

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ANC23FA008

SEARCH AND RECOVERY

Group Chair's Factual Report

May 8, 2023

A. ACCIDENT

Location: Kaupo, HI
Date: December 15, 2022
Time: 2114 Hawaii standard time (HST)
0714 coordinated universal time (UTC), December 16, 2022
Airplane: Raytheon Aircraft Company C90A King Air, N13GZ

B. SEARCH AND RECOVERY GROUP

Group Chair Clinton R. Crookshanks
National Transportation Safety Board
Denver, Colorado

Investigator-in-Charge Millicent Hill
National Transportation Safety Board
Anchorage, Alaska

C. DETAILS OF THE INVESTIGATION

Immediately after being notified of the accident, the group contacted several state and federal agencies for information on the water depth and current near the last known position of the airplane. The group engaged with the National Oceanic and Atmospheric Administration (NOAA), the US Navy Fleet Numerical Meteorology and Oceanography Center, and the University of Hawaii PacIOOS (Pacific Islands Ocean Observing System) from December 16-28, 2022. The information received indicated the depth near the last known position was about 6,000 ft, the surface currents were mostly to the northeast with speeds up to about 1 kt, and the subsurface currents were mostly westbound at speeds less than 1 kt.

Simultaneously, the group provided contact information for several companies that specialize in underwater search and recovery to the operator, Guardian Flight LLC, and the insurance company. The operator contracted with Ocean Infinity (OI) for the deep-water recovery on December 27, 2022, with a proposed start date of January 7, 2023. The NTSB investigator-in-charge (IIC), the NTSB Transportation Disaster Assistance (TDA) Chief, a representative from the operator, and a representative from the insurance company boarded the recovery vessel on January 7 off the coast of Honolulu, HI. The recovery operation concluded on January 12, 2023, with the transfer of the recovered victims and wreckage from the vessel to shore in Honolulu. The group chair provided ongoing support from shore during the operation.

