

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA25MA106

AIRWORTHINESS FACTUAL REPORT- WRECKAGE LAYOUT

February 4, 2026

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A. ACCIDENT

Location: Philadelphia, Pennsylvania
Date: January 31, 2025
Time: 1807 eastern standard time
Airplane: Learjet 55, registration XA-CUI

B. AIRWORTHINESS FACTUAL REPORT- WRECKAGE LAYOUT

IIC	Robert Gretz National Transportation Safety Board Washington, D.C.
Group Chair	Ryan Enders National Transportation Safety Board Washington, D.C.
Party Coordinator	Michael Lemay Bombardier Quebec, Canada
Party Coordinator	Joe Howard Honeywell Phoenix, Arizona

C. SUMMARY

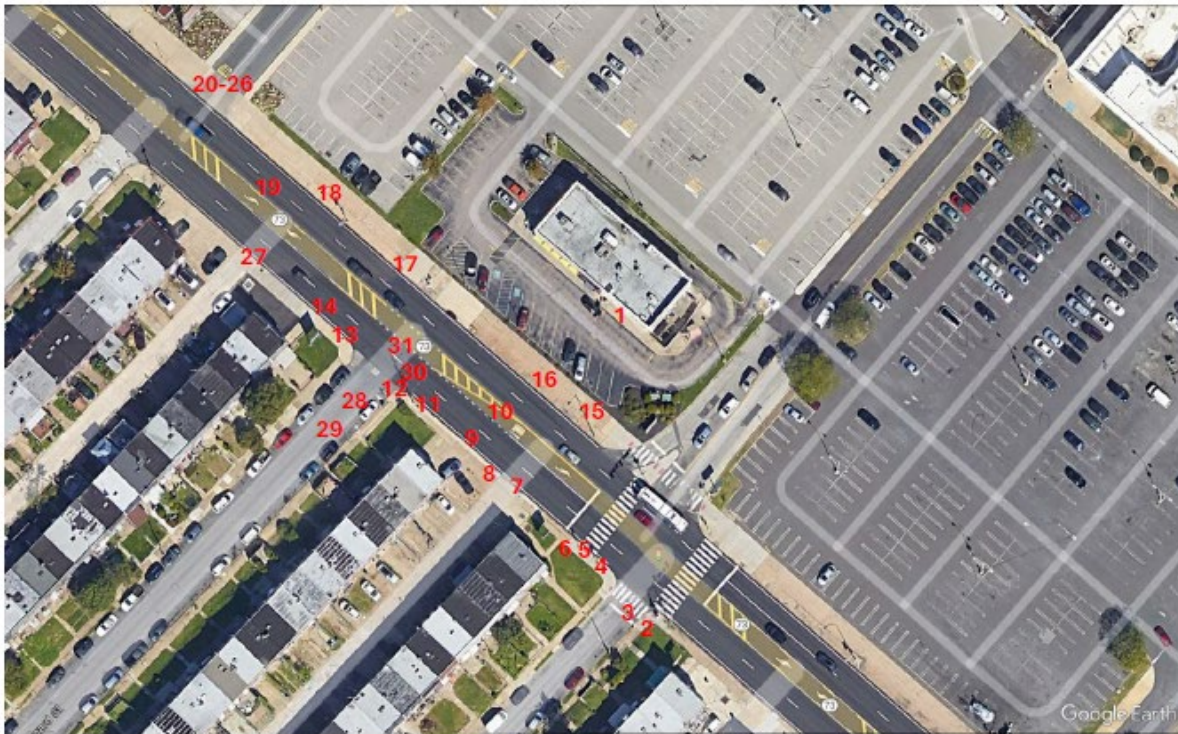
On January 31, 2025, at 1807 eastern standard time, a Learjet 55, XA-UCI, was destroyed when it was involved in an accident near Philadelphia, Pennsylvania. The airline transport pilot, commercial pilot, 2 flight medical staff, 2 passengers, and 1 person on the ground were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 135 air ambulance flight.

D. DETAILS OF THE EXAMINATION

1.0 Wreckage Layouts

The airplane was retained and a layout examination was conducted on February 6, 2025, and March 27, 2025. The retained wreckage debris was collected in large bags that were numbered and their locations were tracked in Figure 1. Figure 2 depicts the accident scene with the key debris locations prior to recovery. Bags that did not receive a number while on-scene were given a number with no reference to

where the contents were collected. A total of 54 bags were collected. Larger debris was contained to a trailer and was not placed in bags.



