
Tower near-miss, Douglas DC-8-71F, January 16, 2001

Micro-summary: Flight navigation malfunction resulted in an inadvertent near-miss with the control tower.

Event Date: 2001-01-16 at 0842 PST


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

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

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		NTSB ID: SEA011A039		Aircraft Registration Number: N8084U	
		Occurrence Date: 01/16/2001		Most Critical Injury: None	
		Occurrence Type: Incident		Investigated By: NTSB	
Location/Time					
Nearest City/Place Seattle		State WA	Zip Code 98168	Local Time 0842	Time Zone PST
Airport Proximity: On Airport		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer McDonnell Douglas		Model/Series DC-8-71F		Type of Aircraft Airplane	
Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
<p>Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:</p> <p>On January 16, 2001, approximately 0842 Pacific standard time, a Boeing (formerly McDonnell Douglas) DC-8-71F, N8084U, operating as Emery Worldwide Airlines flight 102 on a 14 CFR 121 non-scheduled domestic cargo flight from Dayton, Ohio, deviated to the east of the published final approach course while on the instrument landing system (ILS) approach to runway 16R at Seattle-Tacoma International Airport (Sea-Tac), Seattle, Washington. The deviation, approximately 0.4 nautical mile to the left of the runway 16R localizer centerline, took the aircraft east of parallel runway 16L and in proximity to a new air traffic control (ATC) tower under construction on the airport, which at the time of the incident was approximately 290 feet high (including a construction crane being used to construct the tower.) The crew subsequently initiated a missed approach and made a second approach and landing attempt, which was without further incident. There was no damage to the aircraft or other property in the occurrence. The aircraft's four flight crewmembers (consisting of an airline transport pilot-in-command, first officer, flight engineer, and jumpseating crew member) were not injured. There was also no reported damage or injuries to any objects or persons on the ground, to include the new control tower or construction personnel working on the tower. Instrument meteorological conditions existed at the time of the incident, and the flight was on an instrument flight rules (IFR) flight plan.</p> <p>The flight crew reported that the captain was the pilot flying at the time of the incident. They reported that the weather at Sea-Tac was initially below landing minimums, which forced them to hold for 20 to 30 minutes. The captain replied that the aircraft was flown on autopilot using flight management system (FMS)/Global Positioning System (GPS) guidance during this period. The crew reported that as the weather improved, the flight was cleared to track inbound on the 020 degree radial of the Seattle VOR, and was subsequently issued radar vectors for the ILS runway 16R approach. The crew stated that at this time, the autopilot was disconnected from the FMS and both Radio/Nav switches were placed to the Radio position. The crew stated that both navigation radios (NAV 1 and NAV 2) were tuned to the ILS runway 16R frequency and identified, the horizontal situation indicators (HSIs) were set up for the approach, the #1 automatic direction finder was tuned to the PARKK nondirectional radio beacon (NDB) (slightly past the glide slope intercept point on the ILS runway 16R final approach, at the final approach fix for a localizer-only approach), and the #2 ADF was tuned to the DONDO NDB (on the missed approach segment of the approach.) The captain reported that the runway visual range (RVR) for runway 16R was 3,000 feet at this time, and that "The autopilot was to be coupled to the #1 Nav for the approach" (the first officer reported that the autopilot was coupled to the #1 NAV for the approach, and that the aircraft initially intercepted and tracked the localizer normally.)</p> <p>The crew reported that at about PARKK, the first officer's course deviation indicator (CDI) moved full-scale to the right for about two seconds, then returned to center. The first officer reported this to the captain. The crew then queried approach control about their course alignment and were told they were right on course. The crew reported that they then continued their approach to decision height, with all instruments indicating on course and on glide slope. The crew stated</p>					
FACTUAL REPORT - AVIATION					
					Page 1

National Transportation Safety Board

FACTUAL REPORT

AVIATION

NTSB ID: SEA011A039

Occurrence Date: 01/16/2001

Occurrence Type: Incident

Narrative (Continued)

that at decision height, upon "not receiving the proper visual cues, a missed approach was initiated" (both the captain's and first officer's words). The crew reported that the tower subsequently called and informed them that they were left of course. The flight was then vectored back for another approach, which was completed successfully. The crew reported that for the second approach attempt, the first officer hand flew the approach using the #2 NAV.

