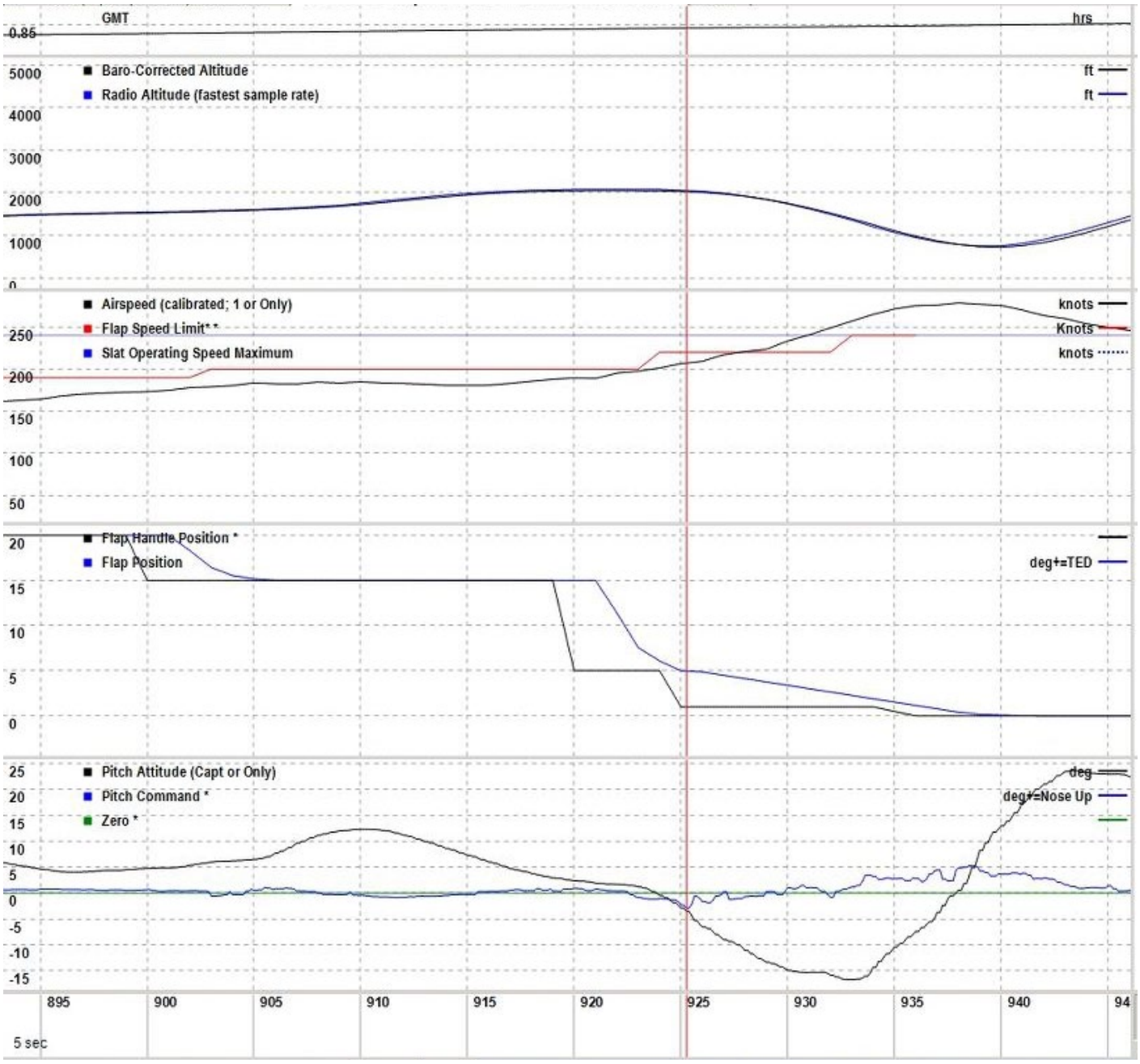
MEMORANDUM FOR RECORD

Douglass Brazy
Air Safety Investigator
Air Carrier and Space Investigations **March 8, 2023**

Subject: NTSB investigation DCA23LA172, N212UA, Boeing B777-222, Kahului, Hawaii, December 18, 2022. Information provided by United Airlines.

