



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

# Aviation Investigation Final Report

<b>Location:</b>	International Waters,	<b>Accident Number:</b>	DCA16CA220
<b>Date &amp; Time:</b>	August 31, 2016, 02:10 UTC	<b>Registration:</b>	N657UA
<b>Aircraft:</b>	Boeing 767 322	<b>Aircraft Damage:</b>	None
<b>Defining Event:</b>	Turbulence encounter	<b>Injuries:</b>	1 Serious, 11 Minor
<b>Flight Conducted Under:</b>	Part 121: Air carrier - Scheduled		

## Analysis

On August 31, 2016, at 0210 universal coordinated time, United Airlines flight 880, a Boeing 767-322, N657UA, encountered severe turbulence during cruise that resulted in one flight attendant sustaining a serious injury. Another flight attendant and 10 passengers, including one infant, received minor injuries. There were no injuries to the other passengers and crew onboard and the airplane was not damaged. The flight was operating under the provisions of 14 Code of Federal Regulations Part 121 as a regularly scheduled passenger flight from the George Bush Intercontinental Airport (KIAH), Houston, Texas to the London-Heathrow Airport (EGLL), United Kingdom. The flight diverted to the Shannon Airport (EINN), Shannon, Ireland .

According to flight crew statements, the aircraft was in cruise at flight level (FL) 340 approximately 50 miles east of 40W on the North Atlantic Track X, when it encountered unexpected severe turbulence that lasted for approximately 45 seconds. The captain indicated there was forecast turbulence for this portion of the flight and there were no pilot weather reports (PIREP) or air traffic control advisories in the pre-flight weather package. The flight crew indicated that the flight conditions were smooth and devoid of any turbulence for approximately two hours prior to the event. The seat belt sign had been off for about 2 hours prior to the event. They indicated that the onboard weather radar was operating in the AUTO mode and there were no returns observed prior to the event. After the event, the seat belt sign was immediately illuminated. After assessing the level and number of injuries, the captain decided to divert to EINN to expedite. After landing, all injured passengers and one flight attendant were treated for minor injuries and released; one flight attendant was admitted to the hospital with fractures of the left wrist and L3 vertebra.

According to a weather analysis conducted by United Airlines, satellite imagery indicated convective buildup/enhancement in the form of an isolated cell in the region of the event. The Atlantic High Weather Prognostic Chart valid for the period depicted the potential for isolated cumulonimbus clouds over the area, which implied the potential for severe or greater turbulence associated with the convection. The nighttime conditions and lack of lightning in the lower convection, likely did not

provide any visual indication of the developing storms below the flight path. Wind and temperature patterns depicted a diffluent wind flow pattern ahead of a trough over the area of the upset, which supported the development of the isolated convection. RPM Turbulence did not indicate presence of Clear Air Turbulence.

## Probable Cause and Findings

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

an inadvertent encounter with severe convective turbulence.

### Findings

Environmental issues	Convective turbulence - Effect on personnel
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## Factual Information

### History of Flight

Enroute-cruise	Turbulence encounter (Defining event)
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### Pilot Information

Certificate:	Airline transport	Age:	49,Male
Airplane Rating(s):	Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	5-point
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	March 15, 2016
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	8928 hours (Total, all aircraft), 1765 hours (Total, this make and model)		

### Co-pilot Information

Certificate:	Airline transport	Age:	37,Male
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:	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	Toxicology Performed:	No
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	April 8, 2016
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	11294 hours (Total, all aircraft), 3204 hours (Total, this make and model)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Boeing	<b>Registration:</b>	N657UA
<b>Model/Series:</b>	767 322 322	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1993	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Transport	<b>Serial Number:</b>	27112
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	
<b>Date/Type of Last Inspection:</b>		<b>Certified Max Gross Wt.:</b>	297624 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	2 Turbo fan
<b>Airframe Total Time:</b>		<b>Engine Manufacturer:</b>	P&W
<b>ELT:</b>		<b>Engine Model/Series:</b>	PW4000 SER
<b>Registered Owner:</b>		<b>Rated Power:</b>	24900 Horsepower
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	Flag carrier (121)

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Night
<b>Observation Facility, Elevation:</b>		<b>Distance from Accident Site:</b>	
<b>Observation Time:</b>		<b>Direction from Accident Site:</b>	
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	
<b>Lowest Ceiling:</b>		<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	/	<b>Turbulence Type Forecast/Actual:</b>	Convective / Convective
<b>Wind Direction:</b>		<b>Turbulence Severity Forecast/Actual:</b>	Severe / Severe
<b>Altimeter Setting:</b>		<b>Temperature/Dew Point:</b>	
<b>Precipitation and Obscuration:</b>			
<b>Departure Point:</b>	Houston, TX (KIAH)	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	London (EGLL)	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	20:27 UTC	<b>Type of Airspace:</b>	

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Serious, 1 Minor	<b>Aircraft Damage:</b>	None
<b>Passenger Injuries:</b>	10 Minor	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Serious, 11 Minor	<b>Latitude, Longitude:</b>	46,38.470001(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	LeBaron, Timothy
<b>Additional Participating Persons:</b>	Jeff Plantz; United Airlines; San Francisco, CA
<b>Original Publish Date:</b>	April 22, 2020
<b>Note:</b>	This accident report documents the factual circumstances of this accident as described to the NTSB.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=93972">https://data.nts.gov/Docket?ProjectID=93972</a>

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