

WPR22FA151

OPERATIONAL FACTORS

Specialist's Factual Report - Attachment 12

FAA AATD Observation

August 15, 2022

TABLE OF CONTENTS

A. ACCIDENT.....	3
B. OPERATIONAL FACTORS SPECIALIST	3
C. SUMMARY	3
D. OBSERVATION SUMMARY	3
1.0 OBSERVATION RUN #1	4
1.1 Notes:	4
2.0 OBSERVATION RUN #2	4
2.1 Notes	6
3.0 OBSERVATION RUN #3	18
3.1 Notes	19
4.0 OBSERVATION RUN #4	30
E. CONSENSUS.....	31
F. APPENDIX	32
1.0 APPROACH CHART	32
2.0 ADDITIONAL PHOTOS	32

A. ACCIDENT

Location: Heyburn, Idaho
Date: April 13, 2022
Time: 0832 Local
1432Z
Airplane: Cessna CE-208B; N928JP

B. OPERATIONAL FACTORS SPECIALIST

Specialist David Lawrence
National Transportation Safety Board
Washington, DC

C. SUMMARY

On April 13, 2022, about 0832 mountain daylight time,¹ a Cessna CE-208B Grand Caravan, N928JP, was substantially damaged when it was involved in an accident near Heyburn, Idaho. The pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulation (CFR)* Part 135 cargo flight. The pilot was transporting cargo on an instrument flight rules flight from the Salt Lake City International Airport (SLC), Salt Lake City, Utah, to the Burley Municipal Airport (BYI), Burley, Idaho.

D. OBSERVATION SUMMARY²

Observations using the Beech 58 Baron Advanced Aviation Training Device (AATD) located at the FAA building in Washington, DC that had a Garmin 1000 similar to that onboard the accident airplane with a database that contained the RNAV (GPS) runway 20 approach at BYI. The team documented the Garmin 1000 displays while flying multiple RNAV (GPS) runway 20 approaches.

Photos and videos were taken by the FAA. A continuous video of the entire approach was also provided to the NTSB.

Participants:
David Lawrence - NTSB (virtually via Teams)
Tom Jacky - NTSB

¹ All times in this Specialist Report are mountain daylight time, unless otherwise noted.

² These field notes are preliminary and subject to change. They are not to be disseminated outside the investigation team for this accident.

Patrick Lusch - FAA (AATD operator)
Todd Gentry - FAA
Matt Cabak - FAA

1.0 Observation Run #1

Title: Continuous descent from IAF (full run)

- Configuration:
 - o Flaps up, gear down
 - o Speed 115, maintained manually
 - o Autopilot On, landing gear down
 - Lateral and vertical guidance coupled to the autopilot
 - o Pre-position (sim freeze) on RNAV lateral course prior to IAF (IREME) at 7000'
 - o Arm lateral and vertical guidance
 - o Release freeze and fly the normal approach on autopilot to threshold crossing altitude (TCH) of 40 feet above ground level (agl)
- Document a single full run of the RNAV (GPS) runway 20 approach at BYI tied to the autopilot down to TCH (40')
 - o Document altitude, speed, vertical speed, and vertical path deviation indicator
 - o Observe vertical deviation indicator as it passes each fix on the approach
 - Note any significant deviations or significant pitch changes

1.1 Notes:

- Lateral and vertical guidance coupled to the autopilot.
 - o Lateral mode indicated by "GPS" on the FMA. Vertical mode indicated by "GP" (glide path) on the FMA
 - o Armed is white, captured is green
- Glide path intercepted 2.1 nm from HIKLO
- There were no abrupt pitch changes
- Vertical speed remained constant about 800 feet per minute throughout the entire approach.
- There were no significant pitch changes or deviations of the GP deviation indicator.
- There was no flight director guidance that changed from fix to fix. Pitch on the descent remained about 5-6 degrees down throughout the approach.

2.0 Observation Run #2

Run 2: Continuous descent from IAF (with snap shots at specific points)

- Configuration:
 - o Flaps up, gear down

- Speed 115, maintained manually
- Autopilot on
- Pre-position (sim freeze) on RNAV lateral course prior to IAF (IREME) at 7000'
- Arm lateral and vertical guidance (APPR)
- Release freeze and fly the approach on autopilot



Photo 1: Primary Flight Display (PFD) display of beginning AATD position.



Photo 2: Map display of beginning AATD position.

