

File No. 1-0004

C I V I L A E R O N A U T I C S B O A R D
AIRCRAFT ACCIDENT REPORT

Adopted: **March 8, 1965**

Released: **March 11, 1965**

FRONTIER AIRLINES, INC.
DOUGLAS DC-3C, N61442
MILES CITY, MONTANA
MARCH 12, 1964

SYNOPSIS

Frontier Airlines Flight 32 of March 12, 1964, crashed and burned during an instrument approach to the Miles City Airport, Miles City, Montana, about 2050 m.s.t. All five occupants, three crew members and two passengers were killed, and the aircraft was destroyed. Weather conditions last reported to the flight were the operational minima of ceiling 400 feet and visibility one mile. Wet snow, strong gusty winds, and near-freezing temperatures prevailed.

Investigation revealed neither malfunctioning of any of the aircraft's components nor of any of the pertinent airport navigational facilities including the VOR, which was utilized. All applicable FAA certification was in order.

The Board determines that the probable cause of this accident was the descent below obstructing terrain, for reasons undeterminable, during an instrument approach in adverse weather conditions.

Investigation

Frontier Airlines (FAL) Flight 32 of March 12, 1964, a DC-3C, N61442, crashed and burned while making an instrument approach to the Miles City Airport, Miles City, Montana about 2050 ^{1/} March 12, 1964. All five occupants, three crew members and two passengers, were killed.

The flight was regularly scheduled between Billings and Sidney with stops at Miles City and Glendive, all in Montana. Departure from Billings was scheduled at 1950 with arrival at Miles City scheduled at 2046.

The crew ^{2/} of Flight 32 arrived at the company's operations office at Billings between 1830 and 1845 to prepare for the flight. At about 1925 the captain received a weather briefing from the U. S. Weather Bureau (USWB) at the airport. The captain was told that a cold front was approaching Miles City at that time and that gusty west to northwest winds would persist following frontal passage with turbulence and at least moderate icing. The captain was also told about the possibility of squalls in the Miles City area and that the ceiling and visibility would be somewhat less than indicated on the Miles City 24-hour terminal forecast starting at 1600, March 12. Specific figures were not given. This forecast was in part as follows:

1/ All times herein are mountain standard based on the 24-hour clock, unless otherwise noted.

2/ The crew consisted of Captain Kenneth C. Huber, first officer Daniel H. Gough, and Stewardess Dorothy Ruth Reif.

1800 to 2100, "Pacific frontal passage, ceiling 2,000 feet overcast, visibility 3 miles, light snow, wind 300 degrees 20 knots with gusts, occasional visibility 1 mile, light snow."

FAL's agent at Billings filed a flight plan for Flight 32 with the Great Falls Air Route Traffic Control Center (GTF ARTCC) about 1920. It was "Frontier 32, DC-3, filed airspeed 150, proposed off Billings at 0255 ^{3/} requesting 7000 Billings Victor 2 to Miles City."

A Dispatch Release for the flight was received from FAL's Denver, Colorado Dispatch Office about 1920. At about 1955 Flight 32 received its Instrument Flight Rules (IFR) clearance from the Billings Tower. It was read back correctly by the flight as "ATC clears Frontier Airlines Flight 32 to the Miles City VOR via Victor 2, maintain 7000."

Flight 32 departed Billings at 2001. The captain occupied the left seat, the first officer the right. The aircraft's gross weight was 23,275 pounds, well under the allowable, and its center of gravity was located within prescribed limits. At 2003 the flight reported to Billings Tower on course and, at 2004, leaving 6,000 feet.

At 2006 Billings Tower asked the flight if it was an estimated 13 miles northeast of Billings and the flight replied that it was over Huntley (a community 10 miles northeast of Billings). At this time the flight was instructed to contact GTF ARTCC. It did so, at 2007, verifying its altitude of 7,000 feet and estimating the Miles City VOR at 2042. GTF ARTCC acknowledged and asked the flight if it was established on Victor 2. The flight replied affirmatively.

^{3/} Greenwich mean time, which is 1955 m.s.t.

