

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



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AIR TRAFFIC CONTROL

Group Chairman's Factual Report

August 28, 2025

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A. ACCIDENT

Location: Kelsey, New York
Date: February 10, 2024
Time: 1543 eastern standard time (EST)¹
2043 coordinated universal time (UTC)²
Airplane: Boeing 777-222ER, N788UA, United Airlines flight 1890 (UAL1890)

B. AIR TRAFFIC CONTROL GROUP

Group Chairman	Michael Brown National Transportation Safety Board Washington, DC
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Specialist - MET	Paul Suffern National Transportations Safety Board Washington, DC
Group Member	Jason Alliston Federal Aviation Administration Hampton, GA
Group Member	Karena Marinas National Air Traffic Controllers Association Palmdale, CA
Group Member	Ryan Hurling United Airlines Chicago, IL
Group Member	Kevin Coon United Airlines San Francisco, CA

C. SUMMARY

On February 10, 2024, at about 15:43 eastern standard time (EST), United Airlines (UAL) flight 1890, a Boeing 777-222ER, N788UA, experienced moderate

¹ All times are in eastern standard time (EST) unless otherwise noted.

² UTC is an international time standard using four digits of a 24-hour clock in hours and minutes based on the time in Greenwich, England.

turbulence when descending to flight level (FL) 190 inbound to the Newark Liberty International Airport (EWR), Newark, New Jersey. Of the 280 passengers and crew, two flight attendants received serious injuries, and one received a minor injury. The flight was conducted under the provisions of Title 14 *Code of Federal Regulations* Part 121 as a scheduled domestic passenger flight from Los Angeles International Airport (LAX), Los Angeles, California to EWR.

D. DETAILS OF THE INVESTIGATION

On February 13, 2024, the decision was made to form an air traffic control (ATC) work group to conduct an on-scene investigation. Notification was made to the Federal Aviation Administration (FAA) in accordance with current protocol, advising our intent to conduct on-site investigative work at Boston Air Route Traffic Control Center (ZBW ARTCC), the facility that was providing services to UAL1890 leading up to the time of the accident. The FAA was provided with a list of controllers that the group requested to interview and advised that all interviews would be recorded and provided for transcription in accordance with National Transportation Safety Board (NTSB) procedures. The group consisted of the group chairman and an ATC investigator from AS-30, a meteorologist from AS-30, a subject matter expert from the FAA, an air safety investigator (ASI) from National Air Traffic Controllers Association (NATCA), and two subject matter experts from United Airlines. On-site investigative work was scheduled for the week of March 4, 2024.

On March 4, 2024, the group arrived at Nashua, New Hampshire.

On March 5, 2024, the group held a brief organizational meeting at the hotel and then traveled to ZBW ARTCC and conducted an in-brief with the air traffic manager (ATM) and other members of their staff. Also present at the in-brief were members from the FAA's Safety Intelligence and Response Group (SIRG), office of accident and incident prevention (AVP-100), Boston District general manager (GM), district executive advisor (DEA), and office of chief counsel. The group was provided with an operational tour of the ARTCC control floor with a focus on Area A and the Delancy radar (R24) sector position (the involved position), the operations manager in charge (OMIC) position, the center weather service unit (CWSU), the weather coordinator position, and traffic management unit (TMU). The group then observed a SATORI³ playback of the accident. The ATM presented findings and information related to the system service review (SSR) that was conducted after the accident.

³ Systematic Air Traffic Operations Research Initiative - A software system utilized for the re-creation of air traffic control operational incidents in a format much like the one displayed to the air traffic control specialist. It is used in en route facilities to review training management issues, investigate accidents and operational errors, develop facility specific specialty training programs, and present facility-wide briefings on operational incidents.

The group interviewed the weather coordinator (WC) controller followed by the R24B⁴ controller.

On March 6, 2024, the group held a brief organizational meeting at the hotel and traveled to ZBW ARTCC. The group interviewed the R24A controller. Following that interview, the group interviewed the R24C controller.

On March 7, 2024, the group held a brief organizational meeting at the hotel and returned to ZBW ARTCC. The group interviewed the operations manager in charge (OMIC), the support manager for quality control (SM-QC) and the operations supervisor (OS) for Area A.

On March 8, 2024, the group held a brief organizational meeting at the hotel and returned to ZBW ARTCC. The group interviewed the ZBW ARTCC executive officer (XO) and the ATM. Following the interviews, the group completed and concurred upon the field notes and were released from the on-scene phase of the investigation by the Investigator in Charge (IIC).

All interviews were audio recorded and provided to Free State Reporting, Inc. for transcription. The interview transcriptions are located in attachment 6 to this report.

E. FACTUAL INFORMATION

1.0 History of Flight

The history of flight was constructed from certified audio re-recordings and automatic dependent surveillance-broadcast (ADS-B)⁵ data provided by the FAA. ATC services provided to UAL1890 from the time they departed Los Angeles International Airport (LAX) until checking in with ZBW ARTCC were uneventful.