- Document snap-shot points along the approach:
 - o Full freeze at the following points. Document altitude, speed, vertical speed, aircraft pitch, vertical path deviation indicator
 - IREME (IAF 7000')
 - HIKLO (FAF 6000')
 - JAMID (stepdown fix 4800')
 - At MDA (4560)
 - At accident site.³

2.1 Notes

- Lateral and vertical guidance coupled to the autopilot

³ The accident site coordinates were taken from the preliminary report on the accident. A fix was entered on the map display, and the AATD was position frozen at that point to indicate where the accident occurred. The accident fix was not able to be entered as a fix on the approach as the Garmin software does not allow a coded approach procedure to be altered.



Photo 4: Map display of glide path intercept.

- At the HIKLO fix (FAF 6000') the GP deviation indicator remained centered and the altitude indicated 6,150 feet.



Photo 5: PFD display at HIKLO fix.



Photo 6: Map display at HIKLO fix.

- At the JAMID fix (stepdown fix 4800') the GP deviation indicator remained centered at 4,780 feet.



Photo 7: PFD display at JAMID fix.

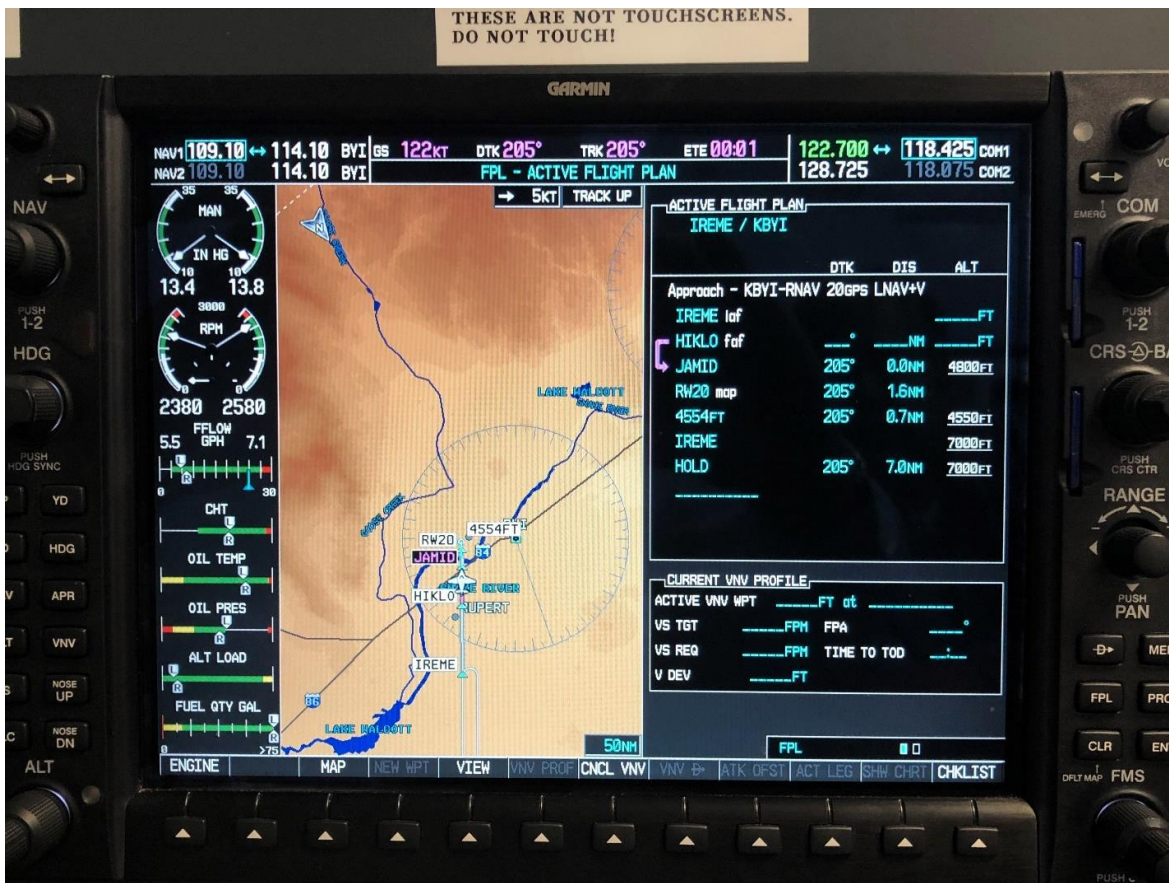


Photo 8: Map display at JAMID fix.

- At MDA (4560) the GP deviation indicator remained centered at 4,560 feet at a distance of 1.0 from runway 20.