At 2019, the Miles City Flight Service Station (MLS FSS) called GTF ARTCC and provided the 2005 surface weather observation for MLS. This was a special observation and the following data were provided: Measured ceiling 1,000 feet overcast, visibility four miles, light snow showers, wind 290 degrees, 25 knots, peak gusts 35 knots, altimeter setting 29.42. The MLS FSS also asked GTF ARTCC if FAL 32 was operating in accordance with Visual Flight Rules (VFR) or IFR and was told the flight was IFR.

Immediately, at 2020, GTF ARTCC contacted FAL 32 and relayed to it the above special weather report except for the omission of the word "showers". Flight 32 acknowledged.

At 2030 GTF ARTCC asked Flight 32 to "Monitor Great Falls frequency 127.3 now," and the flight acknowledged.

At 2032 MLS FSS gave GTF ARTCC another special weather report. This was the 2030 observation which was: "Indefinite ceiling four hundred, sky obscured, visibility one, moderate snow showers, surface wind three zero zero degrees, two zero, peak gusts three zero, altimeter two niner four three." GTF ARTCC then contacted Flight 32 to relay the above. However, Flight 32 replied "Standby please" because it was at that time in contact with the FAL agent at MLS on 129.3 mcs. receiving the MLS weather. GTF ARTCC did contact Flight 32 at 2033 and gave it the above weather report, again omitting the word "showers". Flight 32 acknowledged at 2034. GTF ARTCC then cleared the flight

as follows: "Roger Frontier 32 is cleared for an approach ^{4/} to the Miles City Airport cruise 7000 contact Miles City Radio one two six point seven on initial." The flight acknowledged and read the clearance back correctly.

At 2035, GTF ARTCC advised MLS FSS "Frontier thirty two DC three estimated Miles City zero three four two at presently cruising seven thousand Billings Victor two he has been cleared for an approach your frequency on initial." MLS FSS acknowledged and GTF ARTCC then advised MLS FSS that Flight 32 had been given the 2030 special weather observation.

At 2045 flight 32 reported to the FSS that it was over the VOR starting the approach. The FSS acknowledged and gave the 2030 special weather report. Also, about 2045 the flight contacted the FAL company agent at MLS and advised that it had passed over the VOR at 2042, commencing an approach with a "fuel out of 485 gallons." ^{5/} The FAL station agent read the transmission back and gave the flight the wind, 290 degrees, 20 with peak gusts to 30 knots. The FAL agent then advised the flight to standby for a traffic check. ^{6/} Flight 32 acknowledged.

^{4/} There are four FAA-approved public instrument approach procedures applicable to the MLS Airport. These are a VOR, an ADF and two VOR/DME approaches. Only the VOR or the ADF approaches could have been utilized by Flight 32 as it was not equipped with DME (Distance Measuring Equipment). (See Attachment "A")

^{5/} This means that there would be 485 gallons of fuel on the aircraft (without fueling) upon departing Miles City.

^{6/} Since there is no control tower at the Miles City Airport, Frontier Airlines requires their local agent to make a visual check for other aircraft operating at the airport and to report the results to incoming flights.

The agent checked for local traffic and advised "No traffic sighted advise if you want rudder lock on runway." Flight 32 acknowledged at 2047 and asked for the rudder lock. The station agent replied that he would have the rudder lock ready and asked when the flight would be on the ground. The flight replied that it would be three minutes and the station agent acknowledged. This was the final transmission between the flight and the station agent.

Flight 32 reported at 2048 to the MLS FSS over the VOR inbound. The FSS replied with advisory information that the surface wind at the Miles City Airport was from 300 degrees at 20 knots with peak gusts 30 knots, favoring Runway 30, altimeter 29.43. Flight 32 acknowledged and said "we'll plan three zero." This was the last radio contact between the flight and the MLS FSS.

The elapsed time from when the aircraft was over the VOR commencing the approach (2042), as reported to the FAL station agent, to over the VOR inbound (2048), as reported to the FSS, was six minutes.

In none of the transmissions from the flight was there any mention of operational distress or of weather conditions encountered.

At 2050, or very close thereto, the aircraft struck the ground. The crash site was approximately 1-1/2 miles northeast of the VOR on the 32-degree radial of the VOR. ^{1/}

^{1/} The 032 radial is on a direct line from the VOR station to the approach end of Runway 4.

