File No. 1-0021

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: September 22, 1952 Released: September 25, 1952

U. S. AIRLINES, INC. - JAMAICA, NEW YORK, APRIL 5, 1952

The Accident

A C-46-F aircraft, N 1911M, owned by the United States Air Force and operated under lease by U. S. Airlines, Inc., crashed at Jamaica, New York, on April 5, 1952, at about 0827.1/ The only occupants, two pilots, were killed, as were three persons on the ground. Five other persons were injured, four buildings were destroyed, several automobiles were damaged, and the aircraft was destroyed by impact and subsequent fire.

History of the Flight

The flight was designated as No. 4-2 because it was being operated as the second section of a regularly scheduled cargo flight that left Fort Lauderdale, Florida, on April 4.

Flight 4-2 departed Fort Lauderdale April 5, 1952, at 0055, with a crew consisting of Captain William B. Crockett, Jr., and Copilot Jack L. Woerderhoff. The destination was Teterboro, New Jersey, with intermediate stops at Charleston, South Carolina, and Raleigh-Durham, North Carolina. The gross weight of the aircraft upon departure was less than the maximum of 48,000 pounds permitted in cargo operations, and the load was placed so that the aircraft's center of gravity was within prescribed limits. This first segment of the flight was conducted according to visual flight rules. It was entirely routine with a landing at Charleston at 0328. Fuel was added but no cargo was loaded or discharged at Charleston.

Takeoff from Charleston was at 0410, with a flight plan calling for instrument flight rules. Again the gross weight was less than the allowable and the center of gravity was within prescribed limits. This segment of the flight was also routine, with a landing at Raleigh-Durham at 0524. Again the cargo remained unchanged although 284 gallons of fuel were added.

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

At Raleigh-Durham the pilots were briefed at the office of the U. S. Weather Bureau on current and forecast weather conditions over the route. It was indicated that no difficulty should be encountered en route to the New York area, but the ceilings and visibilities there and at Philadelphia, the alternate, would be 800 feet and five miles with heavy rain upon arrival.

At 0554 the crew filed a flight plan according to instrument flight rules to cruise from Raleigh-Durham to New York International Airport (Idlewild) at 3,000 feet. The original destination, Teterboro, was changed because of worsening weather there, and the alternate was Philadelphia International Airport. The estimated time en route was two hours and ten minutes. The aircraft carried fuel for four hours' flight. The 0528 weather sequence reported Idlewild, the destination, as 2,100 feet ceiling and 4-mile visibility, and Philadelphia, the alternate, as also above minimums.

Upon departure from Raleigh-Durham at 0608 the aircraft's gross weight was about 172 pounds less than its maximum allowable of 48,000 pounds, and its center of gravity was within prescribed limits. The flight proceeded uneventfully at its planned altitude of 3,000 feet. Routine position reports were made through Air Route Traffic Control and arrival over the Idlewild range station was estimated at 0810. At 0809 the flight was instructed by ARTC (Air Route Traffic Control) to climb to 3,500 feet and to contact Idlewild Approach Control when over Scotland Intersection (where the southwest leg of the Idlewild range intersects the southeast leg of the Newark range).

The next instruction to the flight was from Idlewild Approach Control and directed it to hold at Scotland at 3,500 feet, and to expect approach clearance at 0828. The flight reported over Scotland at 3,500 feet at 0817. Immediately following, the flight was given Idlewild weather as follows: "Weather 0804, time now 0817, measured 500 broken, 1800 overcast, visibility 1½ miles in heavy rain, the altimeter 29.82."

The approach controller first saw the flight on the airport surveillance radar (ASR) when it was approaching Scotland. He asked the flight if it could make a straight-in approach from its present position and the flight replied affirmatively. It was then cleared for a straight-in approach, instructed to descend immediately, and to report passing through 2,500 feet. The flight acknowledged and subsequently reported leaving 2,500 feet, and then leaving 2,000 feet. The controller then cleared the flight to continue descent, to advise upon reaching 1,500 feet, and then cleared it to "pass over Runway 4 and make left turn into Runway 13 left."

The next contact with the flight was at 0825, when it reported "contact" over the outer marker, located at the Idlewild range station, 2.9 miles from the approach end of Runway No. 4. The local controller then took over control of the flight and advised it to "bear left and make a right turn into Runway 13L, that's the big runway on the north side of the airport, and call base leg coming up on the Federal Building. Go ahead and you'll probably be west of the Federal Building when you call." This was acknowledged by the flight, which presumably intended to comply because the message was not questioned.