Bag #

1. Dunkin/Dunkin Roof
2. 7275 Rupert Front
3. 7275/7274 Rupert Front
4. 7274 Rupert Front
5. 7274 Rupert Side/Cottman
6. 7274 Rupert Side/Cottman
7. 7274 Rupert Back/Cottman
8. 7283 Leonard Back. 2452 Cottman
9. 7283 Leonard Side/Cottman
10. 7283 Leonard/2452 Cottman (Middle of Cottman)
11. 7283 Leonard Front/Cottman
12. 7282 Leonard Front/Cottman
13. 7282 Leonard Front/Cottman
14. 7282 Leonard Side/Cottman
15. Between Rupert/Leonard, East side of Dunkin on Cottman
16. Leonard and East side of Dunkin on Cottman

17. Leonard and SW side of Dunkin on Cottman
18. Between Leonard/Hanford on Dunking side by construction lot
19. Fatal impact car
20. Pit
21. Pit
22. Pit
23. Pit
24. Pit
25. Pit
26. Pit
27. 7275 Hanford Rear/7282 Leonard Rear on Cottman
28. 7282 Leonard/7283 Leonard
29. 7282 Leonard/7283 Leonard
30. 7283 Leonard Front, Corner of Cottman
31. 7283 Leonard Front

Figure 1: Debris Collection Bag Locations



Figure 2: Large Debris Location

2.0 Airframe Examination

During the first layout, 19 out of 54 recovery bags were examined. Bags are listed in order that they were examined. The following is a summary of the key components identified in each bag during the first layout:

Bag 10: Contained various automobile parts and fiberglass. Remnants of an HP laptop computer were identified. An O2 bottle and CO2 medical bottle were identified.

Bag 20: A portion of circuit breaker panel was identified. The bag contained the autopilot/yaw dampener component previously mentioned. The fuel/oil cooler and airplane drag chute were noted.

Bag 21: Contained airframe structural components and control surface components.

Bag 9: Contained a small portion of circuit breaker paneling. A piece of flap track was identified. The bag also contained an anti-ice system valve, aileron control pulley, and external power receptacle.

Bag 32: Contained lower wing skin pieces, a flotation raft, and the aft service door.

Bag 33: Identified as the street sweeper debris and was not evaluated.

Bag 34: Contained mainly crew and passenger personal items from the baggage compartment. One fuel cap lever was identified.

Bag 1: Contained the main door components, flap actuator valve, spoiler actuator, and cabin temperature control.

Bag 28: Contained a destroyed iPad, several damaged circuit boards, several control cables, the nose gear trunnion, airplane oxygen bottle, and an airframe fuel filter housing. A portion of the fuselage fuel tank with bladder pieces was located. A piece of seat track and air condition lines were within the bag.

Bag 13: Several control cables were in the bag. The avionics junction box, wing spar piece where the landing light attaches, fuel transfer hose, and a portion of a nose gear door.

Bag 29: Contained the left engine cowling, braking anti-skid control valve, warning light control box, a piece of seat track, a portion of the left spar, and miscellaneous control pulleys.

Bag 31: Contained a large section of the vertical stabilizer. The bag contained a large portion of a wiring bundle, a flap track, a blowdown bottle, dorsal inlet duct, left winglet, and a copilot rudder pedal fitting.

Bag 14: Contained the rotating beacon, a flap track, large portions of lower fuselage, and an engine fuel control unit.

Bag 35: Contained portions of the left wing, general wing pieces, and the center gear door.

Bag 25: Had the large portion of the bottom of the tail structure with control cables attached. The bag contained an engine starter, portion of vertical tail skin, and a portion of an engine fuel control unit.

Bag 36: Contained windshield structure, windshield, a compressor blade, and the pilot control yoke.

Bag 27: Contained a main landing gear door, fuselage fuel tank structure, large wire bundles, left inboard flap, and wing structure pieces.

Bag 5: Contained the forward and aft left engine mounts, a large wire bundle, various cockpit instrumentation, various avionics equipment, and the internal door handle of the main entry door.

Bag 3: Contained the bottom structure of a crew seat, various engine accessories, an engine mount, brake discs, the copilot control yoke, and an aileron control cable with a cut.

The remaining bags and trailer contents were examined during the second layout. Bags are listed in order that they were examined:

Bag 37: Large structural debris. Large portion of wire bundle. Small computer chips. Small pieces of interior panel. Personal clothing and miscellaneous medical supplies. A fragment of a fan or compressor blade.

