



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

February 16, 2022

Specialist's Factual Report

OPERATIONAL FACTORS

DCA22LA069

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A. ACCIDENT

Location: Hayden, Colorado
 Date: January 22, 2022
 Time: 1158 Mountain Standard Time (MST)
 1858 UTC
 Airplane: Airbus A320-232, Registration N760JB

B. OPERATIONAL FACTORS SPECIALIST

Specialist David Lawrence
 National Transportation Safety Board (NTSB)
 Washington, DC

C. SUMMARY

On January 22, 2022, JetBlue 1748, an Airbus A320-232, registration N760JB, incurred a tail strike on takeoff from runway 10 at Yampa Valley Airport (HDN) in Hayden, Colorado. A Beechcraft B300 King Air, registration N350J, reported on the Common Traffic Advisory Frequency (CTAF)¹ that they were conducting a visual approach to runway 28 at HDN prior to JetBlue 1748 departing runway 10.² After departure, JetBlue 1748 diverted to Denver International Airport (DEN) in Denver, Colorado. Post-accident inspections determined that airplane suffered substantial damage from the tail strike.³ JetBlue 1748 was a scheduled flight from HDN to Fort

¹ According to the FAA Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25B), a CTAF is a frequency designated for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating control tower. The CTAF may be a Universal Integrated Community (UNICOM), MULTICOM, Flight Service Station (FSS), or tower frequency and is identified in appropriate aeronautical publications. UNICOM is a nongovernment air/ground radio communication station that may provide airport information at public use airports where there is no tower or FSS.

² According to the pilot of N350J, that flight was operated under the provisions of 14 *CFR* Part 91 and had two pilots and two passengers onboard.

³ According to Title 49 *CFR* 830.2 "Definitions," an aircraft accident means an occurrence associated with the

Lauderdale/Hollywood International Airport (FLL), Fort Lauderdale, Florida, and the flight was operated under the provisions of *14 Code of Federal Regulations (CFR) Part 121*.

D. FACTUAL INFORMATION

1.0 Flight Crew Information⁴

The Flight Crew on JetBlue 1748 consisted of a captain and First Officer (FO).

1.1 The Captain

The captain was 45 years old and resided in Pinecrest, Florida. He was hired by JetBlue Airways in 2007 and was based at FLL.

A review of the Federal Aviation Administration (FAA) Program Tracking and Reporting Subsystem (PTRS),⁵ Accident/Incident Data System (AIDS) and Enforcement Information System (EIS) showed no records or reports of any previous aviation accidents or incidents involving the captain.⁶

1.1.1 The Captain's Pilot Certificates and Ratings Held at Time of the Accident⁷

Airline Transport Pilot (certificate issued March 3, 2019)
Commercial Pilot Privileges: Airplane Single Engine Land
Airplane Multiengine Land; A-320, CL-65, ERJ-170, ERJ-190, SF-240 type ratings.

Ground Instructor (certificate issued June 19, 1997)
Advanced Instrument

Medical Certificate - First Class (issued September 2021)
Limitations: Must wear correction lenses

operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage. Substantial damage means damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component.

⁴ Source: JetBlue Airways.

⁵ The Program Tracking and Reporting Subsystem (PTRS) is a comprehensive information management and analysis system used in many Flight Standards Service (AFS) job functions. It provides the means for the collection, storage, retrieval, and analysis of data resulting from the many different job functions performed by Aviation Safety Inspectors (ASIs) in the field, the regions, and headquarters. This system provides FAA managers and inspectors with the current data on airmen, air agencies, air operators, and many other facets of the air transportation system. Source: FAA.

⁶ Source: FAA Safety Performance Analysis System (SPAS) Investigation Package.

⁷ Source: FAA.

1.1.2 The Captain's Training and Proficiency Checks Completed⁸

Date of Most Recent Proficiency Training	January 17, 2022
Date of Most Recent Proficiency Check	January 17, 2022
Date of Most Recent PIC Line Check	October 5, 2020 ⁹

1.1.3 The Captain's Flight Times

The captain's flight times, according to JetBlue Airways records:

Total pilot flying time	11,590
Total flying time last 24 hours	0
Total flying time last 30 days	44
Total flying time last 90 days	196
Total flying time last 12 months	945

1.2 The First Officer

The First Officer was 40 years old and resided in Port St. Lucie, Florida. He was hired by JetBlue Airways in 2012 and was based at FLL.

A review of the FAA PTRS, AIDS and EIS showed no records or reports of any previous aviation accidents or incidents involving the First Officer.

1.2.1 The First Officer's Pilot Certificates and Ratings Held at Time of the Accident¹⁰

Airline Transport Pilot (certificate issued September 22, 2016)
Commercial Pilot Privileges: Airplane Single Engine Land
Airplane Multiengine Land; A-320, B-737, CL-65, ERJ-170, ERJ-190 type ratings.

Flight Instructor (certificate issued April 13, 2020)
Airplane Single Engine

Medical Certificate - First Class (issued April 2021)
Limitations: Must wear correction lenses

1.2.2 The First Officer's Training and Proficiency Checks Completed¹¹

Date of Most Recent Proficiency Training	September 22, 2021
Date of Most Recent Proficiency Check	September 22, 2021

⁸ Source: JetBlue Airways.

⁹ The captain completed Line Oriented Evaluation on January 17, 2022.

¹⁰ Source: FAA.

¹¹ Source: JetBlue Airways.

1.2.3 The First Officer's Flight Times

The First Officer's flight times, according to JetBlue Airways records:

Total pilot flying time	3,307
Total flying time last 24 hours	0
Total flying time last 30 days	15
Total flying time last 90 days	91
Total flying time last 12 months	478

1.3 Flight Crew Recent Schedules¹²

1.3.1 Captain

The captain was in training from January 15, 2022 to January 17, 2022. He was not on duty January 18, 2022.

On January 19, 2022, he was scheduled for a 1-day trip. He departed FLL via ground transportation to Southwest Florida International Airport (RSW), Fort Myers, Florida at 0400 eastern standard time (EST) and arrived RSW at 0615 EST. He flew one leg from RSW to General Edward Lawrence Logan International Airport (BOS), Boston, Massachusetts. He then deadheaded back to FLL, arriving at 1644 EST. His total time on duty was 13 hours and 29 minutes.

On January 20, 2022, he was scheduled for a 1-day trip with a round trip to HPN. He departed FLL at 1428 EST and arrived back at FLL at 2137 EST. His total time on duty was 7 hours and 59 minutes.

On January 22, 2022, he deadheaded from FLL to HDN, departing FLL at 0802 EST. The accident flight departed HDN at 1148 MST. After departure, the flight diverted to Denver International Airport (DEN), Denver, Colorado, arriving at 1249 MST.

