

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA23FA001

AIR TRAFFIC CONTROL

Group Chair's Factual Report

October 7, 2024

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A. ACCIDENT

Location: Duluth, Minnesota
Date: October 1, 2022
Time: 2317 central daylight time (CDT)
0417 coordinated universal time (UTC) - October 2, 2022
Airplane: Cessna C172, N262TA

B. AIR TRAFFIC CONTROL GROUP

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Group Member	Donald Clark ATC Subject Matter Expert Federal Aviation Administration Huntington, WV
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C. SUMMARY

On October 1, 2022, at 2317 central daylight time, a Cessna 172S, N262TA, was substantially damaged when it was involved in an accident near Hermantown, Minnesota. The commercial pilot and two passengers sustained fatal injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

D. DETAILS OF THE INVESTIGATION

On October 3, 2022, an air traffic control (ATC) work group was formed. Duluth Airport Traffic Control Tower (DLH ATCT) was providing services to the airplane at the time of the accident. The group consisted of the NTSB group chair, a subject matter expert from the FAA, and an air safety investigator (ASI) from NATCA. On-site investigative work was scheduled to begin October 5, 2022.

On October 5, 2022, the group arrived in Duluth and conducted an organizational meeting at the hotel and reviewed the agenda for the week.

On October 6, 2022, the group met at DLH ATCT and was provided an in-brief by the DLH ATCT Air Traffic Manager (ATM). Also in attendance at the meeting were representatives from the FAA's Safety Intelligence and Response Group (SIRG), Central Service Area (CSA), and Office of Chief Counsel. The group was provided with an operational tour of the control tower, with emphasis on the TRACAB¹ configuration and equipment layout as it was the night of the accident. The group then reviewed collected data and controller background information and conducted interviews with the tower and radar controllers that were working in the tower at the time of the accident. The group then concluded on-site activities for the day.

On October 7, 2022, the group again met at DLH ATCT, reviewed additional data that had been provided, then conducted an interview with the ATM. The group then continued work on field notes and ensured all requested data had been received. The group then returned to the hotel, completed field notes, obtained concurrence, and concluded the on-site portion of the ATC field investigation.

E. FACTUAL INFORMATION

1.0 History of Flight

The following is a summary of the communications between the accident pilot and DLH ATCT and was constructed from certified audio recordings and data provided by the FAA². Times in this summary are in CDT and are rounded to the nearest minute and altitudes are in feet above mean sea level (msl).

2303 The pilot of N262TA contacted DLH ATCT from the Monaco ramp requesting their IFR³ clearance. The tower controller acknowledged and advised the pilot to stand by.

A few seconds later the tower controller cleared N262TA to South St. Paul Municipal Airport (SGS) via direct, with a climb to 6,000 feet on departure, provided a departure frequency of 125.45 MHz and a transponder code of 4220. The pilot read back the clearance except read back the wrong departure frequency of 125.425 MHz and no beacon code. The controller again provided the beacon code of 4220 and advised the pilot the rest of the readback was correct, however did not correct the readback of the incorrect departure frequency.

¹ TRACAB - Terminal Radar Approach Control Cab - The term used to identify the configuration when the radar approach control operating position(s) of an ATC facility are located within tower cab. This was a normal configuration for DLH ATCT during the event day and time.

² A partial transcript of the ATC audio is provided in Attachment 1: ATC Audio Partial Transcript.

³ IFR - Instrument Flight Rules [ICAO]- A set of rules governing the conduct of flight under instrument meteorological conditions.

2305 The pilot reported ready for taxi and the tower controller instructed the pilot to taxi to runway 9 via taxiway A and that there was about 1/2 mile visibility and that he would get an RVR⁴ in a minute. The tower controller then advised there had been a bases report of 250 feet above ground level (agl), and that a King Air had departed earlier and could not provide an actual tops report, but the controller said they were at about 12,000 feet at that time and advised the pilot that he might expect to be in IMC⁵ for a while. The pilot acknowledged taxiway A and that he would likely be in IMC for a while.