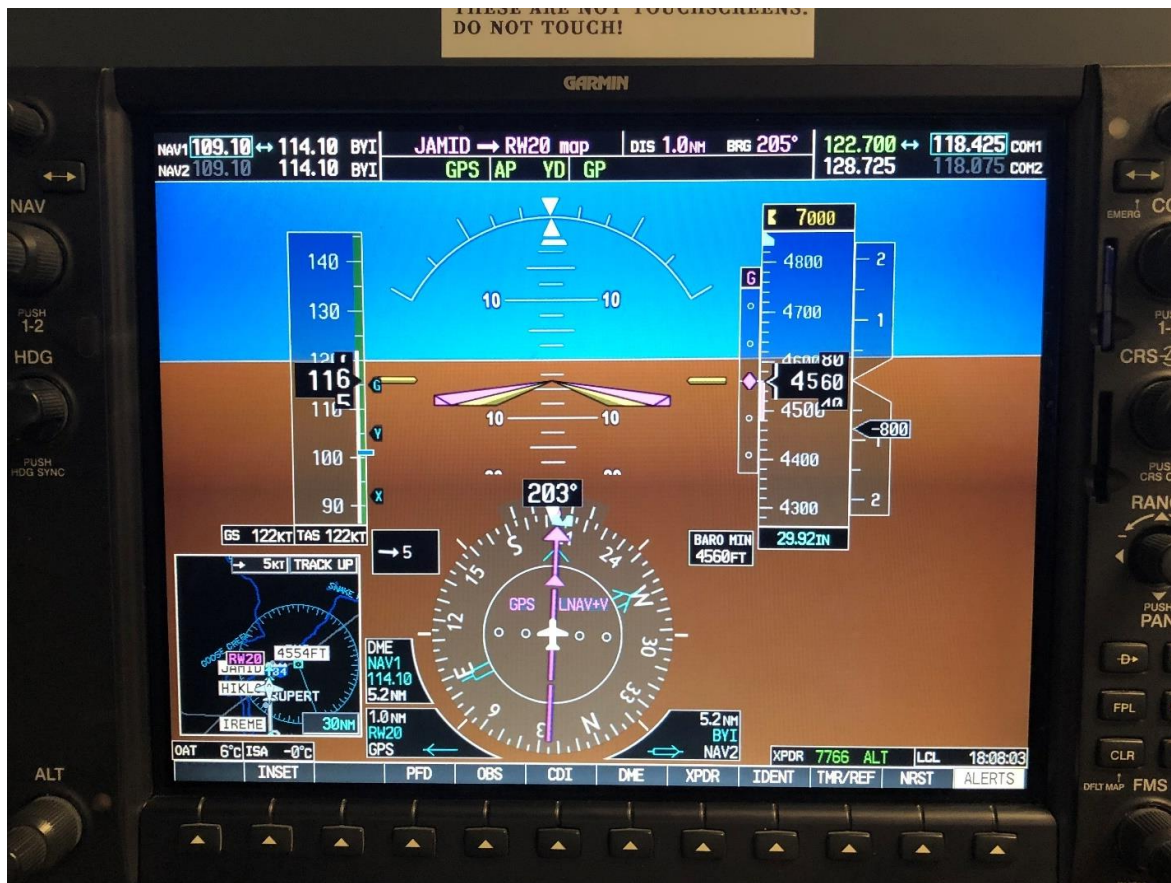


Photo 9: PFD display when airplane reached the MDA.



Photo 10: Map display when airplane reached the MDA.



Photo 11: PFD display when airplane reached the accident site.



Photo 12: Map display when airplane reached the accident site.