At 0827 the local controller saw the aircraft below the overcast and at an estimated altitude of 500 feet, between the tower and Runway 4.2/ He at once transmitted, "Just saw you pass over the airport. You should be passing those hangars now. If you start your left turn and watch the hangars on your left wing, you'll be able to make a left turn into Runway One Three. Go ahead, sir." The landing gear appeared to be fully extended, but the flap position was not noticed.

A few seconds later the aircraft disappeared from view on a northerly heading and still at an estimated altitude of 500 feet. The local controller at once asked the flight if it had started the left turn, and the flight replied that it was pulling up to execute a missed approach. The tower gave immediate instruction to turn right and proceed to Long Beach Intersection (the SE leg of the Idlewild Range and the SW leg of the Hempstead Range, about 10 miles SE of Idlewild) at 1,500 feet altitude. This transmission was acknowledged. This was the last communication from the flight. A very short time later the aircraft crashed at the intersection of 169th Street and 89th Avenue, Jamaica, New York, about 4.4 miles north of the Idlewild control tower.

Investigation

The altitude of the aircraft during its final approach was determined by observation of its path in the precision approach radar (PAR, or precision scope). Unlike the previously mentioned ASR which does not indicate altitude, the latter indicated altitude, deviation in azimuth, and distance. Its operator had the flight in sight on the scope when it was about seven miles from the runway. He saw it level out at an altitude of about 500 feet when approximately one-half mile in from the outer marker where it had given its last position report. He continued to observe the approaching aircraft until it passed beyond the limit of his scope at a point approximately one-third up Runway 4 from the approach end. The approximate 500 feet altitude was maintained during this period. This PAR is the scope used for ground control approaches (GCA)

2/ Refer to Attachment I, a diagram of the airport and the flight path.

and to monitor instrument landing system (ILS) approaches. Neither service was used by the incoming flight, inasmuch as the carrier is not authorized to use either at Idlewild. The carrier's operating specifications call for only visual approaches below 500 feet and with a minimum visibility of one and one-half miles.

Statements were taken from 40 persons who saw or heard the aircraft immediately before the crash. One of these 40 was at the airport and confirmed the tower operator's testimony that the aircraft passed across the airport heading in a generally northerly direction, at an estimated altitude of about 500 feet; that the landing gear was extended and that the engine noise seemed normal.

The 39 remaining witnesses were located along the approximate final two miles of the flight path. Some of them were extremely close to the crash site. Only a few of these 39 persons saw the aircraft, and they saw it only for a very short interval of time. All 39, however, heard unusual noises.

Nine of these witnesses were further examined at the public hearing in connection with this accident. The consensus of their testimony, as well as that of witnesses who did not testify, indicates that both ceiling and visibility were close to zero, and that rain was falling at the time and place of the accident. It also indicates that when the aircraft was first seen by them below the overcast, it was in a sharp right bank and descending rapidly.

Testimony also indicates that engine noise diminished, came on with an unusually loud roar momentarily, again diminished, and came on again with a similar extremely loud roar, whereupon impact occurred. The impact site is at an elevation approximately 150 feet higher than Idlewild Airport.

Investigation also determined that at the time of impact the gross weight of the aircraft, based on its computed weight[3/] upon departure from Raleigh-Durham and probable fuel burn-off, was approximately 45,750 pounds. This was 2,250 pounds less than its certificated gross weight of 48,000

3/ The flight manifest, showing gross weight out of Raleigh-Durham, was never recovered. It was to have been mailed from that point to the company at Miami. The flight manifest upon departure from Fort Lauderdale was properly filled out, and the one showing gross weight out of Charleston was executed and mailed.

pounds. The amount of fuel on board at the time should have been enough for about one hour and forty minutes of flight.

The through cargo was of miscellaneous materials and totaled 13,740 pounds. Testimony of personnel who loaded the aircraft at Fort Lauderdale indicates that this cargo was properly secured. The carrier's operations manager testified that he had never received any reports of cargo shifting during flight.

In regard to the weather: testimony from the captains of 17 flights that took off from or landed at Idlewild during the period from an hour before, until several hours after, the time of the crash indicated that the weather was substantially as reported and that turbulence existed. This turbulence was variously described as from "light" to "severe" from the surface up to the 1,000-foot level. These pilot reports also indicate that all radio facilities at Idlewild were functioning normally during this period. In this connection all radio aids at the airport were checked by CAA as soon as possible; all were found to be operating normally.