⁴ The position providing services to UAL1890 at the time of the accident was the Delancey sector radar (R24) position. There were three controllers associated with the R24 position while in communication with UAL1890: the R24A, R24B, and R24C controllers. The R24A controller provided services when UAL1890 initially checked in. The R24B controller that was initially assigned to relieve the R24A controller but ended up only assisting for a short time and did not take over the position. Lastly, the R24C controller who ultimately relieved the R24A controller and was providing services to UAL1890 at the time of the accident until being handed off to New York TRACON (N90).

⁵ 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.

The following timeline is a summary of the pilot and controller communications, and other pertinent information related to the sequence of events while UAL1890 was operating in ZBW ARTCC airspace and N90 airspace:

- 1532:30 The crew of ACA548 (an uninvolved airplane) checked in and was provided with a pilot report (PIREP)⁶ by the R24A controller.
- 1535:10 The crew of UAL1890 checked in with the R24A controller level at flight level⁷ (FL) 270. The R24 controller did not respond.
- [According to post-accident interviews, the R24A controller stated they did not respond at the time because they were completing other coordination. See attachment 6, page 418, line 10.]*
- 1536:00 The R24A controller instructed the crew of UAL1890 to descend to FL 240.
- 1538:14 The R24A controller conducted a position relief briefing with the R24C controller.
- 1540:38 The R24C controller instructed the crew of ACA548 to contact the Stewart sector (R05) controller. The crew of ACA548 acknowledged the frequency change and advised the R24C controller they had encountered moderate turbulence. The controller did not acknowledge the turbulence report.
- 1540:52 The R24C controller instructed the crew of UAL1890 to cross five miles past the Hancock VOR⁸ (HNK)⁹ at FL 190. The crew acknowledged the instructions.
- 1542:18 The crew of UAL1890 asked the R24C controller to confirm they were instructed to cross five miles past the HNK VOR and the controller responded in the affirmative.
- 1543:06 The R24C controller instructed the crew of UAL1890 to contact the R05 controller. The crew acknowledged the frequency change and advised the R24C controller they had encountered "severely moderate turbulence." The controller did not respond.
- 1544:07 The crew of UAL1890 checked in with the R05 controller and reported descending to FL 190. The R05 controller acknowledged

⁶ PIREP - A report made by a pilot of meteorological phenomena encountered by an aircraft in flight.

⁷ Flight Level - A Flight Level (FL) is a standard nominal altitude of an aircraft, in hundreds of ft. This altitude is calculated from the International standard pressure datum of 1013.25 hPa (29.92 inHg), the standard sea-level pressure, and therefore is not necessarily the same as the aircraft's true altitude either above mean sea level or above ground level.

⁸ VOR - VHF Omni Directional Radio Range - A type of short-range radio navigation system for aircraft, enabling aircraft with a receiving unit to determine their position and stay on course by receiving radio signals transmitted by a network of fixed ground radio beacons.

⁹ HNK - Hancock VOR/DME (Distance Measuring Equipment), Hancock, New York

and advised the crew of precipitation and light to moderate turbulence along their route of flight. The crew responded and stated that they had encountered moderate turbulence when they were at FL 210.

Figure 1 illustrates the approximate area where UAL1890 encountered turbulence along their route of flight.