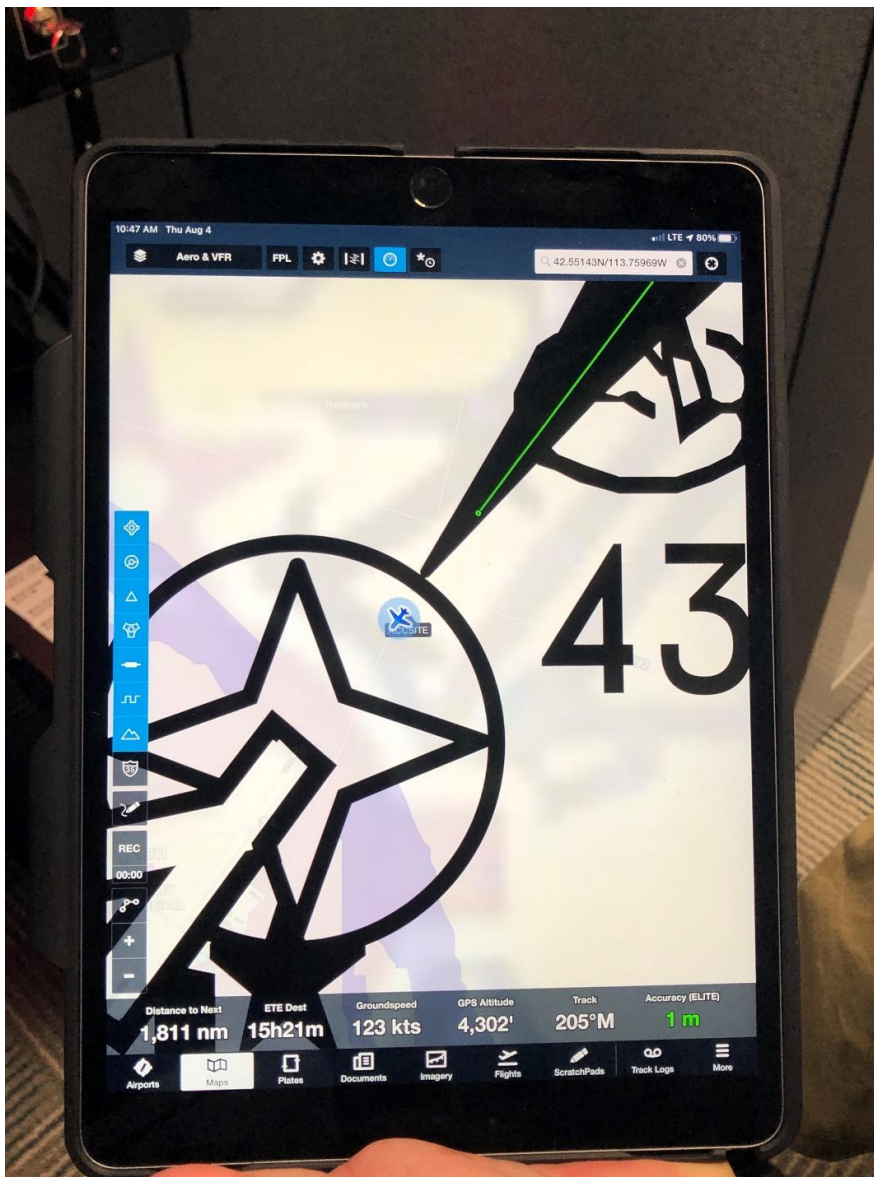


Photo 13: Photo of FAA iPad (slaved to the AATD) showing accident location overlay on the RNAV (GPS) runway 20 approach.⁴

⁴ The app used on the iPad was Foreflight which was being fed GPS positional data from the Garmin 1000 unit to display "own-ship" position.