The actual ceiling existing at the airport when the flight passed over was probably slightly below the carrier's 500-foot minimum. An observation started at 0817 was completed and transmitted to the control tower by telautograph at 0826. This was to be the Weather Bureau's 0828 sequence and included a 400-foot measured ceiling and a visibility of two miles. A careful study of the time factors involved indicates that it would not have been feasible, and perhaps not desirable, to relay this to the aircraft which was then (at 0826) approximately over the airport.

An examination of company flight records revealed that Captain Crockett had made five landings at, and four take-offs from, Idlewild during the six months preceding the accident. This examination also revealed that Copilot Woerderhoff had been on four flights landing at, and three flights taking off from, Idlewild during the previous six months.

Investigation of the wreckage and of the impact site disclosed that the aircraft was on a heading of approximately 330 degrees true, in a steep bank to the right, and nosed down nearly vertically when it struck. All wreckage was extremely localized, occupying a roughly rectangular area only about 142 feet by 30 feet. (A C-46 aircraft has a wing spread of 108 feet and an over-all length of 76 feet.) The left wing was found in a tree approximately 40 feet above the ground, while the empennage was at the base of that tree.

There was no indication of any failure of the aircraft's structure prior to impact, despite the testimony of a number of lay witnesses who thought that they saw one or both wings fold backward. Investigation of the wreckage failed to reveal any indication of a fire prior to the crash, and this is borne out by the testimony of those few persons who saw the aircraft during its final few seconds of flight, in that none of them noted any trailing smoke or flame.

Careful examination of the wreckage also revealed that the landing gear and wing flaps were retracted at the time of impact.

All but four instruments were so badly damaged that their indications were meaningless. These four were:

1. An altimeter which read 140 feet (the altitude of the impact site is approximately 150 feet).

2. An altimeter setting of 29.85 inches (the last barometric reading given the incoming flight was 29.82 inches).

3. Directional gyro upper scale, 218 degrees.

4. Radio compass No. I indicator, 10 degrees.

The positions of the tab trim indicators in the cockpit relative to their respective tab trim actuating jack shafts were studied. The indications varied considerably between cockpit indicators and jack shafts. There was some evidence that the aircraft at the time of impact was trimmed left wing down as if for flight with the right engine inoperative, but this is not conclusive because of the possible movement of the mechanisms at impact.

No evidence was found to indicate malfunctioning of the fuel system aft of the fire wall or of the hydraulic system prior to the crash. The fuel-selector valve settings were on "center tanks," with the cross-feed valve "closed." All six fire wall shut-off valves were open.

Maintenance records indicate that the aircraft at the time of the accident was being operated within the approved inspection and overhaul periods as listed in the company's maintenance manual, which is approved by the CAA. At the time of departure from Fort Lauderdale, Florida, on April 5, 1952, the aircraft had been operated one hour and twenty minutes since its last No. 4 inspection (135 hours), and 119 hours since its last No. 5 inspection (270 hours). The subject aircraft was originally equipped with a Sperry A-3 automatic pilot. However, the carrier not wishing to use the automatic pilot had it deactivated.

This aircraft was equipped with Pratt & Whitney engines, Model R-2800-7 and with Hamilton Standard propellers, Model 23E50-505. The right engine had a total time of 1,045 hours, of which 749 had been since it was last overhauled, and of which six hours and forty minutes had been since it was last inspected. The left engine had a total time of 997 hours, of which six hours and forty-five minutes had been since it was last overhauled. In the right engine there was no evidence found of structural failure or fire before impact following disassembly and thorough examination of all parts under the supervision of a Board investigator.

The left engine was completely disassembled and its various components examined thoroughly. On this engine the diaphragms of both the fuel feed valve and the engine-driven fuel pump were found ruptured. The fuel feed valve diaphragm was not only ruptured but was stiffened as from age or from some unusual exposure. No other significant irregularity was found.

Subsequent ground tests made with a like model engine on a similar aircraft of the same carrier, and with the fuel feed valve diaphragm purposely damaged in simulation of the one in the crashed aircraft, demonstrated that:

(a) The engine would operate normally at low power (corresponding to the amount of power ordinarily used during an approach).

