircraft to regain possession of a brief case containing classified documents. The flight engineer stated "we went back to the other side of the airplane, opened up that exit, went inside and got his papers."

Although evacuation was for the most part orderly, some passengers had to be forcibly encouraged to exit the aircraft.

The captain and first officer of National 429 stated that the local controller's response to their request for takeoff clearance was "National 429 cleared for takeoff," and that there was no doubt in their minds he had cleared them for takeoff. The flight engineer in relating his version of the clearance testified that he heard the local controller say: "cleared for position and takeoff." He stated that while he thought the clearance unusual, the deviation from standard phraseology was insufficient to overcome the impression he also had that National 429 was cleared for takeoff. The tower recording of the clearance, the testimony of the local controller, and the coordinator, all indicate that National 429 was instructed to taxi into position and hold runway 9.

It was established that Allegheny Flight 307 was holding on the north side of runway 9 when National 429 made the takeoff attempt; that Allegheny 307 made two transmissions to the Boston Tower on 118.3 mcs indicating they were ready for takeoff, that the first transmission was made at approximately the same time the local controller issued instructions to National 429 to taxi into position and hold; and that the local controller did not acknowledge the first transmission nor was it recorded on the tower tape, thereby raising the possibility that a transmission from Allegheny 307 might have interfered with the control tower holding instructions to National 429.

To explore the possibility of interference the Board conducted a series of communication tests to determine the conditions under which the Boston Tower recorder will function, and the effects of simultaneous or overlapping transmissions from the control tower and aircraft on the same frequency.

Simulating as nearly as possible the conditions existing at the time of collision, a National DC-6B aircraft was placed in the same position as that occupied by National 429 on the south side of runway 9 and an Allegheny Airlines Convair 440 was placed in the same position as that occupied by Allegheny 307 on the north side of runway 9.

Board investigators were stationed in the Allegheny and National Aircraft and in the control tower. It was determined that when the main tower transmitter was in use, a transmission from the Allegheny aircraft made simultaneously with a control tower transmission produced a sharp squeal in the receiver of the National aircraft, and that when the tower microphone was keyed, no transmissions except the controller's were received and recorded in the control tower. However, when the tower standby transmitter was in use, transmissions from the Allegheny aircraft blocked the control tower's simultaneous transmissions but were received in the National aircraft. When the tower microphone was keyed, no transmissions except the controller's were received and recorded in the tower.

Control tower maintenance personnel were interrogated and it was determined that to the best of their recollection the main transmitter was in use at the time of the accident. However, it is possible that the standby transmitter might have been operated at intermittent periods during that day without the tower logs reflecting its use.

The captain and first officer of National 429 testified that they did not hear a warning message from the local controller and that they did not see the Northeast aircraft in time to take evasive action.

Damage to the Northeast Viscount was extensive. The No. 3 propeller blade was bent aft approximately 6 inches and about 18 inches from the tip. From the aft cabin bulkhead rearward the entire fuselage was torn away.

The empennage aft of Station 731 was severed from the aircraft. All tail surfaces, control cables, wiring, and accessories were torn away. The No. 2 flap shingle was severely damaged, and the No. 3 flap shingle torn away.

No. 1 engine controls were severely damaged. The high pressure cock bell crank was torn off, making it impossible to shut down that engine. The left wing was torn away at the outer edge of No. 1 engine nacelle.

Damage to the National DC-6B was also extensive. The nose of the aircraft at the forward most bulkhead, immediately ahead of the rudder pedals, was severed and held to the aircraft by the main CO₂ lines. The underside of the fuselage from the nose rearward to Station 69 was severely damaged. The nosewheel well area near Station 89 destroyed and the nosewheel assembly was torn away.

The fuselage at Station 260 top and right was cut and torn diagonally down and forward to Station 89. Belt frames, stringers, skin, and major floor structure were severely damaged and mutilated, representing a fuselage fracture. The top of the right wing was torn open from the leading edge at the fuselage to a point aft of the No. 1 engine nacelle. The right main wing spar was broken over the right landing gear. The right wheel well area was severely damaged. The main gear assembly was torn out of its mountings, collapsed rearward, and remained beneath the trailing edge of the wing and flap.

