

FIELD NOTES

DATE Wednesday, August 11th, 2021

MEMO REFERENCE NO. ASIO-2021-ML-019 Rev -1

SUBJECT Bombardier Field Notes - Accident Site Visit - Challenger 605 N605TR (MSN 5715) - Impact with Terrain on Approach to Runway 11 at Truckee Tahoe Airport (KTRK) on July 26th, 2021

FROM Bombardier Air Safety Investigation Office (ASIO)

TO U.S. National Transportation Safety Board (NTSB)

CC Transportation Safety Board of Canada (TSB)

ASIO CASE REF. NO. CL600-2B16 (604 Variant).5715.26-7-21

NTSB CASE REF NO. WPR21FA286

TSB CASE REF NO. A21F0101

Introduction

On July 26^h, 2021, at approximately 1318 Pacific Daylight Time (PDT), Challenger 605 N605TR (MSN 5715) impacted terrain while conducting a circling approach to runway 11 at Truckee Tahoe Airport (KTRK). The aircraft was destroyed by impact forces and post-impact fire. All on-board (two flight crew, four passengers and two domestic animals) were fatally injured.

The U.S. National Transportation Safety Board (NTSB) opened an investigation into the circumstances of the accident. The Transportation Safety Board of Canada (TSB), representing the State of Design and Manufacture of the aircraft, in accordance with International Civil Aviation Organization (ICAO) Annex 13 protocols, designated a non-traveling Accredited Representative to the investigation and appointed Bombardier's Air Safety Investigation Office (ASIO) as a Technical Advisor to the TSB Accredited Representative.

At the request of the NTSB, the ASIO deployed to the site of the accident. This memo is a record of ASIO observations made with regards to the wreckage at the accident site.

Revision -1 removes Bombardier's confidentiality statement thereby allowing the NSTB to publish the document as part of the public docket.

General

The accident site was located between Ponderosa Golf Course and Reynold Way, just East of a house located at 10294 Reynold Way (Figure 1). The threshold of runway 11 at Truckee Tahoe Airport (KTRK) was approximately 0.5 nautical miles away on a bearing of 095 degrees relative to the accident site (Figure 2).



Figure 1: Location of Accident Site



Figure 2: Location of Accident Site Relative to KTRK

Two ASIO investigators arrived on site on July 28th, 2021, at approximately 0800 PDT. Upon arrival, the ASIO investigators met up with the NTSB Investigator-in-Charge (IIC) and another supporting NTSB investigator. The IIC conducted a briefing summarizing the facts known at that time and the state of the accident site. It was noted that prior to the arrival of the ASIO investigators, the wreckage was disturbed and moved to facilitate the recovery of remains by local and federal authorities

A walkaround of the accident site was then carried out. Following clearance to enter the site, a search was conducted for the Flight Data Recorder (FDR), the Cockpit Voice Recorder (CVR) and other useful electronics. The FDR and CVR were recovered. The Integrated Avionics Processor System (IAPS) was also identified and recovered. The Enhanced Ground Proximity Warning System (EGPWS) was not found. The team then proceeded to identify major aircraft components (aircraft survey) in order to verify that the complete aircraft was in the wreckage site, i.e. no missing parts. The ASIO investigators departed the site at approximately 1600 PDT.

A request was made to have some trees removed from the wreckage in order to complete the aircraft survey. Removal of the trees was carried out by personnel under the direction of the aircraft insurer's representative. The following day, July 29th, both ASIO investigators and the supporting NTSB investigator re-entered the site between approximately 1400 and 1500 PDT in order to complete the aircraft survey.

FDR and CVR

The FDR and CVR were found in the vicinity of the tail section, approximately in the area outlined in red in Figure 3. The FDR and CVR are normally installed in the tail section of the aircraft (Figure 4).