D. FACTUAL INFORMATION

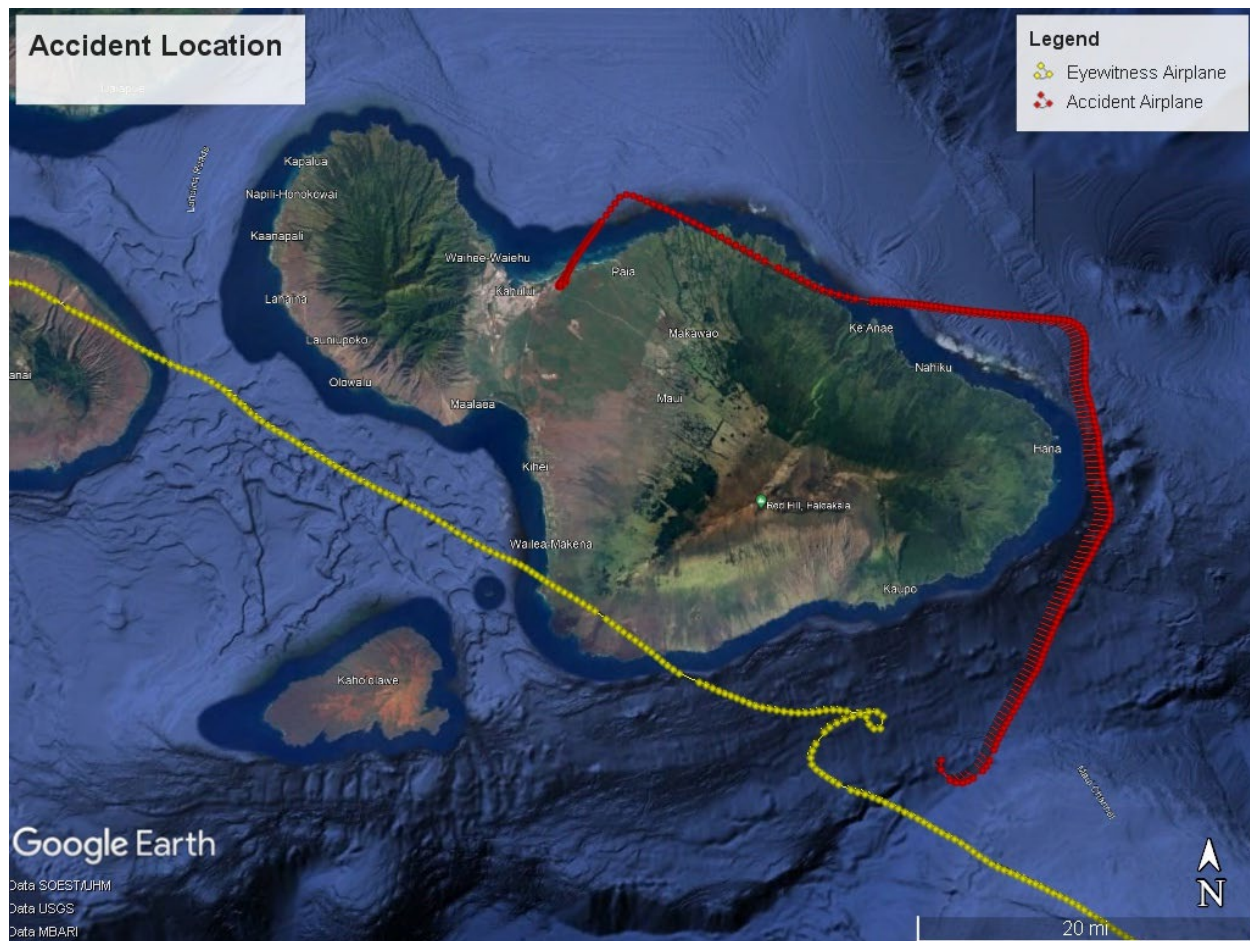
1.0 Airplane Information

On December 15, 2022, about 2114 Hawaii-Aleutian standard time, a Raytheon Aircraft Company (formerly Beech) C90A King Air, twin-engine, turbine-powered airplane, N13GZ, impacted the water near Kaupo, Hawaii. The airline transport pilot, flight paramedic, and flight nurse were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations (CFR)* Part 91 air ambulance positioning flight.

The flight, operated by Guardian Flight LLC, dba Hawaii Life Flight, departed the Kahului Airport (OGG) on the Island of Maui, Hawaii, at 2053, on an instrument flight rules (IFR) flight plan. The accident airplane was destined for the Waimea-Kohala Airport (MUE) on the Island of Hawaii to pick up a patient to be transported to Honolulu, Hawaii.

The accident airplane was equipped with Automatic Dependent Surveillance-Broadcast (ADS-B) equipment, which provides aircraft position information via satellite navigation or other sensors and periodically broadcasts it to air traffic control ground stations, enabling the aircraft to be tracked. According to ADS-B data, after the airplane departed OGG, it initially proceeded north then turned eastbound. As the airplane neared the northeastern shores of Maui it turned southbound along the Victor 11 airway. The ADS-B data stopped about 10 miles south of Kaupo. An eyewitness flying in a nearby airplane reported that the accident airplane impacted the water in the area of the last ADS-B point (Figure 1). The red flight track represents the accident airplane, and the yellow flight track represents the eyewitness airplane.

The accident airplane was equipped with a cockpit voice recorder (CVR) installed in the aft fuselage that recorded all crew communications from the cockpit. The airplane CVR was equipped with an acoustic underwater locator beacon (ULB or pinger) to help locate it, with a required battery life of 30-days. The ULB would ping at a frequency of 37.5 kHz about once a second when submerged. The operator had installed an Appareo Vision 1000 airborne image recording system on the cockpit ceiling to record video of the cockpit during flight. The operator had also installed a SkyTrac ISAT-100A satellite communication transceiver to provide automatic, real-time flight following and a portable Stratus 2S ADS-B receiver was carried in the cockpit.



2.0 Search and Recovery

The search and recovery was a collaborative effort between OI, Guardian Flight, and the NTSB. Significant pre-operation planning was performed to define the search area and establish the water depth and current conditions with input from several state and federal agencies.