Bag 38: Life jacket CO2 cartridge. Window frame. Miscellaneous POH pages. Small computer chip pieces. iPad and Honor phone (destroyed). Miscellaneous medical equipment. Wing spar structure. Aileron balance weight. Three fan stator vanes, fragments of stators, a fragment of a fan blade, and duct flange were identified.

Bag 39: Large piece of wing skins. Fuselage skin and strainers. Fuselage fuel cell pieces. 1 wing rib. 1 apple watch, intact, likely from the patient's mother (based on the clothing it was tangled in). Hydraulic filter assembly. A portion of a fan blade and 2 fan stator vanes.

Bag 40: Cabin interior components. Piece of engine cowling. Medical equipment. Miscellaneous airplane wiring. Manual pressurization control valve. Frame 25 structure. Fan blade root and fan stator vane.

Bag 8: Medical equipment. Misc car parts. Flap rotary switch arm. A few airplane ribs and structure. Spar 8 piece. Portion of seat with a portion of seat belt. Fragment of pressure limiter valve (fuel control), fragment of starter pad, a portion of a fan blade, fragment of LPC axial blade (including root), 6 fan stators, and 5 LPC axial stator vanes from two different stages.

Bag 6: Crew seat and seat tracks. Wing skin. Thrust reverser portion. Avionics rack housing. 2 fan blades, 2 fan stators, and 3 LPC axial stator vanes.

Bag 4: Engine fire bottle. Engine thrust reverser chunk. Wheel well parts/brake components. Door and door hinge. Secondary trim actuator motor. Manual pressurization valve. Seat components and tracks. Fragments of intermediate case and bearing housing assembly (inner part of front frame). Bearing from an engine, fragments of FCU, duct fragment, fragments of LPT vane assembly, and a portion of fan blade.

Bag 41: Large wire bundle. Medical equipment bags. Fan housing fragment and fragment of LPT vane assembly.

Bag 42: Left hand fuselage front entry door, door pulley cables, and handle. Seat tracks, seat belt, fuselage skin, pitot tube. Engine cowl or bypass duct. 2 fan blades. Fan stator, fuel heater, and a fragment of bypass duct with some LRUs attached.

Bag 43: Engine fire bottle. Aft cabin baggage compartment floor structure. Medical bag and medical equipment. 3 large engine fan blades. Flight computer and steering guide.

Bag 44: (initially mislabeled as 43). Large wiring bundles. Fuselage structure. Cockpit structure with expansion valve. Avionics computer. Fuel cap attached to structure. Aft pressure bulkhead. Aft pressure feed through frame and wiring. Piece of seat track. Fan blade.

Bag 12: Nose wheel steering gearbox. Fan stator shroud.

Bag 45: Fuselage frame aft of the emergency exit. Aft pressure bulkhead parts. Raft ELT/additional survival equipment. Wing structure. Large wiring bundles. Windshield structure and glass.

Bag 17: Significant amount of soil. 4 fan stators blades and portion of shroud. Small pieces of structure. Portion of landing gear trunnion pin. Fragment of a fan blade tip.

Bag 46: Quantities of wiring bundles. Part of control yoke. Bleed air ducting. Seat and seat tracking. 2 fan blades. LPC shroud, 5 fan stators, and 3 LPC axial stators.

Bag 24: Main landing gear actuator. Tail cone structure. Rudder torque tube. Hydraulic shutoff valve. Aft fuselage structure. Generator wiring. Hinge portion of left-hand aileron balance tab. Hydraulic filters. Low pressure fuel filter housing. Control cable and turn buckle pieces. Potential autopilot servo and control cables. Wing attachment. 23 LPC stators, 4 fan stators, 4 LPC blades, a shroud fragment, and a flange fragment. Fan blade fragments and a fragment of transition liner.

Bag 15: Fuel flow indicator dial face. Engine inlet. Pressure bulkhead. Windscreen fragments. 5 fan blade fragments, 8 LPC axial stators, 12 fan stators, and a fan stator shroud fragment.

Bag 7: Leading edge of the rudder and balance weights. Cockpit switches and breakers. Portion of flight control section. Destroyed iPhone. 5 fan stators, 1 fan blade fragment, 3 LPC axial stators, 3 LPC blade fragments, an accessory gearbox fragment, and a fragment of a spinner.

Bag 2: Rudder pedals and controls, iPhone (damaged but retained). Cockpit switches. Seatbelts and seats. Portion of control column with cables. Flight control push pull tubes. 3 fan blade fragments, 2 fan stators, oil cooler, a tube, and 1 LPC blade.

