NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

December 14, 2022

Group Chairman's Factual Report

Maintenance Records

DCA22MA009

A. ACCIDENT

Location:	Brookshire, Texas
Date:	October 19, 2021
Time:	10:00 CDT
	15:00 UTC
Airplane:	McDonnell Douglas DC-9-87, N987AK
Operator:	987 Investment LLC

B. MAINTENANCE RECORDS

Group Chairman	Gregory Borsari
	NTSB
	Washington, DC

Group Member	Sarah Paul Tatonduk Outfitters LTD Fairbanks, AK
Group Member	Patrick Hrubes Federal Aviation Administration Denali, AK
Group Member	Todd Lockwood Boeing Aircraft Company Seal Beach, CA

C. DETAILS OF THE INVESTIGATION

On October 21, 2021, the maintenance record group convened at Everts Air Cargo[1] located in Fairbanks Alaska to document the maintenance records for N987AK.

D. FACTUAL INFORMATION

1.0 Airplane Information

Aircraft N987AK, serial No. 49404 was manufactured by McDonnell Douglas. On December 5, 2015, the registration for N987AK transitioned to 987 Investments LLC. At the time of the accident, the airplane had accumulated 49,566.2 total hours and 31,977 total cycles.

The airplane was equipped with two Pratt & Whitney engines and a Garret Auxiliary Power Unit (APU). The engines and APU had accumulated the following operating times as of April 26, 2021[2].

Table 1 - Engine and APU Information

	No.1 Engine	No.2 Engine	APU
Manufacturer	P&W	P&W	Garret
Model Number	JT8D-219	JT8D-219	GTCP85-98DAF
Serial Number	718113	725376	P28289C

[1] 987 Investment LLC contracted Everts Air Cargo to track the maintenance requirements and maintain the maintenance records.
[2] Last flight prior to the accident.

	No.1 Engine	No.2 Engine	APU
Date Installed	4/26/2016	4/26/2016	4/12/2018
Location of Engine/APU Installation	Aero Sky	Aero Sky	Houston Executive Airport
Total Time (Engine /APU hours)	45,499.1	57,508.1	NA
Total Cycles (Engine/APU cycles)	31,746	38,440	NA
Date of Last Overhaul	August 24, 2015	November 4, 2015	July 24, 2017
Time Since Overhaul (hours)	144.4	144.4	110.9
Cycles Since Overhaul	78	78	74
Date of HSI	December 19, 2018	December 19, 2018	NA
Time Since HSI	86.8	86.8	NA
Cycles since HSI	44	44	NA

1.1 Operations Specifications (OpSpecs)[3]

Operation specifications (OpSpecs) issued to 987 Investment LLC were reviewed. The following operation specifications noted.

- On December 4, 2018, the FAA issued OpSpecs number A001-1 to 987 Investment LLC authorizing part 91 operation.

- On September 28, 2017, the FAA issued OpSpecs number A004-1 authorized RVSM operation.

- On December 4, 2018, the FAA issued OpSpecs D095 that authorized the use of the MMEL as the MEL.

[3] Operations Specifications contains the authorizations, limitations, and certain procedures under which each kind of operation, if applicable, is to be conducted by the certificate holder.

1.2 Type Certificate Data Sheet

The TCDS number A6WE prescribes conditions and limitations under which the product for which the Type Certificate (TC) was issued meets the airworthiness requirements of the Federal Aviation Regulations. According to the document, The Boeing[4] Company is the holder of the TC.

1.3 Maintenance Program and Inspection

The maintenance and inspection items were based on the Boeing maintenance planning document (MPD) ME80-020-TNK dated August 1, 2019. Routine maintenance checks were numbered A1, A2, A4, C1, C2, C3, C4, C5, C6, & C8. A Check tasks were performed every six months and C Check tasks were performed every 24 months. In addition, a service check was conducted every 72 hours. Table 2 below shows the last time the checks were accomplished, the maintenance check intervals and next completion date/hours.

Table 2 – Routine Check Data

Check	Date Completed	Time Hours	Interval Calendar	Interval Hours	Remaining	Date Due	TAT Due
A1	10/18/2021	49,566.2	6 Mo.	600	600	4/2022	50,166.2
A2	10/18/2021	49,566.2	12 Mo.	1,200	1,200	10/2022	50,766.2
A4	10/31/2020	49,560.9	18 Mo.	1,800	1,794.7	5/2022	51,360.9
C1	8/1/2020	49,558.7	24 Mo.	3,600	3,592.5	8/2022	53,158.7
C2	8/31/2020	49,558.7	48 Mo.	7,200	7,192.5	8/2024	56,758.7
C3	5/31/2018	49,557.7	72 Mo.	10,800	10,691.5	5/2024	60,257.7
C4	5/20/2019	49,503.9	96 Mo.	14,400	14,337.7	5/2027	63,903.9

[4] The Boeing Company merged with McDonell Douglas in 1997.