(b) The engine would backfire violently, and stop completely if its throttle was advanced to the position of cruise power or more.

The left engine had only been in use for six hours and forty-five minutes since it was last overhauled. Investigation disclosed that this engine had been test-flown after installation in the aircraft for a period of 35 minutes by the chief pilot for U. S. Airlines and to his satisfaction.

The propeller pitch setting of the left engine was determined to have been approximately 19 degrees at the time of impact. The right propeller was found to have been set at a pitch angle of 17 degrees at the time of impact.

Investigation further disclosed that the left engine had been overhauled for U. S. Airlines by the Air Carrier Engine Service, Miami, Florida, (ACES), a certificated engine overhaul station. The diaphragm in question is an integral part of the engine and not of any accessory, and was supposedly installed by ACES at the time of engine overhaul. Replacement of this diaphragm is mandatory during engine overhauls, which for this carrier are required at periods of 905 hours or less of operation. Testimony of the mechanic employee of ACES who worked on that portion of the engine at the time of overhaul was to the effect that he could not remember replacing a new diaphragm on the subject engine, but that he had never failed to install new diaphragms on all engines that he had worked on. ACES shop procedure of overhauling engines calls for, first, a complete disassembly of the engine. All parts are then placed on a rack, and cleaned by immersion in "Kleen-A-Karb" (the trade name of a commonly used degreasing agent). Ferrous parts are then magnaflux-inspected, washed, placed on a rack, and sent to the inspection department. One inspector handles only the engine rear section (the section containing the defective diaphragm). An official of ACES testified that his company had never stocked diaphragms of the subject type and part number.

The diaphragm is some two inches in diameter and of fabric, coated with synthetic rubber. It is fastened to the engine intermediate rear case by a metal cover secured by six filuster head screws. This cover was permanently deformed (depressed) at all six screw holes as if the screws had been tightened excessively. The cover itself bore no signs of heat. Cover deformation of this nature could have contributed to, or possibly precipitated, failure of the diaphragm.

ACES received this engine on January 4, 1952, for overhaul. Following the work the engine was block tested for five hours and ten minutes and pronounced finished on February 7. No abnormalities were noted. The engine

was then transported to the carrier's base on March 25, 1952, and installed in N 1911M on April 4, 1952. In order to tamper with the diaphragm a metal plate, installed on the rear case for protection during transportation, would have had to have been removed.

Testimony of personnel of the carrier was to the effect that neither diaphragm nor cover was disturbed in any way after receipt of the engine from the overhaul base. The subject diaphragm and similar new diaphragms were forwarded to the National Bureau of Standards for tests, these will be discussed later.

Analysis

When the flight reported "contact" over the outer marker, it meant that it had the ground in sight. It did not necessarily mean that it had any appreciable forward visibility. Because of rain and the fact that the aircraft was just about at the bottom of the overcast, or possibly in and out of a rugged bottom, it is probable that it had very little forward visibility. This must account for the flight not following the tower's first suggestion, "bear left and make a right turn into Runway 13L, that's the big runway on the north side of the airport, and call base leg coming up on the Federal Building. Go ahead and you'll probably be west of the Federal Building when you call." It appears that the captain, who was relatively unfamiliar with Idlewild Airport, which is much larger than most airports, and with the existing marginal weather, did not wish to lose the directional guidance of the NE leg of the Idlewild range which he unquestionably was using. Accordingly, he did not elect to follow the tower's suggestion but stayed on the range leg and maintained his 500-foot minimum until he was well up Runway No. 4. After passing abeam of the tower, (see attachment), he was given a second suggestion to turn left for an approach to the same Runway (13L). This was not acknowledged by the flight. However, almost immediately the tower asked if the left turn had been started, and the flight then did acknowledge by stating that it was pulling up for a missed approach.

At this time the left engine acted erratically with violent surging as the fuel feed valve diaphragm failed. This type of surging has an extremely adverse effect upon the aircraft's controllability. Control of the aircraft was then lost largely because of this surging, but also because of the turbulent air. Although the right engine was developing power, the aircraft, under these conditions, lost altitude rapidly in what was probably an extreme right sideslip, taking on some of the aspects of a right spin, and crashed. The attachment shows the extremely tight right turn that was made just before impact.

It is evident that no operational error was involved in this accident. Under the existing marginal weather at an airport the size of Idlewild, the tower operator acted properly, and in full discharge of his duties, in twice giving detailed landing suggestions.