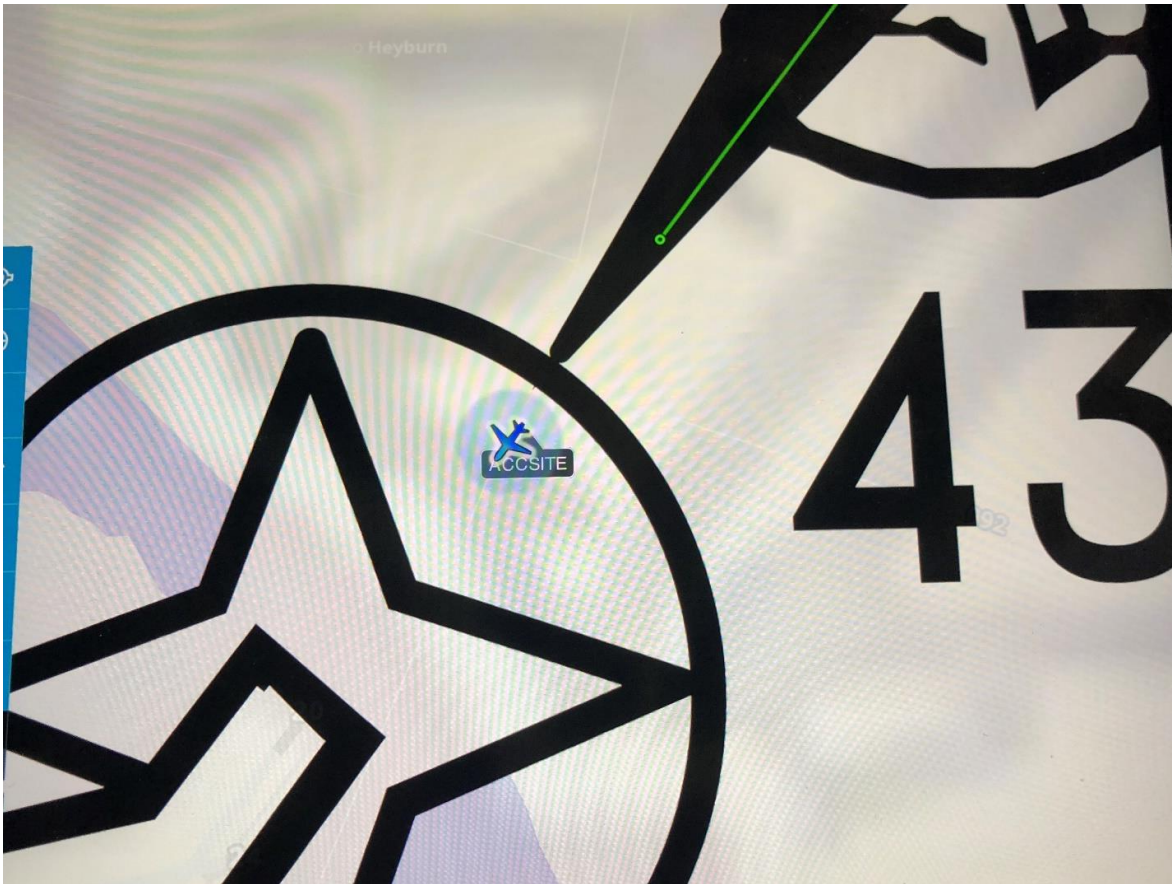


Photo 14: Enlargement of previous photo.

3.0 Observation Run #3

Run 3: Continuous descent from IAF (with snap shots at specific points, adding accident site lat/long on map display)⁵

- Configuration:
 - o Flaps up, gear down
 - o Speed 115, maintained manually
 - o Autopilot on
 - o Pre-position (sim freeze) on RNAV lateral course prior to IAF (IREME) at 7000'
 - o Arm lateral and vertical guidance (APPR)
 - o Release freeze and fly the approach on autopilot

⁵ The accident site coordinates were taken from the preliminary report on the accident. A fix was entered on the map display, and the AATD was position frozen at that point to indicate where the accident occurred. The Garmin software does not allow an approach to be modified or altered from the FAF inbound. Since the accident site was inbound from the FAF, and the waypoint could not be inserted on the approach.

- Document snap-shot points along the approach:
 - o Full freeze at the following points. Document altitude, speed, vertical speed, aircraft pitch, vertical path deviation indicator
 - IREME (IAF 7000')
 - HIKLO (FAF 6000')
 - JAMID (stepdown fix 4800')
 - At MDA (4560)
 - At accident site lat/long

3.1 Notes

- Lateral and vertical guidance coupled to the autopilot
 - o Lateral mode indicated by "GPS" on the FMA. Vertical mode indicated by "GP" (glide path) on the FMA
 - o At IREME (IAF 7000') the GP came into view on the right side of the primary flight display (PFD) as the airplane passed IREME. GP deviation indication was full scale up at IREME.



Photo 15: PFD display at beginning of AATD run #3.



Photo 16: Map display at beginning of AATD run #3.

- o The airplane continued to maintain 7,000 feet until it reached 2.1 nm from the next fix (HIKLO). At that point the GP deviation indicator became centered and the airplane began descending on the approach.





Photo 18: Map display at GP intercept.

- At the HIKLO fix (FAF 6000') the GP deviation indicator remained centered and the altitude indicated 6,150 feet.



Photo 19: PFD display at HIKLO.



Photo 20: Map display at HIKLO.

- At the JAMID fix (stepdown fix 4800') the GP deviation indicator remained centered at 4,780 feet.
- Note: at JAMID ADS-B altitude of accident flight indicated 4750'.



Photo 21: PFD display at JAMID fix.



Photo 22: MAP Display at JAMID fix.

- At MDA (4560) the GP deviation indicator remained centered at 4,560 feet at a distance of 1.0 from runway 20.



Photo 23: PFD display at MDA.



Photo 24:

- At accident site: 0.4 nautical miles at 4,300 feet.



Photo 25: PFD display at accident site.