The No. 3 engine nacelle was severely buckled and torn. The engine nose case was broken and separated from the center section. The No 3 propeller blades were ground off, broken, and bent.

The No. 4 engine nacelle was severely damaged. The inboard engine mounts were torn loose. The engine nose case was separated from the engine, and the propeller was damaged beyond repair.

The leading edge of the right wing, approximately eight feet from the tip, was badly torn with large holes at Stations 600 and 635. The main spar was bent at Station 635. The right aileron aft of Station 635 was torn in two. The right flap was buckled aft of the right gear at wing Station 148. The left main gear inboard wheel well doors sustained substantial damage.

The investigation indicated that maintenance of powerplants and aircraft was current and satisfactory. All certification of the carriers involved was in order.

Air Traffic Control

There were five air traffic control specialists occupying the various operating positions in the Boston Tower at the time of the collision - a coordinator, a local controller, a ground controller, a clearance delivery controller, and a flight data controller. Radio communications by the Boston Tower with National 429 were as follows.

1700 Ground controller issued taxi instructions
1702 Ground controller advised National 429 "Center can't find flight plan, what altitude did you request?"
1703 Ground controller advised National 429 to change to clearance delivery frequency.
1706 Clearance delivery advised National 429 to taxi across runway 9.
1707:30 Clearance delivery issued IFR clearance.
1707:45 Clearance delivery advised National 429 to contact local control when ready.
1708:36 Local controller advised National 429 to taxi into position and hold runway 9.

The collision occurred at approximately 1709:36.

During the interval from the issuance of holding instructions at approximately 1708:36 to approximately 1709:32, apparently no one in the control tower observed the positioning of the National aircraft on runway 9 or the attempted takeoff. As the local controller stated, "When I first observed the National aircraft it was two or three seconds before the collision and all I could get out over the microphone was 'check the traffic.'" The coordinator stated that when he first observed National rolling down runway 9 he turned to the local controller to warn him, but at that moment the local controller was making the transmission "check the traffic."

Approximately four seconds elapsed between the time of the warning message and the collision. There were no tower transmissions made to either aircraft during this interval. No attempt was made to warn the Northeast aircraft.

Of the five controllers on duty in the Boston Control Tower, three apparently saw only the collision, while the remaining two controllers first observed the National aircraft approximately four seconds before the collision.

Runway 4R is 10,022 feet long and 225 feet wide and was in use for landing aircraft. Runway 9 is 7,021 feet long and 225 feet wide and was in use for departing aircraft. The distance from the approach end of runway 4R to the centerline intersection of runway 9 is 2,066 feet. The distance from the approach end of runway 9 to the centerline intersection of runway 4R is 1,023 feet.

Analysis and Conclusions

The current system of communications for air traffic control at Boston requires a departing IFR flight to request taxi instructions on the ground control frequency of 121.9 mcs. Upon reaching the vicinity of the runway position the flight requests an IFR en route clearance on 121.7 mcs., the clearance delivery frequency. When ready for takeoff the clearance therefor is requested on the local control frequency of 118.3 mcs. After takeoff, the flight contacts departure control on 119.1 mcs. From the time National 429 was cleared to taxi to runway 9 by ground control, to the time that the flight was instructed to taxi into position and hold by local control, a period in excess of eight minutes elapsed. During this time it is not likely that the crew heard any transmissions of the local controller on 118.3 mcs. to inbound flights Northeast 120 or Northeast 236 which were both landing straight in on runway 4R, or the clearance to American 291 which was advised to take off immediately or hold on runway 9.

It must be concluded, therefore, that National 429 was not aware at any time prior to the collision that runway 4R was designated by the Boston Tower as the active runway for landing aircraft. Furthermore, since the National crew observed the takeoffs of Eastern 471, American 425, and American 291 on runway 9, it is believed they could reasonably assume that this runway was active for both takeoffs and landings.