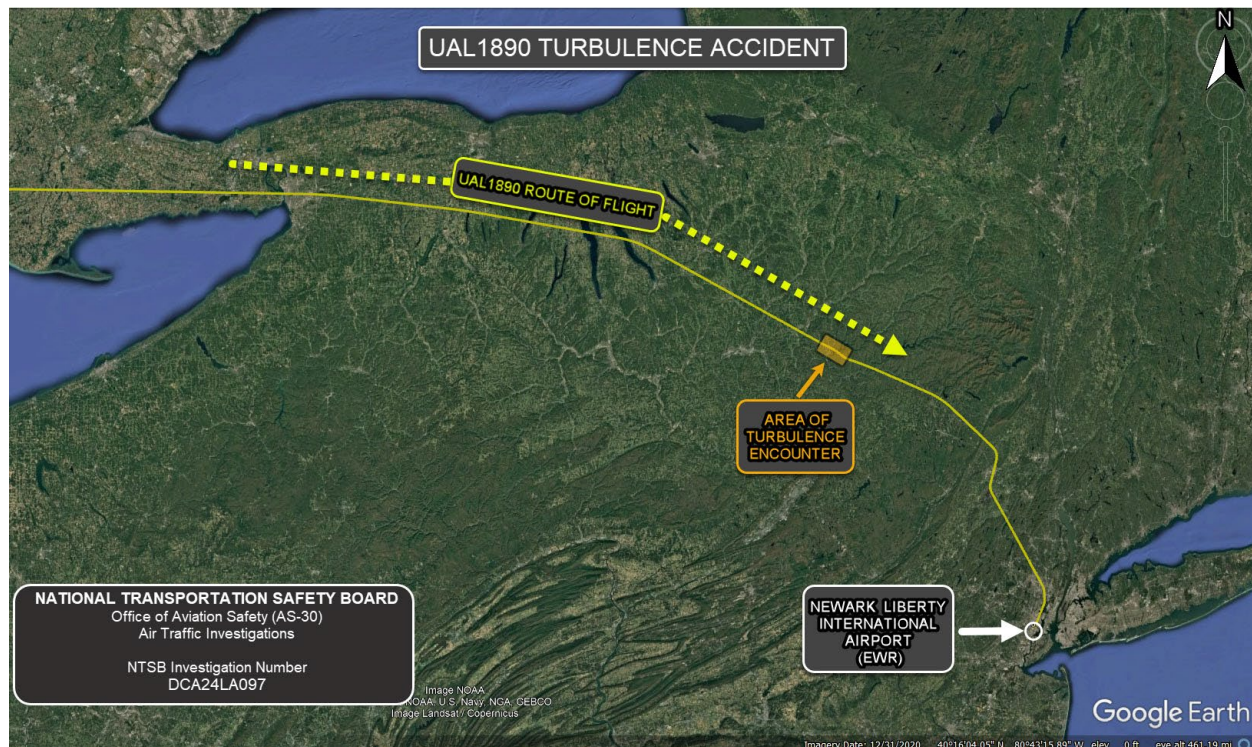


Figure 1. A graphic depicting the area of turbulence encounter.

- 1547:02 The R05 controller instructed the crew of UAL1890 to descend to 17,000 feet. The crew read back the instruction as issued.
- 1547:35 The R05 controller instructed the crew of UAL1890 direct FLOSI¹⁰ and issued a descent to 11,000 feet with a good read back.
- 1548:25 The R05 controller instructed the crew of UAL1890 to cross FLOSI at 9,000 feet with a good read back.
- 1550:27 The R05 controller instructed the crew of UAL1890 to cross CRANK¹¹ at 7,000 feet with a good read back.
- 1552:42 The R05 controller instructed the crew of UAL1890 to contact N90 on frequency 120.15 with a good read back

¹⁰ FLOSI is an airspace fix located near located 3.7 nm from Orange County Airport (MGJ).

¹¹ CRANK is an airspace fix located 0.9 nm from Randall Airport (06N).

There were no further radio communications recorded between UAL1890 and ZBW ARTCC. The following documents are the communications between UAL1890 and N90 TRACON.

- 1553:07 The crew of UAL1890 checked in with the N90 TRACON radar controller and reported they were at 8,000 feet and would cross CRANK at 7,000 feet. The radar controller acknowledged, advised the crew that automated terminal information system (ATIS)¹² information "Mike" was current and to expect the instrument landing system (ILS)¹³ approach to runway 22L at EWR. The crew acknowledged and advised they had information Mike.
- 1553:52 The radar controller instructed the crew of UAL1890 to proceed direct IZEKO¹⁴, intercept the localizer and to descend and maintain 7,000 feet. The crew acknowledged then said "standby."
- 1554:37 The crew of UAL1890 declared an emergency due to injured flight attendants and advised the radar controller they had already contacted their company. The crew requested they be given no delay and the controller acknowledged.
- 1555:00 The radar controller requested the crew of UAL1890 to verify whether they had an aircraft emergency or medical emergency. The crew reported they had a medical emergency. The controller requested the age, gender, type injury for those reported injured.
- 1555:39 The radar controller instructed the crew of UAL1890 to descend and maintain 5,000 feet with a good read back.
- 1556:15 The radar controller asked the crew of UAL1890 for their gate assignment. The crew responded with "Charlie One." The radar controller again asked for ages, gender and type injury for those reported injured. The crew advised that they were working on it.
- 1557:35 The radar controller requested the crew of UAL1890 to report the intensity, location, and time of the turbulence. The crew responded that it was at FL 210 or 200, "we hit a bad pocket of moderate to severe turbulence, it was brief in nature, but it was definitely on the higher end of the moderate side." The controller acknowledged.

¹² ATIS - Automatic Terminal Information Service - A continuous broadcast of current, routine information to arriving and departing aircraft by means of continuous and repetitive broadcasts throughout the day or specified portion of the day.

¹³ ILS - Instrument Landing System - A precision instrument approach system that normally consists of a Localizer, Glideslope, Outer/Middle Markers, and approach lights utilized by a properly equipped pilot to conduct an ILS approach.

¹⁴ IZEKO is the Intermediate Fix (IF) for the ILS RWY 22L Approach into EWR.

- 1558:40 The crew of UAL1890 advised it was around the HNK area when it happened. The N90 controller acknowledged.
- 1600:27 The radar controller contacted Newark Airport Traffic Control Tower (EWR ATCT) and relayed the medical emergency information from UAL1890.
- 1601:00 The radar controller instructed the crew of UAL1890 to descend and maintain 3,000 feet with a good read back.
- 1601:40 The radar controller cleared the crew of UAL1890 for the ILS RWY 22L approach to EWR with a good read back.
- 1602:20 The radar controller instructed the crew of UAL1890 to contact EWR ATCT with a good read back.