2.1 Scope of Work

The defined goals, in order of priority, were to locate the airplane wreckage on the seafloor, recover the crew members from the airplane, identify and recover the airplane CVR, Appareo Vision 1000, and SkyTrac ISAT-200A, and recover the major items of wreckage.

The pre-operation plan defined the following four phases.

Phase 1 – Reconnaissance survey. If required, a short bathymetric survey may be conducted from the vessel using a hull mounted multibeam echo sounder (MBES) to accurately map the depth contours and optimize the search plan.

Phase 2 - Locate the targets of interest. Autonomous underwater vehicles (AUVs) will be the primary search method using Side Scan Sonar. A Remote Operated Vehicle (ROV) can be used for specific infill if needed to search very complex terrain. Target identification will be verified visually using an ROV or AUV. A client provided pinger locator is planned to be installed on the ROV to aid in the search for the pinger located on the airplane CVR.

Phase 3 - Detailed data acquisition. Visual inspection using an ROV and additional AUV to collect 2D/3D high resolution data, and optional collection of AUV digital still camera images as needed.

Phase 4 - Recovery. Using ROV, vessel crane, and lifting baskets as needed for salvage operations. Recover the three crew members, data recorders, and the aircraft wreckage if required by client.

Based on prior aircraft accident investigation experience, it was expected that very little fuel, oil, or hydraulic fluid remained in the airplane due to water impact forces that likely fragmented the airplane and the fuel tank venting design. There were no known hazardous materials onboard the airplane during the flight. Provisions were made to capture any leaking materials once the wreckage was aboard the recovery vessel with absorbent mats.

2.2 Equipment

2.2.1 Survey Vessel

OI elected to utilize their highly advanced, multi-functional, offshore survey and salvage vessel *M/V Island Pride* for the operation (Figure 2). The vessel is normally used in geophysical survey, environmental sampling, salvage, and light construction. It is equipped with a diesel-electric power plant serving two main azimuth thrusters, one retractable thruster, and two tunnel thrusters. The vessel is equipped and certified according to IMO Class II for Dynamic Positioning. The vessel surpasses industry standards with regards to performance, and fully complies with requirements for energy efficiency and conservation.



Figure 2. OI survey vessel *M/V Island Pride* (OI photo)

2.2.2 Autonomous Underwater Vehicle (AUV)

The *M/V Island Pride* is permanently mobilized with six Hugin 6000 AUVs carrying a remote-sensing payload of MBES, side scan sonar (SSS), sub-bottom profiler (SBP), optional synthetic aperture sonar (SAS), turbidity sensor, conductivity, temperature, and density (CTD) sensor, magnetometer, and a stills camera (Figure 3). Three AUVs were used on this project, AUV 04, AUV 11 and AUV 15, with two in the water at a time. These vehicles have 85 hours of battery life and are depth rated to 6,000 m.