An attempt was made to explain the difference between the tower clearance and what the crew of National 429 stated they heard. As has been related earlier in this report, it was determined from tests that a transmission from an Allegheny aircraft, holding on the north side of runway 9, transmitting and receiving on the same frequency as the local controller and National 429 might have partially or completely blocked the tower's holding instructions to National 429 to the extent that the National crew heard only the word "takeoff" spoken by Allegheny 307 as it transmitted "ready for takeoff." Believing what they heard to be a tower transmission, from experience they supplied the missing words, acknowledged the transmission, and commenced a takeoff.

The Board made a study of the phraseology used in the tower transmission coupled with a possible omission of certain words therein and the substitution of any and all of Allegheny 307's transmissions. However, an analysis of the results leads to the conclusion that the composite message as possibly heard by the crew of National 429 could not have been misconstrued as a clearance for takeoff. Thus, neither the testimony of the crew of National 429 nor the results of the tests overcome a preponderance of the evidence which indicates that National 429 was given a holding clearance instead of a clearance for takeoff.

It is estimated that the crew of National 429, after positioning the aircraft for takeoff, had approximately 850 feet of runway available for acceleration prior to the point at which the collision occurred. The time for an aircraft of this type to accelerate to approximately 60 knots in 850 feet is computed to be approximately 13 seconds.

Considering the time it would have taken the captain of National 429 to taxi into position on runway 9, stop the aircraft, and transfer control to the pilot who commenced the takeoff, it is estimated that there were approximately 56 seconds during which no one in the control tower detected the movement of the aircraft. However, the aircraft's movement during most of this interval was commensurate with the clearance issued. There can be little doubt that earlier detection was possible since there were no obstructions to the local controller's vision, the weather was clear, and both aircraft were operating within the same general area of the airport.

The local controller's warning to check the traffic was transmitted approximately nine seconds after the takeoff roll had begun and approximately four seconds before the collision. In the absence of regulatory or procedural requirements, it cannot be determined with certainty at what point in time within the 13 seconds the local controller should have detected the failure of National 429 to comply with holding instructions. However, two facts are evident. There were both detection and warning within nine seconds after National commenced its takeoff roll. Whether the warning given by the local controller was sufficient to discharge his duty to prevent collision requires further examination. The control tower recording tape indicates that the warning message was not addressed to National 429 or Northeast 120, both of which at the time of transmission were in positions of peril. Although the local controller stated that he directed the warning message to National, the crew of National and Northeast testified that they heard no warning. This testimony is given credence by the fact that the warning message did not identify the addressee. The crews of both aircraft would normally be alerted to danger only by a warning which was specifically directed to them. Since the warning message was not directed to anyone, it is found to have been deficient in that respect.

Radio messages for the control of air traffic have been standardized into a series of phraseologies. Among these are phraseologies used to control the movement of aircraft on an airport. There is no doubt that the local controller attempted a warning; however, he failed to use the phraseologies established for such a warning. While some latitude is allowed in composition, a warning message should alert the pilot to danger and inform him of possible preventive action. The phrase "check the traffic" does neither. Therefore, in not directing the warning message to National and not using standard phraseology or its equivalent, the local controller's performance is found to have been deficient.

As the result of this accident the Board recommended to the Federal Aviation Agency that consideration be given to requiring that all restrictive clearances or instructions issued by air traffic control be acknowledged by pilot repetition.

Probable Cause

The Board finds that this ground collision accident occurred as the result of commencement of takeoff by National 429 without clearance.

Contributing factors were the failure of tower personnel to provide adequate surveillance of the active runways and to issue an appropriate warning message to the pilot of National 429 alerting him to the impending traffic confliction

BY THE CIVIL AERONAUTICS BOARD.

/s/ ALAN S. BOYD
Chairman

/s/ ROBERT T. MURPHY
Vice Chairman

/s/ CHAN GURNEY
Member

/s/ G. JOSEPH MINETTI
Member

/s/ WHITNEY GILLILLAND
Member

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 shortly after occurrence. An investigation was conducted in accordance with the provisions of Title VII of the Federal Aviation Act of 1958.

Depositions were taken in the conference room of American Airlines, Inc., Logan International Airport, Boston, Massachusetts, on November 17, 1961, and concluded in Room 206, Federal Building, New York International Airport, Queens, New York, on January 5, 1962.