Bag 16: Right wing leading edge. Miscellaneous leading-edge pieces. Oil cooler. 4 fan blade fragments, 5 fan stators, front frame fragment, and 2 LPC stator fragments.

Bag 18: Main landing gear support. 1 large engine fan blade. Fan stator shroud and 3 LPC stators.

Bag 23: Left hand engine mounts, both forward and aft. Flap interconnect cable portion. Autopilot control cable. 3 fan blade fragments, 8 fan stators, 2 gear shaft assemblies, shroud ring, bypass flange fragments, and 7 LPC stators.

Bag 11: Portion of the control column assembly. Main landing gear tire. A portion of a fan engine support housing and intermediate case assembly with engine mount attached. Fan stator shroud fragment, 5 fan stators, and 4 LPC stator fragments.

Bag 26: Antiskid valve, portion of flap track. Control cables and pulleys. Wire bundles. 3 fan stators and 1 LPC stator.

Bag 22: Right winglet. Flap actuator. Part of fuel pump. Landing gear fractured pieces. CVR dataplate. Fractured engine mount bolt. Fuel pump impeller and shaft assembly and housing fragment. Support strut fragment, fan shroud case fragments, multiple flange fragments, 11 LPC stators, 9 fan stators, 2 fan blade fragments, 4 LPC blades, bleed duct, and oil pump shaft assembly and housing fragment.

Bag 47: Avionics components, medical equipment, oxygen bottle top, engine inlet ring, fire extinguisher. Fuel/oil cooler, fuel pump, and T/R pneumatic drive actuator assembly.

Bag 48: Large wiring harness from cockpit (originally in the trailer)

Bag 19: Nose landing gear strut. Car parts and car tire. Left hand elevator outboard section. Aft bottom fuselage structure. Engine cowling material. Large piece of wing structure. Control Yoke piece. 9 LPC stator fragments, 1 fan blade fragment, 3 LPC blade fragments, 1 fan stator, case fragments, and a bypass support strut.

Bag 49: Main landing gear support and wheel assembly. 3 main landing gear tires. Second broken main landing gear support and wheel assembly. Engine mount.

Bag 50: Lower wing skin, interior panel. Left side fuselage skin, forward nose skin. Flight control cable. 1 fan blade, 2 fan blade fragments, 6 fan stators, bleed duct fragment, and case fragments.

Bag 51: Dirt bottom, roof top items on top. Misc electronics and an avionics component. Flight control counterweight. Main landing gear torque link. Seat track. Fan blade fragment, front frame fragment, and 2 LPC stators.

Bag 52: All the collected engine parts from the above bags. Honeywell collection pile.

Bag 53: Oxygen bottles collected throughout the layout. Haz mat contained items.

Bag 54: First bag of the saved items from the bags mentioned above. Nose landing gear. Portion of torque tube from nose landing gear. Centering cam nose landing gear. Wheel well structure. Main landing gear Actuator. Upper portion and torque link of main landing gear with a trunnion pin and excessive shims. Box of engine parts from first layout. Brake valves and emergency extension and emergency braking. Saved avionics equipment. Circuit break panels. Portion of throttle levers. Rudder pedal pieces. 1 full control yoke and pieces of second control yoke. Portions of control column. Centering yoke. Aileron interconnect. Pieces of flight control push rods sectors. Sections of rudder pedal assembly. Misc flight control pulleys and cables. Portion of gear door uplock. Piece of throttle cable (feedthrough housing section). Section of rudder pedal assembly. Piece of fuselage structure with push pull tubes. Loop antenna for GPS. Center pedestal pieces. Four-way valves (spoilers, flaps, unknown which one). Hydraulic actuator. Piece of aft fuselage structure with flight control cables with drag chute storage compartment. Portion of thrust reverser. Rudder torque tube. Autopilot servo. Remainder of stab actuator and secondary motor (retained). Bowl wheel for aileron. Piece of flap track.