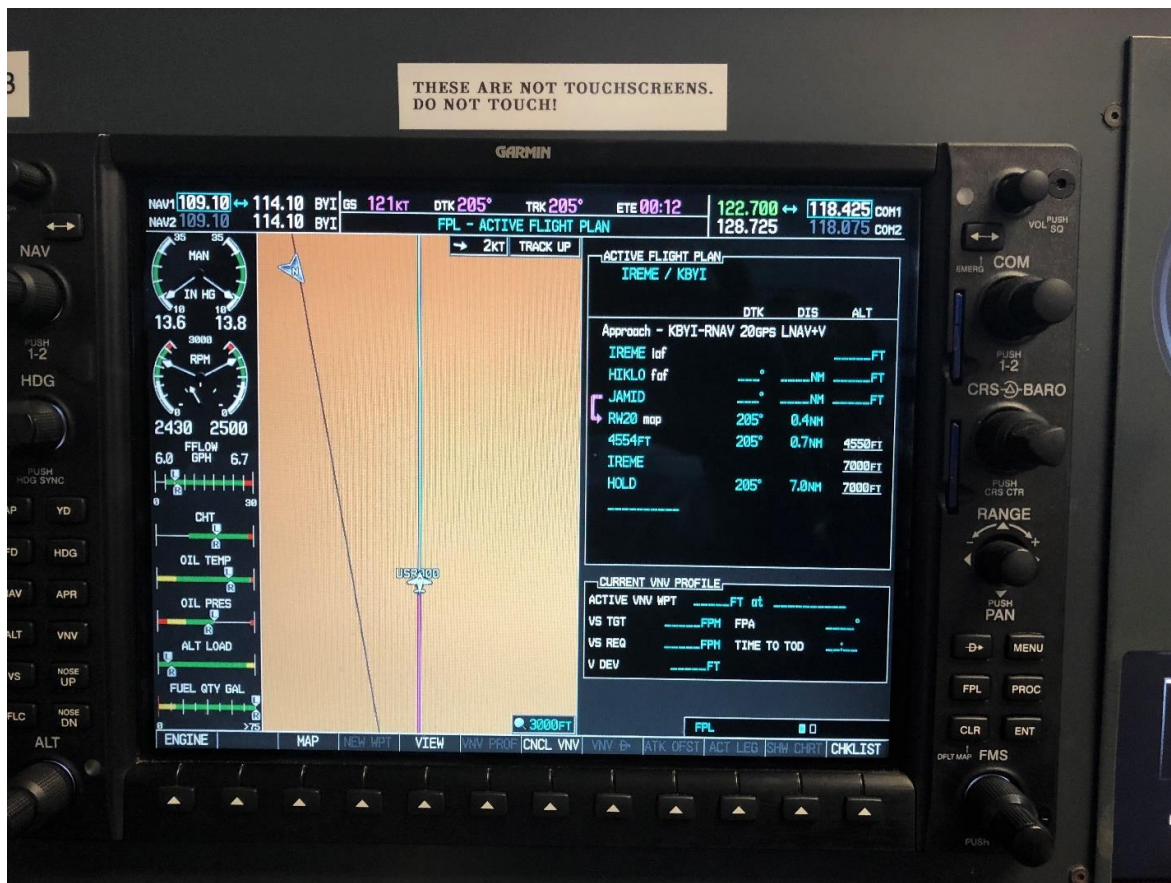


Photo 26: Map display at accident site.

4.0 Observation Run #4

Run : Continuous descent from IAF

- Configuration:
 - o Flaps up, gear down
 - o Speed 115, maintained manually
 - o Autopilot on
 - o Pre-position (sim freeze) on RNAV lateral course prior to IAF (IREME) at 7000'
 - o Arm lateral and vertical guidance (APPR)
 - o Release freeze and fly the approach on autopilot
- Run 4 was an attempt to fly coupled laterally with a separate vertical mode (i.e. vertical speed mode), for example descend as a "dive and drive" on autopilot while using the GPS lateral mode. Following multiple attempts to alter the vertical mode while laterally flying via GPS:

- With GP captured, you can't select altitude hold at the MDA, it doesn't do anything. The lateral mode goes to Roll mode.