Review of a re-recording of ATC communications tapes disclosed that about 0840:45, about 4 1/2 minutes after being cleared for the ILS approach to runway 16R, the crew asked, "how do you show us on course?" The approach radar controller responded, "I show you right on course sir perfect." ATC radar data showed the aircraft in the vicinity of the PARKK compass locator at this time. The flight was then instructed to contact Seattle Tower.

Review of a re-recording of ATC local control communications disclosed that approximately 0839:17, about 2 1/2 minutes before Emery 102 checked on with the tower, a Boeing 737 (B-737), Continental 1869, was cleared into position to hold on the parallel runway, 16L, and remained there for about 5 minutes. About 1 1/2 minutes after Continental 1869 was cleared on to hold on 16L, the aircraft immediately in front of Emery 102 on the 16R ILS approach, Evergreen 836, went around. The reason for Evergreen 636's go-around was not determined by investigators. There was no mention made on the tape of the reason for this go-around, and no indication on the tape that Evergreen 836 was off-course on the approach. Emery 102 then checked in on the tower frequency, about 0841:23. The tower informed Emery 102 that winds were from 060 degrees at 7 knots, touchdown runway visual range (RVR) was 2,000 feet, midfield RVR was 5,000 feet, and rollout RVR was 2,600 feet, and cleared Emery 102 to land on runway 16R. (NOTE: Published minimum RVR for the runway 16R ILS approach is 1,800 feet.) About 0842:31, the tower controller advised Emery 102, "I'm showing you about a mile east of the centerline sir." The crew of Emery 102 replied, "Emery 102 going missed." Continental 1869 was then cleared for takeoff from runway 16L, about 1 1/2 minutes after Emery 102's missed approach. After Continental 1869 departed, the aircraft immediately following Emery 102 on the 16R ILS approach, Skywest 6817 (an Embraer EMB-120), checked on with the tower and subsequently landed successfully on 16R with no reports of ILS problems on the tape.

ATC radar data on the aircraft, obtained through the Port of Seattle Noise Abatement Office, depicted the aircraft's ground track as generally paralleling the runway 16R extended centerline, approximately 0.4 nautical miles east of the centerline, during the entire final approach segment. According to the radar data, the airplane passed abeam the runway 16R threshold, to the east (left) of both runways, between 0842:22 and 0842:27. At 0842:22, radar showed the airplane's altitude as 600 feet above mean sea level (MSL), and at 0842:27 (by which point it was past the abeam point of the runway 16R threshold) the airplane had descended to 500 feet MSL (its lowest recorded altitude), according to radar. The airplane remained at 500 feet MSL altitude at 0842:32. No radar positions on the aircraft were depicted for the aircraft between 0842:32 and 0843:05 in this data. Decision height (DH) for the runway 16R ILS approach is 626 feet MSL, 200 feet above the runway 16R touchdown zone elevation of 426 feet MSL. The 0856 Seattle-Tacoma METAR observation reported weather conditions as: wind from 060 degrees true at 3 knots; visibility 1/4 statute mile with freezing fog; vertical visibility 100 feet; temperature and dew point both -1 degree C; and altimeter 30.40 inches Hg.

An FAA regional airways facilities official reported that a scheduled periodic flight inspection of the runway 16R ILS system was coincidentally conducted on January 18-19, 2001. The FAA's record of this flight inspection rated the ILS runway 16R front course and glide slope UNRESTRICTED/SAT. The FAA airways facilities official also stated in response to a telephone query by the NTSB investigator-in-charge (IIC) that an aircraft on the numbers on runway 16R, or in the displaced threshold area of that runway, is well outside the runway 16R localizer critical area.