The crash site was on a 22-degree upslope at an elevation of 2610 feet m.s.l. and 9,900 feet short of the approach end of Runway 4. The airport elevation is 2,628 feet m.s.l. and that of the VOR station is 2,702 feet m.s.l. At the time of impact the aircraft's heading was about 38 degrees magnetic and the elevation of the crest of the small rise ahead was 2,615 feet m.s.l. (See Attachment "B")

At impact the aircraft was in a slight left wing-down attitude of about six degrees and in a slight nose-up attitude of about four degrees. The landing gear was extended and the wing flap actuator was extended about 8-3/4 inches corresponding to 1/4 flap extension. After initial impact the aircraft began to disintegrate and continued moving for a distance of about 600 feet. Fire developed and the major portion of the aircraft was destroyed.

Examination of the airframe wreckage, systems and powerplants revealed nothing to indicate there had been any operational defect or malfunction prior to impact. The propeller slash marks in the ground were congruent with a ground speed of 137 knots. ^{8/} The aircraft was equipped with de-icer boots on the leading edges of the wings and empennage and an alcohol anti-icing system for the propellers and windshield. It could not be determined if these systems had been in use.

Fire and other damage made it impossible to determine the readings of many instruments. However, the captain's altimeter was set at 29.47

^{8/} The computation assumed a probable engine speed of 2050 r.p.m.

inches and the first officer's at 29.42 inches. The captain's Omni Bearing Selector (OBS) was set at 031; the first officer's OBS was not readable. No frequency information could be obtained from the radio controls. However, internal examination of the several units showed that the No. 1 VHF communications unit was tuned to company frequency at Miles City, the No. 2 VHF communication unit was set on the MLS FSS frequency, the No. 1 VHF navigation receiver was at 112.1 mcs., (the frequency of the MLS VOR), and the No. 2 VHF navigation receiver at 115.3 mcs., (the frequency of the Sheridan, Wyoming VOR). The two ADF receivers were at 362 kcs. and 247 kcs. Miles City radio-beacon frequency is 320 kcs.

Examination of the maintenance records of the aircraft indicated that maintenance had been current and as prescribed in all company and Federal Aviation Agency (FAA) directives. No item that could logically be related to this accident was disclosed. Fire at impact and the time interval before persons reached the crash site made it impossible to determine if airframe icing had been present at impact.

The last official weather observation taken at the Miles City Airport prior to the accident was the 2030 special observation, the values of which have been previously mentioned. Subsequent to the accident a record special observation was taken at 2055 and was in part: indefinite ceiling 500 feet, sky obscured, visibility 1 mile, light snow showers, temperature 32°F., dewpoint 32°F., wind 300 degrees, 20 knots with gusts to 30 knots, altimeter setting 29.44 inches, snow began at 2002.

The Miles City Airport has a UHF omnidirectional course and distance information facility (TACAN) ^{9/} and a VHF omnidirectional course indicator (VOR) ^{10/}, known jointly as VORTAC ^{11/}, housed together 3-1/2 miles southwest of the airport. The TACAN was reported out of service at 2015. A technician was dispatched to the facility and found that the TACAN antenna was coated with ice, which, in his opinion, was the cause of the malfunction. However, the TACAN and the VOR are separate pieces of equipment and failure of one in no way affects the other. Since the aircraft was not equipped with DME this feature of the VORTAC facility could not have been utilized. The FAA flight tested the MLS VOR about 0300 the following morning and found it to be operating normally.

Statements were taken from 21 persons who saw and/or heard an airplane in the Miles City area near the time of the accident. Investigation revealed no other aircraft in flight at the approximate place and time except for Northwest Airlines Flight 40, a DC-7C, which reported over Miles City at 2035 en route from Billings to Minneapolis at 17,000 feet. Some of the witnesses were to the southwest of the MLS Airport (along the flightpath from Billings) and some were to the east and northeast.

9/ TACAN stands for Tactical Air Navigation. It furnishes both azimuth guidance and distance information.

10/ VOR stands for Very High Frequency Omnidirectional Range.

11/ VORTAC is a combining form of VOR and TACAN.