1.3.2 First Officer

On January 18, 2022, the First Officer was scheduled for a 3-day trip. He departed FLL at 0802 EST to John F Kennedy International Airport (JFK), New York, New York, and eventually arrived at Austin-Bergstrom International Airport (AUS) Austin, Texas at 1715 EST and was on duty for 10 hours and 59 minutes. He was off duty in AUS for 35 hours and 48 minutes.

On January 20, 2022 he departed AUS at 0557 to FLL, and then flew a roundtrip to Santo Domingo Airport (SDQ), Dominican Republic. He arrived back at FLL at 1611 and his total time on duty was 9 hours and 53 minutes.

¹² Source: JetBlue Airways.

On January 22, 2022 he deadheaded with the accident captain from FLL to HDN. The accident flight departed HDN at 1148 MST. After departure, the flight diverted to DEN, arriving at 1249 MST.

1.4 Flight Crew Duties

According to the JetBlue Airways Flight Operations Manual (FOM), Chapter 11.3.18 “Captain/Pilot-in-Command (PIC),” each captain of an aircraft was, during flight time, in command of the aircraft and crew and was responsible for the safety of passengers, crewmembers, cargo and airplane.¹³ Captain duties included ensuring flights were conducted in accordance with established company policies, Operations Specifications, and Federal Aviation Regulations for optimum safety, efficiency and passenger comfort.

Title 14 *CFR* 91.3(a) Responsibility and authority of the pilot in command, stated the following:

The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft.

According to the FOM, Chapter 11.3.19 “First Officer/Second-in-Command (SIC)” First Officer duties included conducting aircraft operations and related job assignments in accordance with policies established in the FOM and company manuals, and assisting the PIC, as requested, in the performance of flight-related assignments.

Title 14 *CFR* 91.13 Careless or reckless operation, stated the following, in part:

No person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another.

FAA inspector guidance in Flight Standards Information Management System (FSIMS) Volume 14, Chapter 3, Section 5 “Reckless Operation of Aircraft” stated the following, in part:

While there is no regulatory definition of the term, “reckless,” it has been defined in cases decided by the NTSB. A reckless operation results from the operation of an aircraft conducted with a deliberate or willful disregard of the regulations or accepted standards of safety so as to endanger the life or property of another either potentially or actually. Accordingly, any such reckless behavior violates § 91.13.¹⁴

¹³ See Title 14 *CFR* 121.533.

¹⁴ According to the Journal of Air Law and Commerce, Volume 80, Issue 1 “A Legal Analysis of 14 *CFR* Part 91 “See and Avoid” Rules to Identify Provisions Focused on Pilot Responsibilities to “See and Avoid” in the National Airspace System” (2015), traditionally, the FAA packages “careless or reckless” as one violation. However, these terms are not synonymous. Careless is most often likened to negligence, that is, one knew or should have known better. Generally, carelessness reflects inadvertent conduct. Recklessness, on the other hand, is usually reserved for more serious violations of Section 91.13(a), and often for violations that were intentional. See also *Ferguson v. NTSB*, 678 F.2d 821, 824 (9th Cir. 1982).

2.0 Airplane Information

2.1 JetBlue 1748



Photo 1: Photo of accident airplane N760JB.¹⁵

The accident airplane was an Airbus A-320-232, registration N760JB (serial number 3659) and was manufactured in 2008. Its airworthiness certification was issued October 27, 2008. It was powered by two IAE V2527-A5 engines. According to FAA records, it was registered to JetBlue Airways Corp. on Long Island City, New York.

2.2 N350J



Photo 2: Photo of N350J.¹⁶

The airplane on a visual approach to runway 28 at HDN when JetBlue 1748 suffered its tail strike on departure was a Beechcraft B300 King Air, registration N350J (serial number FL80) and was

¹⁵ Source: [Airbus A320-232 - JetBlue Airways | Aviation Photo #2508924 | Airliners.net.](#)

¹⁶ Source: [Raytheon 350 King Air \(B300\) - Untitled | Aviation Photo #1914845 | Airliners.net.](#)

manufactured in 1992. It was powered by two P&W Canada PT6A-60A engines. According to FAA records, it was registered to Southern Star, Inc. in Poteau, Oklahoma.

3.0 Weight and Balance and Performance

According to documents provided by JetBlue Airways, the JetBlue flight 1748 had two pilots, four flight attendants and 109 passengers onboard. The airplane weighed 145,782 pounds at departure with a maximum takeoff weight of about 147,600 pounds (runway takeoff limitation from runway 10 at HDN).

The V₁/V_R/V₂ speeds for takeoff from runway 10 were calculated at 142/142/143 knots respectively with the flaps at setting 1 and the trim set to nose down 0.5 units. The thrust setting (with engine bleeds on) for takeoff from runway 10 was TOGA (takeoff go-around) thrust.

4.0 Meteorological Information

The accident occurred at 1158 MST (1858 UTC). The following are archived weather reports leading up to the time of the accident:

**ARCHIVED METAR OF: 20220122 // FROM: 15 TO: 18 UTC
AIRPORTS REQUESTED: KHDN**

```
KHDN 221556Z AUTO 21003KT 1/4SM -SN FZFG OVC001 M12/M14 A3036 RMK AO2 SNE02B33  
SLP354 P0000 T11221139 FZRANO  
KHDN 221647Z AUTO 05004KT 1/4SM -SN FZFG OVC001 M12/M14 A3037 RMK AO2 P0000  
FZRANO  
KHDN 221717Z AUTO 00000KT 3SM -SN BR BKN001 M10/M12 A3037 RMK AO2 SNB11 P0000  
FZRANO  
KHDN 221735Z AUTO 19003KT 6SM -SN SCT001 M08/M12 A3037 RMK AO2 SNB11 P0000  
FZRANO  
KHDN 221756Z AUTO 21005KT 8SM -SN FEW003 M11/M14 A3037 RMK AO2 SNB11 SLP364  
P0000 60000 T11061144 11072 21144 51008 FZRANO  
KHDN 221826Z AUTO 22003KT 8SM -SN BKN005 M10/M13 A3037 RMK AO2 P0000 FZRANO  
KHDN 221856Z AUTO 00000KT 9SM OVC005 M04/M10 A3036 RMK AO2 SNE52 SLP339 P0000  
T10441100 FZRANO
```

Figure 1: Archived weather reports leading up to the time of the accident.

According to the HDN Operations, Safety and Security Superintendent who witnessed the event, the weather at the time of the accident was “clear” when JetBlue 1748 departed on runway 10. He said that the Automated Weather Observing System (AWOS)¹⁷ was reporting a 500 foot ceiling, but there was a “wispy” layer of fog right over the AWOS sensor, which was located along the approach end of runway 10.¹⁸

¹⁷ According to the FAA Pilot’s Handbook of Aeronautical Knowledge (FAA-H-8083-25B), AWOS was a system consisting of various sensors, a processor, a computer-generated voice subsystem, and a transmitter to broadcast weather data.