Figure 3: Approximate Location of FDR and CVR in Wreckage

Both FDR and CVR were damaged and had been subjected to post-impact fire. Both units had been discolored (no longer orange). The chassis of one unit was broken in half. Both Crash Survivable Memory Units (CSMU) appeared to be intact and not compromised. Due to the damage, it was not immediately apparent which unit was the FDR and which was the CVR. The units recovered from the wreckage are shown in Figure 5.

The Challenger 605 Illustrated Parts Catalogue (IPC) indicates that Challenger 605 MSN 5715 would have been equipped with a P/N 2100-1020-00 L3 CVR and a P/N 2100-4043-00 L3 FDR at build. A search of Bombardier Service Bulletin incorporation records did not reveal any modifications which would have upgraded these units to later models. A search of Computerized Aircraft Maintenance Program (CAMP) records accessible to Bombardier for MSN 5715 indicated that at the time of the accident, the aircraft was still equipped with a P/N 2100-1020-00 L3 CVR and a P/N 2100-4043-00 L3 FDR.

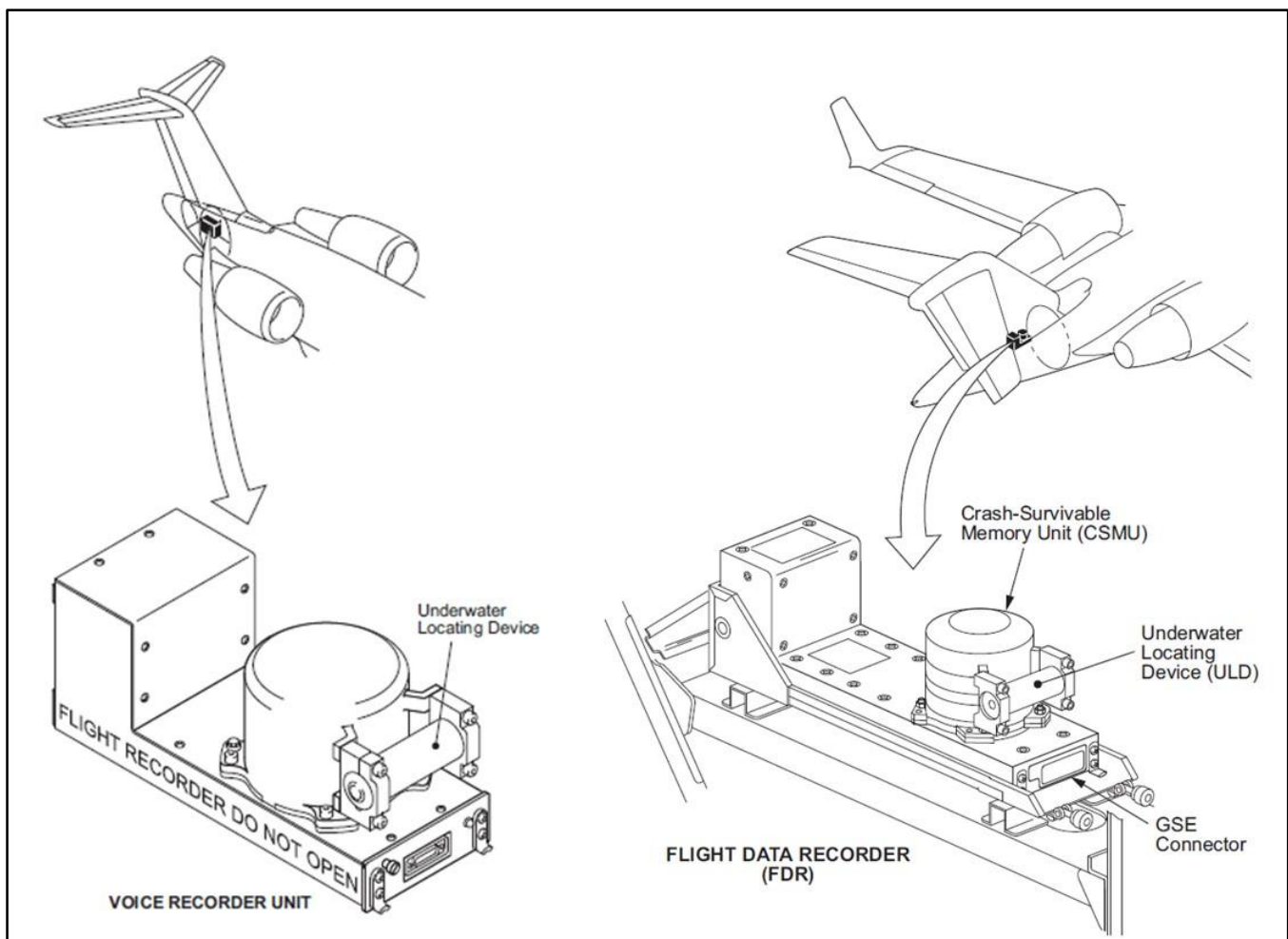