2306 The tower controller advised the pilot of N262TA "for planning purposes" that the lights were set on step 4 out of 5, and that that the runway 9 RVR was greater than 6,000 feet. The pilot acknowledged.

2311 The pilot of N262TA called tower holding short of runway 9 and ready for takeoff. The tower controller cleared N262TA for takeoff from runway 9 with a right turn out direct to SGS airport on departure. The controller also provided the winds which were from 090 at 14 knots with gusts of 18 knots and reiterated the RVR of greater than 6,000 feet. The pilot acknowledged.

2313 *[The data tag appeared on radar indicating an altitude of 1,700 feet and ground speed of 50 kts.]*

Surveillance data showed N262TA entering a right-hand climbing turn on departure, and upon climbing through 2,000 feet the controller instructed the pilot contact departure. The pilot acknowledged.

[According to the FAA's services rendered telcon (SRT) conducted after the accident, the tower controller then stepped out of the control environment without conducting a position relief briefing (PRB).]

[According to surveillance data, the airplane continued to climb slowly but then made a left 270-degree turn reaching an altitude of about 2,800 feet and arcing in a counterclockwise direction and beginning to descend.]

2314 The radar controller attempted to contact N262TA on departure

⁴ RVR - Runway Visual Range - An instrumentally derived value, based on standard calibrations, that represents the horizontal distance a pilot will see down the runway from the approach end. It is based on the sighting of either high intensity runway lights or on the visual contrast of other targets whichever yields the greater visual range. RVR, in contrast to prevailing or runway visibility, is based on what a pilot in a moving aircraft should see looking down the runway. RVR is horizontal visual range, not slant visual range. It is based on the measurement of a transmissometer made near the touchdown point of the instrument runway and is reported in hundreds of feet. RVR, where available, is used in lieu of prevailing visibility in determining minimums for a particular runway.

⁵ IMC - Instrument Meteorological Conditions - Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.

frequency with no response, then selected and transmitted on the tower frequency, requesting the pilot of N262TA to contact departure. The pilot responded saying "contacting departure two tango alpha."

Several seconds later, while the airplane continued to descend in a counterclockwise direction and increasing in ground speed, the radar controller advised N262TA that he observed the aircraft descending and asked the pilot to confirm he was climbing. There was no response. Simultaneously, there was a low altitude (LA)⁶ alert observed on the tower display workstation (TDW)⁷.

2316 *[Both the tower and radar controllers continued with repeated attempts to contact N262TA but received no response.]*

2.0 Flight Track Surveillance Data

2.1 Automatic Dependent Surveillance - Broadcast Data

Certified ADS-B⁸ data was provided by the FAA⁹. The data were provided in .csv format, as well as .kml. The ADS-B data were of good quality and provided flight track surveillance information for the entire accident flight. Though these data contain greater track fidelity, the radar data below was used for the figures below.

2.2 Standard Terminal Automation Replacement System - Radar Data

Certified STARS¹⁰ radar data was provided by the FAA¹¹. The data were provided in .ppb format. The STARS radar data contained the flight track surveillance information that would have been displayed to controllers at DLH ATCT. These data were overlaid onto satellite imagery and used to produce figures 1-3 below.

⁶ LA - Low Altitude Alert - An automated function of the installed radar system at CRG that alerts the controller when a Mode C transponder equipped aircraft on an IFR flight plan is below a predetermined minimum safe altitude. Both aural and visual alerts are provided.

⁷ TDW - Tower Display Workstation - A tower situational display that is a part of the Standard Terminal Automation Replacement System (STARS) which displays radar data that has been collected by various sensors and processed by the radar data processor (RDP), combined with flight plan data, and then presented on a color monitor.