¹⁸ See Appendix to this Factual Report.

5.0 Airport Information

Yampa Valley Airport was located about 2 miles east of Hayden, Colorado and about 20 miles west of Steamboat Springs, Colorado at an elevation of 6,606 feet above mean sea level. The airport did not have an operating Air Traffic Control (ATC) tower. Communications with the Denver Air Route Traffic Control Centers (ARTCC) was possible via a remote repeater near the airport.¹⁹ Remote radar coverage existed from enroute to airport surface.

According to the FAA's Airport Data and Information Portal (ADIP), for the 12 months prior to January 1, 2019, HDN had the following mix of aviation operations:²⁰

Air Carrier:	2,100
Air Taxi:	3,955
General Aviation Local:	1,714
General Aviation Itinerant:	3,699
Military:	6
TOTAL OPERATIONS:	11,474

The airport had a single asphalt/grooved runway, designated runways 10/28, that was 10,000 ft long and 150 ft. wide. Runway 10 was serviced by a 3.0° 4-light Precision Approach Path Indicator (PAPI) on the left side of the runway.²¹ Runway 28 was serviced by a 3.5° 4-light PAPI on the left side of the runway.²² Runway 10 was serviced by a precision instrument landing system (ILS) approach and two nonprecision RNAV approaches. Runway 28 was serviced by a nonprecision RNAV approach.

According to the FAA Airport Facilities Directory, all aircraft were required to report on the CTAF frequency 10 minutes prior to takeoff or landing.²³

5.1 Special Airport

JetBlue Airways listed HDN as a special airport per 14 *CFR* 121.445 and provided their pilots with an Airport Briefing Guide (ABG) for the airport.²⁴ According to the JetBlue Airways ABG for

¹⁹ According to the FAA Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25B), an ARTCC provides ATC service to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight.

²⁰ Source: <https://adip.faa.gov/agis/public/#/airportData/HDN>.

²¹ According to the FAA Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25B), a PAPI was a system of lights similar to the visual approach slope indicator (VASI) but consisting of one row of lights in two- or four-light systems. A pilot on the correct glideslope will see two white lights and two red lights.

²² The runway 28 PAPI did not provide obstacle clearance beyond 4 nautical miles from the runway.

²³ There were no Notices to Airmen (NOTAMs) at the time of the event. ___Source: <https://www.notams.faa.gov/dinsQueryWeb/queryRetrievalMapAction.do>.

²⁴ According to 14 *CFR* 121.445, the FAA may determine that certain airports (due to items such as surrounding terrain, obstructions, or complex approach or departure procedures) are special airports requiring special airport qualifications and that certain areas or routes, or both, require a special type of navigation qualification.

HDN, general cautions for operations into and out of HDN included high terrain, high density altitude, high grid minimum off route altitude (MORA), frequent use of opposing runways by arrival/departure aircraft, and high traffic (both commercial and general aviation).

The JetBlue Airways ABG for HDN noted that JetBlue Airways pilots should make traffic calls and monitor radio traffic carefully, and further stated that runway 10 was primarily used for arrivals with tail winds up to 10 knots. Departure guidance from the JetBlue Airways ABG for HDN reminded pilots to call the airport operations on the UNICOM frequency 10 minutes prior to departure.

5.2 Chart Supplement

HAYDEN

YAMPA VALLEY (HDN)(KHDN) 2 SE UTC-7(-6DT) N40°28.87' W107°13.06'

6606 B ARFF Index—See Remarks NOTAM FILE HDN

RWY 10-28: H10000X150 (ASPH-GRVD) S-75, D-170, 2D-260

HIRL

RWY 10: MALSF. PAPI(P4L)—GA 3.0° TCH 52'. Thld displcd 510'. Rgt t/c.

RWY 28: REIL. PAPI(P4L)—GA 3.5° TCH 54'. P-line. 0.3% down.

RUNWAY DECLARED DISTANCE INFORMATION

RWY 10: TORA-10000 TODA-10000 ASDA-10000 LDA-9490

RWY 28: TORA-10000 TODA-10000 ASDA-10000 LDA-10000

SERVICE: FUEL 100LL, JET A QX 3, 4 LGT ACTIVATE MALSF Rwy 10; REIL Rwy 28; PAPI Rwy 10; HIRL Rwy 10-28—CTAF. Rwy 28 PAPI does not provide obst clearance byd 4 NM from thld.

NOISE: Request all acft departing Rwy 28 make right or left turnout as soon as safety permits after t/cf to avoid town of Hayden and comply with noise abatement procedures.

AIRPORT REMARKS: Attended 1300-0300Z±. Class I, ARFF Index C from Dec-Mar. ARFF Index B from Apr-Nov. Possible severe winter conditions from Oct-Apr. Check NOTAMS for arpt conditions. No arpt information nor snow removal guaranteed during hrs of nonattendance. CLOSED to unscheduled air carrier ops with more than 30 passenger seat except PPR; call UNICOM 970-819-1333. Large flocks of sandhill cranes around arpt in spring and fall. All acft report 10 minutes prior to t/cf/lbg on 123.0—monitor frequency 24 hrs, PAEW on rwy. Between 1300-0300Z± ctc UNICOM prior to all t/cfs and lbg for PAEW advisories. During snow season ctc UNICOM. Ldg fee for acft 12,500 pounds and over.

AIRPORT MANAGER: 970-276-5004

WEATHER DATA SOURCES: AWOS-3PT 119.275 (970) 276-3690.

COMMUNICATIONS: CTAF/UNICOM 123.0

HAYDEN RCO 122.25 (DENVER RADIO)

® **DENVER CENTER APP/DEP CON** 120.475

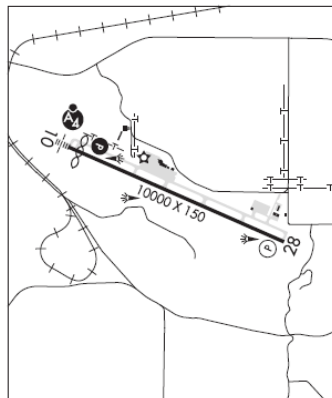
AIRSPACE: CLASS E svc 1400-0400Z±; other times CLASS G.

RADIO AIDS TO NAVIGATION: NOTAM FILE DEN.

HAYDEN (H) (H) VORW/DME 115.6 CHE Chan 103 N40°31.20' W107°18.29' 106° 4.6 NM to fld. 7271/14E.

ILS/DME 109.9 I-HDN Chan 36 Rwy 10. Class IB. ILS is unmonitored.

CHEYENNE
H-3E, L-9E, 11E
MAP



NOT FOR NAVIGATION

Figure 2: FAA Chart Supplement information for Yampa Valley Airport (HDN).