Air Carriers

National Airlines, Inc., a Florida corporation, is a scheduled air carrier with its principal offices located in Miami, Florida. It possesses a currently effective certificate of public convenience and necessity issued by the Civil Aeronautics Board, and an air carrier operating certificate issued by the Federal Aviation Agency. These certificates authorize the carrier to transport persons, property, and mail, by air, over established routes including the route from Boston, Massachusetts, to New York, New York.

Northeast Airlines, a Massachusetts corporation, is a scheduled air carrier with its principal offices located in Boston, Massachusetts. It holds a currently effective certificate of public convenience and necessity issued by the Civil Aeronautics Board, and an air carrier operating certificate issued by the Federal Aviation Agency. These certificates authorize the carrier to transport persons, property, and mail, by air, over established routes including the route from New York, New York, to Boston, Massachusetts.

Flight Personnel

1. National Airlines, Inc.

Captain Clarence F. Hofer, age 41, was employed by National Airlines on December 15, 1952. He held a valid airman certificate, No. 410693, with an air-line transport rating for Convair 440, and Douglas DC-6B aircraft. Captain Hofer had a total of 8,000 flying hours, 1,445 of which were in Douglas DC-6B aircraft. He qualified in this type of equipment on March 21, 1961. He was current in proficiency and line check requirements, route qualifications, and recurrent training. His last FAA physical examination was passed August 16, 1961.

First Officer Robert H. Harder, age 40, was employed by National Airlines on November 12, 1956. He held a valid airman certificate No. 51340-41, with an air-line transport rating for Douglas DC-6B equipment. He had a total of more than 6,000 flying hours, 1,459 of which were in Douglas DC-6B aircraft. He qualified in this type of equipment in 1956, and was requalified on November 13, 1961. He was current in all FAA and company requirements, and his last FAA physical was passed on March 10, 1961.

Flight Engineer Edward J. Nadeau, age 26, was employed by National Airlines on June 18, 1960. He held a valid flight engineer certificate, No. 1455291, an airframe and powerplants certificate, and a commercial pilot certificate with

an instrument rating. He qualified as a flight engineer on Douglas DC-6B equipment on December 22, 1960. He had a total of 1,400 hours, 800 of which were acquired as a flight engineer in Douglas DC-6B equipment.

Stewardess Betty Jean Cataldo was employed by National Airlines on June 2, 1961. Stewardess Patricia Kikola was employed by National Airlines on October 1, 1961.

2. Northeast Airlines

Captain Charles Liebman, age 48, was employed by Northeast Airlines on July 21, 1943. He held a valid airman certificate, No. 49815, with an airline transport rating for Douglas DC-3, DC-6, DC-7, Convair 240 and 340, and Vickers Viscount aircraft. Captain Liebman had a total of 17,000 flying hours, approximately 2,000 of which were in Viscount aircraft. His last qualification in this type of equipment was on December 2, 1960. He was current in proficiency and line check requirements, route qualifications, and recurrent training. His last FAA physical examination was passed July 27, 1961.

Flight officer Dwight E. Chapin, age 32, was employed by Northeast Airlines on November 8, 1957. He held a valid airman certificate, No. 1261483, as a commercial pilot with instrument rating. He had 3,000 flying hours, 400 of which were in Viscount equipment. He was current in all FAA and company requirements, and his last physical examination was passed on September 15, 1961.

Stewardess Janet Ostberg was employed by Northeast Airlines on February 26, 1960. Stewardess Sandra Knehr was employed by Northeast Airlines on February 29, 1960.

The Aircraft

1. National Airlines N 8228H, a Douglas DC-6B, serial No. 43821 was manufactured on January 1, 1953. At the time of the accident the aircraft had a total of 26,849 flying hours. The aircraft had been flown 187 hours since last overhaul. The aircraft was equipped with Pratt & Whitney engines model R 2800-CB16 and Hamilton standard propellers model 43E60.

2. Northeast Airlines N 6592C, a Vickers Viscount, serial No. 234, was manufactured on July 5, 1957. At the time of the accident the aircraft had a total of 8,328:20 flying hours, and had been flown 33:55 hours since the last overhaul. The aircraft was equipped with Rolls Royce engines, model Dart 510-65, and ROTOL Ltd. propellers, model R-130/4-20-4/12E.