⁸ ADS-B - Automatic Dependent Surveillance-Broadcast - A surveillance system in which an aircraft or vehicle to be detected is fitted with cooperative equipment in the form of a data link transmitter. The aircraft or vehicle periodically broadcasts its GPS-derived position and other information such as velocity over the data link, which is received by a ground-based transmitter/receiver (transceiver) for processing and display at an air traffic control facility.

⁹ ADS-B source data is provided in Attachment 2: ADS-B Data.

¹⁰ STARS - Standard Terminal Automation Replacement System - A system that receives radar data and flight plan information and presents the information to air traffic controllers on high resolution, 20" x 20" color displays allowing the controller to monitor, control, accept hand-off of air traffic, and assist with weather avoidance.

¹¹ Radar source data is provided in Attachment 3: STARS Radar Data.

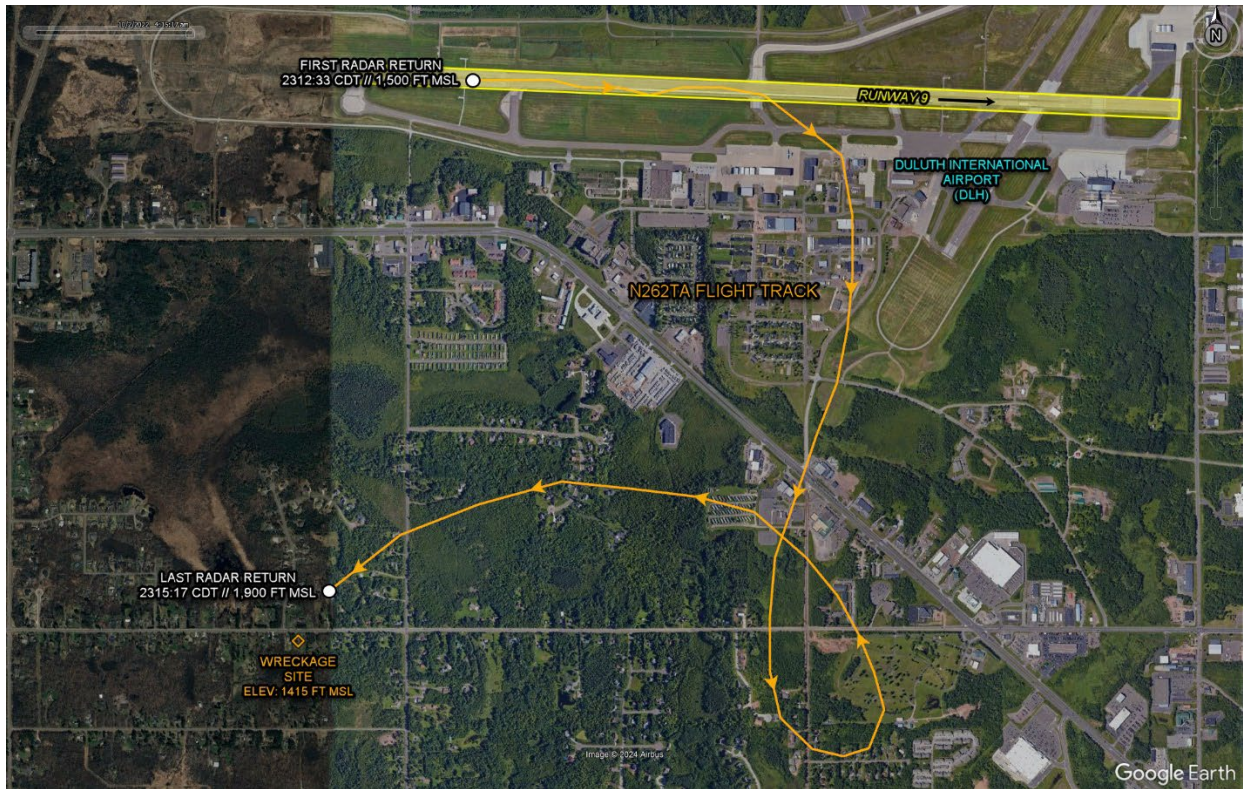


Figure 1. Overview of the entire accident flight track overlaid on satellite imagery.

