
TCAS Resolution Advisory injuries, Boeing 737-300, June 8, 1997

Micro-summary: This Boeing 737-300 executed a TCAS Resolution Advisory maneuver, injuring two flight attendants.

Event Date: 1997-06-08 at 917 CDT


Investigative Body: National Transportation Safety Board (NTSB), USA

Investigative Body's Web Site: <http://www.nts.gov/>

Cautions:

1. Accident reports can be and sometimes are revised. Be sure to consult the investigative agency for the latest version before basing anything significant on content (e.g., thesis, research, etc).
 2. Readers are advised that each report is a glimpse of events at specific points in time. While broad themes permeate the causal events leading up to crashes, and we can learn from those, the specific regulatory and technological environments can and do change. ***Your company's flight operations manual is the final authority as to the safe operation of your aircraft!***
 3. Reports may or may not represent reality. Many many non-scientific factors go into an investigation, including the magnitude of the event, the experience of the investigator, the political climate, relationship with the regulatory authority, technological and recovery capabilities, etc. It is recommended that the reader review all reports analytically. Even a "bad" report can be a very useful launching point for learning.
 4. Contact us before reproducing or redistributing a report from this anthology. Individual countries have very differing views on copyright! We can advise you on the steps to follow.
-

Aircraft Accident Reports on DVD, Copyright © 2006 by Flight Simulation Systems, LLC
All rights reserved.
www.fss.aero

 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: CHI97LA162		Aircraft Registration Number: N321UA	
		Occurrence Date: 06/08/1997		Most Critical Injury: Serious	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place VALPARAISO		State IN	Zip Code 46383	Local Time 0917	Time Zone CDT
Airport Proximity: Off Airport/Airstrip		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Boeing		Model/Series 737-300		Type of Aircraft Airplane	
Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:					
<p>On June 8, 1997, at 0917 central daylight time (cdt), a Boeing 737-300, N321UA, operated by United Airlines as flight 1517, and a Cessna 414, N414RN were involved in a near mid-air collision near Valparaiso, Indiana. Neither airplane sustained any damage. One flight attendant onboard United 1517 sustained serious head and neck injuries. Another flight attendant was treated and released from the hospital with minor injuries. The 2 flight crewmembers, another flight attendant, and 76 passengers onboard flight 1517 were not injured. The pilot and four passengers onboard N414RN were not injured. United 1517 had departed Philadelphia, Pennsylvania, at 0758 cdt, on an IFR flight plan, en route to the Chicago O'Hare International Airport. N414RN had departed Warsaw, Indiana, at approximately 0900 cdt, en route to Wichita, Kansas. N414RN was not on a flight plan nor was the pilot in contact with air traffic control when the encounter occurred.</p> <p>United 1517 had crossed over the Knox VOR and was cleared to descend and maintain 11,000 feet. The near mid-air occurred approximately 10 miles northwest of the Knox VOR. According to the Chicago ARTCC/Chicago TRACON Letter of Agreement, O'Hare jet traffic arriving from the southeast (Bearz Sector) is to cross the BEARZ Intersection at 11,000 feet. United 1517 was approximately 31nm southeast of the BEARZ Intersection when the near mid-air occurred.</p> <p>United 1517</p> <p>The Captain reported in his written statement that the First Officer (F/O) was flying the airplane when the near mid-air occurred. He stated the weather was "solid IMC which began about 14,000" and that they broke out of the cloud layer between 8,000 and 10,000 feet. While descending from 12,000 feet to 11,000 feet they received a Traffic Advisory (T/A) from the Traffic Alert and Collision Avoidance System (TCAS). He reported he leaned forward to view the TCAS display and he saw the target "just to the right of the nose of the aircraft symbol." He reported that their altitude was 11,700 feet and the target displayed an altitude of 11,300 feet and climbing. He then told the F/O to "stop the descent or hold our altitude or words to this effect." The F/O responded by turning on the autopilot altitude hold function. The Captain reported they immediately got a Resolution Advisory (R/A) to climb. He reported that at this time their altitude was probably 11,500 feet and that the time frame between receiving the T/A and the R/A was about five seconds.</p> <p>The Captain continued to report that upon receiving the R/A he pulled back "firmly" on the yoke to stop the descent and "we may have even climbed a bit." He stated he pulled back for about one second, then he released the back pressure. He was not sure if he actually pushed forward on the yoke or not. He reported that the R/A warning ceased within five seconds.</p> <p>He reported that he and the F/O both looked out of the airplane and saw "what appeared to be a Cessna 414: white with blue trim... ." He reported that this airplane was at his 10 o'clock position, and 100 to 200 feet below them traveling southwesterly. He reported they were able to see the airplane only briefly because of a hole in the clouds and that it disappeared into the</p>					
FACTUAL REPORT - AVIATION					
Page 1					