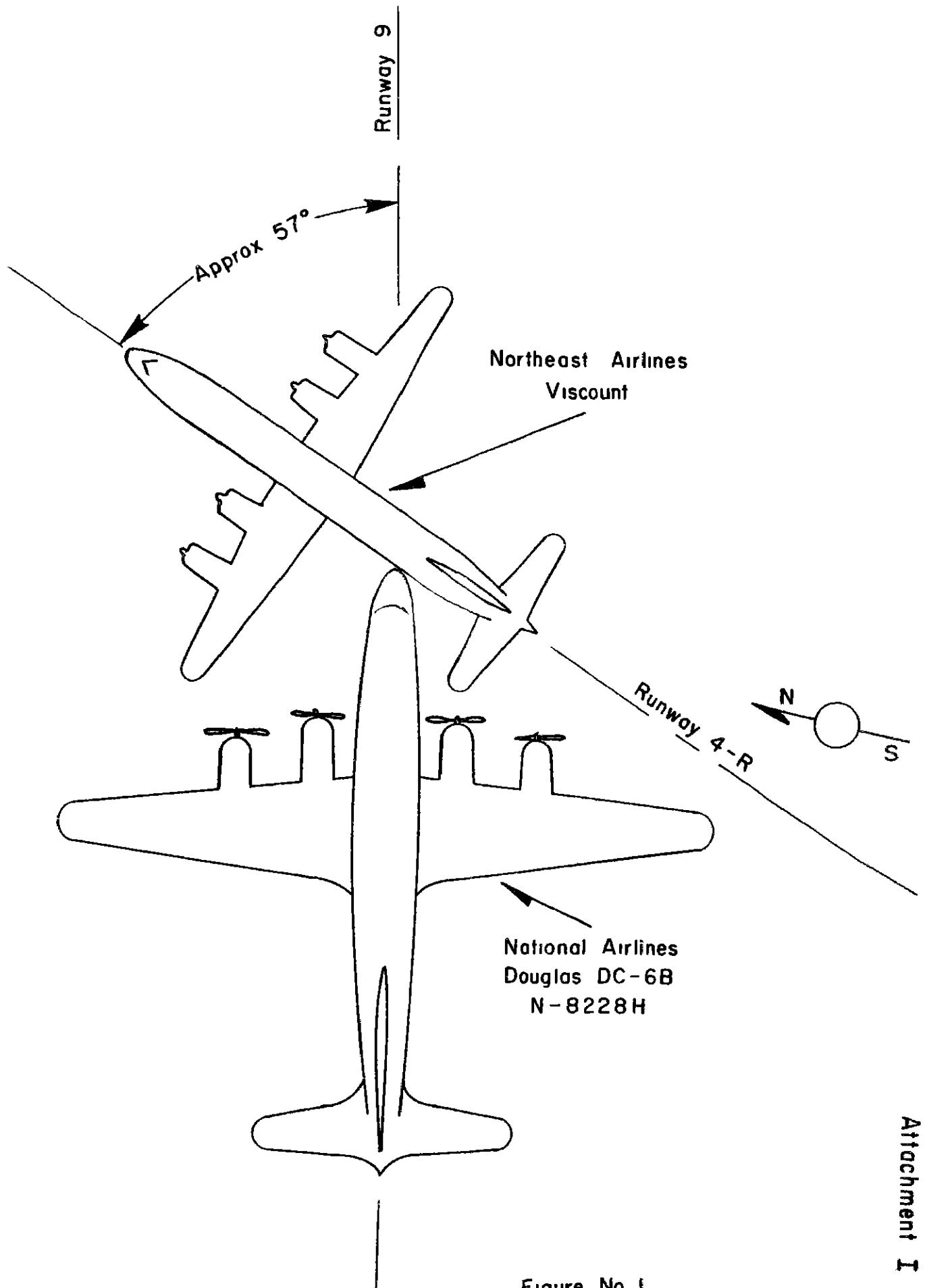
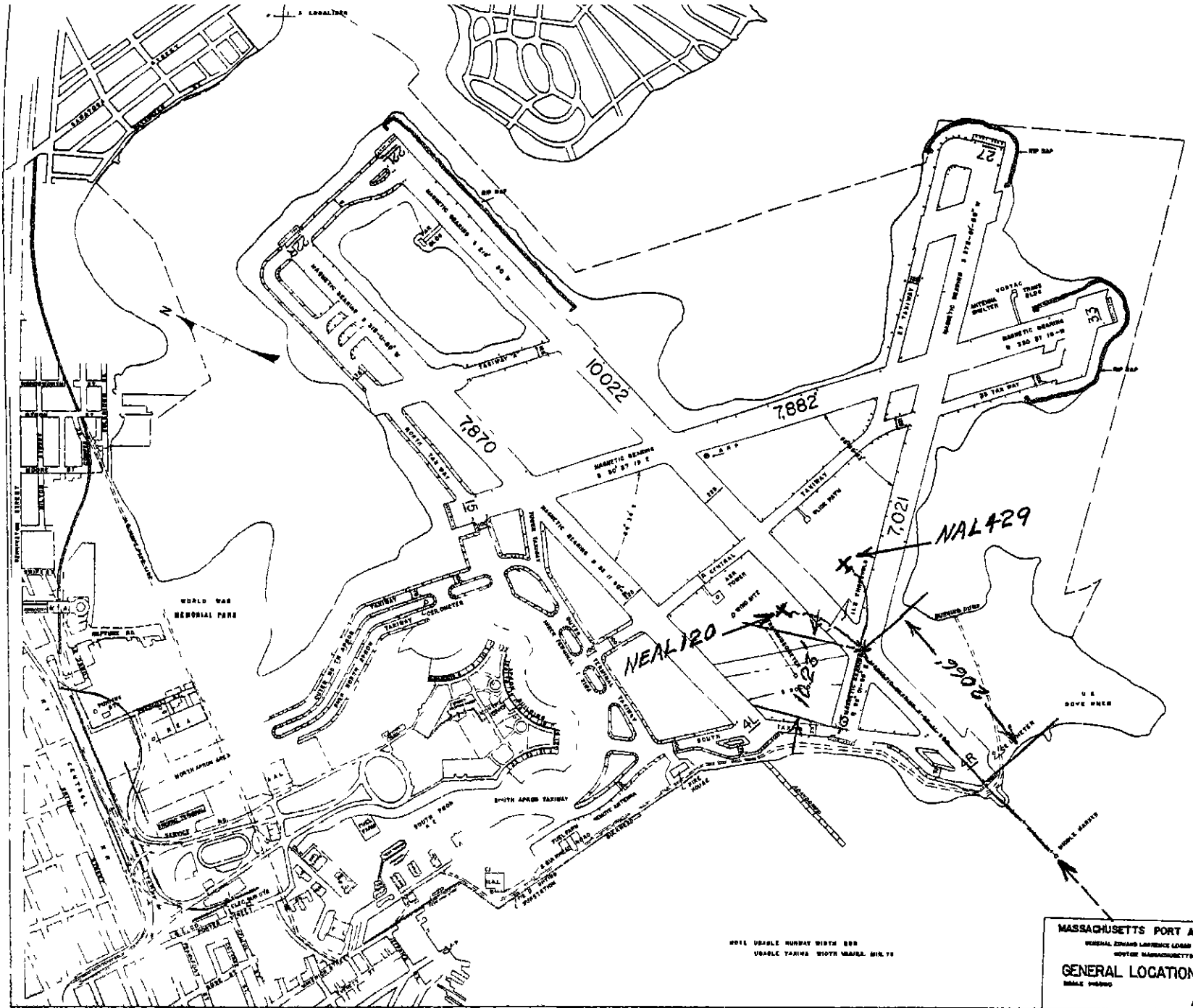


Figure No 1



ONE INCH EQUALS HUNDRED FEET
UNSCALED DRAWING

MASSACHUSETTS PORT AUTHORITY
GENERAL EDWARD LAWRENCE LOBBY AIRPORT
BOSTON, MASSACHUSETTS
GENERAL LOCATION PLAN
SCALE 1/8" = 1'-0"
MARCH 1960
JAMES F. DYKES
AIRPORT ENGINEER