At about 1606, UAL1890 landed on runway 22L at EWR without further incident.

2.0 Flight Track Surveillance Information

2.1 Automatic Dependent Surveillance - Broadcast (ADS-B)

ADS-B data was provided by the FAA. These data were provided in comma separated value (.csv), as well as keyhole markup language (.kml) formats. The ADS-B data provided flight track surveillance information for the entire accident flight. Figure 2 in this section was produced using these data and overlaid onto satellite imagery in Google Earth¹⁵.

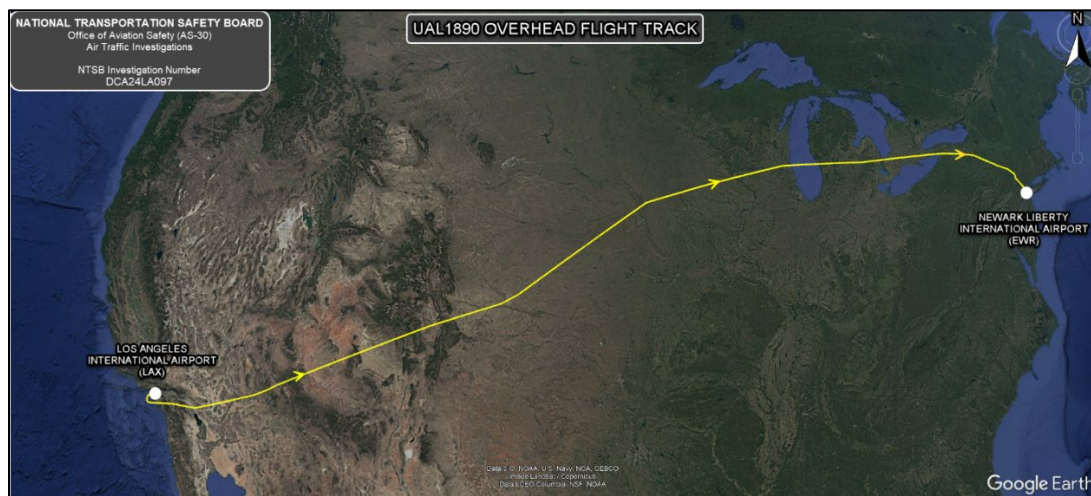


Figure 2. Overhead view of the accident flight track of UAL1890.

¹⁵ Google Earth - A web based virtual globe, map and geographical information program that maps the Earth by the superimposition of images obtained from satellite imagery, aerial photography and geographic information system 3D globe.

3.0 Meteorological Information¹⁶

3.1 Surface Observations

The area surrounding the accident site was documented using official aviation routine weather reports (METARs)¹⁷ and special reports (SPECIs)¹⁸. The following observations were taken from standard code and are provided in plain language. A magnetic variation¹⁹ of 12° west was indicated over the area.

Greater Binghamton Airport (KBGM) had the closest official weather station to the accident site. KBGM had an automated surface observing system (ASOS²⁰) and its longline²¹ reports were augmented by ATC when the tower was in operation²². The KBGM ASOS was located 27 miles east-southeast of the accident site, at an elevation of 1,636 ft, and issued the following observations surrounding the accident time²³:

[1433 EST] SPECI KBGM 101933Z 27007KT 3SM TSRA FEW027 BKN039 OVC049 06/03 A2975
RMK AO2 PK WND 31031/1919 LTG DSNT E RAB14 TSB25 P0017 T00610033

[1450 EST] SPECI KBGM 101950Z 28010KT 5SM RA OVC039 07/04 A2974 RMK AO2 PK WND
31031/1919 LTG DSNT NE AND E RAB14 TSB25E47 P0020

**[1453 EST] METAR KBGM 101953Z 28011KT 4SM RA BR OVC041 07/05 A2974 RMK
AO2 PK WND 31031/1919 LTG DSNT NE AND E RAB14 TSB25E47 SLP078 P0020
T00720050**

KBGM weather at 1453 EST, wind from 280° at 11 knots, visibility 4 statute miles, moderate rain, mist, overcast ceiling at 4,100 ft above ground level (agl),

¹⁶ Detailed meteorological information is located in the Meteorologists Specialist's Factual Report in the docket.

¹⁷ METAR - Aviation Routine Weather Report - The METAR has been adopted by the United States to provide surface observations of current weather conditions in support of aviation for the terminal. It is issued at fixed times hourly.

¹⁸ Latest criteria for SPECIs can be found in the Federal Meteorological Handbook: [Federal Meteorological Handbook Number 1, Surface Weather Observations and Reports \(icams-portal.gov\)](https://icams-portal.gov/fmh1/)

¹⁹ Magnetic variation - The angle (at a particular location) between magnetic north and true north. Latest measurement taken from <https://skyvector.com/>

²⁰ ASOS - Automated Surface Observing System is equipped with meteorological instruments to observe and report wind, visibility, weather phenomena, ceiling, temperature, dewpoint, altimeter, and barometric pressure. ASOS are maintained by the NWS.