National Transportation Safety Board

FACTUAL REPORT

AVIATION

NTSB ID: CHI97LA162

Occurrence Date: 06/08/1997

Occurrence Type: Accident

Narrative (Continued)

clouds within approximately two seconds.

The Captain reported they then contacted Air Traffic Control to report the near collision followed by an announcement to the passengers. Shortly thereafter, the flight crew was informed by a flight attendant that both she and another flight attendant in the back of the airplane were injured during the maneuver and that they would need medical attention upon their arrival at the gate. The flight crew requested medical assistance meet them upon arrival and the flight continued to O'Hare International Airport where an uneventful landing was made.

The F/O's recall of the events were virtually the same as that of the Captain.

N414RN

The pilot reported he departed Warsaw, Indiana, en route to Wichita, Kansas, and due to clouds along the direct route of flight, he made a climb to the west. He reported that while approaching 10,000 feet he checked his transponder for operation at which time he noticed the #2 transponder was set in the "alt" position and the selector was positioned on the #1 transponder which was OFF. He stated he switched the selector position to the #2 transponder as the airplane continued to climb through 10,000 feet. The pilot reported that at an altitude of about 11,000 feet he saw a jet passing behind his airplane at the 4-5 o'clock position. He stated the jet was about 1/2 mile away as it passed behind his airplane.

INJURIES TO PERSONS

Two flight attendants on United 1517 reported injuries. There were no other injuries reported by any other occupants of either airplane. It should be noted that the flight crew of United 1517 had the passenger seat belt sign on and all the passengers were seated, as they were in their arrival descent.

The injured flight attendant in the back of the airplane reported that he was putting away service items in the aft galley when the near mid-air occurred. He reported, "All of a sudden, I was down on my knees then flew straight up to the ceiling hitting my head on the ceiling. I then fell against door 2R and landed on my spine. I was on the floor, turned to the left with my head facing up the aisle." This flight attendant was able to get back in his jumpseat where he remained for the rest of the flight. Upon landing, he was transported to the hospital where he was diagnosed with two herniated discs in his neck.

Another flight attendant in the front of the airplane near the 1L door recalled floating up toward the ceiling then being "thrown from up in the air flat on my back halfway into the aisle... ." This flight attendant was transported to the hospital where she was treated for back pain and bruises, and released.

COMMUNICATIONS

United 1517 was in contact with the Chicago Air Route Traffic Control Center (ARTCC), Bearz Sector Controller when the near mid-air collision occurred. At 0914:55, United 1517 was cleared to descend and maintain 11,000 feet. At 0917:10, United 1517 transmitted, "fifteen seventeen do you have any traffic there at fourteen uh four?" At 0917:20, United 1517 transmitted "united fifteen seventeen do you see anybody at ah just behind us at four at eleven ah four?" The controller responded, "united fifteen ah yeah I do have target there now ah mode c shows eleven or twelve thousand now unverified." United 1517 replied, "well why didn't you point him out to us sir we almost hit him." The controller responded, "united fifteen seventeen ah at the time I had not been aware of the traffic he's climbing he's climbing rapidly and ah I was coordinating with another controller on something I apologize I was not aware of the traffic at the time um prior to your crossing."

National Transportation Safety Board

FACTUAL REPORT

AVIATION

NTSB ID: CHI97LA162

Occurrence Date: 06/08/1997

Occurrence Type: Accident

Narrative (Continued)

N414RN was not in contact with any Air Traffic Control facility at the time of the occurrence.