According to an Emery flight safety representative, the incident aircraft was equipped with a UNS-1D Global Positioning System (GPS)-based flight management system (FMS) manufactured by Universal Avionics Systems Corporation of Tucson, Arizona. This system was installed under FAA

National Transportation Safety Board

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Supplemental Type Certificate (STC) number (ST09247SC) held by Aircraft Systems & Manufacturing, Inc. of Georgetown, Texas. Emery is not certified to utilize this system for area navigation (RNAV) approaches, and does not provide RNAV approach procedures to its flight crews. The FMS incorporates a database for use during the en route phase of flight. According to the Emery flight safety representative, manual entry of data into the FMS is also possible but is not standard practice at the carrier. The Emery flight safety representative further indicated that in post-incident maintenance checks of the aircraft's navigation receivers, no problems were found; and that the Seattle-Tacoma airport reference point (ARP) in the FMS database was checked and found to be accurate. According to the aircraft maintenance log, Emery maintenance personnel removed and replaced the aircraft's #1 NAV receiver after the incident, although they were unable to duplicate the problem reported by the flight crew.


A repeat occurrence was reported on the incident aircraft on January 26, 2001. The aircraft maintenance log indicated that on this date, while on a coupled approach to Dayton, Ohio, the aircraft headed left of centerline with the CDI showing on course. Following this incident, ground and inflight troubleshooting was conducted by FAA and Emery personnel at Emery's facilities in Dayton. Inflight system testing disclosed that the autopilot was erratic in pitch, with porpoising about the glide slope. However, maintenance personnel were again unable to duplicate the problem with the CDI. Several aircraft components were removed and replaced at this time, including the #1 and #2 NAV receivers, the captain's horizontal situation indicator (HSI) and radio magnetic indicator (RMI), the first officer's RMI, the #1 and #2 instrument amplifiers, the #1 flight director computer, the pitch computer, and the autopilot controller system. The coaxial cables for the entire #1 and #2 VOR/localizer system were also checked (including the connectors), and all cable checks were reported to be normal.

A second repeat occurrence of the problem was reported on the incident aircraft in early February 2001. This incident took place on an approach to Newark, New Jersey. Following the second repeat occurrence, the aircraft was ferried to Dee Howard Aircraft Maintenance (DHAM), San Antonio, Texas, for further evaluation. Maintenance personnel working at DHAM discovered a defective K1 relay, a source selector for the captain's side instruments. The maintenance personnel found during a ramp test of the course deviation circuitry that the captain's CDI jumped whenever the area around the FMS switching matrix or the K1 relay itself was physically tapped. When a replacement K1 relay was installed, this anomaly was not observed. Maintenance personnel also discovered an anomaly during the autopilot pitch computer self test, which was resolved by replacing the fore and aft pitch accelerometers. Maintenance personnel further discovered that by replacing the BNC connectors at NAV 1 and NAV 2, significant improvements in system efficiency were attained. No anomalies with the first officer's CDI were reported.

Bench tests on the first officers instruments (including radio magnetic indicator [RMI], pictorial deviation indicator [PDI], #2 NAV radio, and two amplifier racks), identified two anomalies: 1) the first officers compass slaving was not working properly, with the first officer's compass card running as a free directional gyro (DG); and 2) the first officers PDI glide slope needle would stick at the stop. The #2 NAV radio was found to operate within manufacturer's specifications. No anomalies with the first officer's CDI indications, or false "on glide slope" indications, were reported from bench testing of the first officer's instruments.

The cockpit voice recorder (CVR) from the incident aircraft was sent to the NTSB Vehicle Recorders Division, Washington, D.C., for readout. Preliminary review of the CVR recording disclosed that the CVR, an older tape-based unit, had malfunctioned and that the recording contained no usable data.