The captain likewise cannot be criticized for not following this advice but it would have been better practice for the flight to inform the tower if it did not intend to follow such advice. He was flying at his company's

legal minimum altitude and all evidence indicates that horizontal visibility at that altitude was highly restricted. Accordingly, to have let down further would have been in violation of these minimums.

Failure of the engine-driven fuel pump diaphragm would not be expected in any way to fail the fuel feed valve diaphragm. However, failure of the fuel feed valve diaphragm might possibly cause pressure surges at the fuel pump outlet resulting in failure of the fuel pump diaphragm. It is more likely, however, that this failure was the result of a pressure surge which occurred in the fuel line at impact. The condition of the fuel feed valve diaphragm, as found, could not have resulted from heat of the ground fire following impact because its location insulates it quite well from heat.

There is conflict in the testimony as to the responsibility for the installation of the defective diaphragm and its deformed retaining cover in this overhauled engine. Either the diaphragm was not replaced by ACES at the time of overhaul, or U. S. Airlines, Inc. replaced it after receipt of the overhauled engine. Although the second possibility does exist, we regard it as a very remote one, in light of tests conducted by the U. S. Bureau of Standards and of other factors brought out in the record of this case.

As indicated above, the defective diapnragm together with new diaphragms of the same type, were forwarded to the U. S. Bureau of Standards for an examination of the defective diaphragm itself, and for them to attempt to reproduce in the new diaphragms the same stiff and otherwise deteriorated condition as that existing in the failed diaphragm. The tests conducted by the Bureau of Standards disclosed that a new diaphragm, even if immersed in aviation fuel for a period as long as 1,000 hours, would not deteriorate or become stiff as had the failed diaphragm found in the left engine. The tests further disclosed, on the other hand, that a new diaphragm if immersed in aviation fuel for 1,000 hours and then in "Kleen-A-Karb" for four hours would stiffen and deteriorate to a condition substantially the same as that of the failed diaphragm. These tests indicated, in other words, that to produce a stiffened and deteriorated condition such as that found in the defective diaphragm, mere use in an engine and contact with aviation fuel was not enough.

The investigation conducted by the Board's investigators revealed no evidence that the engine as received from ACES had been tampered with in the shops of U. S. Airlines. Furthermore, no evidence was found indicating that a part or all of a fuel feed valve assembly had been installed in any other aircraft of U. S. Airlines in the time during which U. S. Airlines had the engine in its shops. Furthermore, since U. S. Airlines does none of its own engine overhauls, it does not have a degreasing agent similar in strength to Kleen-A-Karb. Finally, there is the testimony of record of the principal officials of U. S. Airlines indicating under oath that the engine as received from ACES was not tampered with in any way prior to its installation on the aircraft, N 1911M. These factors indicate to us that the replacing by U. S. Airlines of the diaphragm after receipt of the overhauled engine from ACES is a very remote possibility.

The Bureau of Standards' tests indicate, on the contrary, that the first possibility - that the diaphragm was not replaced by ACES at the time of overhaul - is the probable explanation for the presence of the defective diaphragm in the left engine at the time of the crash. ACES was responsible for the installation of a new diaphragm in connection with its overhauling of the engine. Personnel of ACES testified that the company had never stocked diaphragms of the subject type and part number. As already noted, the Bureau of Standards' tests indicated that an immersion of a similar new diaphragm in aviation fuel for a 1,000 hours and then in Kleen-A-Karb solution, which was the agent stocked and used by ACES, would deteriorate a new diaphragm to a condition substantially the same as that of the failed diaphragm in question.

As the time for overhauls for the subject engine was 905 hours, it must be concluded that the diaphragm in question had been in use, i.e., exposed to fuel for this period of time, had not been removed, was immersed in a cleaning agent, and put back in the overhauled engine.

Although ACES company officials testified that such omission could not possibly happen because of their shop methods, the Board finds that the diaphragm in question was not replaced at the time of engine overhaul, and that its deteriorated condition as found was due to its having been subjected to previous service and to the action of the "Kleen-A-Karb" agent. It is quite obvious that had a new diaphragm been installed, its condition could not have been reduced to the state of the one involved during six odd hours of engine use.

Findings

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

1. The carrier, the aircraft and the crew were properly certificated.

2. The flight was properly dispatched and cleared and was routine until it arrived over Idlewild Airport.

3. As the flight approached Idlewild it was given the local weather including a measured ceiling of 500 feet and a visibility of one and one-half miles.