²¹ "Longline" refers to the dissemination of weather observations with the intent that they are available in near-real time to national databases 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 weather observations are distributed.

²² ATC hours of operation were between 0600 and midnight local time.

²³ The bold sections of products in this report are intended to highlight the text that directly reference the weather conditions that affected the accident region around the accident time. The local times in this section next to the METARs are provided for quick reference between UTC and local times.

temperature of 7° Celsius (C), dew point temperature of 5°C, and an altimeter setting of 29.74 inches of mercury (inHg). Remarks, automated station with a precipitation discriminator, peak wind from 310° at 31 knots at 1419 EST, lightning distant²⁴ northeast and east, rain began at 1414 EST, thunderstorm began at 1425 EST, thunderstorm ended at 1447 EST, sea level pressure 1007.8 hPa, 0.20 inches of precipitation since 1353 EST, temperature 7.2°C, dew point temperature 5.0°C.

3.2 In - Flight Weather Advisories

There was a convective significant meteorological information (SIGMET)²⁵ valid for the accident site at the accident time. SIGMET 29E issued at 1455 EST forecast an area of embedded thunderstorms with tops to FL 280 with the SIGMET box area moving from 250° at 40 knots:

WSUS31 KPCI 101955
SIGE
-MKCE WST 101955
CONVECTIVE SIGMET 29E
VALID UNTIL 2155Z
ME NH VT NY PA
FROM 60WNW BGR-50WSW BGR-30NNE HAR-10NW EWC-60WNW BGR
AREA EMBD TS MOV FROM 25040KT. TOPS TO FL280.

Figure 3 below is a graphical representation of SIGMET 29E from the Aviation Weather Center's (AWC) observation page. The approximate location of the accident has been outlined with a black circle.

²⁴ Distant indicated that the lightning was beyond 10 miles but less than 30 miles from the center of the airport (or airport location point, [ALP]).

²⁵ US Convective SIGMETs - Convective SIGMETs are issued in the conterminous U.S. if these conditions are occurring or expected to occur:

1. Line of thunderstorms at least 60 miles long with thunderstorms affecting 40% of its length.
 2. Area of thunderstorms covering at least 40% of the area concerned and exhibiting a very strong radar reflectivity or a significant satellite or lightning signature.
 3. Embedded or severe thunderstorms expected to occur for more than 30 minutes
- Special issuance criteria occur with tornado, hail greater than 3/4 inch in diameter, and wind gusts greater than or equal to 50 knots. Any convective SIGMET implies severe or greater turbulence, severe icing, and low level wind shear. A convective SIGMET may be issued for any convective situation which the forecaster feels is hazardous to all categories of aircraft. Bulletins are issued hourly at Hour+55. The text of the bulletin consists of either an observation and a forecast or just a forecast. The forecast is valid for up to 2 hours.