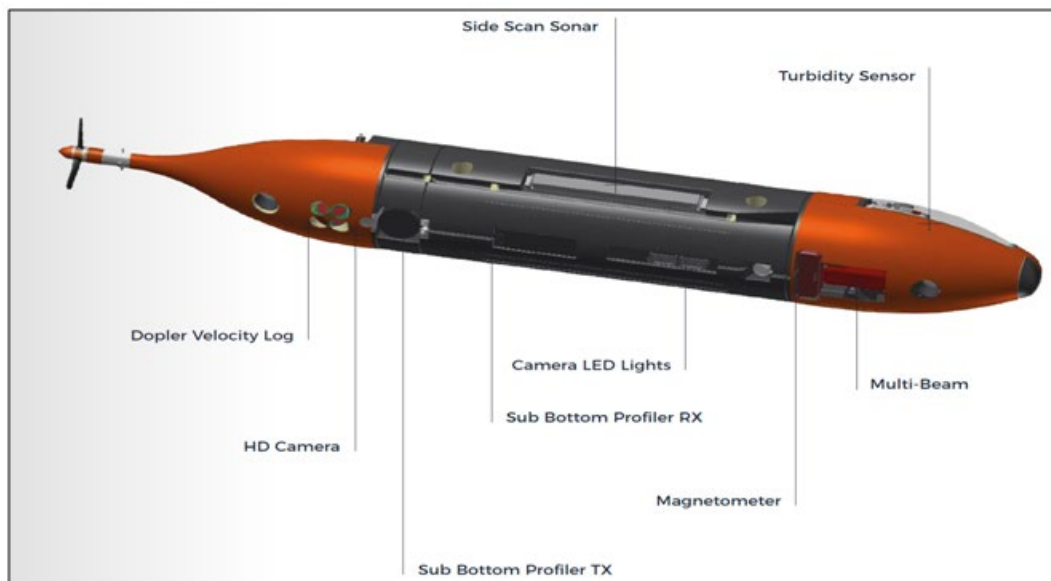


Figure 3. Hugin AUV - series 6000 (OI photo)

2.2.3 Remotely Operated Vehicle (ROV)

Ocean Infinity owns and operates two work-class ROVs onboard the *M/V Island Pride*. These heavy duty ROVs, denominated HD14 and HD15, are capable of operating down to 6,000 and 5,000 meters respectively (Figure 4). The Schilling Robotics HD system is an advance designed ROV that has the versatility to undertake subsea asset and positioning operations. The ROV is equipped with two manipulator arms, several cameras, and onboard sonar.



Figure 4. Schilling Robotics HD14 remotely operated vehicle (OI photo)

2.3 Search Operations

The *M/V Island Pride* arrived outside Honolulu around 06:00 HST on January 7, 2023. Guardian Flight, insurance company, and NTSB personnel were transferred to

the ship along with additional supplies before transiting to the search location. During transit it was decided to forego phase 1 and move immediately to the AUV survey in phase 2 since sufficient bottom contour data was received from various agencies prior to the operation. OI deployed a conductivity, temperature, and depth sensor to gather data for the operation prior to beginning phase 2.

Two AUVs were deployed on January 8 to begin the large area survey with side scan sonar in the vicinity of the last known position of the airplane. The survey covered an area of approximately 114 km² with water depths ranging between 1400 m and 2300 m. The AUVs utilized 75 kHz low frequency side scan sonar which gave a swath of 1200 m. Twenty lines with a line spacing of 500 m were designated to cover the survey area with 200% coverage. This reduced the chance of data gaps due to topography shadows and improved the chance of confirming target detection. The AUVs flew at an altitude of 60m above the seabed at a speed of 3.6 knots. Despite the varying topography and range of depths in the area the AUVs were able to complete all lines.

While the AUVs were performing their survey, the ROV was deployed several times at locations selected by the team based on the topography, current data, last known position of the airplane, witness information, and the position of debris and fuel on the ocean surface. The ROV, equipped with the vehicle acoustic directional receiver (VADR) pinger locator, examined six proposed locations. All six locations were examined with no detection of the CVR pinger (Figure 5).