Three witnesses were able to fix the time of their observation quite closely. One, the technician who was sent to inspect the inoperative TACAN, established that it was 2048 when he saw an aircraft, which he could identify as a DC-3, pass overhead, toward the airport at a height above the ground of approximately 1,000 feet and about 600 feet north of his position. According to the witness, the aircraft appeared and sounded normal at this point. At that time he could see the glow of the rotating beacon at the airport, 3-1/2 miles to the northeast. He also noted weather conditions and estimated that wind gusts were 35-40 knots "or maybe more", that the wind was strong enough to move small rocks on the ground and that the driving snow was very wet. Another witness, who was in a parked car about 3-1/2 miles south of the airport, did not see or hear an airplane but did see a red flash in the sky, ". . . the whole sky to the west was lit up . . ." at a time he established as close to 2050. He noted a gusty wind from the north with snow or sleet. A pilot witness was in his home in Miles City about one mile southeast of the airport. At about 2050, a time established by reference to a television program he was watching, he heard an unusually loud noise from an airplane. This loud noise lasted for five to eight seconds and ended abruptly. He described the weather as moderate wet freezing snow with wind gusts of 30-40 knots.

Other witnesses were not sure of the exact time of hearing or seeing the aircraft. Most of them, however, recalled the state of

the weather and expressed it in such terms as "poor visibility, snowing", "heavy wet snow", "swirling snow, wet, heavy, visibility less than 200 feet." The wind was described, in consensus, as gusty up to 45 knots.

Witnesses in various locations around the VOR site and airport reported seeing an aircraft below 6,000 feet during the early evening. Others heard an aircraft over the city of Miles City (about one mile southeast of the airport) at low altitude during the same time period.

Runway 30 at Miles City Airport is 5,601 feet long, 150 feet wide, and was lighted at maximum brilliance. The airport does not have a control tower. There is no USWB station. FAL maintains a station at this airport and, at the time of the accident, one FAL agent was on duty at the station. The FAA maintains an FSS at the airport and, at the time of the accident, one man was on duty. This individual was certificated by the USWB to take surface weather observations. The ceilings which he reported were obtained by means of a ceiling light projector and a clinometer. The FAA-prepared and USWB-approved visibility reference charts in use at MLC FSS did not include the visibility reference points required to establish surface visibility at night. ^{12/} The FSS observer used only one reference point, the obstruction lights at the end of Runway 4 which were one mile distant, when he determined the one mile visibility. This did not allow him to ascertain the visibility prevailing through one-half of the horizon circle, as prescribed

^{12/} Corrective action on this matter has been initiated by the U. S. Weather Bureau as a result of the Board's investigation of the accident.

in the Manual of Surface Observations (Weather Bureau, Air Force, Navy) Circular N.

The VOR approach procedure prescribes that the aircraft starts a descent from an altitude not below the minimum en route altitude (6,000 feet) to 4,500 feet outbound on the 211-degree radial of the VOR and executes a procedure turn not below that altitude. Upon completion of the procedure turn further descent to 3,500 feet is authorized while inbound to the station on a 031-degree course. After crossing the VOR on final approach, descent to 3,100 feet is authorized until passing Fort Intersection (a 300-degree bearing from the MLS radio beacon). Further descent to minimum altitude is then authorized. The night weather minima for this approach (circling) ^{13/} were ceiling 400 feet and visibility one mile for any runway. The procedure as depicted on both the U. S. Coast and Geodetic and Jeppesen approach charts provides that final approach is not authorized from the holding pattern at the VOR and that a procedure turn must be made.

Following this accident Board investigators requested FAL to instruct certain Flight 32 crews to execute VOR instrument approaches to the MLS Airport for the purpose of ground witness observations. The company complied and flights were so made on March 15 and 17, 1964. The first flight landed on Runway 30 and the second simulated a landing on Runway 30 before using Runway 12. During both flights, investigators were present at certain witness locations, with the witnesses to compare what they saw and/or heard with their observations on the night of the accident.

^{13/} A circling approach was intended inasmuch as the crew advised the FSS of their intention to use Runway 30.

The elapsed time between the reported positions of these latter flights were substantially the same as those reported by Flight 32 of March 12. During the second flight, engine r.p.m. and manifold pressure were increased to maximum limits when directly above the crash site in an attempt to duplicate the sound heard by one witness immediately prior to the crash of Flight 32 of March 12. This witness, an experienced pilot, remarked that the noise on the night of the accident was much louder, seemed to be lower in height, and was followed by complete silence.