Figure 4: Normal Installation of CVR and FDR



Figure 5: CVR and FDR Recovered from Wreckage

At Bombardier's recommendation, both Underwater Locating Devices (ULD) were removed from the units prior to shipping to the NTSB recorder laboratory in Washington, D.C. Each ULD contains a battery which might be a hazard for shipping.

IAPS

The IAPS, P/N 822-0781-001, was found on the road at the top of the wreckage site (Figure 6). The IAPS contains a card which holds the Maintenance Diagnostic Computer (MDC), item 5 in Figure 7. The MDC retains maintenance fault history and a log of flight deck effects messages, among other things, which may be useful for the investigation. While not intended to be crash-protected, the data may still be recoverable. The IAPS was shipped to the NTSB recorder laboratory in Washington D.C. Bombardier recommends that the IAPS be sent to Rockwell Collins for examination and attempted retrieval of data from the MDC.



Figure 6: IAPS

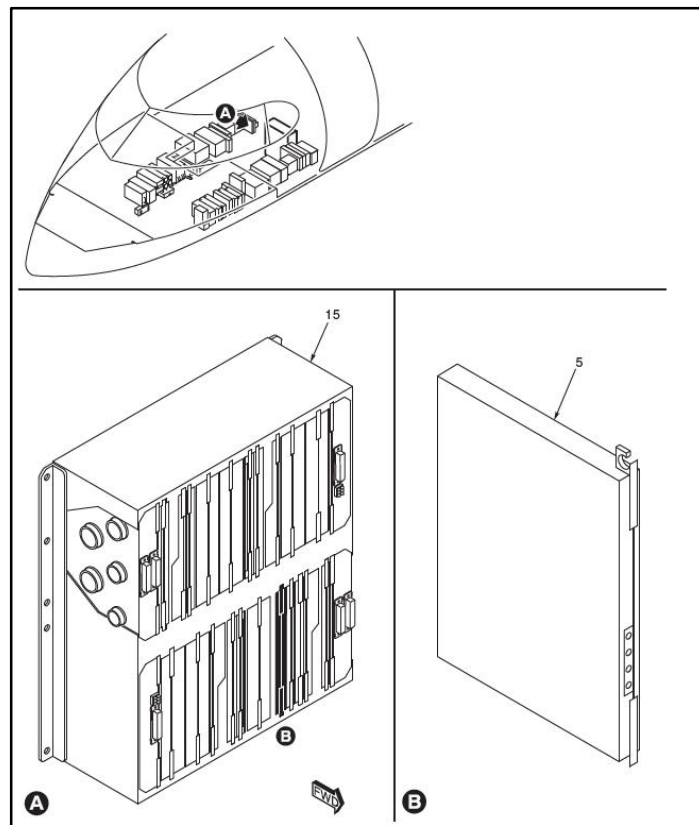


Figure 7: Normal Installation of IAPS and MDC

Flight Surfaces

The following flight surfaces were identified in the wreckage:

1. Left outboard wing - 12-foot section, starting 15 feet outboard (Figure 8)
2. Left winglet (Figure 8)
3. Left outboard flap (Figure 9)
4. Left Aileron (Figure 8)
5. Right wing - 8 feet, from mid outboard flap to aileron (Figure 10)
6. Right winglet (Figure 11)
7. Right inboard flap (Figure 12)
8. Right outboard flap (Figure 13)
9. Right aileron - outboard two feet - still attached to right wing (Figure 14)
10. Left outboard horizontal stabilizer - 3.5 feet (Figure 15)
11. Left outboard elevator - approximately half span (Figure 16)
12. Right horizontal stabilizer (Figure 17)
13. Right elevator - still attached to the right horizontal stabilizer (Figure 17)
14. Vertical stabilizer (Figure 18)
15. Rudder - bottom 18 inches - still attached to vertical stabilizer (Figure 19)



Figure 8: Left Wing, Winglet, Aileron



Figure 9: Left Outboard Flap



Figure 10: Right Wing



Figure 11: Right Winglet



Figure 12: Right Inboard Flap



Figure 13: Right Outboard Flap



Figure 14: Right Aileron



Figure 15: Left Horizontal Stabilizer



Figure 16: Left Elevator



Figure 17: Right Horizontal Stabilizer and Elevator



Figure 18: Vertical Stabilizer



Figure 19: Rudder

Other Components

The main cabin door was observed located just above the wreckage site, on Reynold Way, near the driveway for 10309 Reynold Way (Figure 20).

A thrust reverser actuator assembly was found in the wreckage near the right engine (Figure 21). The thrust reverser actuator was in the stowed position. There are four thrust reverser actuator assemblies on each engine. It was not possible to conclusively determine which side and position the thrust reverser actuator assembly came from.

One nose landing gear wheel and tire assembly was found under a street-facing window at 10327 Reynold Way. The window was broken. It was reported that the wheel and tire assembly had struck the window during the accident sequence.

The left main landing gear door was found at the top of the driveway leading to 10327 Reynold Way. The right main landing gear door was found on Reynold Way, at the bottom of the driveway leading from 10327 Reynold Way.



Figure 20: Main Cabin Door



Figure 21: Thrust Reverser Actuator



Figure 22: Nose Landing Wheel and Tire Assembly



Figure 23: Left Main Landing Gear Door



Figure 24: Right Main Landing Gear Door

Observations on Wreckage Pattern

Major aircraft components are identified on Figure 25 through Figure 31. Figure 25 is a view of the wreckage site from the ground, looking forward along the flight path. Figure 26 through Figure 31 are a series of consecutive screenshots taken from drone video looking down at the wreckage site and moving forward along the flight path. The drone video was provided to the ASIO by the NTSB and had been recorded the day before (July 27th) the ASIO arrived on site.

The damage to the trees around the wreckage site indicates that the aircraft entered the trees at a fairly steep angle, most likely 30 degrees nose-down or more, and at a very high bank angle, most likely somewhere between 60 and 120 degrees. As the aircraft entered the trees, it continued to roll until inverted or nearly inverted.

The distribution of wreckage around the site indicates that the aircraft was most likely left wing down when it entered the trees and inverted, or nearly inverted, when it impacted with the ground.

Based on what was identified in the wreckage, it is highly likely that all of the aircraft was contained in the wreckage site, i.e. there were no components which departed the aircraft in flight prior to impact.