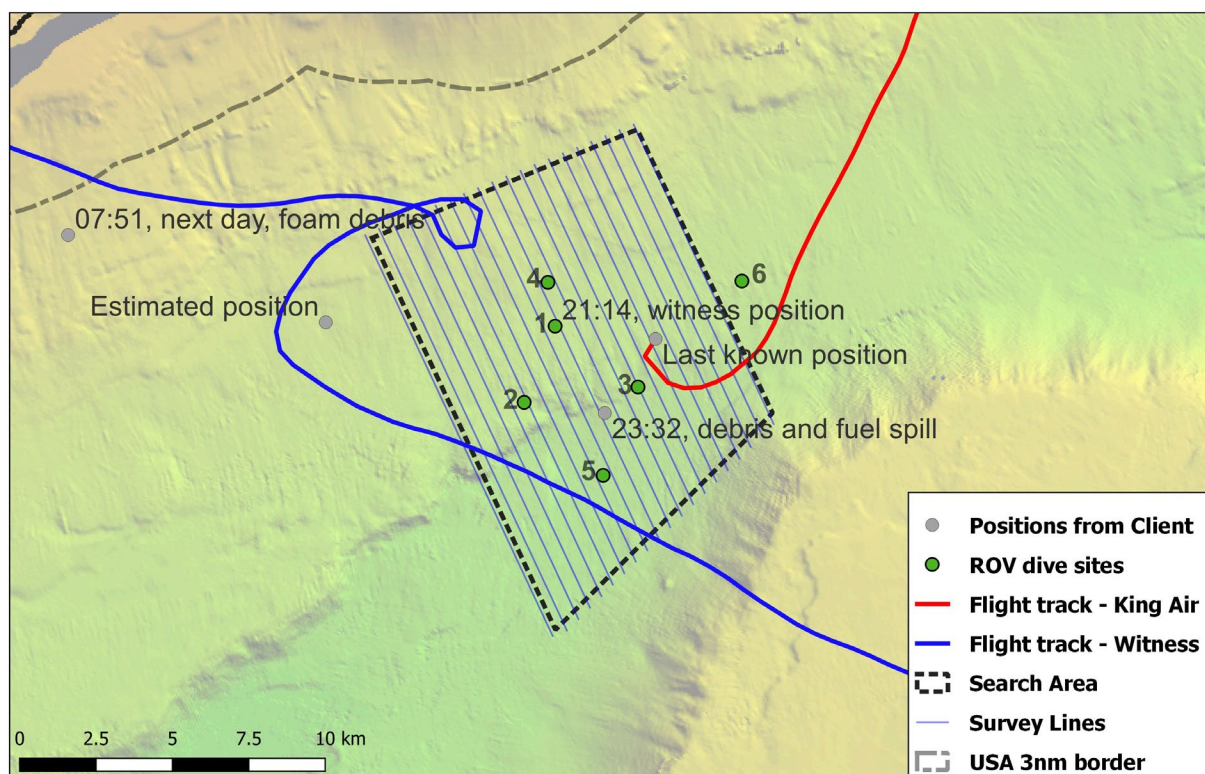


Figure 5. Map of search area and ROV dive sites (courtesy of OI)

During all operations the vessel mounted ultra-short baseline (USBL) high precision acoustic position (HiPAP) receiver was set to listen for emergency beacons EMA and EMB at 37.5 kHz. Weak signals were detected across the area, but the positions were deemed unreliable. During one of the transits a stronger, more consistent signal was detected, and it was decided to dive on that location. As a result, on January 9 at 05:30 HST the ROV located the airplane main wreckage on the seabed at a water depth of approximately 1960 m. The wreckage was found about 360 m south of the last known position from the flight track. The airplane was lying upside down, with the fuselage largely intact and both inboard wing sections still attached (Figure 6). The outboard wing sections, part of the tail section and both engines were separated.