Other witnesses recalled that what they saw and/or heard on the night of the accident seemed to be much closer or louder to them than what they saw and/or heard during these tests.

Analysis

The investigation revealed no improper procedures and/or malfunctions of the following: dispatch, ground-air communications, aircraft components, powerplants, and pertinent navigational airport aids to landing. Therefore, it is indicated that the causal factors of this accident are related to either the manner in which the aircraft was flown or to the prevailing severe weather conditions, or to a combination thereof.

It is impossible to reconstruct the precise flightpath or exact altitudes of the aircraft during its final few minutes of flight. It must be borne in mind that strong winds with blowing wet snow and low ceilings could and probably did significantly distort both

sound and sightings as described by witnesses. The evidence indicates that the aircraft flew over the VOR at approximately 2048 about 1,000 feet above the surface. The aircraft at this position, according to the witness, appeared and sounded normal in all respects. Yet, the point of impact was located only 1.7 miles from the VOR where the minimum descent altitude should have been approximately 400 feet above the ground.

Because there is no evidence of any failure or malfunction of the aircraft or navigational aids, nor any message received from the crew pertaining to any difficulties, the Board cannot state, with any degree of certainty, the reason for the unexplained departure from the minimum descent altitude. However, based on the evidence available the following possibilities appear to be the most plausible:

1. An attempt to Conduct the Final Portion of the Approach by Visual Reference to the Ground

The witness located at the VOR site stated that visual contact with both the aircraft and the airport beacon was possible from his position. It is, therefore, possible that when the aircraft was in the vicinity of the VOR, visual contact with the ground and/or airport beacon was established by the crew. If this were the case, it is conceivable that with both pilots attempting to maintain visual contact with the ground and/or keep the airport beacon in sight, a continued unmonitored descent below the existing ceilings could have resulted.

The final approach speed for the DC-3 is approximately 105 knots and the aircraft's ground speed at impact was computed to be approximately 137 knots. Under the existing wind conditions the indicated airspeed (IAS) at impact would have been approximately 134 knots. To obtain this speed, with landing gear down and flaps 1/4 extended, either high engine power settings or a decrease in the angle of attack or a combination of the two would be required. The evidence indicates that normal engine power was being utilized by Flight 32 until just prior to impact.

Therefore, it can be postulated that in order to continue the flight by visual means during the final portion of the approach a rapid descent became necessary to remain below the clouds and to keep the ground and/or airport beacon in sight. If both pilots were concentrating on conditions outside the cockpit, and the altimeters were unmonitored, it is possible that the descent was continued until contact with the ground was unavoidable. Power was added by the crew when it was realized they were at a dangerously low altitude. However, the power application was too late to prevent ground impact.

2. Airframe Icing

It was determined that weather conditions in the vicinity of Miles City were conducive to moderate to heavy

airframe icing in clouds and precipitation. Strong gusty winds over the rough terrain would likely have produced moderate to severe turbulence in the area.

Under these conditions large ice accretions on the wing surfaces, if undetected throughout the descent and initial approach, would have become a serious detriment to airspeed and altitude control, especially after the landing gear and flaps were extended. With such an accumulation of ice, it is possible that prior to or at the time the flight reached its minimum descent altitude (400 feet), the descent could not be arrested without a serious loss of airspeed. A situation of this type, it is recognized, could necessitate lowering the nose of the aircraft to regain airspeed, resulting in a rapid loss of altitude and operation below a safe terrain clearance altitude.

N61442 was equipped with a de-icing system which is normally able to cope with ice accretions on critical airframe surfaces. Because of fire and impact damage it was impossible to determine whether this system was operational or in use prior to impact. However, there were no indications noted in any of the aircraft's maintenance records pertaining to any discrepancies or malfunctions to this system. It can, therefore, be presumed that this system was capable of normal operation prior to the commencement of this flight. Any ice

accretions sufficient to have caused a loss of airspeed or altitude control should have been known to the crew and, accordingly, removed from the aircraft through the use of the de-icing system.