Trailer: The wreckage in the trailer was removed and laid out. Identified right hand horizontal stabilizer, elevator, and the vertical fairing at the top of the stabilizer. Identified about 1/3 of the left-hand elevator. Right hand side fuselage, a section with the emergency egress door, a section with three cabin windows, right hand pilot side window and windshield. Portion of the top fuselage, approximately corresponding to the three cabin windows. Section of the left-hand side forward cabin window. Right hand wing: most of the top wing skin with the identification of the aircraft. One section contained the right-hand flap actuator (still in position). The actuator was connected to the sector and to the wing mounting lug. The right-hand flap was identified with the flap rod still attached. Most of the right-hand aileron with the balance tab. The balance tab rods were still attached at both ends. Large portion of the right-hand wing tip without the winglet. Laid out portions of the right-hand wing in their approximate positions. Laid out portions of the right-hand side in their relative positions. Laid out right hand horizontal stabilizer in their approximate position. Miscellaneous items identified: portion of the left-hand bottom skin. Right-hand wing bottom skin. Various pieces of fuselage. Massive cockpit wiring bundle. Miscellaneous interior medical equipment. The Honeywell FMS chassis and front plate, with circuit boards missing, was identified. The left engine support housing and intermediate case assembly (fan bypass duct with support vanes). 5 fragmented fan blades and 2 fan stator vanes.

The back portion of the pilot seat was located but could not be identified as pilot or co-pilot. Two passenger bottom seats, and several medical bags from the interior of the airplane were evaluated. None of the remaining seat portions or canvas medical bags displayed signs of sooting.

Two large portions of circuit breaker paneling were recovered and photographed. Both the pilot and copilot control yokes were recovered and photographed. Several control cables and control cable pulleys were photographed and examined with no discrepancies noted. The lower portion of the vertical tail structure with several control cables was identified and photographed. Portions of both main landing gear assemblies was identified and examined. A portion of the right and left mid-span wing was identified. The forward and aft left engine mounts and the right aft engine mount were identified with no discrepancies noted. Miscellaneous avionics, navigation components, and other electronic devices were isolated and separated. Portions of both engine fuel control units (FCU) were identified. An oil tank, two compressor blades, and miscellaneous engine hardware were noted.

The right-hand wing was placed on a table upside down. The access panels for the right-hand flap actuator were removed. The actuator was verified to be connected at the sector and the mounting lug. The flap interconnect cable was still attached to the flap sector. The hydraulic lines were still attached to the actuator. The spoiler actuator remained in place and undamaged and remained connected to the spoiler. An aileron control cable was observed running through the wing. The flap actuator was removed from the wing but during the removal the actuator piston was pulled/extended about 1-1 ½ ". The righthand flap actuator measurement, post pull, was 19" equating to full extension. Prior to the movement, it would have been about 17 ½ - 18". 17 ½ corresponds to 30 degrees of flap, which is not a standard position (Figure 58).

The left-hand flap actuator was measured at about 13 ¼" corresponding to about 2 degrees of flap (retracted). The piston appeared to be jammed and could not be moved by hand.

3.0 Engine Examination

Both engines were examined to confirm their respective locations on the airplane. Reference Appendix C. The engines were identified based on the physical damage to the aft engine mounts and the serial numbers of a fan disk and a first stage compressor disk. A borescope inspection was completed on both engines showing that the 1st stage of the low pressure (LP) turbine was present.

The engine in the street near the impact crater was identified by the engine aft mount damage and from a partial serial number on the first stage compressor disk. The fan assembly under the car had serial number markings with four digits of the fan disk serial number reading "1860". Per engine build book for engine serial number P-

85243, the serial number of the fan disk was 970322901860. From the airplane airworthiness documentation, it was determined that engine serial number P-85243 was in position 1, which is the left engine. The 3 o'clock aft engine mount bolt hole was torn outward, indicating that it was the left engine. The inter-turbine temperature (ITT) harness was routed on the right side of the engine to go to the lefthand engine pylon. The first stage compress disk, part number was identified as 3072395-1 with serial number 1-12112-1548. Per the engine build log, the serial number was 1-12112-1548.

For the engine found in the second-floor bedroom, the 9 o'clock aft engine mount bolt hole was torn outwards, indicating that the engine was mounted in the number 2 position, which is the right side. Through aircraft airworthiness documentation, this engine is identified as P-85139C.