United Airlines provided the following information in an email on March 8, 2023:

Flight Data Derived Strip Chart (next page) :


GMT
hrs
0.85
Baro-Corrected Altitude
Radio Altitude (fastest sample rate)
ft
ft
5000
4000
3000
2000
1000
0
Airspeed (calibrated; 1 or Only)
Flap Speed Limit* *
Slat Operating Speed Maximum
knots
Knots
knots
250
200
150
100
50
Flap Handle Position *
Flap Position
deg+=TED
20
15
10
5
0
Pitch Attitude (Capt or Only)
Pitch Command *
Zero *
deg
deg+=Nose Up
25
20
15
10
5
0
-5
-10
-15
895
900
905
910
915
920
925
930
935
940
94
5 sec

Narrative description of flight data:

All times are expressed in Hawaii-Aleutian Standard Time (HST).

1. 14:49:33 – The event flight rotated from Runway 20 at PHOG.

    1. Flap handle position was 20 degrees
    2. Flap position was 20 degrees
    3. The flight tracked an initial magnetic heading of 28 degrees, shifting to 16-18 degrees as the flight climbed to 1,500 feet (radio altitude) over approximately 45 seconds.
    4. The pitch attitude decreased to approximately 4.09 degrees with a 480 ft/min vertical speed at 14:50:15

2. 14:50:18 – At 1,546 feet (radio altitude), the flap handle position was selected to 15 degrees.

    1. Vertical speed and radio altitude continue to climb
    2. Magnetic heading was 17.5 degrees

3. 14:50:38– Vertical speed and pitch attitude reached 144 feet per min and 2.37 degrees, respectively, at approximately 2,082 feet (radio altitude).

    1. Flap handle position was selected to 5
    2. Flap position was 15
    3. Magnetic heading 17.3 degrees

4. 14:50:43 – While at 2,082 feet (radio altitude), vertical speed and pitch attitude continued their negative downward trend at -1,648 feet per minute and -2.9 degrees, respectively.

    1. Flap handle position is selected to 1
    2. Flap position was at 5
    3. Magnetic heading 18.3 degrees

5. 14:50:47 – GPWS “Sink Rate” aural at approximately 1,848 feet (radio altitude)

6. 14:50:48– GPWS “Pull Up” aural at approximately 1,745 feet (radio altitude)

7. 14:50:50 – Flap handle position selected to 0

8. 14:50:51– Vertical speed and pitch attitude continued a negative downward trend to reach a maximum of -8,536 feet per minute and -16.74 degrees respectively while at 1,386 feet (radio altitude)

9. 14:50:52 – Maximum roll attitude measured at -4.83 degrees; this is a left wing down condition

10. 14:50:57– GPWS “Too Low Terrain” aural

    1. Latitude: 20 degrees 57’48.83” N / Longitude: 156 degrees 23’24.18
    2. Magnetic heading 18.5 degrees
    3. The lowest radio altitude during the undesired aircraft state was 748 feet; this occurred approximately 5.06 miles after the location that the aircraft rotated from the runway.

    4. Vertical acceleration recorded was 2.66g

11. 14:51:01 – Maximum pitch attitude was recorded at +23.42 degrees at an altitude of 1,020 Feet (radio altitude)

    1. Magnetic heading 19 degrees

12. 14:51:03 – Maximum vertical speed recorded was 8,680 feet per minute

13. 14:51:04 – Recovery from the undesired aircraft state continued for the remainder of the climb

    1. Unremarkable flight data-derived parameters were recorded for the remainder of the event flight

<end>