5.3 Sectional Chart

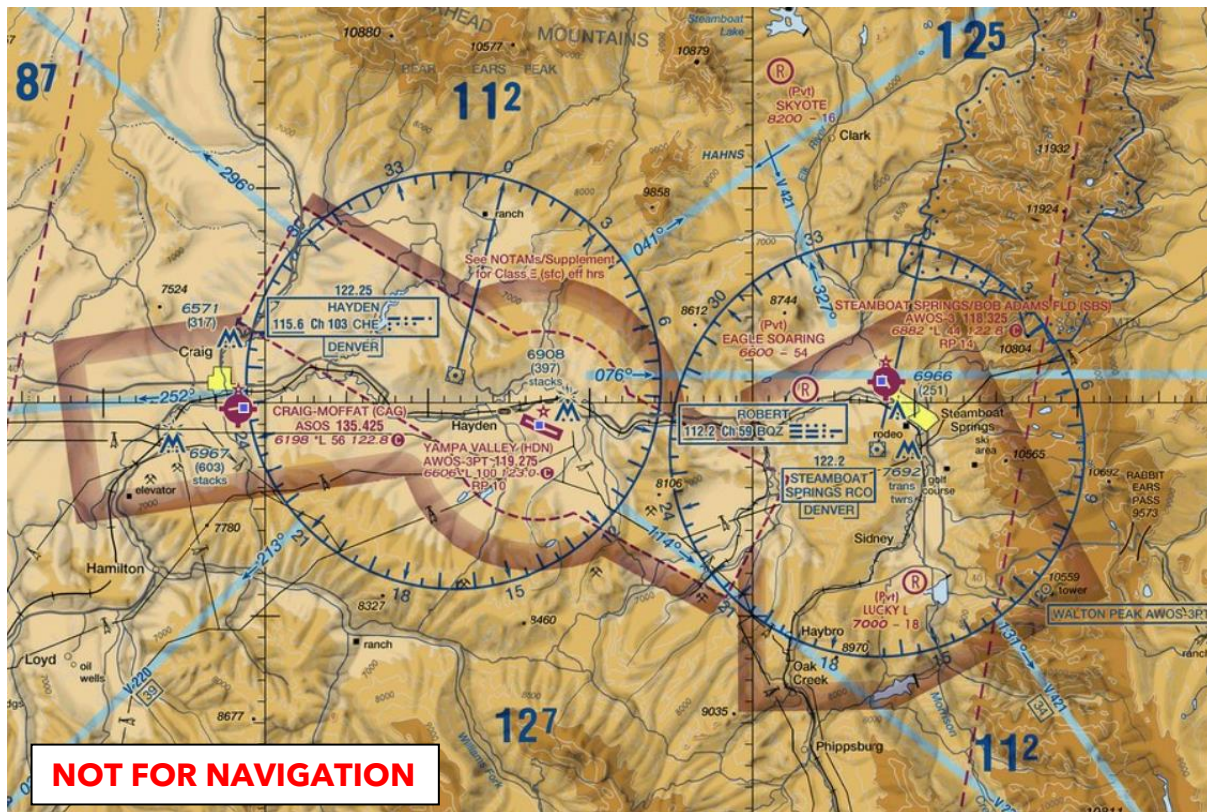


Figure 3: FAA Sectional Chart for Yampa Valley Airport (HDN).

5.4 Airport Charts

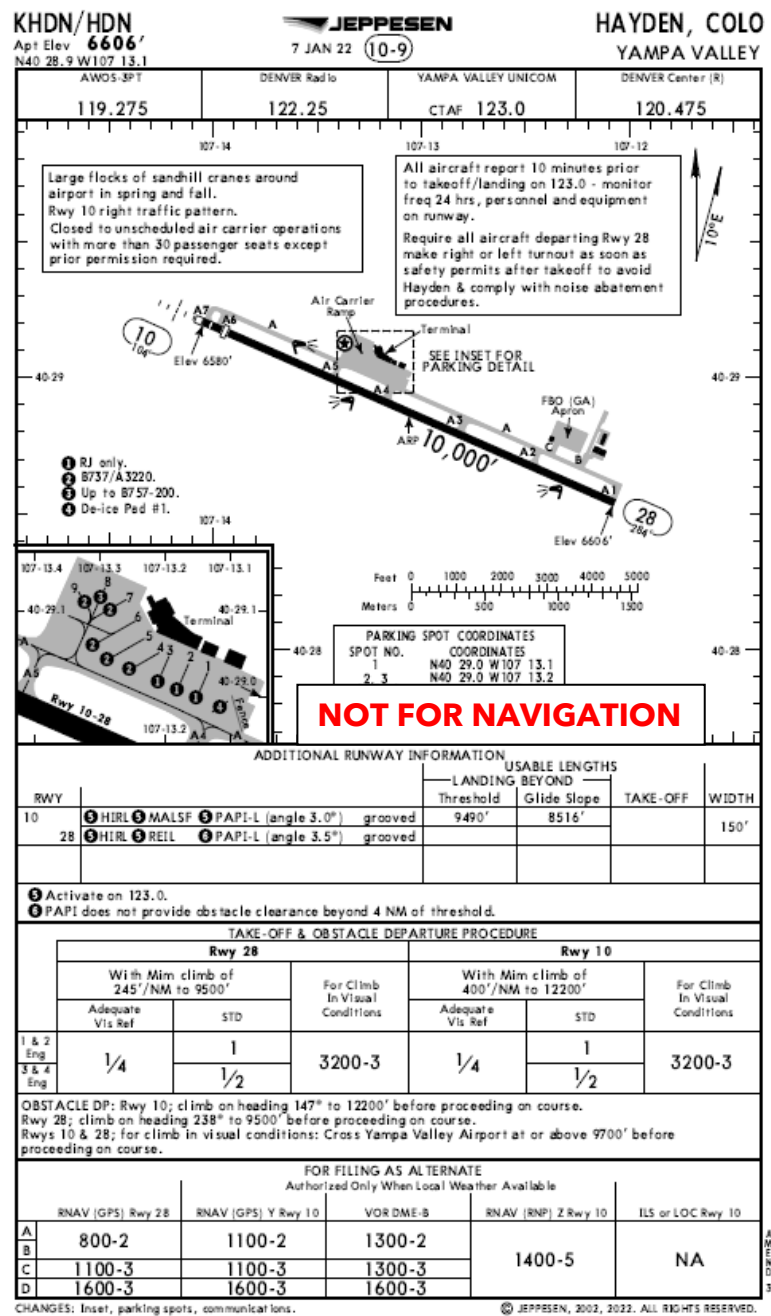


Figure 4: Jeppesen Airport Chart for Yampa Valley Airport (HDN).