Check	Date Completed	Time Hours	Interval Calendar	Interval Hours	Remaining	Date Due	TAT Due
C5	6/16/2021	49,556.2	120 Mo.	18,000	18,000	6/2031	67,566.2
C6	1/20/2021	49,411.0	144 Mo.	21,600	21,444.8	1/2033	71,001.0
C8	9/13/2017	49,421.8	168 Mo.	25,200	25,055.6	9/2031	74,621.8

Note: The Emergency Lighting System is checked during the A2 check. Including both from the flight deck and the forward flight attendant panel as well as simulating loss of electrical power by opening the emergency lights arm and charge circuit breaker. The A2 check was completed October 18, 2021. The emergency light task card for the A2 was completed June 7, 2021.

The accident airplane had not flown since April 2021; however, maintenance checks/inspections were still being accomplished. On June 16, 2021, A C5 Check was accomplished. On October 18, 2021, A1 and A2 checks were accomplished. On October 19, 2021, the 72-hour service check 05-001-02-01 and daily walk around tasks; (i.e. servicing checks, security checks for defects in the cockpit, cabin, landing gears, access doors, wing external surfaces, foreign object damage, fuselage exterior surface, vertical and stabilizer surfaces, check of Engines for FOD, check and security of cowling, reversers and pylons, check of fluid leaks, tail pipe for metal deposits, and proper servicing and wear of landing gear tires) were accomplished.

1.4 Minimum Equipment List (MEL)[5]

987 Investments LLC was authorized to use an approved MMEL on the airplane per its OpSpecs. At the time of the accident, there were no open MMEL items.

1.5 Supplemental Type Certificate (STC)[6]

Supplemental Type Certificates (STCs), supplied by air carrier, were reviewed. A total of 18 STCs were documented and installed by the operator. There were no STCs that affected the elevators or the elevator control system. The following is noted.

[5] The FAA approved Minimum Equipment List contains a list of equipment and instruments that may be inoperative on a specific aircraft for continuing flight beyond a terminal point.
[6] The FAA issues Supplement Type Certificates, which authorize a major change or alteration to an aircraft, engine or component that has been built under an approved Type Certificate.

- On April 5, 2016, STC ST01943LA - JET Engineering LTD. Advance stage 4 Hush kits JT8D-219 was installed per installation Doc. JET-205-310 Rev B. Dated 10/15/2007. The STC also required that a supplement to the AMM be incorporated (Doc. JET-TR-405 Rev B. 10/16/2007).

1.6 Airworthiness Directive (AD)[7] and Service Bulletins (SB)

An AD summary for the airplane, its powerplants and appliances were provided for review. The AD summary contained the 987 Investments LLC applicable method of compliance by flight hours, flight cycles, or due dates with corresponding completion dates/hours/cycles for each AD. All ADs applicable to the airplane and engines were either implemented or being tracked for completion. No discrepancies were found during the review of the listing. The review concentrated on the stabilizers, the stabilizer control system and AD compliance overall. The following are noted.

- AD 2016-25-06 HFEC inspection of the LH & RH Horizontal Stabilizer Rear spar lower cap per SB MD80-55A072. Initial 20,000 FC or 3,000 from April 8, 2016. Last done 31,903 FC. Next due 34,903 FC.

- AD 2014-21-04 HFEC of the LH & RH upper rear spar cap barrel nut holes and caps at the two aft most barrel nuts for the left and the right per SB MD80-55A070. 4,500 FH interval. Initial at 2,768 FC and repeat at 4,500 FC. Due at 34,685 FC.

- AD 2013-05-02 HFEC aft face of the horizontal stabilizer (left and right) per SB 80-55A069 due to cracking of hinge bearing lug. Next due 36,282 FC.

- AD 2000-15-15 Horizontal jackscrew endplay and free play check per SB DC9-27A362. Last accomplished at 49,398.0 flight hours, next due 51,398.0 flight hours. AD interval 2,000 flight hours.

- AD 91-21-07 Remove and replace primary longitudinal trim relays, reference SB A27-316. Previously complied with by Aero Mexico.

1.7 Aircraft Flight Logs

Aircraft Flight and Maintenance Logs were reviewed from May 18, 2021 thru October 19, 2021. The following are noted:

- June 16, 2021 – Completed C5 inspection. TAT 49,556.2, TAC 31,977.

[7] Airworthiness Directive (AD) is a regulatory notice sent out by the FAA informing the operator of an action that must be taken for the aircraft to maintain its airworthiness status.