Additionally, ice accretions sufficient to cause a loss of control resulting in ground impact 1.7 miles beyond the VOR would necessarily have had to begin accumulating considerably further back on the approach. This, in turn, would have required the use of much higher engine power settings to keep the aircraft within tolerable airspeeds, descent rates, and altitudes throughout the remainder of the approach. The sound of high engine power heard by the witnesses just prior to the crash in conjunction with the witness observations of normal engine sounds in the proximity of the VOR suggests that normal power was being employed until just prior to impact. Further, if airspeed and altitude control became critical during the approach, the landing gear and flaps would not normally have been extended until a landing on the runway was assured. If they had already been extended and a serious icing situation developed, it appears logical that one of the first steps taken by the pilot would have been the immediate retraction of any drag producing components.

Finally, the airspeed at impact, which was determined to have been approximately 134 knots, should have been more

than sufficient to counteract the effects of severe airframe icing if such a situation were present.

The effects of severe turbulence combined with heavy airframe ice would, of course, constitute an additional control problem. A situation of this type would compound existing controllability problems normally associated with severe airframe ice but should not have rendered the aircraft incapable of controlled flight.

In conclusion, although existing weather conditions were conducive to airframe icing, there is insufficient evidence available to support a definitive finding in this area. Similarly, the evidence will not support any conclusion that the pilot committed a gross departure from proper piloting techniques by attempting to conduct the final portion of the approach by visual reference to the ground. The Board, therefore, is unable to determine the reason for the aircraft's departure below the approved minimum descent altitude.

Probable Cause

The Board determines that the probable cause of this accident was the descent below obstructing terrain, for reasons undeterminable, during an instrument approach in adverse weather conditions.

BY THE CIVIL AERONAUTICS BOARD:

/s/ ALAN S. BOYD
Chairman

/s/ ROBERT T. MURPHY
Vice Chairman

/s/ G. JOSEPH MINETTI
Member

/s/ WHITNEY GILLILLAND
Member

CHAN GURNEY, Member, did not take part in the adoption of this report.

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

Investigation

The Civil Aeronautics Board was notified of the accident immediately after its occurrence. An investigation was immediately initiated in accordance with the provisions of Title VII of the Federal Aviation Act of 1958, as amended. Depositions in connection with this investigation were taken at Miles City, Montana, on April 15, 1964, and at Billings, Montana, on April 16, 1964.

The Carrier

Frontier Airlines, Inc., is a Nevada corporation with its principal office in Denver, Colorado. The corporation holds a 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 engage in air transportation of persons, property, and mail over the route involved.

The Aircraft

The aircraft was a Douglas model DC-3C, serial number 9642, and bore FAA identification N61442. It was manufactured June 1943, and at the time of the accident had been operated 30,442 hours. Maintenance had been current and in compliance with FAA requirements.

The two engines were Pratt and Whitney model R-1830, S1C3G and the propellers were Hamilton Standard model 23E50. Maintenance of engines and propellers had been current and in compliance with FAA requirements.

Flight Personnel

Captain Kenneth C. Huber, age 42, had a total piloting time of 15,335 hours of which 12,830 had been in DC-3 aircraft. He was properly certificated, rated and checked. His rest period, prior to the start of the subject flight, was in excess of 30 hours. He had been employed by Frontier Airlines, Inc., since January 1951, and was unusually well experienced, currently, in landing scheduled Frontier Airlines DC-3s at the Miles City Airport.

First Officer Daniel H. Gough, age 25, had a total piloting time of 3,539 hours of which 1,355 hours had been as first officer in DC-3s. He was properly certificated, rated, and checked. His rest period, prior to the start of the subject flight, was in excess of 30 hours. He had been employed by Frontier Airlines, Inc., since June 1962.

Captain Huber and First Officer Gough had flown together, as a crew, on numerous Frontier flights into the Miles City Airport.

Stewardess Dorothy Ruth Reif, age 22, had been employed by Frontier Airlines, Inc., since October 13, 1963.