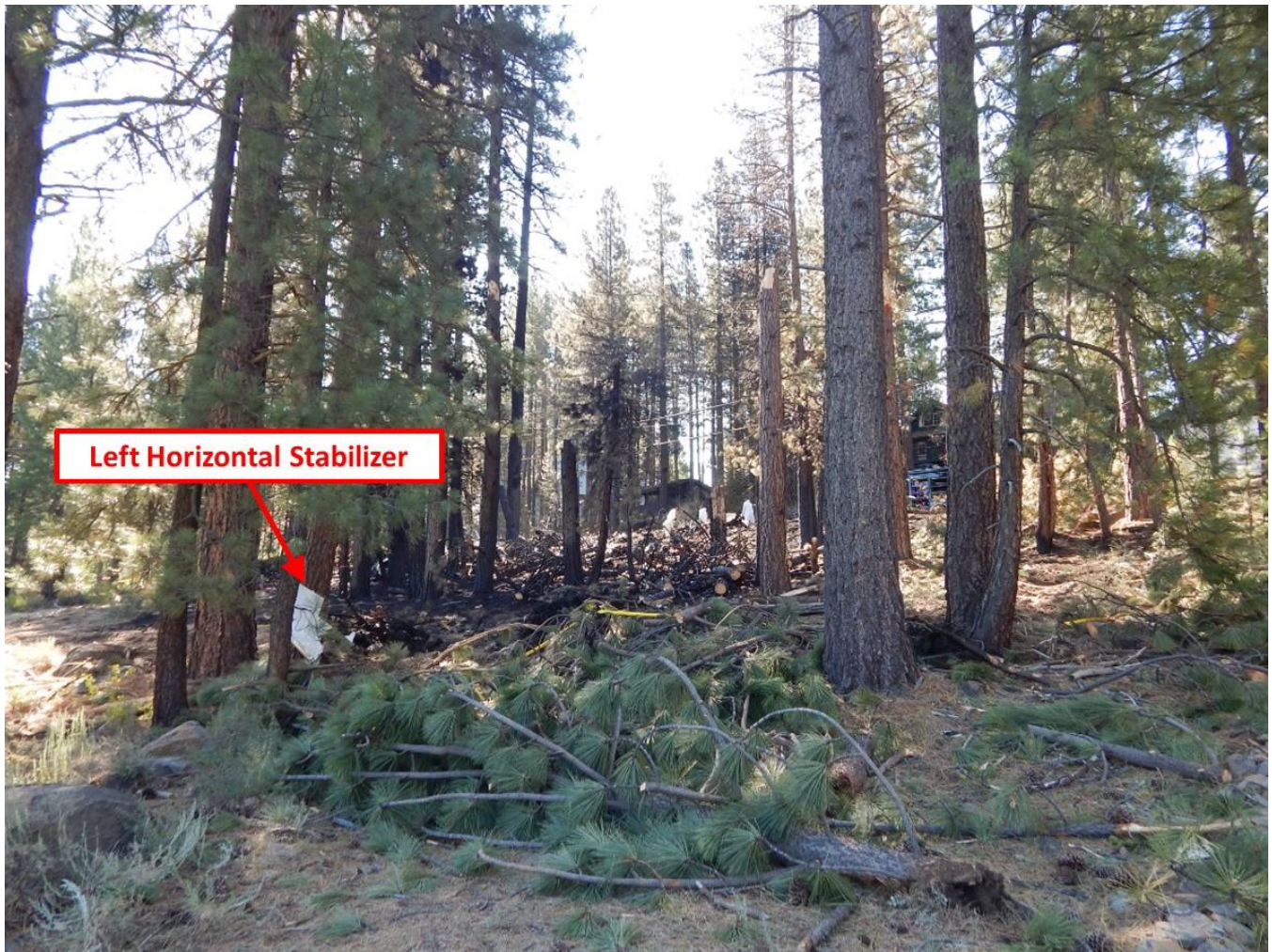


Figure 25: View of Wreckage Looking Forward along Flight Path



Figure 26: Screenshot 1 of 6 - Overhead Drone Video - Moving Forward along Flight Path



Figure 27: Screenshot 2 of 6 - Overhead Drone Video - Moving Forward along Flight Path