 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: SEA011A039			
		Occurrence Date: 01/16/2001			
		Occurrence Type: Incident			
Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
Seattle-Tacoma International	SEA	429 Ft. MSL	16R	9425	150
Runway Surface Type: Concrete					
Runway Surface Condition: Unknown					
Type Instrument Approach: ILS-complete					
VFR Approach/Landing: None					
Aircraft Information					
Aircraft Manufacturer		Model/Series		Serial Number	
McDonnell Douglas		DC-8-71F		45974	
Airworthiness Certificate(s): Transport					
Landing Gear Type: Retractable - Tricycle					
Homebuilt Aircraft? No	Number of Seats: 7	Certified Max Gross Wt.	328000 LBS	Number of Engines: 4	
Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:		
Turbo Fan	CFM International	CFM56-2	22000 LBS		
- Aircraft Inspection Information					
Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time		
Unknown	12/2000	111.43 Hours	73964.5 Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed? No	ELT Operated?	ELT Aided in Locating Accident Site?			
Owner/Operator Information					
Registered Aircraft Owner		Street Address			
		Lee Farm Corporate Park - 83 Wooster Heights			
Aero USA Inc. c/o GPA Corporation		City	State	Zip Code	
		Danbury	CT	06810	
Operator of Aircraft		Street Address			
		One Emery Plaza			
Emery Worldwide Airlines		City	State	Zip Code	
		Vandalia	OH	45377	
Operator Does Business As:			Operator Designator Code: RRXA		
- Type of U.S. Certificate(s) Held:					
Air Carrier Operating Certificate(s): Supplemental					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 121: Air Carrier					
Type of Flight Operation Conducted: Non-scheduled; Domestic; Cargo					
FACTUAL REPORT - AVIATION					

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: SEA011A039
	Occurrence Date: 01/16/2001
	Occurrence Type: Incident

First Pilot Information

Name On File	City On File	State On File	Date of Birth	Age 53
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Sex: M	Seat Occupied: Left	Principal Profession: Civilian Pilot	Certificate Number: On File
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Certificate(s): Airline Transport; Commercial; Flight Engineer

Airplane Rating(s): Multi-engine Land

Rotorcraft/Glider/LTA: Helicopter

Instrument Rating(s): Airplane

Instructor Rating(s): None

Type Rating/Endorsement for Accident/Incident Aircraft? Yes	Current Biennial Flight Review? 01/2001
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Medical Cert.: Class 1	Medical Cert. Status: Valid Medical--w/ waivers/lim.	Date of Last Medical Exam: 12/2000
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- 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	13949	8419								
Pilot In Command(PIC)	11369	8000								
Instructor										
Last 90 Days	198	198								
Last 30 Days	34	34								
Last 24 Hours	6	6								

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Toxicology Performed? No	Second Pilot? Yes
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Flight Plan/Itinerary

Type of Flight Plan Filed: IFR				
Departure Point	State	Airport Identifier	Departure Time	Time Zone
Dayton	OH	DAY	0703	EST
Destination	State	Airport Identifier		
Same as Accident/Incident Location		SEA		


Type of Clearance: IFR

Type of Airspace: Class B

Weather Information

Source of Briefing:
Company

Method of Briefing: Unknown


 National Transportation Safety Board FACTUAL REPORT AVIATION	NTSB ID: SEA01IA039
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	Occurrence Type: Incident

Weather Information					
WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
SEA	0856	PST	429 Ft. MSL	NM	Deg. Mag.
Sky/Lowest Cloud Condition: Partial Obscuration			100 Ft. AGL	Condition of Light: Day	
Lowest Ceiling: Indefinite (V V)		100 Ft. AGL	Visibility: 0.25	SM	Altimeter: 30.40 "Hg
Temperature: -1 °C	Dew Point: -1 °C	Wind Direction: 30		Density Altitude: Ft.	
Wind Speed: 4	Gusts:	Weather Conditions at Accident Site: Instrument Conditions			
Visibility (RVR): Ft.	Visibility (RVV)	SM	Intensity of Precipitation:		
Restrictions to Visibility: Fog					
Type of Precipitation:					

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				1	1
Cabin Attendants					
Other Crew				1	1
Passengers					
- TOTAL ABOARD -				4	4
Other Ground					
- GRAND TOTAL -				4	4

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 National Transportation Safety Board FACTUAL REPORT AVIATION	NTSB ID: SEA01IA039	
	Occurrence Date: 01/16/2001	
	Occurrence Type: Incident	

Administrative Information

Investigator-In-Charge (IIC)

Gregg Nesemeier

Additional Persons Participating in This Accident/Incident Investigation:

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