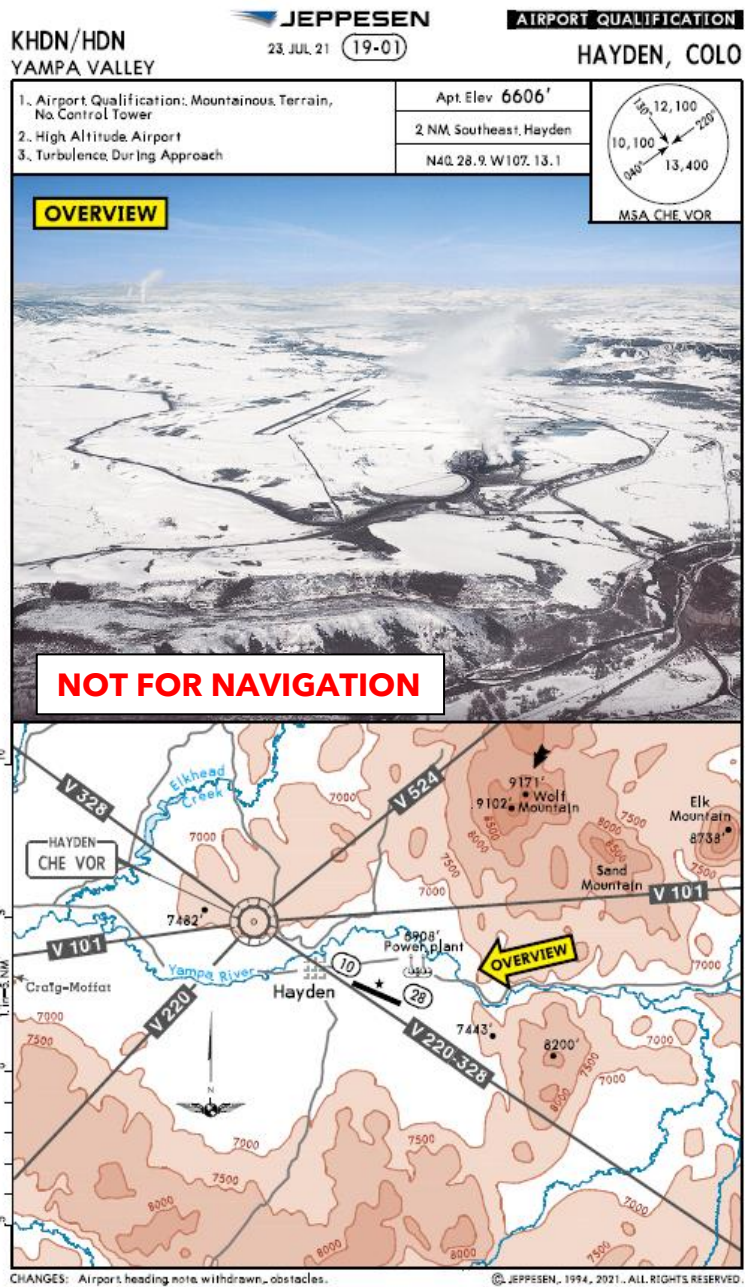


Figure 5: Airport Qualification Chart for Yampa Valley Airport (HDN).

6.0 Relevant Systems

6.1 Traffic Alert and Collision Avoidance System

The Traffic Alert and Collision Avoidance System (TCAS) onboard the Airbus A-320 detected any aircraft, equipped with transponders, flying in its vicinity. TCAS was normally independent of the ground-based air traffic control system and had detection capability to intruders flying within a maximum range of 100 nautical miles and with a maximum altitude range of 9,900 feet (above and below the threatened aircraft).

Each time the relative position of an intruder presented a collision threat, an aural and visual advisory was presented on each pilot's Navigation Display (ND). In the event of a collision threat while airborne, TCAS would calculate a Resolution Advisory (RA) on each pilot's Primary Flight Display (PFD) with vertical speed orders to indicate the vertical direction that the airplane should take to avoid a collision.

TCAS advisory messages and warnings were inhibited when the airplane was on the ground (RAs inhibited below 1,100 ft. on departure and all TA aural messages below 600 feet above ground level (agl) on departure). Provided the airplane's transponder was in TA/RA or TA, traffic was still displayed on each pilot's ND while the airplane was on the ground.²⁵

7.0 Relevant Procedures

7.1 Takeoff from an Uncontrolled Airport

According to the pilot's statements to the NTSB, JetBlue 1748 was given a 2-minute "void time" for their IFR clearance from HDN. According to the FAA Aeronautical Information Manual (AIM), Section 5.2.7, ATC may assign departure restrictions, clearance void times, hold for release, and release times, when necessary, to separate departures from other traffic or to restrict or regulate the departure flow. Departures from an airport without an operating control tower must be issued either a departure release (along with a release time and/or void time if applicable), or a hold for release.

A pilot may receive a clearance, when operating from an airport without a control tower, which contains a provision for the clearance to be void if not airborne by a specific time. A pilot who does not depart prior to the clearance void time must advise ATC as soon as possible of their intentions. ATC will normally advise the pilot of the time allotted to notify ATC that the aircraft did not depart prior to the clearance void time. This time cannot exceed 30 minutes. Failure of an aircraft to contact ATC within 30 minutes after the clearance void time will result in the aircraft being considered overdue and search and rescue procedures initiated.²⁶

²⁵ According to the JetBlue FCOM Volume I, the First Officer's flow for Cockpit Preparation included setting the TCAS Mode Selector to TA/RA or TA as appropriate.

²⁶ Similar language is found in the JetBlue FOM, Section 4.1.8 "Departures from an Airport Without an Operating Control Tower." See also FAA Order JO 7110.65, Para 4-3-4, Departure Release, Hold for Release, Release Times, Departure Restrictions, and Clearance Void Times.

According to the JetBlue FOM Section 4.1.8 “Departures from an Airport Without an Operating Control Tower,” JetBlue pilots were required to make appropriate traffic advisories, including announcing taxi and departure intentions as a traffic advisory, and report taxiing and taking the runway. No takeoff clearance would be issued, and the FOM cautioned pilots to avoid holding in position on the runway and to attempt to monitor CTAF until approximately 10 miles from the airport.

7.2 Normal Takeoff Procedures

Normal Takeoff Procedures were located in the JetBlue Airways A320/321 Flight Crew Operating Manual (FCOM), Volume I (revision 33 dated September 1, 2021). According to the FCOM, for normal takeoffs the captain would set the takeoff thrust and keep his hand on the thrust levers until the airplane reached the takeoff decision speed (V_1).²⁷ When the airplane reached rotation speed on takeoff (V_R), the pilot flying (PF) should rotate the airplane at a 3° per second rate up to a maximum pitch attitude of 15° .