E. CONSENSUS

NTSB:
David Lawrence _____

Tom Jacky _____ Via email _____

FAA
Patrick Lusch _____ Via email _____

F. APPENDIX

1.0 Approach Chart

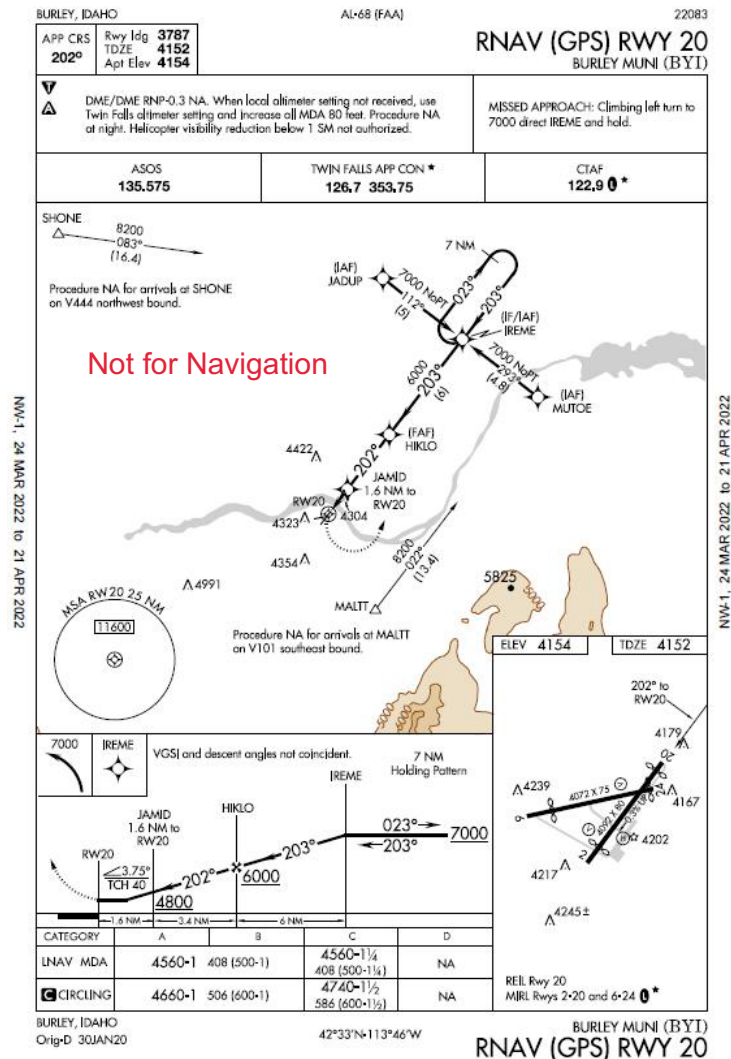


Figure 1: Jeppesen RNAV (GPS) Runway 20 Approach Chart.