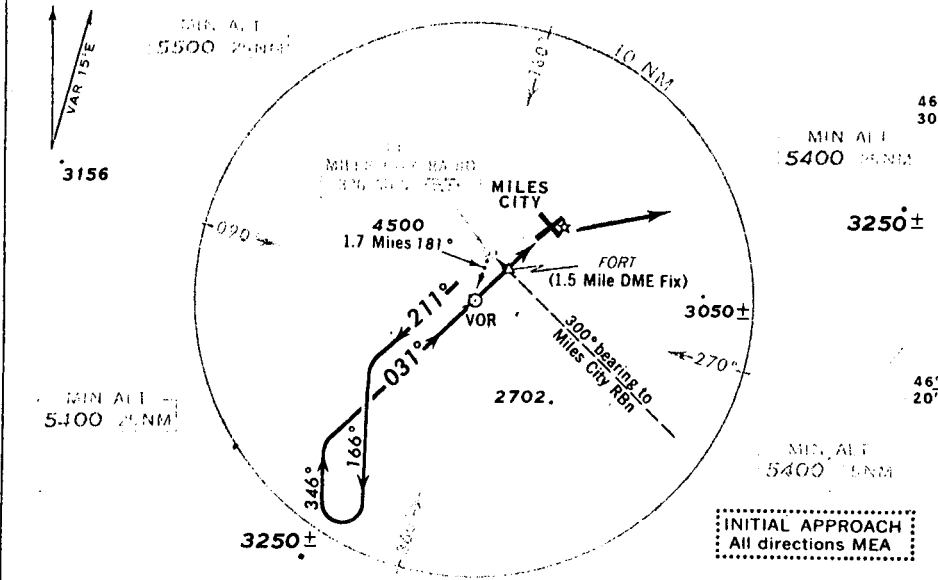
INST APCH PRO (FAA)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

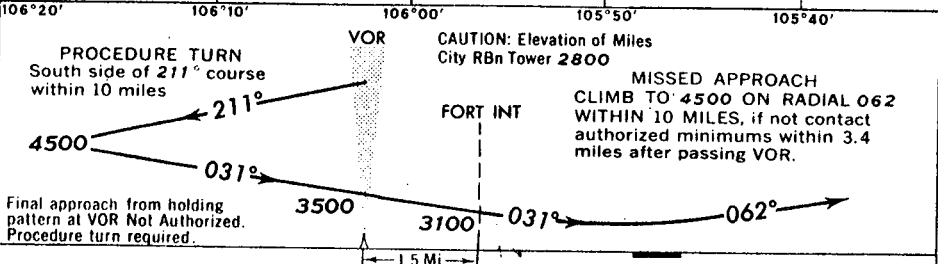
MILES CITY AIRPORT
MILES CITY, MONT.

NO APPROACH CONTROL	MILES CITY RADIO 112.1 MSL Chan 58 122.2 126.7 135.9 255.4 272.7	NO TOWER	NO RADAR
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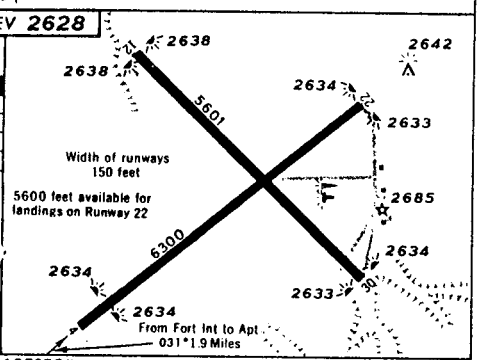
Consult Flight Information Publications for latest information



EMERG SAFE ALT 100 NM 7400



	MINIMA				FIELD ELEV 2628	
	65 knots or less 2 eng or less		Over 65 knots 2 eng or less		Over 65 knots Over 2 eng	
	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT
T	300-1	300-1	300-1	300-1	200-½	200-½
C	400-1	400-1	500-1	500-1	500-1½	500-1½
S 4	400-1	400-1	400-1	400-1	400-1	400-1
A	800-2	800-2	800-2	800-2	800-2	800-2