4. This ceiling and visibility were the minimums for the subject flight.

5. The captain elected not to follow the tower's suggestions due to limited forward visibility at his altitude.

6. During power application for a missed approach the fuel feed valve diaphragm of the left engine either completely failed or an existing failure became worse, this diaphragm had not been replaced at the time of engine overhaul, as required.

7. The left engine then acted erratically with surging, intermittently cutting out.

8. At the time the flight was on instruments in turbulent air.

9. Control was lost and the aircraft descended rapidly in a sharply nose-down right slip taking on aspects of a spin, and crashed.

Probable Cause

The Board determines that the probable cause of this accident was loss of control following sudden engine failure, caused by a deteriorated fuel feed valve diaphragm during an attempted missed approach.

BY THE CIVIL AERONAUTICS BOARD:

/s/ DONALD W. NYROP

/s/ OSWALD RYAN

/s/ JOSH LEE

/s/ JOSEPH P. ADAMS

/s/ CHAN GURNEY

SUPPLEMENTAL DATA

Investigation and Hearing

The Investigator-in-Charge of the New York office of the Civil Aeronautics Board was notified of this accident by the Civil Aeronautics Administration a few minutes after occurrence. 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 at the Hotel Lexington, New York City, May 6, 7 and 8, 1952.

Air Carrier

U. S. Airlines, Inc., is a scheduled cargo air carrier, incorporated in Florida, with its principal place of business at Fort Lauderdale, Florida. It 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 cargo by air from Fort Lauderdale, Florida, to several cities within the country, including New York, New York.

Flight Personnel

Captain William B. Crockett, Jr., age 27, held a currently effective airline transport rating with an appropriate rating for the subject aircraft. He had been continuously employed by U. S. Airlines, Inc., since May 1948. His total piloting time was 4,760 hours, of which 2,225 hours had been as a C-46 captain, and of which 225 hours had been on instrument. Captain Crockett's last six months' instrument and equipment check, taken on December 19, 1951, less than four months before this accident, was satisfactory.

Copilot J. L. Woerderhoff, age 38, held a currently effective commercial airman certificate with a multi-engine rating. He had acquired 246 hours as a copilot on C-46's since he was hired by U. S. Airlines in December 1951. The record indicates that he had flown some 2,000 hours from 1929 to 1935. Since then he had flown a total of 1,070 hours.

The Aircraft

N 1911M was a C-46-F and was built for, and delivered to the Army Air Force in July 1945. It was later stored and was acquired under lease by U. S. Airlines in August 1947. It was placed in civil use on October 9, 1948, following conversion and certification by the Civil Aeronautics Administration. At the time of the accident it had been flown 4,293 hours. The engines were Pratt & Whitney Model R-2800-75 and the propellers were Hamilton Standard Model 23E50-505.

JAMAICA HIGH SCHOOL
TOP EL. 265' ABOVE MSL.

WATER TANK
90' HIGH
ELEV. OF TOP 224.9'

APARTMENT BUILDING
(NW CORNER)
TOP EL. 209' ABOVE MSL.

POINT OF IMPACT

GAS TANK 336' ABOVE MSL

DISTANCE FROM POINT OF IMPACT
TO CONTROL TOWER 4.4 MILES

BROOKLYN

FEDERAL BUILDING

WIND DIRECTION E. SE. (MAG.)
WIND VELOCITY 22 MPH.
WITH GUSTS TO 30 MPH.

POINT FIRST
OBSERVED

CONTROL TOWER

NEW YORK INTERNATIONAL AIRPORT
FIELD ELEVATION 12' ABOVE MSL.

MAG.
GRID
12° 15'
11° 29'

PROBABLE FLIGHT PATH
FIRST APPROACH INSTRUCTION
SECOND APPROACH INSTRUCTION

IDLEWILD
RADIO RANGE

OUTER MARKER

O C E A N

A T L A N T I C

DISTANCE IDLEWILD RANGE
TO RIIS PARK INTERSECTION
(SCOTLAND) IL 25 MILES

1 1/2 0 1 MILE

13533

PROBABLE FLIGHT PATH
U. S. AIRLINES C-46
AIRCRAFT ACCIDENT
N1911M JAMAICA, N. Y.
APRIL 5, 1952

ATTACHMENT I