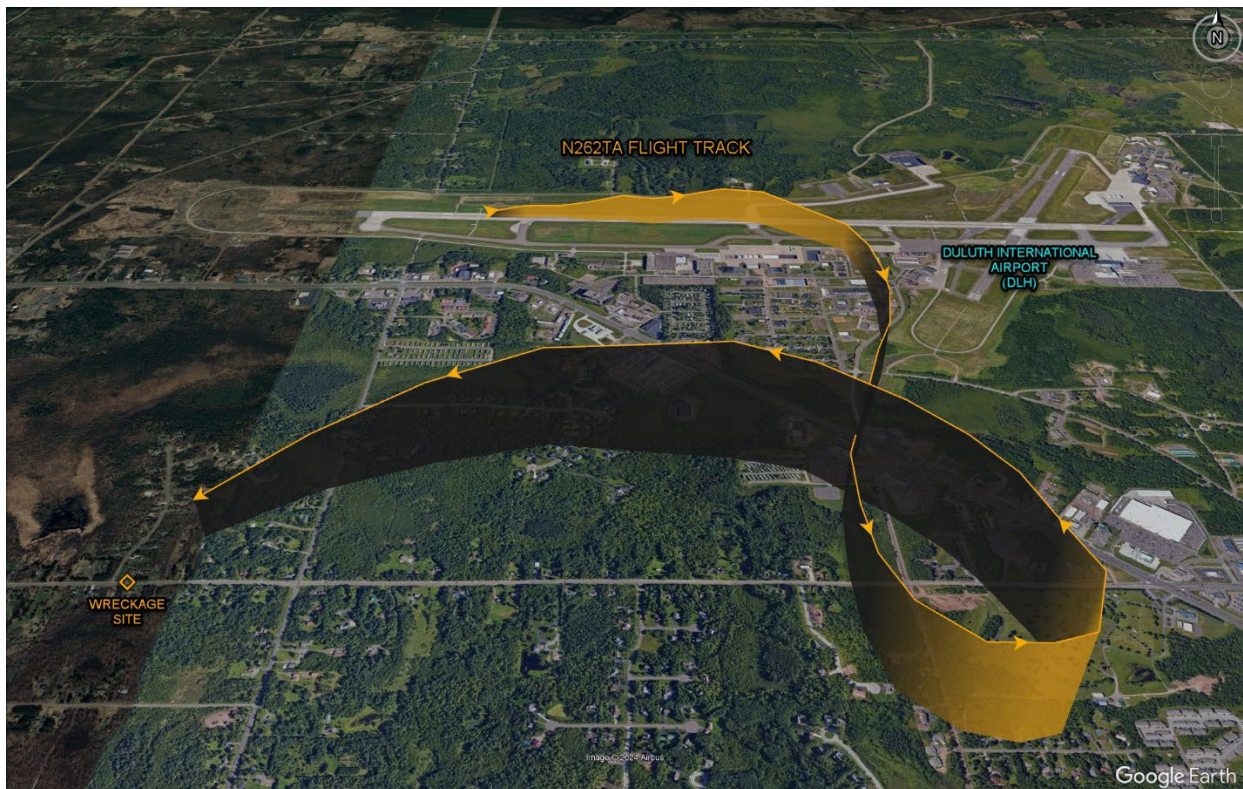


Figure 2. Profile view of the entire accident flight track overlaid onto satellite imagery.