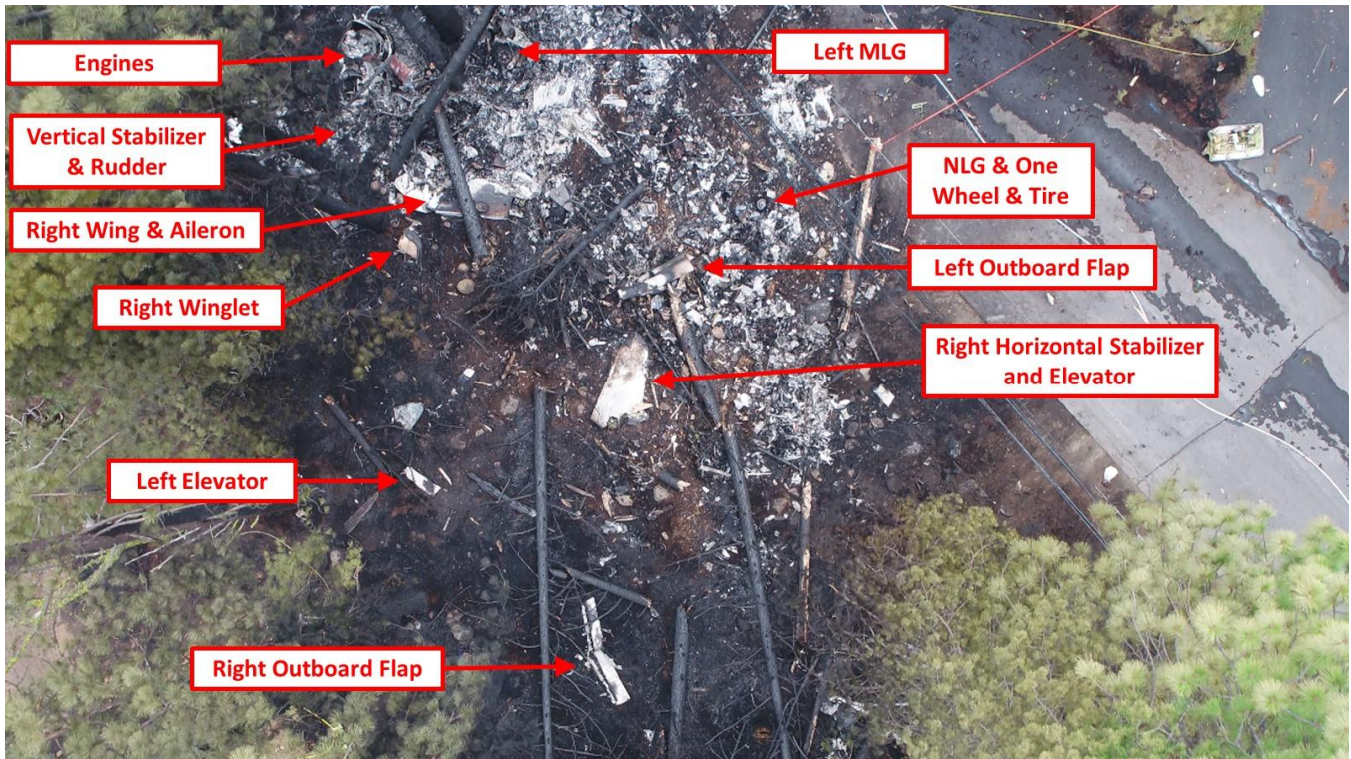


Figure 28: Screenshot 3 of 6 - Overhead Drone Video - Moving Forward along Flight Path



Figure 29: Screenshot 4 of 6 - Overhead Drone Video - Moving Forward along Flight Path



Figure 30: Screenshot 5 of 6 - Overhead Drone Video - Moving Forward along Flight Path



Figure 31: Screenshot 6 of 6 - Overhead Drone Video - Moving Forward along Flight Path