The following loose engine hardware was observed:

- PLA portion of the Fuel Control Unit located in impact crater. Debris was on PLA indicator preventing inspection of indicator dial position.
- Remaining portion of FCU inspected in the field.
 - PN: 3070800-22; Series 2; Mod 44
 - SN: A6159C
- Gearbox gears
- Portion of fuel/oil cooler
- Oil tank
- Loose compressor blades
- Oil pump g-rotors
- Portions of a front frame
- Filter housing
- Portions of spinner supports

4.0 Appendix A- Bagged Debris Displayed



Figure 3: Bag 10



Figure 4: Bag 21



Figure 5: Bag 9



Figure 6: Bag 1



Figure 7: Bag 28



Figure 8: Bag 13



Figure 9: Bag 29



Figure 10: Bag 31



Figure 11: Bag 14



Figure 12: Bag 35



Figure 13: Bag 25

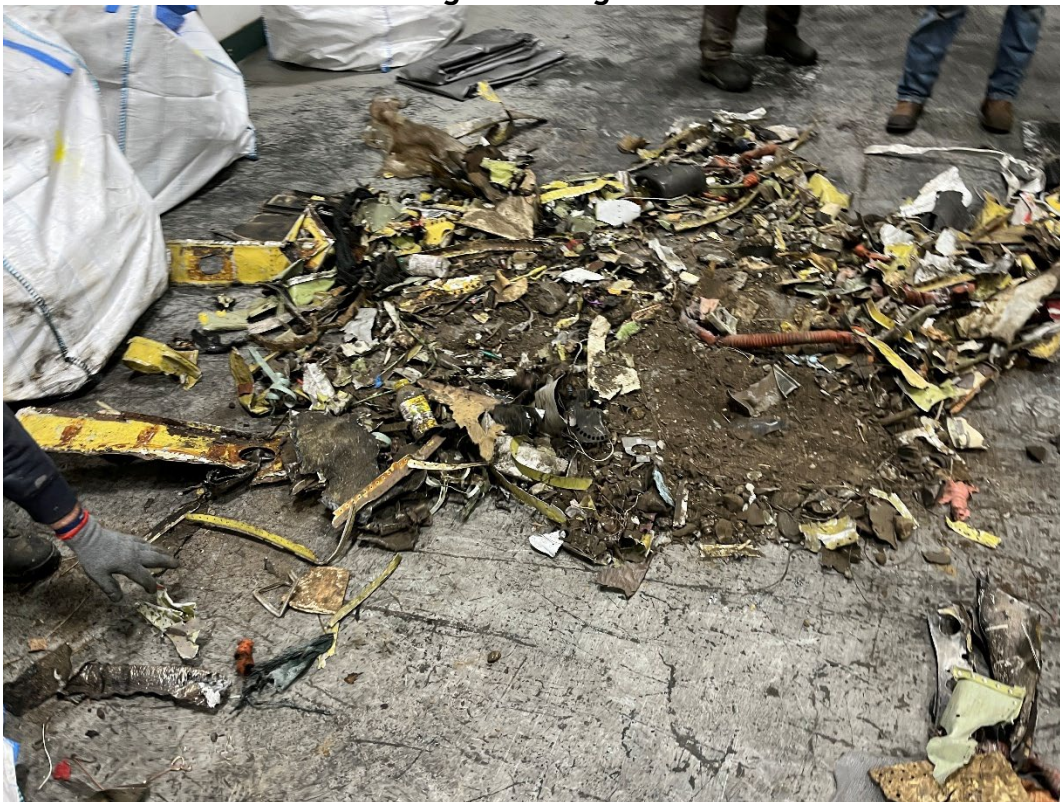


Figure 14: Bag 36



Figure 15: Bag 27



Figure 16: Bag 5



Figure 17: Bag 3



Figure 18: Bag 37



Figure 19: Bag 38



Figure 20: Bag 39



Figure 21: Bag 40



Figure 22: Bag 8