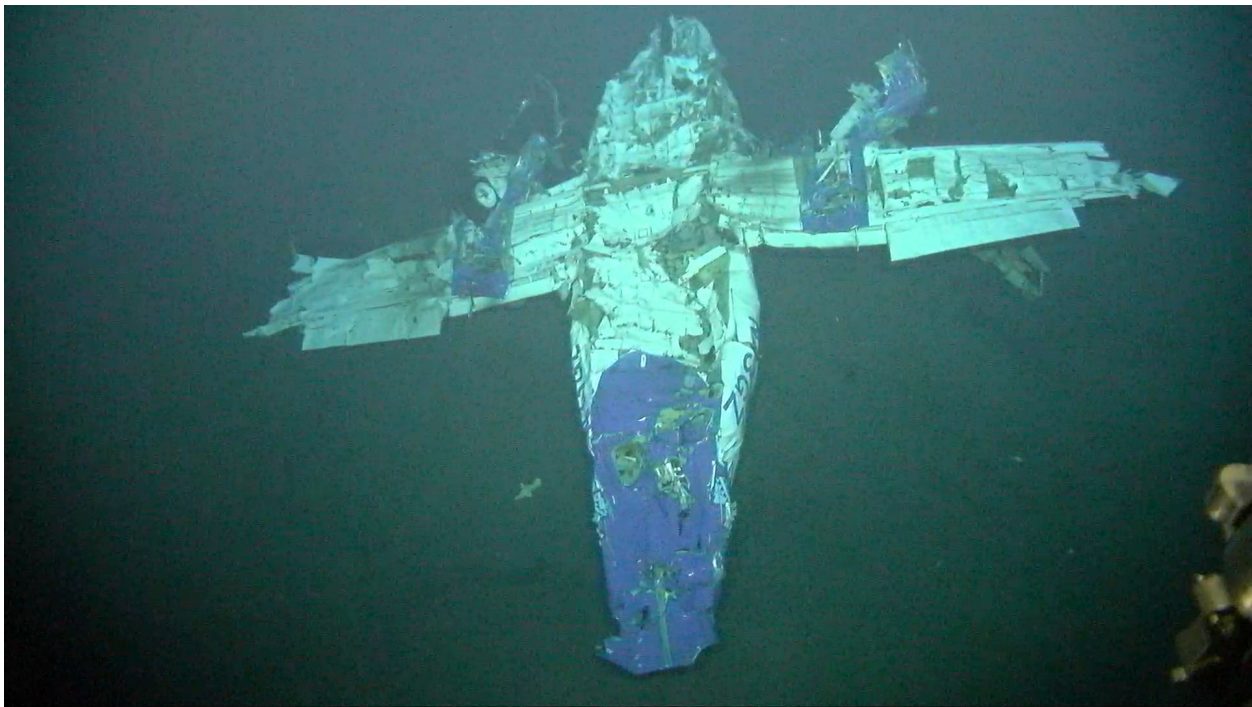


Figure 6. Airplane wreckage on the seafloor (OI photo)

The ROV performed a detailed visual inspection of the wreckage to assess the structural integrity of the fuselage in preparation for recovery (Figures 7 and 8). Examination of the underwater imagery revealed that the fuselage was mostly intact from the nose to the tail. The horizontal stabilizer, elevators, vertical stabilizer, and rudder were separated. The left and right wings were mostly intact but damaged from the roots out to beyond the end of the outboard flaps. The lower fuselage and lower surface of the wings had significant upward crushing damage. The nose and right main landing gear remained attached and were in the retracted position. The left main landing gear was separated and recovered by the USCG after the accident. Further ROV examination confirmed the presence of possible human remains inside the fuselage.