2.0 Additional photos

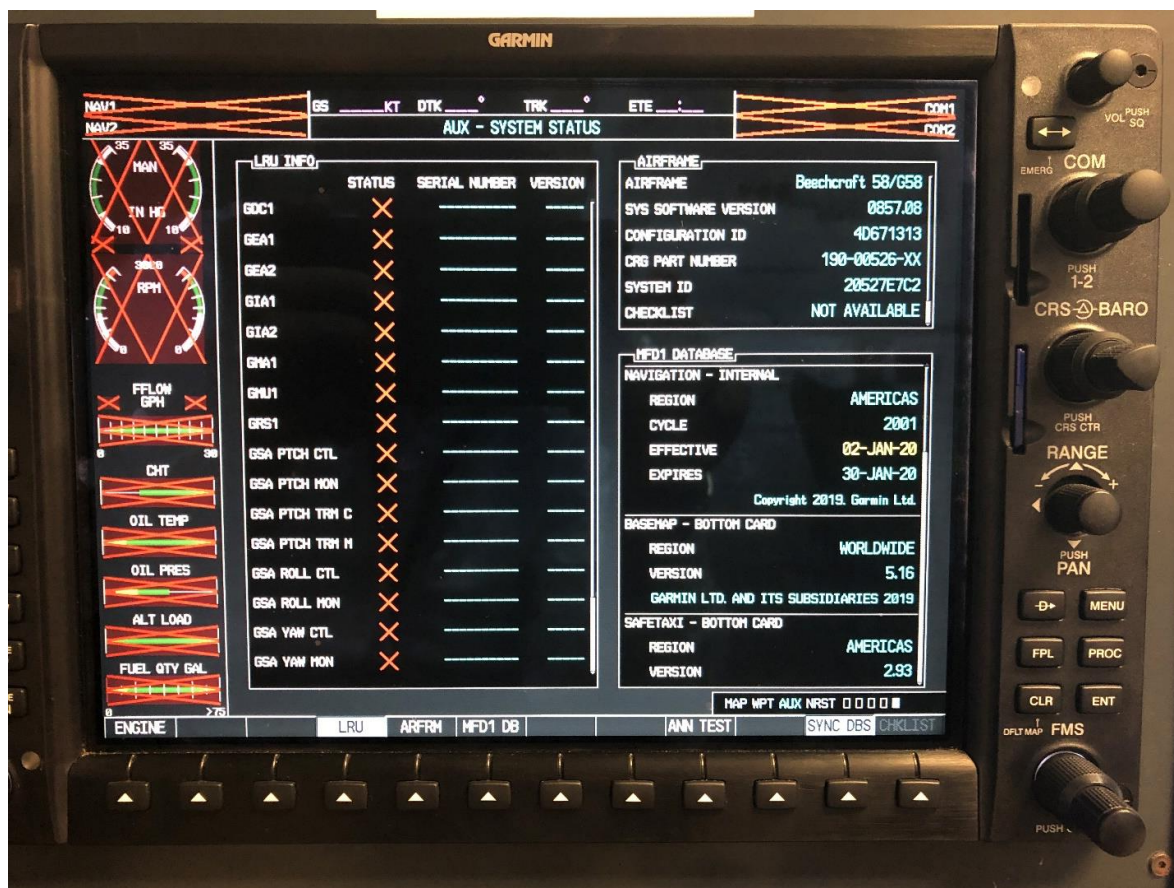


Photo 27: Garmin 1000 AUX Systems Page.

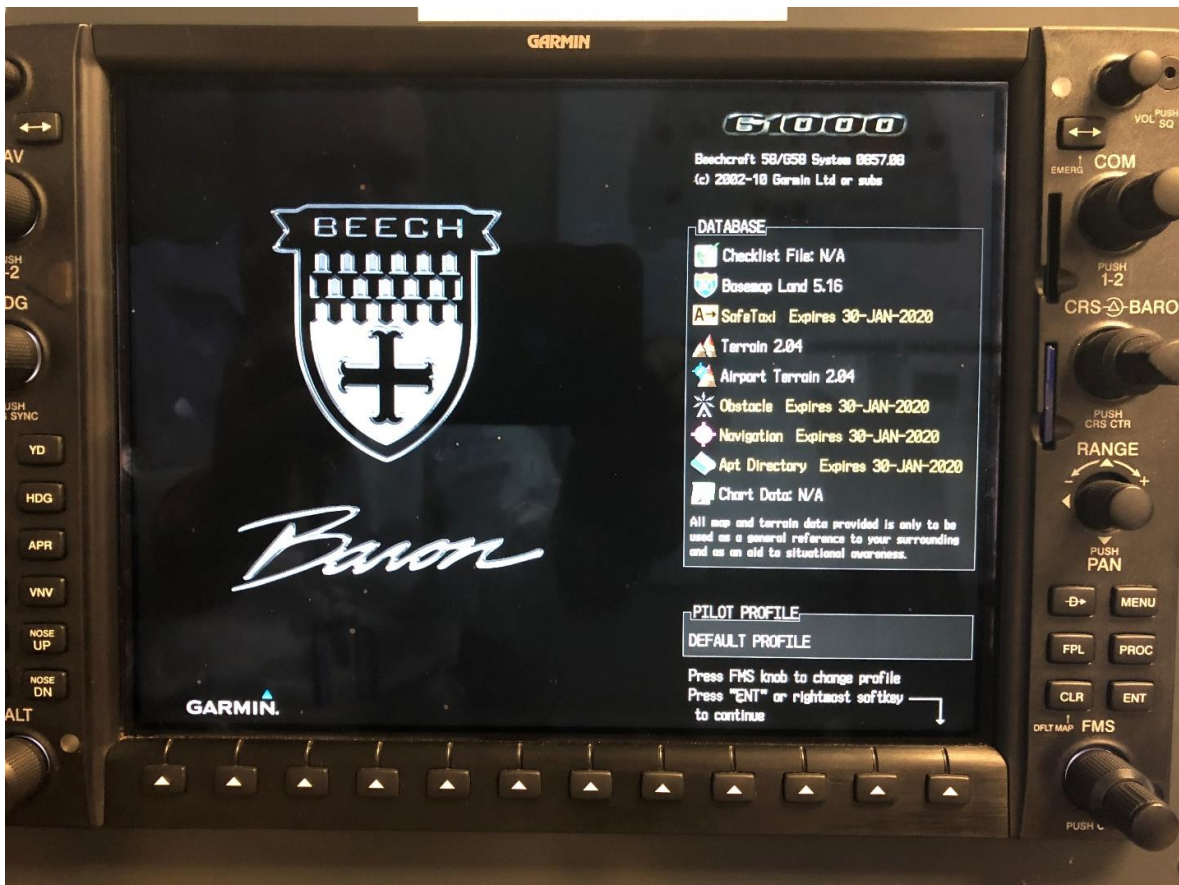


Photo 28: FAA AATD Specifications Page.