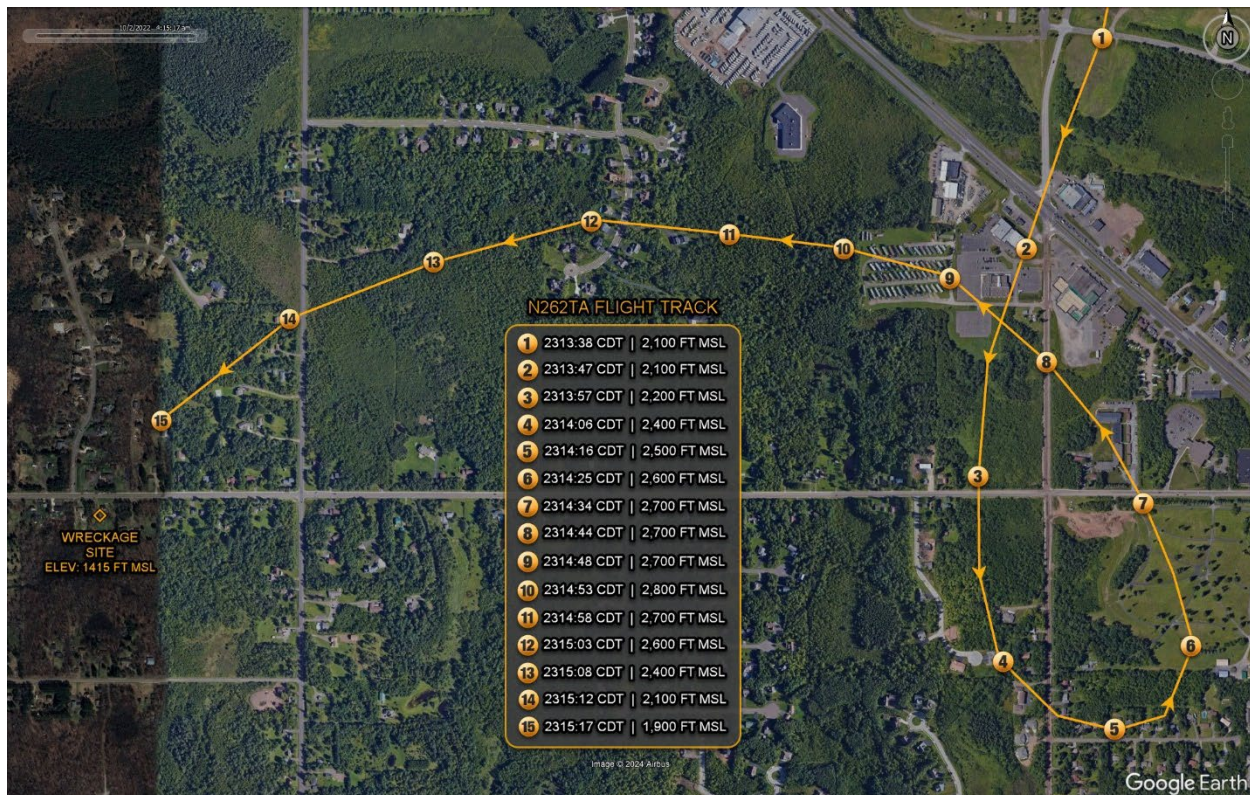


Figure 3. Final portion of the accident flight track with time and altitude information overlaid on satellite imagery.

3.0 Meteorological Information

DLH lists an elevation of 1,428 feet and had an Automated Surface Observation System (ASOS)¹², which was augmented by DLH ATCT LAWRS¹³ certified air traffic controllers during normal operating hours between 0500 and 2400 CDT. The magnetic variation was 1° W over the area. The following conditions were being reported at the time of the accident. General surface conditions are provided below. For more detailed meteorological information, see the Meteorology Factual Report in the public docket.

3.1 Surface Observations

KDLH weather observation at 2255 CDT, wind from 080° at 10 knots gusting to 19 knots, visibility 5 statute miles, mist, overcast ceiling at 200 feet agl, temperature

¹² ASOS – Automated Surface Observing System – Automated sensor suites equipped with meteorological instruments to observe and report wind, visibility, ceiling, temperature, dewpoint, altimeter, and barometric pressure. These systems generally report at hourly intervals, but also report special observations if weather conditions change rapidly and cross aviation operation thresholds.