7.3 Tail Strike on Takeoff

According to Airbus, an A-320 tail strike would occur at the following pitch angles:²⁸

- Pitch attitude limit with the main landing gear (MLG) struts fully compressed: 11.7°
- Pitch attitude limit with the MLG fully extended: 13.5°

The JetBlue Airways FCOM Volume I provided the following caution on takeoff:

If a tailstrike occurs, avoid flying at an altitude requiring a pressurized cabin, and return to the originating airport for damage assessment.

The JetBlue A320 Quick Reference Handbook (QRH) had the following procedure for a tail strike:

²⁷ According to 14 *CFR* 23.51, V_1 was the calibrated airspeed on the ground at which, as a result of engine failure or other reasons, the pilot assumed to have made a decision to continue or discontinue the takeoff.

²⁸ Source: https://safetyfirst.airbus.com/app/themes/mh_newsdesk/documents/archives/a320-prevention-of-tailstrikes.pdf.

Tail Strike

When a tail strike is experienced:

1. LAND ASAP
2. MAX FL 100 or MSA
 - 2a. Rate of climb should be targeted to 500 fpm
 - 2b. Rate of descent should be targeted to 1000 fpm
 - 2c. Final approach normal rate
3. Notify ATC of rate of climb.
4. RAM AIR ON
5. PACK 1 and 2 OFF



Figure 6: JetBlue Airways A320 QRH Tail Strike Procedure.

According to the Airbus A320 FCOM, Abnormal and Emergency Procedures, in the event of a tail strike on takeoff, the pilot should climb at 500 feet/minute to minimize pressure changes and for passenger comfort up to a maximum altitude of 10,000 feet msl or the minimum safe altitude (MSA).²⁹ The procedure also called for the pilot to land as soon as possible.³⁰

According to ADS-B³¹ data, after departure from HDN JetBlue 1748 continued to climb to 31,000 feet above mean sea level (msl) before diverting to DEN.

8.0 CTAF Communications

According to the AIM, Section 4-1-9, an airport may have a full or part-time tower or FSS located on the airport, a full or part-time UNICOM station or no aeronautical station at all. There are three ways for pilots to communicate their intention and obtain airport/traffic information when operating at an airport that does not have an operating tower: by communicating with an FSS, a UNICOM operator, or by making a self-announce broadcast.

A CTAF is a frequency designated for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating control tower. The CTAF may be a UNICOM, MULTICOM, FSS, or tower frequency and is identified in appropriate aeronautical publications. At HDN, the CTAF and UNICOM frequencies were both 123.0 Mhz.

According to UNICOM audio recordings on the day of the accident, JetBlue 1748 made a call on the CTAF when they began their pushback from the gate and announced their intent to depart from

²⁹ According to the FAA Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25B), the MSA is the minimum altitude depicted on approach charts which provides at least 1,000 feet of obstacle clearance for emergency use within a specified distance from the listed navigation facility. According to the HDN Jeppesen 19-01 Airport Chart, the MSA for Runway 10 departures to the east was 13,400 feet (see Figure 5).

³⁰ Source: https://safetyfirst.airbus.com/app/themes/mh_newsdesk/documents/archives/a320-tail-strike-at-take-off.pdf.

³¹ Automatic Dependent Surveillance-Broadcast (ADS-B) works by broadcasting information about an aircraft's GPS location, altitude, ground speed and other data to ground stations and other aircraft, once per second. Air traffic controllers and properly equipped aircraft can immediately receive this information. Source: FAA.

runway 10 at HDN. The King Air (N350J) then made a call on CTAF when they were descending out of 13,000 feet that they were about 9 minutes from the airport for runway 10 at HDN.

The King Air subsequently called on CTAF their intent to conduct a straight-in visual approach to runway 28 at HDN, followed by JetBlue calling on CTAF they were beginning their taxi to runway 10 at HDN. The King Air made another call that they were inbound to runway 28 at HDN and then asked on the CTAF if anyone was about to depart from runway 10 at HDN. JetBlue 1748 responded that they were holding short of runway 10 awaiting their clearance. The King Air responded that they were on a 10-mile final to runway 28 at HDN.

When JetBlue 1748 announced on CTAF their takeoff from runway 10 at HDN, the King Air responded they were still on final for runway 28. JetBlue 1748 responded to the King Air that they thought he was 8-9 miles out and the King Air stated he was 4 miles out. JetBlue 1748 acknowledged the King Air and announced that they were beginning their takeoff roll from runway 10 at HDN.³² The King Air responded that they were on a short final and “I hope you don’t hit us.”

According to ADS-B data, when JetBlue 1748 taxied onto runway 10 the King Air was on a reciprocal course 4.91 nautical miles away from JetBlue 1748.

While on short final to runway 28, the King Air asked JetBlue 1748 if they were going to do a quick turn-out, and JetBlue 1748 responded “yes sir.”

According to ADS-B data, when JetBlue 1748 began its right turn after departure from runway 10 the King Air was on a reciprocal course 2.27 nautical miles from JetBlue 1748.

9.0 See and Avoid Concept

According to the FAA Advisory Circular (AC) 90-48D “Pilot’s Role in Collision Avoidance” dated April 19, 2016, the flight rules prescribed in 14 *CFR* Part 91 set forth the concept of “See and Avoid.” Title 14 *CFR* 91.113 prescribed that when weather conditions permit, regardless of whether the operations were conducted under instrument flight rules (IFR) or visual flight rules (VFR), each person operating an aircraft shall maintain vigilance as to see and avoid other aircraft.

The FAA AC 90-66B “Non-Towered Airport Flight Operations,” dated March 13, 2018, stated the following, in part:

Collision Avoidance. The pilot in command’s (PIC) primary responsibility is to see and avoid other aircraft and to help them see and avoid his or her aircraft.

Title 14 *CFR* 91.113 Right-of-way rules Except water operations further stated, in part:

Aircraft, while on final approach to land or while landing, have the right-of-way over other aircraft in flight or operating on the surface, except that they shall not take advantage of

³² According to the JetBlue FCOM Volume I, rolling takeoffs were permitted.

this rule to force an aircraft off the runway surface which has already landed and is attempting to make way for an aircraft on final approach. When two or more aircraft are approaching an airport for the purpose of landing, the aircraft at the lower altitude has the right-of-way, but it shall not take advantage of this rule to cut in front of another which is on final approach to land or to overtake that aircraft.

According to the FAA Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25B) "Clearing Procedures," the following procedures and considerations were in place to assist pilots in collision avoidance under various situations:

- Before takeoff—prior to taxiing onto a runway or landing area in preparation for takeoff, pilots should scan the approach area for possible landing traffic, executing appropriate maneuvers to provide a clear view of the approach areas.
- Climbs and descents—during climbs and descents in flight conditions that permit visual detection of other traffic, pilots should execute gentle banks left and right at a frequency that permits continuous visual scanning of the airspace.