In his written statement the Bearz Sector Controller reported he had just switched back to the 60 mile range on his radar when the pilot of United 1517 called inquiring about the traffic. He reported, "I had not observed any traffic prior to switching ranges and after his call I saw the mode C intruder for the first time passing behind him at about 300ft above him climbing based on flight paths. I saw no conflict prior to a/c having already passed. Computer data confirmed that the VFR beacon didn't appear until it was already in conflict @ 11,200 ft."

METEOROLOGICAL CONDITIONS

The flight crew of United 1517 reported being in IFR conditions when the encounter occurred. The pilot of N414RN stated he was in VFR conditions when the near mid-air occurred.

Cloud conditions varied at weather reporting sites surrounding the location of the near mid-air. Some of the reporting stations were reporting the following:

Ft. Wayne, Indiana (79nm east-southeast) At 0856, reported 9,000' broken

Midway Airport (45nm northwest) At 0853, reported few clouds at 15,000', and scattered clouds at 20,000'

Gary, Indiana (27nm northeast) At 0850, reported few clouds at 3,000' and scattered clouds at 8,000'

South Bend, Indiana (30nm northwest) At 0954, reported clear conditions

The forecast for Indiana for the time of the accident called for the northern 1/3 of the state to have scattered clouds at 5,000' and for the southern 2/3 of the state to have occasional 1,000' to 2,000' ceilings with layered tops to FL180 with occasional cumulonimbus tops to FL300.

RECORDER INFORMATION

The Flight Data Recorder from United 1517 was readout by United Airlines. A printout of the recorder data shows that United 1517 was descending through a pressure altitude of 11,424', at 864 feet per minute when they received the initial T/A. The crew began to arrest the descent. Four seconds later, at a pressure altitude of 11,392', they received the first R/A. This advisory was to climb. The flight crew initiated a climb obtaining a maximum pressure altitude of 11,525'. The G load range during the maneuver varied from +2.65g's to +.56g's.

TESTS AND RESEARCH

On June 19, 1997, a Principal Maintenance Inspector from the Federal Aviation Administration, Lubbock, Texas, Flight Standards District Office witnessed a transponder, encoder, and altimeter integration test on N414RN. The inspector reported that all components performed within the parameters outlined in the Code of Federal Regulations. See attached Inspector's Statement.

A TCAS Significant Event Analysis was conducted by ARINC. They reconstructed the event based on United 1517 flight crew statements, Air Traffic Control Radar Data, and Flight Data Recorder Information. ARINC's analysis of the data showed that the closest point of separation between the two aircraft was 0.1 nm horizontally and 50' vertically. See attached ARINC report for further details.

ADDITIONAL INFORMATION

National Transportation Safety Board

FACTUAL REPORT

AVIATION

SAFETY BOARD


NTSB ID: CHI97LA162


Occurrence Date: 06/08/1997

Occurrence Type: Accident

Narrative (Continued)

Parties to the investigation were the Federal Aviation Administration, United Airlines, Inc., Airlines Pilots Association, and the Association of Flight Attendants.

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>		NTSB ID: CHI97LA162			
		Occurrence Date: 06/08/1997			
		Occurrence Type: Accident			
Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation Ft. MSL	Runway Used 0	Runway Length	Runway Width
Runway Surface Type:					
Runway Surface Condition:					
Type Instrument Approach:					
VFR Approach/Landing:					
Aircraft Information					
Aircraft Manufacturer Boeing		Model/Series 737-300		Serial Number 23953	
Airworthiness Certificate(s): Transport					
Landing Gear Type: Retractable - Tricycle					
Homebuilt Aircraft? No	Number of Seats: 133	Certified Max Gross Wt.	130000 LBS	Number of Engines: 2	
Engine Type: Turbo Fan	Engine Manufacturer: CFM	Model/Series: CFM56-3C1	Rated Power: 22000 LBS		
- Aircraft Inspection Information					
Type of Last Inspection Continuous Airworthiness	Date of Last Inspection	Time Since Last Inspection Hours	Airframe Total Time Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed? No	ELT Operated?	ELT Aided in Locating Accident Site?			
Owner/Operator Information					
Registered Aircraft Owner UNITED AIRLINES		Street Address P.O. BOX 66100			
		City CHICAGO	State IL	Zip Code 60666	
Operator of Aircraft Same as Reg'd Aircraft Owner		Street Address Same as Reg'd Aircraft Owner			
		City	State	Zip Code	
Operator Does Business As:			Operator Designator Code: UAL		
- Type of U.S. Certificate(s) Held:					
Air Carrier Operating Certificate(s): Flag Carrier/Domestic					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 121: Air Carrier					
Type of Flight Operation Conducted: Scheduled; Domestic; Passenger Only					