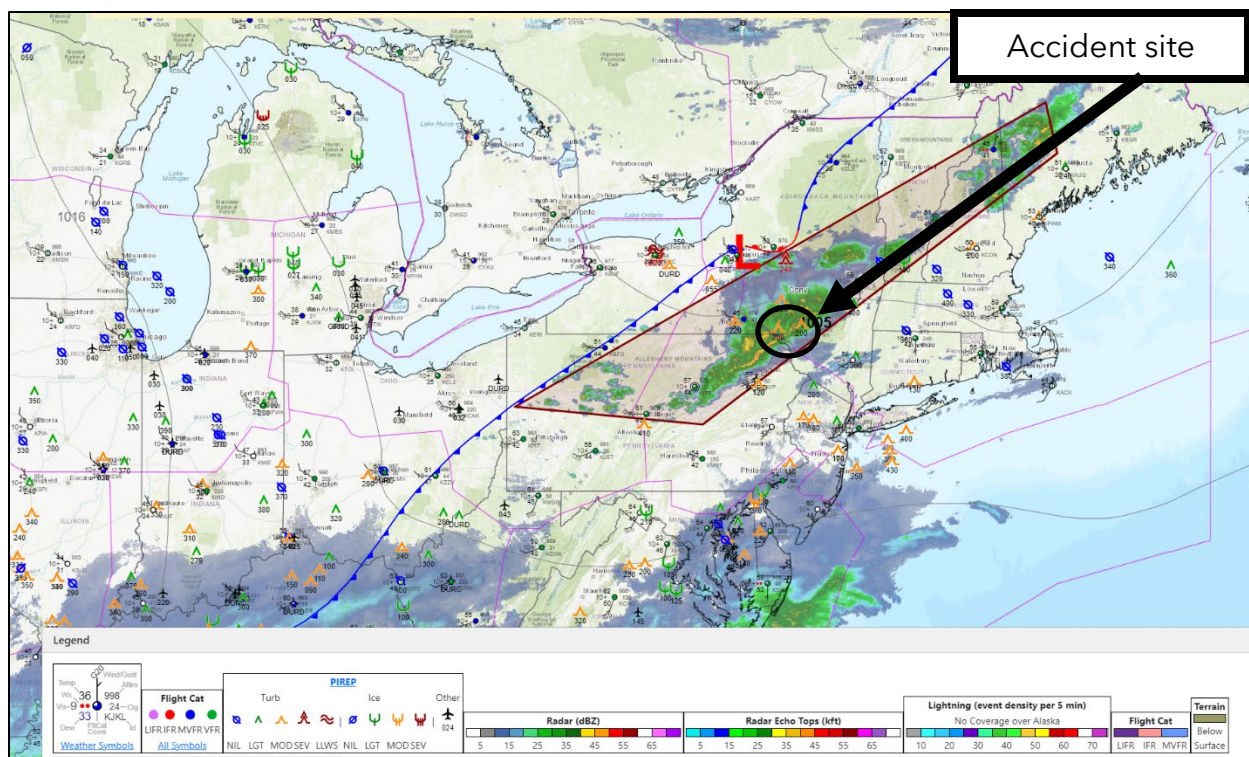


Figure 3. Aviation Weather Center observation page valid at 1545 EST with fronts, PIREPs, and the area of Convective SIGMET 29E highlighted. The location of the accident site is marked by the black circle.

3.3 Pilot Weather Reports (PIREPs)

The longline disseminated (PIREPs) distributed into the national airspace system (NAS) within 2 hours of the accident time in and around BGM²⁶:

BGM UA /OV RKA/TM 1904/FL220/TP B737/TB MOD 230-220/RM CAT
 BGM UA /OV CFB/TM 1910/FL220/TP E190/TB MOD
 BGM UA /OV CFB/TM 1957/FL220/TP B38M/TB LGT-MOD CHOP 200-220
 BGM UA /OV HNK/TM 2022/FL220/TP B789/TB MOD CHOP 220-190
 BGM UA /OV DNY140005/TM 2038/FL200/TP C68A/TB MOD 200-190
 UCA UUA /OV UCA/TM 2043/FL240/TP TBM8/TB MOD-SEV 240/RM +/- 600FT ALTITUDE LOSS
 BGM UUA /OV HNK/TM 2052/FL210/TP B737/TB MOD-SEV CAT 200-210
 BGM UA /OV BGM180040/TM 2054/FL170/TP E145/TB MOD
 BGM UA /OV CFB360005/TM 2059/FL150/TP E145/TA M17/IC LGT RIME
 BGM UUA /OV RKA250030/TM 2109/FL210/TP CRJ7/TB MOD-SEV CAT/RM 180-210
 BGM UA /OV CFB040015/TM 2114/FL170/TP E170/TA -02/TB MOD/IC MX
 BGM UA /OV HNK/TM 2120/FL170/TP B772/TB MOD/RM WIND SHEAR WITH MINOR SPEED CHANGES

²⁶ Only PIREPs with the World Meteorological Organization headers UBNY**, UBCT**, UBPA**, UBNJ**, and UBMA** were considered. These do not include pilot reports only broadcast via radio.

BGM UA /OV RKA128050/TM 2132/FL240/TP E75L/RM LGT TURB 230-150 ON LGRA ARRIVAL
BGM UA /OV CFB/TM 2149/FL150/TP CRJ7/TB LGT CHOP
BGM UA /OV HNK/TM 2229/FL190/TP CRJ7/TB LGT CHOP 190
BGM UA /OV CFB270050/TM 2234/FL380/TP B737/TB LGT-MOD

3.4 Weather Surveillance Radar Imagery

Figure 4 is a regional view of the National Weather Service (NWS) National Reflectivity Mosaic and the approximate location of the accident has been outlined with a red circle. The mosaic imagery depicted echoes of 25 to 40 dBZ²⁷ above the accident site.