¹³ LAWRS – Limited Aviation Weather Reporting Station – An airport weather station that utilized various degrees of automated sensors and/or other automated equipment (ie; ASOS) and is often augmented/backed up by certified tower weather observers at these locations.

9° Celsius (C), dew point temperature 8° C, altimeter 30.38 inches of mercury (inHg).
Remarks: automated station with a precipitation discriminator, sea level pressure of 1029.6 hectopascals (hPa), temperature 9.4° C, dewpoint 8.3° C.

The longline¹⁴ observations that were disseminated on weather circuits and general flight categories were as follows (observation closest to the accident time is in bold for emphasis):

IFR METAR KDLH 012355Z 08011G20KT 10SM BKN007 BKN023 10/08
A3036 RMK AO2 SLP292 T01000078 10144 20100 51012=
IFR METAR KDLH 020055Z 09013KT 10SM OVC005 09/08 A3036 RMK AO2
SLP291 T00940078=
LIFR¹⁵ SPECI KDLH 020127Z 09013G24KT 10SM OVC004 09/08 A3036 RMK
AO2 T00940078=
IFR METAR KDLH 020155Z 09012G22KT 10SM OVC005 09/08 A3037 RMK
AO2 SLP294 T00940078=
LIFR SPECI KDLH 020214Z 08015G22KT 10SM OVC004 09/08 A3037 RMK
AO2 T00940083=
LIFR METAR KDLH 020255Z 09015G24KT 10SM OVC003 09/08 A3037 RMK
AO2 SLP293 T00940083 53002=
**LIFR METAR KDLH 020355Z 08010G19KT 5SM BR OVC002 09/08
A3038 RMK AO2 SLP296 T00940083=**
LIFR METAR KDLH 020455Z 08012KT 4SM BR OVC002 09/08 A3038 RMK
AO2 SLP296 T00890078=
LIFR METAR KDLH 020555Z 08011KT 9SM OVC002 09/08 A3037 RMK AO2
SLP293 T00940083 10100 20089 401440089 50000=
LIFR METAR KDLH 020655Z 09009G17KT 10SM OVC004 09/08 A3037 RMK
AO2 SLP293 T00940083=

¹⁴ "Longline" refers to the dissemination of weather observations with the intent that they are available in near-real time to national databases (effectively, the whole world) and accessible to the general global public from a large number of vendors. This does not include public accessibility to observations from a reporting station's Very High Frequency (VHF; line-of-site) or telephone broadcast, where applicable. Longline dissemination of weather observations is the primary vehicle through which the general global public has access to surface weather observations, particularly outside of the aviation community.

¹⁵ LIFR - Low Instrument Flight Rules - IFR conditions with ceilings less than 500 feet above ground level and/or visibility of less than 1 mile.

4.0 Air Traffic Control Personnel Interviewed

There were two controllers working in the tower at the time of the accident. All radar positions were combined to the approach control local (R4) position in the tower and all tower positions, including controller in-charge (CIC), were combined to the local control (LC) position in the tower, which was the normal mid-shift TRACAB configuration. The tower controller, radar controller, an uninvolved operations supervisor (OS), and the ATM were interviewed. Basic information is provided below, the interviews were not recorded and interview summaries¹⁶ were produced to document these interviews.

4.1 Tower Controller

The tower controller working at the time of the accident had been employed by the FAA in November 2010 and after initial training at the FAA academy, began working at DLH ATCT in February 2011. He was current on all tower positions he was working at the time of the accident in accordance with facility standards. Post-accident drug testing was conducted with negative results; however, it was not conducted until October 5, 2022, and post-accident alcohol testing was not ordered. No explanation was provided by the FAA as to why alcohol testing was not ordered nor why drug testing was conducted so long after the accident.