Submitted by:

David Lawrence
National Resource Specialist - Air Carrier Operations

E. APPENDIX

10.0 Statements³³

10.1 Captain Statement

Flight 1748 KHDN - KFLY 01/22/22

We were departing KHDN, a scheduled flight, on our way to KFLY. I was the Captain on this flight, and the designated Pilot Flying for this segment. KHDN is an uncontrolled field, so we were using Unicom / CTAF frequency to alert traffic of our movement and subsequent departure. During boarding, and just prior to push, we observed multiple aircraft using runway 10, including other airlines that had either just landed or departed prior to us. We called Unicom asking for pushback on the ramp, which they cleared us to do.

Prior to taxi from the ramp to the active runway, we noticed no other aircraft moving on the taxiways. We called Denver Center while still on the ramp for a clearance. Denver Center was extremely busy and it took some time to get a hold of them. Once we did, Denver Center asked for us to call back again when we were holding short of the runway, number one for departure, ready to go. We then transmitted on Unicom, taxiing from the Ramp to Runway 10 for departure. At this point we heard from an inbound aircraft that they were on a long straight in Final.

We taxied out to Runway 10 via A, monitoring both Unicom and Denver Center. While holding short of runway 10, nose pointed to the West, we once again called Denver Center, and were given a Clearance for Departure, with a 2 MIN Void Time.

As we were ready for departure, switched over to Unicom / CTAF informed airport traffic we were departing Runway 10. Inbound traffic called that they were now approaching final, we did not hear a Runway Number. Verifying Runway 10, Final Clear, entering the runway, we made another transmission as we started our takeoff.

The Takeoff was a Flaps 1 / TOGA Power. As we are accelerating down the runway, the inbound traffic on final made a transmission asking "Do you see us?" and that "they are approaching short final." At this point, we start to realize the traffic may not be behind us, but actually straight in front of us landing 28. As we continue to accelerate, the First Officer calls out traffic on TCAS in front of us. I start looking for visual confirmation, which is made difficult with the high snow-covered terrain to our East, and a thin layer of Overcast Clouds along the Valley, in front of us. In an effort to avoid conflicting traffic and while I am actively trying to acquire inbound airplane, the aircraft's nose starts to pitch up, and a potential tail strike on the runway occurs. I lowered the pitch of the nose, continued with the takeoff / rotation. Once airborne, we turned to the Southeast, passed through a thin layer of Overcast Clouds, and continued to climb away from the conflicting traffic. Although I never saw the other aircraft visually, that aircraft did continue and land on Runway 28. We called Denver Center for Radar Contact, and asked for clarification on course, as our on course conflicted with that of the inbound aircraft.

³³ Source: JetBlue Airways.

Continuing climb, called the Flight Attendants, then followed up with Maintenance Control and Dispatch. With Safety in Mind, All Parties agreed for the flight to divert to KDEN, for aircraft inspection. We informed Denver Center of our divert, who then coordinated our approach to the airport, and we informed our Customers and Crew. Upon Arrival into Denver, and at the gate, spoke to ATC to gather information, etc. Post Flight Walk Around confirmed tail strike, Logbook entry was made by the Crew.

10.2 First Officer Statement

First Officer Flight 1748 01/22/22

I was the first officer on flight 1748 HDN-FLL and was designated as the Pilot Monitoring. After observing multiple aircraft using runway 10, we planned on using 10 for departure. We set up the aircraft for departure on runway 10, briefed that we would use runway 10 and received valid takeoff data for that runway. All preflight activities were accomplished normally for the flight. While trying to obtain our IFR clearance, we were told by the Center controller to let them know when we were “number one at runway 10”. While taxiing to runway 10, we heard an aircraft on CTAF say that they were about 10 miles out. Upon reaching runway 10, we received our IFR clearance for departure with a void time of 2 mins. After visually clearing the final approach we announced our intentions for takeoff on runway 10. We then heard an aircraft tell us they were “on final”. When I queried the aircraft about being 10 miles out, I remember the response as, “we’re closer now”. We stopped and looked for the aircraft again on TCAS and visually, and saw no traffic. We thought the aircraft was still on a long final for runway 10 since we could not see it on TCAS or visually. We stated our intentions to take off again, and commenced a rolling takeoff on runway 10 without delay. Upon my normal scan of the instruments inside the cockpit during takeoff, I noticed there was a TCAS target directly in front of us, in line with the runway 10 departure path. I called this out and pointed to the TCAS display. The traffic observed on TCAS was on final for runway 28. We thought the inbound traffic was on final for runway 10. The nose lifted on takeoff roll resulting in an apparent tail strike. After the aircraft lifted off, we immediately began a climbing turn away from the traffic observed on TCAS. We continued to climb and avoided the traffic using TCAS and never saw it visually.

10.3 King Air Pilot Statement³⁴

—“We were approximately about 15 minutes away from KHDN cleared to CHE (Hayden VOR) to expect ILS to Runway 10. At about 25-30 NM out we began being vectored by Denver Center to ILS 10 approach. Shortly thereafter we saw the runway very clearly and called Denver Center to ask about possibly cancelling IFR, and landing runway 28 in VFR conditions instead of runway 10. We were not yet ready to cancel IFR but were seeking Denver Center’s input on making such a decision. Denver Center’s response was “you can do whatever you want.” So we accepted the IFR cancelation that Denver Center gave us. We then called our VFR position on KHDN Unicom 123.0 for runway 28, from approximately a 20 mile, 10 mile and 5 mile position.

About 5 miles out from landing we heard Jet Blue say “Jet Blue XXXX, on the roll 1-0 Hayden.”

We did not know we had conflicting traffic until we were heard Jet Blue’s call and we were less than a 5nm final at that moment. We communicated directly with Jet Blue and told him we were on a short final. We continued, thinking we saw Jet Blue abort, however he took off on 10 and lifted off about midway down the runway and executed a sharp right turn out. We were on a short final at that point so we continued and landed safely.

In hindsight we could have entered a downwind for 10 as soon as we heard Jet Blue’s call, and next time I am sure we will; but this time Jet Blue acknowledged that they had been hearing our call on final, so we were shocked to hear JetBlue was taking off. We both concluded that he was going to abort on the runway but that was not the case. The End.—“

³⁴ HDN Airport Director via email to the NTSB February 1, 2022.