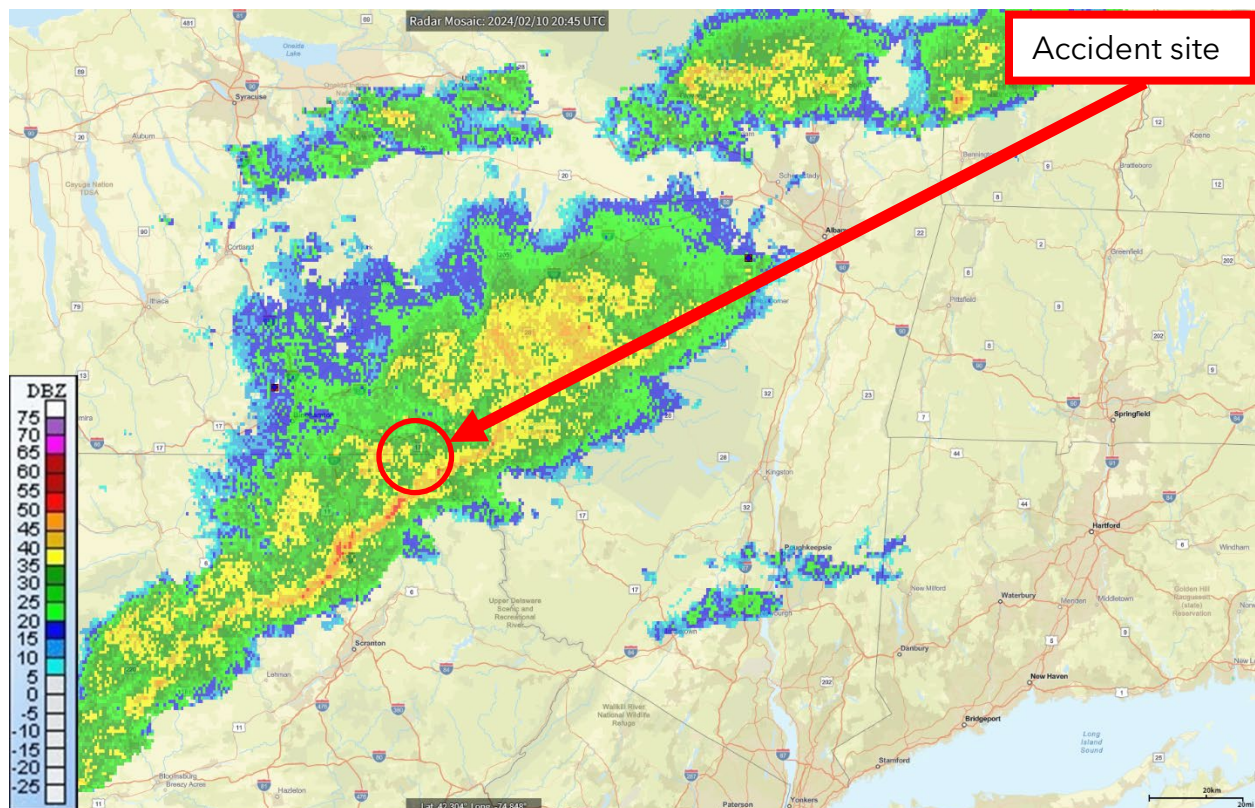


Figure 4. National Reflectivity Mosaic for 1545 EST.

4.0 Air Traffic Control Facility

ZBW ARTCC was a level 12 enroute ATC facility located in Nashua, NH, and was part of the FAA's eastern service area. The radar facility was responsible for approximately 165,000 square miles of airspace that bordered six other ARTCCs including New York (ZNY), Cleveland (ZOB), Washington (ZDC), Montreal (ZUL), Moncton (ZQM) and Toronto (ZYZ). ZBW ARTCC was open 24 hours per day, 7-days per week, year-round.

²⁷ dBZ - A non-dimensional "unit" of radar reflectivity which represents a logarithmic power ratio (in decibels or dB) with respect to radar reflectivity factor, Z.

5.0 Air Traffic Control Personnel

5.1 Resource Management - Time of Event

According to facility management, area A (the area involved) was required to be staffed for the shift with eight certified professional controllers (CPCs) and one OS. At the time of the accident, the area was staffed with nine CPCs and two OSs. There were three CPCs on position with one trainee receiving on the job training (OJTI), and an OS providing direct supervision. There were six CPCs and one OS available.

5.2 Personnel Interviewed

5.2.1 Delancey Sector Radar - Initial (R24A) Controller

The R24A controller provided services to UAL1890 upon initial check-in until being relieved by the R24C controller. The R24A controller entered on duty with the FAA in January 2018 and after completing initial training at the FAA Academy, was assigned to ZBW ARTCC. He had certified on the R24 position and became fully CPC rated in November 2021. He was 32 years old, possessed a current second-class medical clearance with a requirement to wear corrective lenses while performing ATC duties, and stated he was wearing his glasses as required at the time of the accident.

5.2.2 Delancey Sector Radar - Initial Relieving (R24B) Controller

The R24B controller was initially assigned to relieve the R24A controller. The R24B controller entered on duty with the FAA in 2008 and after completing initial training at the FAA Academy, was assigned to ZBW ARTCC. He had certified on the R24 position and became fully CPC rated in August 2011. He was 40 years old, possessed a current second-class medical clearance with no documented waivers or restrictions.

5.2.3 Delancey Sector Radar - Event (R24C) Controller

The R24C controller relieved the R24A and was the controller providing services to UAL1890 at the time of the accident. The R24C controller entered on duty with the FAA in December 2007 and had prior ATC experience in the U.S. military and a contract tower prior to FAA service. He had been certified on the R24 position since June of 2019 and became fully CPC rated at the same time. He was 44 years old, possessed a current second-class medical clearance with a waiver for prescription medication.

5.2.4 Operations Supervisor (OS)

The OS entered on duty with the FAA in May 2009 and attended the FAA air traffic control academy in Oklahoma City, OK. After graduating he was assigned to

ZLA ARTCC where he attained his CPC rating in April 2012. He became an OS at Los Angeles ARTCC (ZLA) in January 2022 then transferred to ZBW as an OS in April 2023. He was 41 years old and possessed a current second-class medical clearance with no waivers.

