Aviation Investigation Final Report

Location:	Houston, Texas	**Accident Number:**	DCA23LA304
Date & Time:	June 1, 2023, 16:32 Local	**Registration:**	N479UA
Aircraft:	AIRBUS INDUSTRIE A320-232	**Aircraft Damage:**	None
Defining Event:	Turbulence encounter	**Injuries:**	1 Serious, 117 None
Flight Conducted Under:	Part 121: Air carrier - Scheduled		

Analysis

A flight attendant was seriously injured when United Airlines flight 1288 encountered low-topped convectively-induced turbulence during a descent into the George Bush Intercontinental Houston Airport (IAH), Houston, Texas.

Flight 1288 originated from Baltimore/Washington International Thurgood Marshall Airport (BWI), Baltimore, Maryland. The captain was the pilot monitoring, and the first officer was the pilot flying.

The flight crewmembers reported that during preflight planning, the weather briefing and dispatch-provided flight papers were normal, with no turbulence concerns or convective weather issues noted. The captain briefed the flight attendants that the ride was expected to be good, and normal inflight service could be expected.

During the flight, the flight crewmembers observed some weather building up along their route along the Kentucky-Tennessee border. To avoid this weather, they planned a different route, consulted with their dispatcher, and received a new route south of the building storms.

As the flight was approaching the Houston terminal area, the flight crew briefed the descent and anticipated approach into IAH including a review of the weather. They indicated there were no pilot reports (PIREPS), significant meteorological information (SIGMETS), or other warnings issued for the area approaching IAH. After starting the descent, they turned the seatbelt sign on at 18,000 feet and advised the passengers via the passenger announcement (PA) system to remain seated for the rest of the flight.

The flight crewmembers reported that they were in visual flight rules (VFR) conditions for the descent with a scattered cumulus layer below them around 10,000 - 13,000 feet mean sea level

(MSL). No buildups were towering over them and the visibility above the scattered cumulus layer below them was good. They hadn't received any reports of turbulence and fully expected their descent to be normal.

At this time, they had not yet given the final double bell signal (indicating that the flight was approaching 10,000 feet) to the flight attendants. Just as they entered the cumulus area around 13,000 MSL it became apparent they were going to go directly through one of the cumulus clouds. Entering the cloud layer, the flight encountered brief turbulence. The flight crew classified the turbulence as being moderate and indicated that it only lasted for a few seconds.

When the turbulence was encountered, two flight attendants in the aft galley, who were preparing to begin their initial descent procedures, were knocked to the floor. As one FA propped herself up into a seated position so she could get up and take her jump seat, a second encounter with turbulence occurred and she was tossed into the air. She landed directly on her tailbone, injuring her spine, and resulting in severe pain in her lower back. Shortly thereafter, the captain made a PA for the flight attendants to take their Jump seats. He did not use the phrase, "flight attendants be seated immediately," because the event was over before he could grab the PA to make that announcement.

Approaching 10,000 feet, the flight crew received a call from the cabin advising them that two of the flight attendants might have been injured. Passing through 10,000 feet, the captain rang the double chime and heard the purser make a passenger announcement that the flight attendants would remain seated for the rest of the flight and asked the passengers to stow all items and return their seats to the upright positions. Shortly thereafter, the flight crew received another call from the cabin advising them that one of the Flight Attendants' injuries was more severe and may require paramedics to meet the flight at the gate.

Emergency medical personnel met the airplane at the gate and treated the injured flight attendant. A post-flight medical evaluation revealed that the flight attendant was diagnosed with a "spinal compression fracture."

Based on a review of weather radar (KHGX), satellite (GOES-16), and upper air model data (HRRR), the turbulence encounter was generally coincident in time and location with low-topped convective activity that reached heights above 12,000 feet. Based on the Automatic dependent surveillance-broadcast (ADS-B) data at the time of the accident, the aircraft did not look to be inside a convective updraft but was operating close to the updrafts. There was no other source of turbulence (e.g., clear-air turbulence, mountain wave turbulence) present.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

An encounter with convectively-induced turbulence (CIT).

Findings

Environmental issues	Convective turbulence - Effect on personnel

Factual Information

History of Flight

Enroute-descent	Turbulence encounter (Defining event)

Pilot Information

Certificate:	Airline transport; Flight engineer; Flight instructor	**Age:**	59,
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	5-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	March 9, 2023
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	20699 hours (Total, all aircraft), 14616 hours (Total, this make and model), 7791 hours (Pilot In Command, all aircraft), 171 hours (Last 90 days, all aircraft), 69 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	**Age:**	41,
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	5-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	October 17, 2022
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	9614 hours (Total, all aircraft), 2449 hours (Total, this make and model), 1567 hours (Pilot In Command, all aircraft), 145 hours (Last 90 days, all aircraft), 6 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	AIRBUS INDUSTRIE	**Registration:**	N479UA
Model/Series:	A320-232	**Aircraft Category:**	Airplane
Year of Manufacture:	2001	**Amateur Built:**	
Airworthiness Certificate:	Commuter; Normal; Transport	**Serial Number:**	1538
Landing Gear Type:	Retractable - Tricycle	**Seats:**	156
Date/Type of Last Inspection:	Continuous airworthiness	**Certified Max Gross Wt.:**	169700 lbs
Time Since Last Inspection:		**Engines:**	2
Airframe Total Time:		**Engine Manufacturer:**	
ELT:	C126 installed, not activated	**Engine Model/Series:**	
Registered Owner:	UNITED AIRLINES INC	**Rated Power:**	
Operator:	UNITED AIRLINES INC	**Operating Certificate(s) Held:**	Flag carrier (121)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KIAH	**Distance from Accident Site:**	
Observation Time:	21:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Few / 5000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 10000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	None /
Wind Direction:	180°	**Turbulence Severity Forecast/Actual:**	N/A /
Altimeter Setting:	29.87 inches Hg	**Temperature/Dew Point:**	31.1°C / 18.9°C
Precipitation and Obscuration:			
Departure Point:	Baltimore, MD (KBWI)	**Type of Flight Plan Filed:**	IFR
Destination:	Houston, TX (KIAH)	**Type of Clearance:**	IFR
Departure Time:	13:53 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Serious, 5 None	**Aircraft Damage:**	None
Passenger Injuries:	112 None	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 Serious, 117 None	**Latitude, Longitude:**	29.9902,-95.3368

Administrative Information

Investigator In Charge (IIC):	Hauf, Michael
Additional Participating Persons:	Michael Garver; United FAA
Original Publish Date:	November 15, 2023
Last Revision Date:	
Investigation Class:	Class 4
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=192290