The tower controller was 37 years old, held a current medical clearance certificate at the time of the accident and had received his last ATC physical on April 8, 2021. He was required to wear corrective lenses while performing ATC duties and stated that he was wearing his prescription contact lenses at the time of the accident as required. In the terms of excellent, good, fair, or poor; he described his health as good. His working hours for the week leading up to and including the day of the accident were:

Day	Date	Shift	Hours (CDT)	Overtime
Monday	Sep 26	Off	None	None
Tuesday	Sep 27	Off	None	None
Wednesday	Sep 28	Eve	1415-2215	None
Thursday	Sep 29	Swing	1230-2030	None
Friday	Sep 30	Day	0545-1345	None
Friday**	Sep 30	Mid	2200-0600	None
Saturday	Oct 1	Mid	2200-0600	None

** "Quick-turn" from day to mid shifts - both start in same day

¹⁶ Interview summaries are provided in Attachment 4: ATC Personnel Interview Summaries.

4.2 Radar Controller

The radar controller working at the time of the accident had been employed by the FAA in August 2007 and after initial training at the FAA academy, began working at Fargo (FAR) ATCT where he remained until October 2010 when he accepted a position at DLH ATCT. He was current on all radar positions he was working at the time of the accident in accordance with facility standards. Post-accident drug testing was conducted with negative results, however, was not conducted until October 5, 2022, and post-accident alcohol testing was not ordered. No explanation was provided by the FAA as to why alcohol testing was not ordered nor why drug testing was conducted so long after the accident.

The radar controller was 40 years old, held a current medical clearance certificate at the time of the accident and had received his last ATC physical on September 6, 2022. He had no waivers, restrictions, or limitations to his medical clearance. In the terms of excellent, good, fair, or poor; he described his health as good to excellent. His working hours for the week leading up to and including the day of the accident were:

Day	Date	Shift	Hours (CDT)	Overtime
Monday	Sep 26	Mid	2200-0600	None
Tuesday	Sep 27	Off	None	None
Wednesday	Sep 28	Day	0630-1045	4 hr + 15 min
Thursday	Sep 29	Day	0630-1430	None
Friday	Sep 30	Day	0545-1345	None
Friday**	Sep 30	Mid	2200-0600	None
Saturday	Oct 1	Mid	2200-0600	None

** "Quick-turn" from day to mid shifts - both start in same day

4.3 Operations Supervisor

The only OS assigned to DLH ATCT was not working at the time of the accident and was interviewed as an uninvolved supervisor only. He had been employed by the FAA in September 2006 and after initial training at the FAA academy, began working at Green Bay (GRB) ATCT where he remained until April 2009 when he accepted a position at Minneapolis Terminal Radar Approach Control (M98 TRACON). After working at M98 TRACON for more than 10 years, he accepted a position at DLH ATCT in September 2019.

4.4 Air Traffic Manager

The ATM was not working at the time of the accident and was interviewed as the facility manager in charge of managing the facility operations. She had been employed by the FAA in April 1997 and after initial training at the FAA academy,

began working at Grand Forks (GFK) ATCT where she remained for three years when she accepted a position at DLH ATCT. Her working hours leading up to and including the day of the accident were:

Day	Date	Shift	Hours (CDT)	Overtime
Sunday	Sep 25	Off	None	Not Applicable
Monday	Sep 26	Day	0635-1605	Not Applicable
Tuesday	Sep 27	Day	0705-1700	Not Applicable
Wednesday	Sep 28	Day	0705-1605	Not Applicable
Thursday	Sep 29	Day	0645-1545	Not Applicable
Friday	Sep 30	Day	0725-1210	Not Applicable
Saturday	Oct 1	Off	None	Not Applicable

5.0 Air Traffic Control Facility

DLH ATCT was a level 6 combined tower and TRACON facility. The facility is authorized to operate in the TRACAB configuration, and due to the limited staffing is almost continually in this configuration in order to accommodate training. The TRACAB configuration was not designed to be the routine daily configuration.