5.2.5 Operations Manager (OM)

The OM entered on duty with the FAA in May 1987 and began working at ZBW ARTCC. During his tenure at ZBW, he was a CPC in Area A until May 2012. He performed duties as a TMU specialist from May 2012 until January 2013. He was promoted to OS of Area C from January 2013 until September 2014. He was promoted to OM in September 2014 until September 2016. He accepted a position as the quality control manager in September 2016 and performed those duties until July 2018. In July 2018 he returned to duties as an OM.

5.2.6 Support Manager of Quality Control (QC)

The support manager entered on duty with the FAA in June 2003 and began his position as support manager in July 2018. Prior to assignment at ZBW, he served as ATM at multiple facilities including Laurence G Hanscom Field Airport (BED), Savannah Air Traffic Control Tower (SAV) and Manchester Air Traffic Control Tower (MHT). He began his FAA career at Boston Logan Airport (BOS) in June 2003 then transferred to Manchester Air Traffic Control Tower where he was certified as a CPC then was promoted to OS in November 2006. The support manager was not in the facility at the time of the accident.

5.2.7 Weather Coordinator Controller (WC)

The WC controller entered on duty with the FAA in November 2005 and certified as a CPC at ZBW in May 2008. She transitioned to TMU in July 2014. She was 44 years old and possessed a current second-class medical clearance with a waiver for prescription medication.

5.2.8 Executive Officer (XO)

The XO entered on duty with the FAA in June 2003 and began his position as XO in March 2022. Prior to this promotion, he served as OS at ZBW beginning in January 2021. Prior to that he was the ZBW training administrator, an OM and an OS at ZBW beginning in September 2016. The XO was not in the facility at the time of the accident.

5.2.9 Air Traffic Manager (ATM)

The ATM entered on duty with the FAA in December 2002 and began her position as the ATM in December 2022. Prior to the promotion she served at ZBW as

an OM, and an OS in October 2008. Her previous facility before assignment to ZBW was BED where she certified as a CPC, then as an OS. The ATM was not in the facility at the time of the accident.

6.0 Air Traffic Procedures

6.1 PIREP Solicitation and Dissemination

FAA order 7110.65AA, *Air Traffic Control*, paragraph 2-6-2, PIREP Solicitation and Dissemination, provided procedures and guidance for controllers on requirements for the solicitation and dissemination of PIREPS. The paragraph stated in part:

Emphasis must be placed on the solicitation and dissemination of Urgent (UUA) and Routine (UA) PIREPs. Timely dissemination of PIREPs alerts pilots to weather conditions and provides information useful to forecasters in the development of aviation forecasts. PIREPs also provide information required by ATC in the provision of safe and efficient use of airspace. This includes reports of strong frontal activity, squall lines, thunderstorms, light to severe icing, wind shear and turbulence (including clear air turbulence) of moderate or greater intensity, braking action, volcanic eruptions and volcanic ash clouds, detection of sulfur gases in the cabin, and other conditions pertinent to flight safety. Controllers must provide the information in sufficient detail to assist pilots in making decisions pertinent to flight safety.

- a. Solicit PIREPs when requested, deemed necessary or any of the following conditions exist or is forecast for your area of jurisdiction:
 1. Ceilings at or below 5,000 feet. These PIREPs must include cloud bases, tops and cloud coverage when available. Additionally, when providing approach control services, ensure that at least one descent/climb-out PIREP and other related phenomena is obtained each hour.
 2. Visibility (surface or aloft) at or less than 5 miles.
 3. Thunderstorms and related phenomena.
 4. Turbulence of moderate degree or greater.
 5. Icing of light degree or greater.
 6. Wind shear.
 7. Braking action reports less than good.
 8. Volcanic ash clouds.
 9. Detection of sulfur gases (SO₂ or H₂S), associated with volcanic activity, in the cabin.

b. Record with the PIREPs:

- 1. Time.*
- 2. Aircraft position.*
- 3. Type aircraft.*
- 4. Altitude.*
- 5. When the PIREP involves icing include:*
 - (a) Icing type and intensity.*
 - (b) Air temperature in which icing is occurring.*

c. Obtain PIREPs directly from the pilot, or if the PIREP has been requested by another facility, you may instruct the pilot to deliver it directly to that facility.

d. Disseminate PIREPs as follows:

- 1. Relay pertinent PIREP information to concerned aircraft in a timely manner.*
- 2. EN ROUTE: Relay all operationally significant PIREPs to the facility weather coordinator.*

F. LIST OF ATTACHEMENTS

Attachment 1: FAA Certified Audio

Attachment 2: ADS-B Data

Attachment 3: ZBW Controller Interview Transcripts

Attachment 4: ZBW Airspace Maps

Attachment 5: Facility Weather Items

Attachment 6: ZBW Facility and Position Logs

Attachment 7: ZBW Local Safety Council, Compliance Verification and Corrective Action Plans

Attachment 8: ZBW Facility SOP and Training Order

Attachment 9: Facility Event Review Documentation

Submitted by:

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