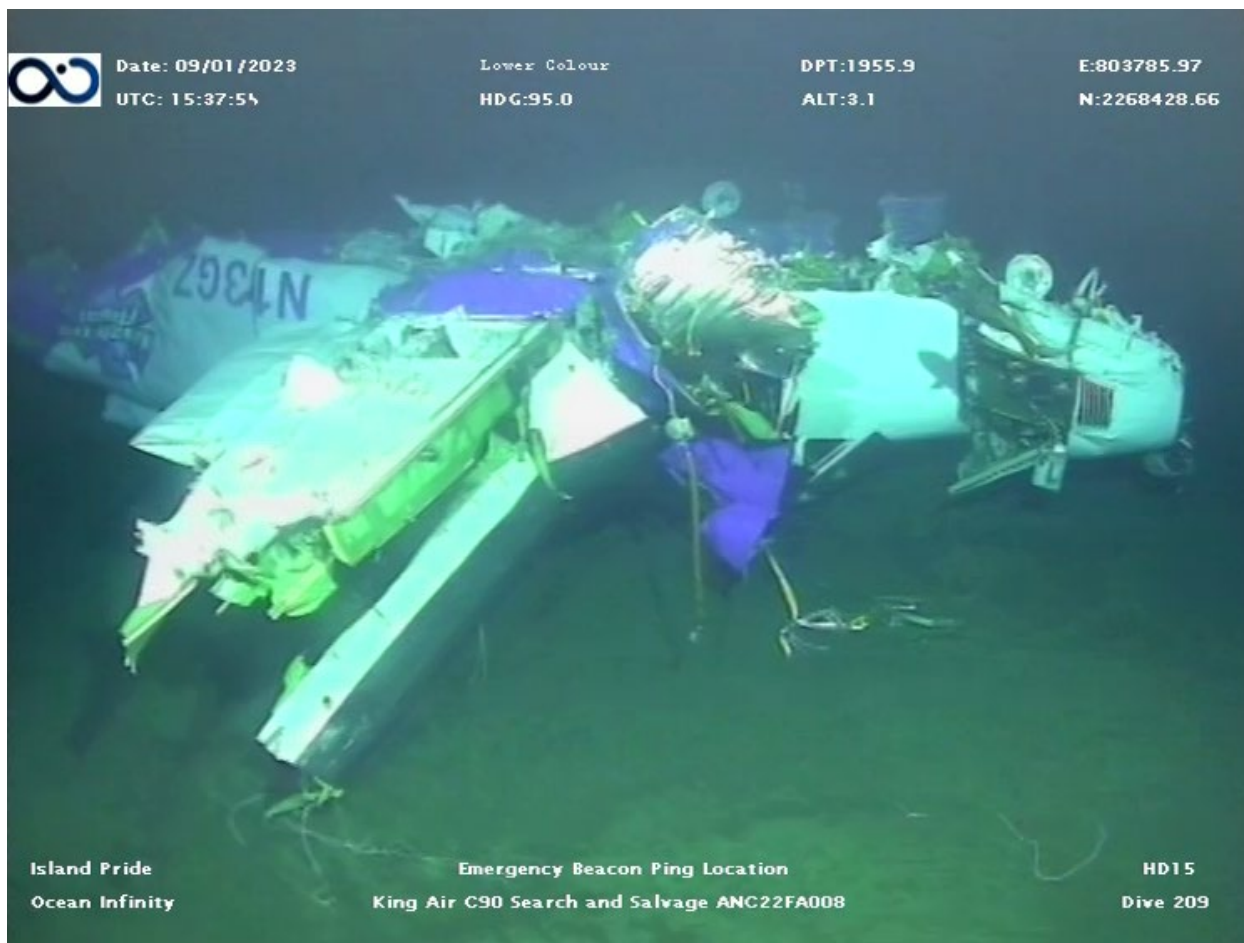


Figure 7. Airplane wreckage, left side (OI photo)