Figure 23: Bag 6



Figure 24: Bag 4



Figure 25: Bag 41



Figure 26: Bag 42



Figure 27: Bag 43



Figure 28: Bag 44



Figure 29: Bag 12



Figure 30: Bag 45



Figure 31: Bag 17



Figure 32: Bag 46



Figure 33: Bag 24



Figure 34: Bag 15



Figure 35: Bag 7



Figure 36: Bag 2



Figure 37: Bag 16



Figure 38: Bag 18



Figure 39: Bag 23



Figure 40: Bag 11



Figure 41: Bag 26



Figure 42: Bag 22



Figure 43: Bag 47



Figure 44: Bag 19



Figure 45: Bag 50



Figure 46: Bag 51

5.0 Appendix B- Debris Not Within Bags and Large Items Removed from Bags



Figure 47: Interior Seating and Medical Equipment Absent of Soot



Figure 48: Control Pulleys, Circuit Breakers, and Miscellaneous Switch Panel



Figure 49: Pilot Control Yokes and Pedals



Figure 50: Cockpit Control Linkages



Figure 51: Control Cable Connections and Pulleys



Figure 52: Circuit Breaker Panels and Miscellaneous Electronic Equipment



Figure 53: Circuit Breaker Panels and Miscellaneous Electronic Equipment