5.1 Staffing

According to information provided by the ATM, the current staffing at DLH continued to be a significant concern. They were staffed with only 11 of 20 authorized certified professional controllers (CPCs). They had 8 controllers in training (developmental controllers), but 3 of those were out of the rotation leaving only 5 actively training. They had only 1 of 3 authorized OSs onboard, with one new OS identified, but not onboard yet.

In addition to these documented staffing shortages, the facility had also lost their Staff Support Specialist recently, adding significant administrative workload to the remaining facility management. With staffing levels this low, it has forced the facility to remain in a TRACAB configuration almost continually to accommodate training. Continual combining of positions into the TRACAB configuration is not optimal and introduced increased risk into the control environment when remaining this way for long term.

5.2 Tower Equipment

The control tower cab is equipped with only one TDW. Because the facility is routinely configured in the TRACAB configuration, the only TDW must be set-up and configured as a radar display, and therefore unusable by tower controllers for use in

traffic, sequencing, and as an "extended eye." A second TDW had been procured but requires engineering support to mount, and this support has yet to be identified.

6.0 Air Traffic Control Procedures

6.1 FAA Order JO 7110.65Z, Air Traffic Control

Chapter 2, Section 10, Team Position Responsibilities, paragraph 2-10-1

a. Tower Team Concept and Intent: There are no absolute divisions of responsibilities regarding position operations. The tasks to be completed remain the same whether one, two, or three people are working positions within a facility/sector. The team, as a whole, has responsibility for the safe and efficient operation of that facility/sector.

b. Terms: The following terms will be used in terminal facilities for the purpose of standardization.

1. Tower Cab: The area of control responsibility (delegated airspace and/or airport surface areas) of the tower team, and the team as a whole.

2. Tower Position(s) (LC or GC): That position which is in direct communications with the aircraft and ensures separation of aircraft in/on the area of jurisdiction.

3. Tower Associate Position(s): That position commonly referred to as "Local Assist," "Ground Assist," "Local Associate," or "Ground Associate."

4. Tower Cab Coordinator Position (CC): That position commonly referred to as "Coordinator."

5. Flight Data (FD): That position commonly referred to as "Flight Data."

6. Clearance Delivery (CD): That position commonly referred to as "Clearance."

c. Primary responsibilities of the Tower Team Positions:

5. Clearance Delivery:

(a) Operate communications equipment.

(b) Process and forward flight plan information.

(c) Issue clearances and ensure accuracy of pilot read back.

(d) Assist tower cab in meeting situation objectives.

(e) Operate tower equipment.

(f) Utilize alphanumerics.

Chapter 3, Section 9, Departure Procedures and Separation, paragraph 3-9-3, Tower Team Position Responsibilities, stated in part:

Provide current departure information, as appropriate, to departing aircraft.

a. Departure information contained in the ATIS broadcast may be omitted if the pilot states the appropriate ATIS code.

b. Issue departure information by including the following:

- 1. Runway in use. (May be omitted if pilot states "have the numbers.")*
- 2. Surface wind from direct readout dial, wind shear detection system, or automated weather observing system information display. (May be omitted if pilot states "have the numbers.")*
- 3. Altimeter setting. (May be omitted if pilot states "have the numbers.")*

c. Time, when requested.

d. Issue the official ceiling and visibility, when available, to a departing aircraft before takeoff as follows:

- 1. To a VFR aircraft when weather is below VFR conditions.*
- 2. To an IFR aircraft when weather is below VFR conditions or highest takeoff minima, whichever is greater.*

F. LIST OF ATTACHMENTS

Attachment 1: ATC Audio Transcript

Attachment 2: ADS-B Data

Attachment 3: STARS Radar Data

Attachment 4: ATC Personnel Interview Summaries

Attachment 5: Facility Logs and Records

Attachment 6: Facility Procedures

Submitted by:

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