- July 12, 2021 – Complied with AD 2018-07-04 pitot and air data heat system change. System tested normal.

- July 12, 2021 - Lower right sidewall lights INOP between stations 636-712. Replaced ballast and lamp holder IAW MD80 AMM 33-21-03. Lights tested normal.

- July 12, 2021 – Left air conditioning turbine nozzle valve does not open. Replaced left air-conditioning turbine nozzle valve IAW MD80 AMM 21-50-06. System leak and operational test normal IAW MD80 AMM 21-00-00.

- September 10, 2021 – Nav database requires update. Undated nav data base IAW MD80 AMM 34-63-00. Database EV52109001 expires October 17, 2021.

- September 10, 2021 - Position 14 cabin smoke detector producing false alarm. Removed and replaced position 14 cabin smoke detector with reference to Securaplane Technologies ST3000 manual. System test normal.

- October 18, 2021 – Compete A1, A2 checks, TC 53 019 02 01 Int – D/Insp Aft Lower Cargo Compartment Door. TC 35-010-11-01 Discard crew oxygen bottle (288 MO).

- October 18, 2021 – CW A1, A2 inspection. Aircraft equipped with Artex.

1.8 Elevators – High Wind / Gust Damage – Inspection Check

AMM 05-60-00 contained the conditional maintenance instructions for aircraft exposed to high wind/gust damage to the elevators with the aircraft on the ground. If winds or gust are less than 63 MPH (55 knots), no special inspection was required. If high winds or gusts are 63 MPH (55 knots) or greater, an inspection for freedom of elevator control surface movement per this procedure was required. The procedure was to visually observe the elevator surface positions and do the following:

If both elevator trailing edges appear to be at the neutral position or above, no further action was required. If either elevator trailing edge appears to be below the neutral position do the following:

Pull either control column aft, while an observer at the aircraft tail watches each elevator surface trailing edge that is below the neutral position and observe the following:

If the elevator surface moves in the trailing up direction in response to the aft control column movement, no further action was required. If the elevator surface

does not move in the trailing edge up direction in response to the aft control column movement, do the following before further flight:

Perform a hands-on check for freedom of elevator surface movement. If the elevator surface moves freely by hand, no further action required. If the elevator surface cannot be moved by hand, perform corrective action as required. Check for over-centered and locked gear tab actuation linkage at the elevator leading edge was recommended as a first step if the elevator cannot be moved by hand.

Maintenance personnel were interviewed[8] and determined that they were unaware of this requirement.

1.9 Weight and Balance Summary

The aircraft was weighed May 16, 2019. The figures for the last weight and balance are shown below:

Weight:	101,185 pounds
Arm:	814.78 inches
Moment:	82,443,486 lb-inches

1.10 Service Difficulty Reports (SDR)

A review of the FAA SDR database from January 1, 2015, to October 19, 2021, was conducted. No SDRs were reported to the FAA.

While not required for CFR part 91, reporting a service difficulty is recommended by the FAA.

1.11 Major Repairs and Alterations

16 major repairs and 14 major alterations were completed/incorporated on the accident aircraft. None affected the elevator flight controls or the elevator control surfaces.

1.12 Time Limit Components

The Time Limit Component Report (dated October 19, 2021) which contained the time limits for the components installed on the airplane, the two installed powerplants and the APU were reviewed. No discrepancies were noted.

[8] Reference Human Factors factual interview summaries.

1.13 Flight Recorder Parameter Review

The Flight Recorder Data download and parameter integrity review was a C-check task and was last accomplished on the accident airplane on August 6, 2020. The flight recorder part number 980-4100-DXUN, serial number 5354 was removed July 16, 2020, sent to Aero Instruments and Avionics for review of all required parameters. The parameter functional check passed, and the underwater locator beacon battery was replaced. The recorder was returned with an 8130 tag, dated July 31, 2020, and reinstalled on the airplane.

1.14 Method of Record Keeping

Aircraft logbooks were utilized for the method of record keeping. The record of maintenance was sent back to Everts Air to update the electronic tracking system (RAAS)[9]. The mechanic enters the data for work completed and Everts Air verifies the record of maintenance and closes the item (comply reset).

1.15 Manuals

Maintenance personnel utilized Aircraft/Engine Maintenance Manuals, Structural Repair Manuals, Overhaul Manuals, Wiring Manuals, Illustrated Parts Catalog, Corrosion Program Manual, NDT Manual, Significant Structure Items Manual, Service Bulletins and Engine Manuals.

Submitted by:
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Aviation Accident Investigator

[9] RAAS is a trademarked technical records module provided by Aviation InterTec Services.