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: CHI97LA162
	Occurrence Date: 06/08/1997
	Occurrence Type: Accident

First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 51
-----------------	-----------------	------------------	--------------------------	-----------

Sex: M	Seat Occupied: Left	Principal Profession: Civilian Pilot	Certificate Number: On File
--------	---------------------	--------------------------------------	-----------------------------

Certificate(s): Airline Transport; Flight Engineer

Airplane Rating(s): Multi-engine Land; Single-engine Land; Single-engine Sea

Rotorcraft/Glider/LTA: None

Instrument Rating(s): Airplane

Instructor Rating(s): None

Type Rating/Endorsement for Accident/Incident Aircraft? Yes	Current Biennial Flight Review?
---	---------------------------------

Medical Cert.: Class 1	Medical Cert. Status: Valid Medical--no waivers/lim.	Date of Last Medical Exam: 03/1997
------------------------	--	------------------------------------

- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument		Rotorcraft	Glider	Lighter Than Air
						Actual	Simulated			
Total Time	6435	961								
Pilot In Command(PIC)										
Instructor										
Last 90 Days	178	178								
Last 30 Days	55	55								
Last 24 Hours	7	7								

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Toxicology Performed? No	Second Pilot? Yes
--------------------	----------------------------	--------------------------	-------------------

Flight Plan/Itinerary

Type of Flight Plan Filed: IFR

Departure Point PHILADELPHIA	State PA	Airport Identifier PHL	Departure Time 0830	Time Zone EDT
---------------------------------	-------------	---------------------------	------------------------	------------------

Destination CHICAGO	State IL	Airport Identifier ORD	
------------------------	-------------	---------------------------	--


Type of Clearance: IFR

Type of Airspace: Class E

Weather Information

Source of Briefing: Company

Method of Briefing:

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: CHI97LA162
	Occurrence Date: 06/08/1997
	Occurrence Type: Accident

Weather Information					
WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
	0000		0 Ft. MSL	0 NM	0 Deg. Mag.
Sky/Lowest Cloud Condition: Unknown			0 Ft. AGL	Condition of Light: Day	
Lowest Ceiling: Overcast		10000 Ft. AGL		Visibility: 0 SM	Altimeter: "Hg
Temperature: °C	Dew Point: °C	Wind Direction:		Density Altitude: Ft.	
Wind Speed:	Gusts:	Weather Conditions at Accident Site: Instrument Conditions			
Visibility (RVR): 0 Ft.	Visibility (RVV) 0 SM	Intensity of Precipitation: Unknown			
Restrictions to Visibility: None					
Type of Precipitation: None					

Accident Information		
Aircraft Damage: None	Aircraft Fire: None	Aircraft Explosion: None

Classification: U.S. Registered/U.S. Soil					
- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot				1	1
Second Pilot				1	1
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants		1	1	1	3
Other Crew					
Passengers				76	76
- TOTAL ABOARD -		1	1	79	81
Other Ground	0	0	0		0
- GRAND TOTAL -	0	1	1	79	81

--	--

National Transportation Safety Board

FACTUAL REPORT

AVIATION



NTSB ID: CHI97LA162

Occurrence Date: 06/08/1997

Occurrence Type: Accident

Administrative Information

Investigator-In-Charge (IIC)

PAMELA S. SULLIVAN

Additional Persons Participating in This Accident/Incident Investigation:

DAVID L SHICK
1843 COMMERCE DRIVE
SOUTH BEND, IN 46628

BILL YANTISS
7401 MARTIN LUTHER KING BLVD.
DENVER, CO 80207

PETE DELO
AIRLINE PILOTS ASSOCIATION

FIDEL GONZALEZ
6400 SHAFER ST., SUITE 250
ROSEMONT, IL 60018