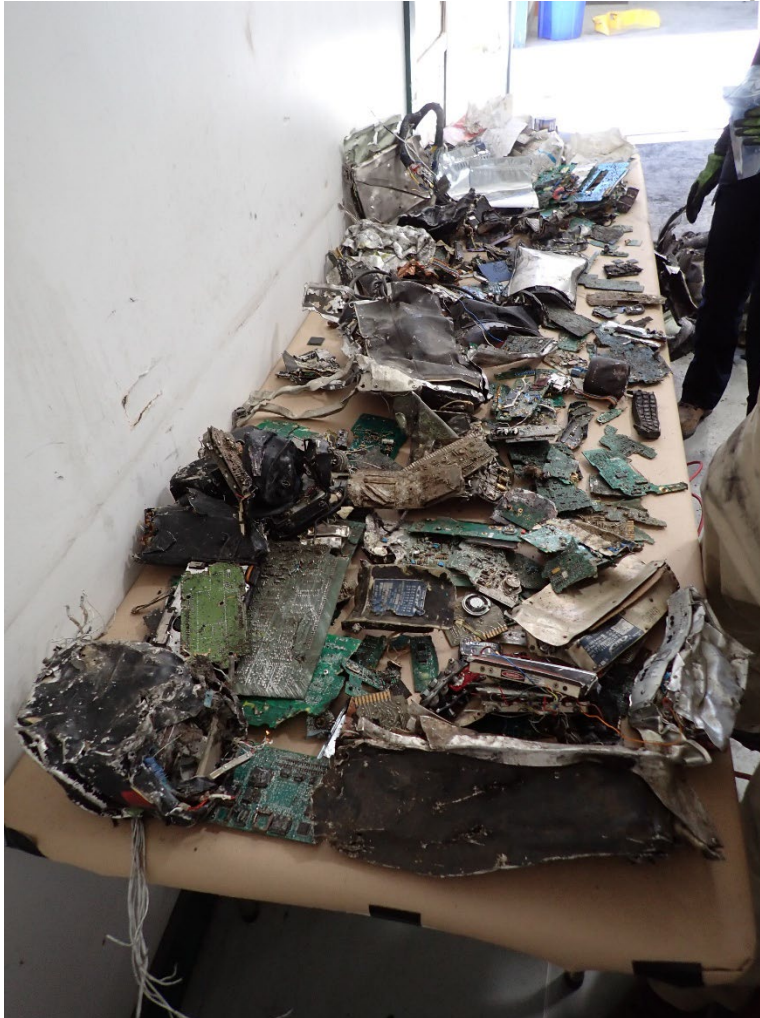


Figure 54: Circuit Breaker Panels and Miscellaneous Electronic Equipment



Figure 55: Lower Tail Section with Attached Control Cables



Figure 56: Engine Mounts



Figure 57: Landing Gear Components

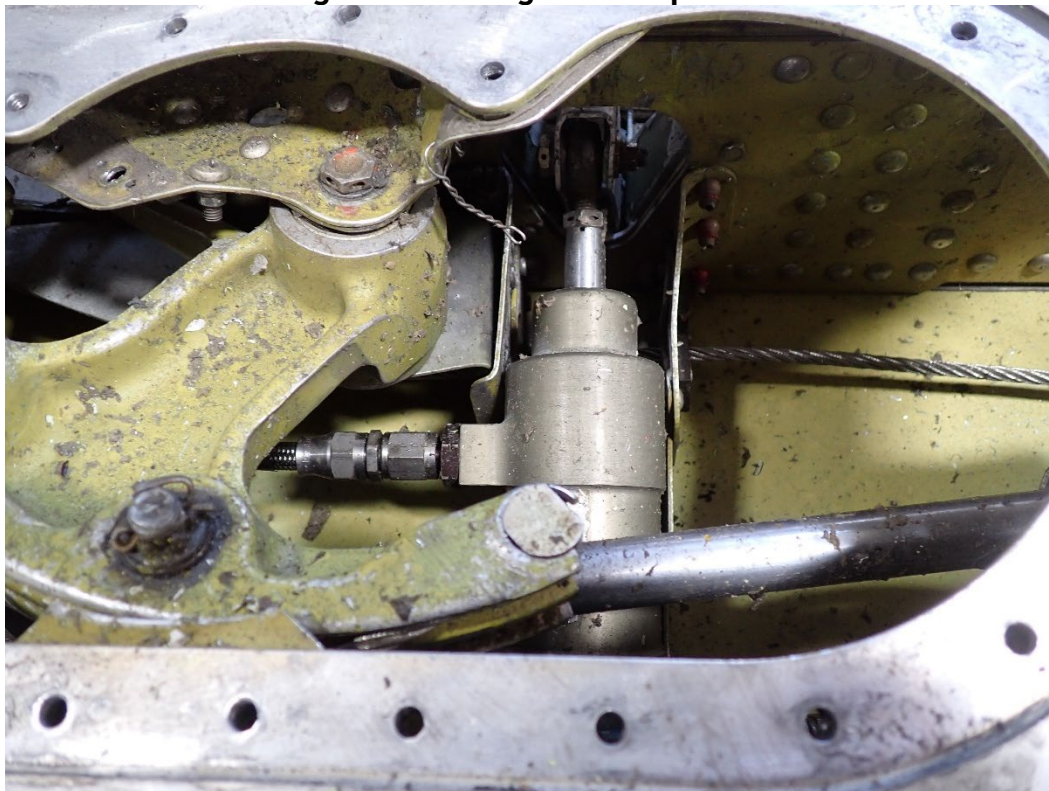


Figure 58: Right Flap Actuator as Installed



Figure 59: Layout of Trailer Components



Figure 60: Layout of Trailer Components



Figure 61: Layout of Trailer Components and Large Wiring Bundle

6.0 Appendix C- Engine Photographs



Figure 62: Left Fan Disc Serial Number (Courtesy of Honeywell)



Figure 63: Left Engine First Stage Compressor Disc Part Number and Serial Number (Courtesy of Honeywell)



Figure 64: Left Aft Engine Mount(Courtesy of Honeywell)



Figure 65: Right Engine Aft Mount (Courtesy of Honeywell)

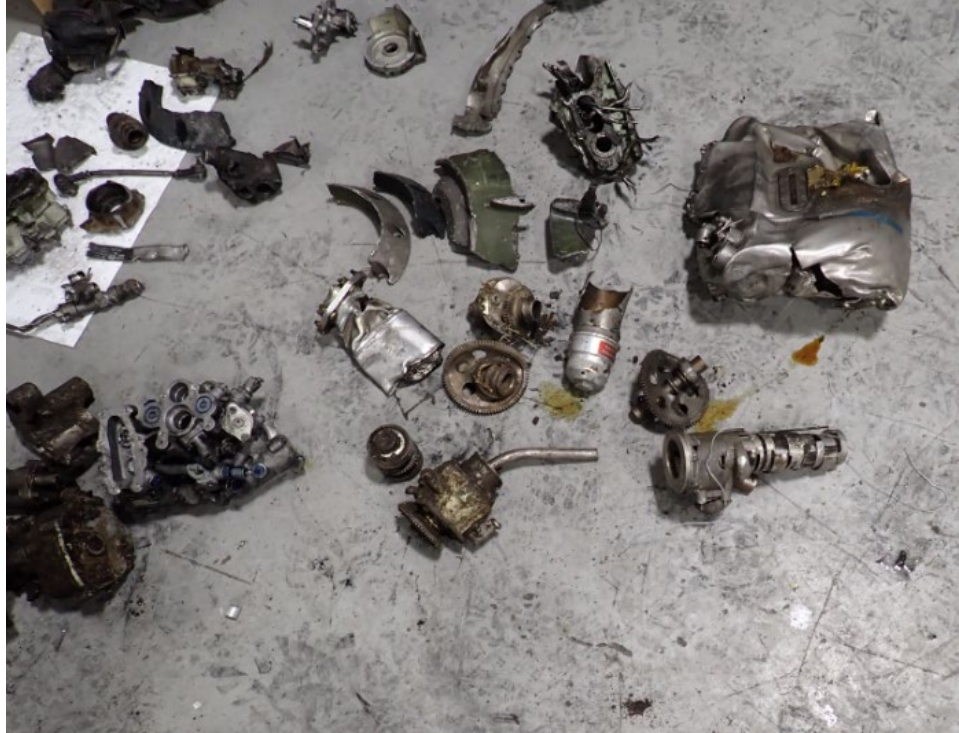


Figure 66: Loose Engine Hardware

Submitted by:

Ryan Enders
Aviation Accident Investigator