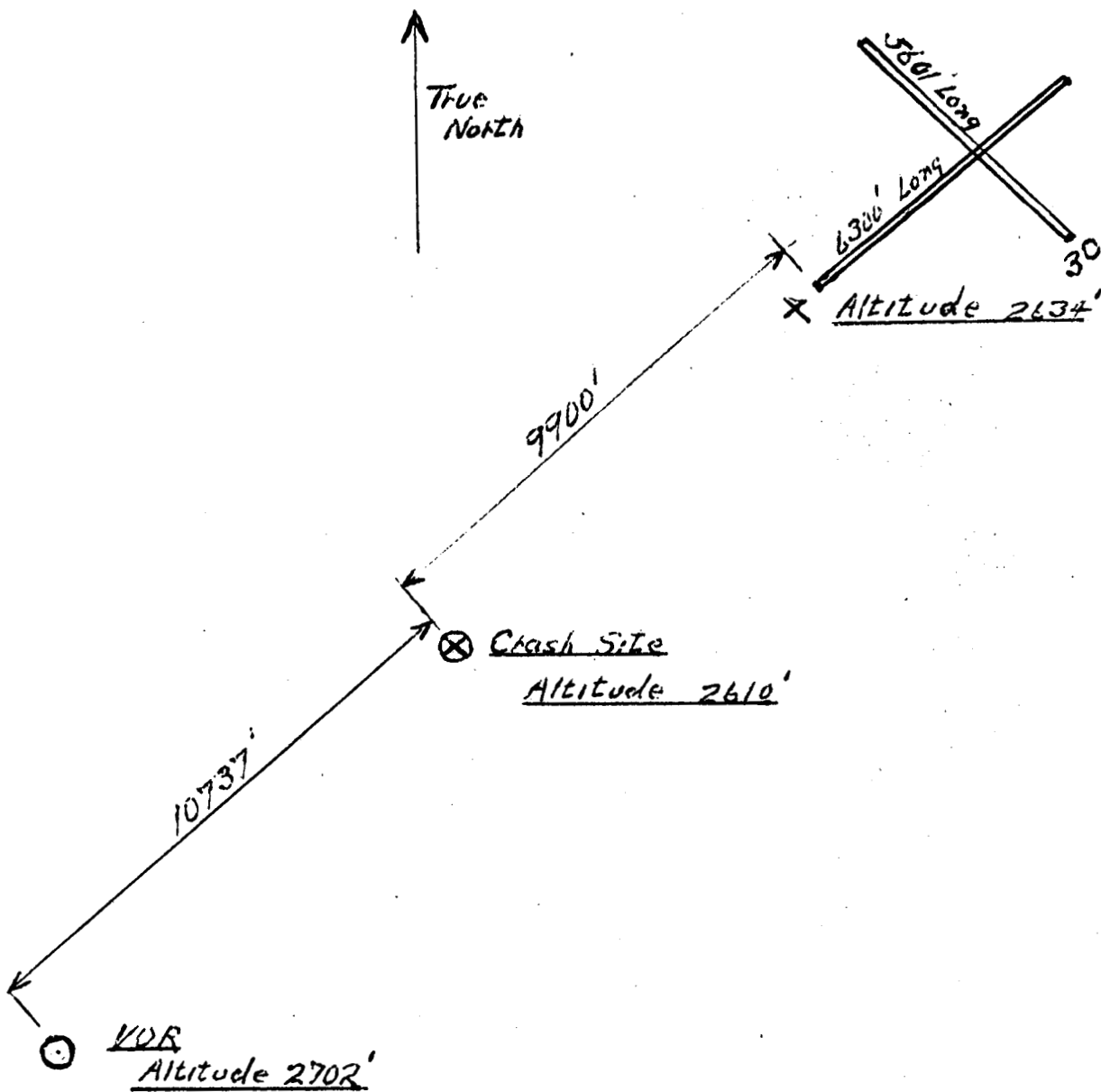
FACILITY TO AERODROME: 031° 3.4 NM	
TIME FROM FACILITY TO MISSED APPROACH	
KNOTS	90 100 110 130 150
MIN. SEC	2:16 2:02 1:51 1:34 1:21

AL-259-VOR-1
10 JAN. 1964

46°26'N - 105°53'W

MILES CITY, MONT.
MILES CITY AIRPORT

Attachment "A"
Frontier Airlines, Inc.
DC-3 N61442
Miles City, Mont. 3/12/64



Attachment "B"

Frontier Airlines, Inc.

DC-3 NB1442

Miles City, Mont. 3/12/64