10.4 Witness Statement



NTSB RECORD OF CONVERSATION

David Lawrence
Aviation Safety Investigator
Operational Factors Division, AS-30

Date: 1/26/2022 at 1302 MST
Person Contacted: Dustin Williams (via phone)
NTSB Accident Number: DCA22LA069
Attendees: David Lawrence - NTSB

Narrative:

- His name was Dustin Williams, and he was the Yampa Valley Airport (HDN) Operations, Safety and Security Superintendent for the airport. He said he was also essentially the acting fire chief. He was not a pilot and had been a fire fighter for 30 years.
- He said he had just come out of his office on the south side of the airport, across from the terminal, to watch Jetblue take off.
- He could not say if the airplane had a tail strike when he first saw the takeoff. He recalled thinking the departure "was a little steep."
- Kevin Booth was the Airport Director, and he was taking the lead on this event and was getting everyone involved together.
- He said Jessi Greenberg was running the Unicom at the time of the incident.
- He had just come out of his office towards the Ops Center. He had a view out his window straight toward the terminal. He could not see the departure ends of the runways.
- The Operations Center opens up to a view of the runway and terminal. He only saw the Jetblue's angle off the runway.
- He had seen other airlines takeoff, and this one seemed a little unusual.
- When asked where along the runway Jetblue got airborne, he said about 5,500 feet down the runway. That point along the runway seemed to be the normal place they got airborne from when departing off of runway 10, depending on their loads.
- Jetblue took off between taxiways intersections A5 and A4.

Page 1 of 2



NTSB RECORD OF CONVERSATION

- When asked about the weather, he said it was actually clear when the Jetblue took off. The AWOS was reporting a 500 foot layer, but it was a wispy layer of fog right over the sensor, which was located on the south side of the airfield along the approach end of runway 10.
- He did not pay attention to the amount of traffic at the airport at that time, but it did not seem that busy.
- When asked if they have had problems with traffic conflicts between the airlines and other traffic, he said "being uncontrolled, we've had our share of those."
- When asked if the Jetblue did a rolling takeoff, he said he didn't see the airplane go from the taxiway and runway.
- He never saw the King Air on approach or landing. He only saw it after the airplane was already parked. He went over to where the airplane was parked and did talk to the Beech pilot briefly, but the pilot didn't have much to say to him.
- The Beech had parked down at Atlantic Aviation. He was told the pilot said he was going break-off the approach if there was going to be a conflict.
- I said he knew the Beech pilot had filed a NASA report.
- He had seen the Beech before, and it flew in and out of HDN "quite a bit." The pilot flew for the owner of the airplane. The airplane was not based at HDN.
- The pilot did not say if he had any passengers onboard.
- He provided the Airport Director's contact information for further follow-up.
- They used to only work at the airport 4 months a year. In 1999 they went to year-round operations.
- He started at the airport in 1990, and Continental, American and Northwest fly there during the winter months. United is year-round.
- When asked if he had any past problems or concerns specific to Jetblue, he said "no."

10.5 HDN Airport Personnel Statements³⁵

Yampa Valley Regional Airport

OSS Incident Report

IR# 2022-10

Date: 22 Jan 22 Start Time: 1154

Location: RWY 10

Incident Type: Aircraft Conflict

Responding Agencies: Unicom

I, Kris Olsen, was in seat 2 (Push back/Atlantic) radios and noticed on Aerobahn that we had one incoming Rwy 28 N350J and JetBlue 1748 was taking the active on Rwy 10. JetBlue called taking the active and N350J advised they were on short final and Jet Blue said they were on the roll and N350J said they were on short final 4 mile copilot advised less than 4 mile. JetBlue departed Rwy 10 at an aggressive angle to a right bank, while watching JetBlue leave I could see N350J on short final for Rwy 28. Chief came into room but Jesse and I advised him of the incident in question. END OF REPORT Kris Olsen F9-12

Additional info:

It was brought to my attention that there was an opposing aircraft conflict, I stepped into Unicom to see B6 1748 depart Rwy 10 at 11:53:59 between A5 and A4 at a steep angle of attack, looking close to being a possible tail strike. Asked where the aircraft approaching Rwy 28 was informed towards Seneca Hill. Watched JetBlue turn to the south for departure and the N350J finally came into sight and landed on Rwy 28 at 11:54:55. Estimate N350J was on a 2NM final (estimated approach speed of 140 KTS) when JetBlue rotated for takeoff.

I, Jesse Greenberg, was running radios at the time of the incident. At approximately 11:45 N350J called that he was on a 10 mile final for Rwy 28. N760JB (JetBlue) advised that he was holding at Rwy 10 awaiting clearance from Denver. Approximately 2 minutes later JetBlue advised that he was taking Rwy 10 for departure. The pilot of N350J immediately advised before I could that he was on about a short final and Jet blue responded "Oh I thought you were about 8-9 miles out." N350J responded that wasn't the case and that they were on a 4 mile final. An unidentified female voice then got on the radio and said "less than that." I assume that was the co-pilot of N350J. The JetBlue pilot then advised that he was rolling and N350J stated "Ok well we're on a short final, hope you don't hit us." I remember thinking it was strange that a pilot would say that to a commercial aircraft rather than breaking from his pattern if he was concerned that a collision was a possibility. As JetBlue was taking off he was wheels up from the runway directly in front of Unicom at about the halfway mark between Alpha 5 and Alpha 4. There was a loud reaction from everyone in Unicom as we thought we had just witnessed JetBlue's tail strike the runway. I also have never seen a commercial aircraft lift off that soon while taking off from Rwy 10. N350J then requested that JetBlue do an early turnout and JetBlue advised that he was, but I believe it

³⁵ Source: HDN Airport Manager.

was while the N350J pilot was still speaking. JetBlue turned pretty immediately to the Southeast and N350J landed about a minute later and could be heard talking to Denver Center about what the best way to file a complaint about the incident was. Denver Center provided the pilot with a phone number. END OF REPORT Jesse Greenberg Fire 9-4

Williams called Denver Center immediately after the incident and talked with Travis, advised Travis that there was an aircraft N350J on short final for Rwy 28 when JetBlue 1748 departed Rwy 10. Travis thanked me for the information and said he would look into it. Travis is a Denver Center Area Manager and can be reached at [REDACTED].

Williams responded to Atlantic Aviation and met with Bob Huskey, the pilot of N350J. Bob and his wife Kathy were in the pilot and co-pilot positions of N350J; both stated that they were reporting their position on the approach. On his initial contact with Unicom Bob reported he would be landing on Rwy 10. Bob stated that he had talked with Denver Center while on approach and stated that if it was not a conflict to land on Rwy 28 he would cancel his IFR and make a visual approach to Rwy 28, Bob was advised by Denver Center that his IFR was canceled. From that point on Bob made calls indicating his intent to land on Rwy 28 and his distance from Rwy 28 (12, 10 and 4 NM).

Bob Huskey was going to contact Denver Center.

Asked Bob if he would give me a statement of the events, and Bob said he would send me an email. Bob Huskey contact number is [REDACTED].

Received a call from that it is being investigated from Denver Center, when asked if there was any information they could share, was informed no.

End of Report Dustin Williams F9-1