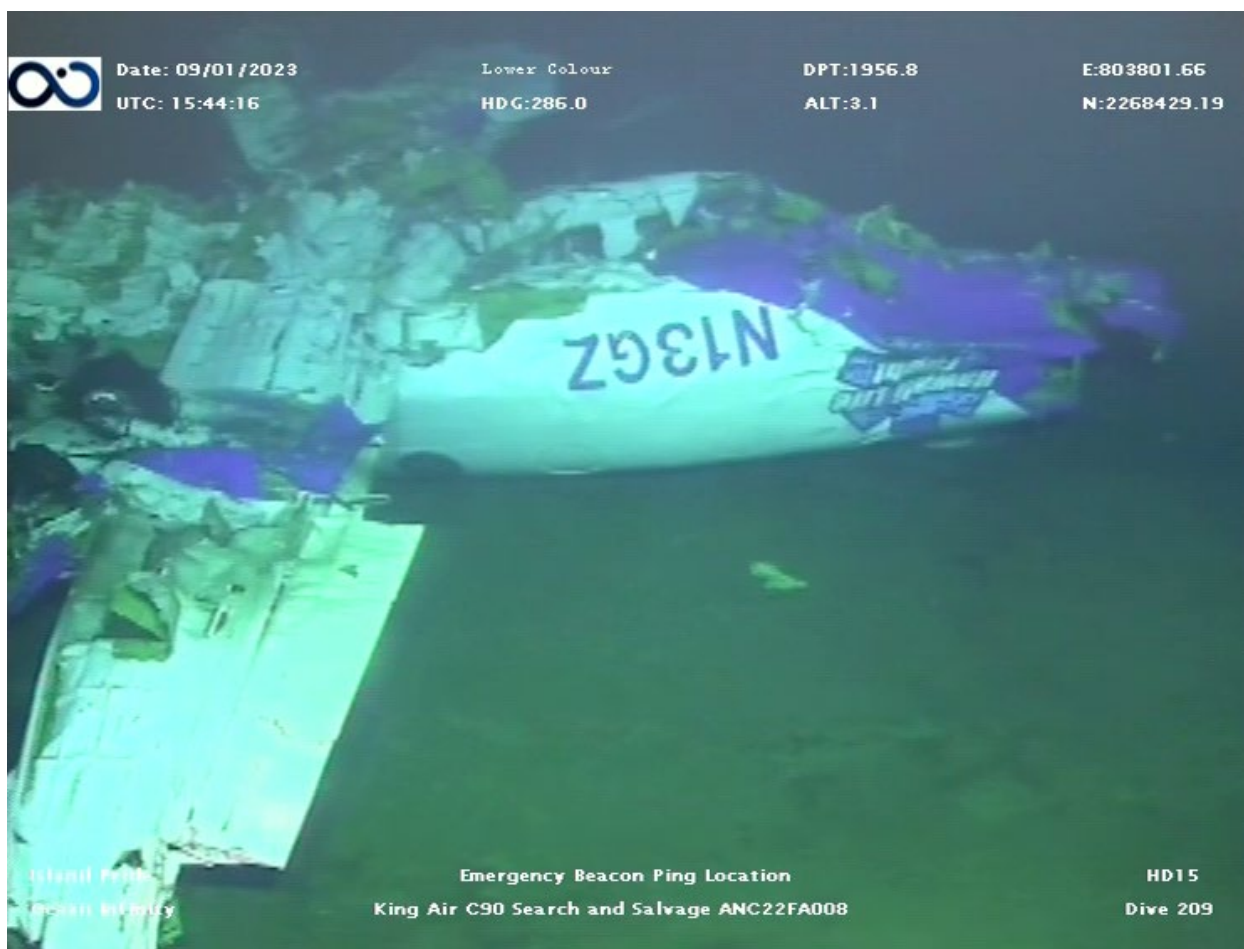


Figure 8. Airplane wreckage, right side (OI photo)

While the ROV was examining the main wreckage, the AUVs were recovered, and the side scan sonar imagery was reviewed. After the fuselage was inspected, the ROV inspected 16 Points of Interest (POI's) provided by the processed AUV side scan imagery. Of the 16 POI's identified and examined, one was the main wreckage, 2 were the airplane engines, and one was a portion of wing flap. The remaining 12 POI's were geologic features on the seafloor. See Attachment 1 for the details of the POI's. The ROV continued a systematic visual survey along a grid pattern with lines spaced at 10 m. The vehicle flew at low altitude utilizing all its cameras as well as the forward-looking sonar to locate any additional debris. During this search, further metallic airplane debris was identified.

2.4 Recovery Operations

The team decided to attempt the recovery of the complete fuselage and deployed a subsea basket with lifting straps and tools inside. The ROV rigged the wreckage using four wide webbed straps, one around each wing, one forward, and one aft on the main fuselage (Figure 9). The four-point lift maintained stability of the airplane and reduced the chance of the fuselage moving during the operation. Once

connected to the crane, the ROV monitored the lift from the seafloor to the surface. The main wreckage was lifted from a depth of about 1960 m at an ascent rate of 8 m/min on January 10. The crane operated in Active Heave Compensation mode ensuring the best possible stability and the *M/V Island Pride* was allowed to drift with the current to minimize the side loading. The lift was halted at 200 m depth and previously attached taglines were released by the ROV. The ship's Fast Rescue Craft (FRC) was deployed to stand by in case any debris or human remains escaped the fuselage as the water was draining in the final stage of the lift operation.



Figure 9. Airplane recovery lift strap orientation (OI photo)

The airplane fuselage was lifted slowly through the splash zone and held above the surface to allow for water to drain before continuing the lift onto the ship's back deck. In the final stages of water draining from the fuselage, a distinct fluorescent green hue was observed, forming a very visible layer on the water surface (Figure 10). The airplane's onboard survival kit included a life raft, dye pouch, and other survival equipment. The substance observed was consistent with the Fluorescein Dye Marker from the survival kit. The visible layer dispersed entirely within several minutes. There were no traces of any oily substances observed on the surface throughout the recovery operation.



Figure 10. Green dye on water during airplane recovery (OI photo)

The main fuselage was secured to the deck of the *M/V Island Pride* (Figure 11) and the CVR, SkyTrac, Stratus, and Appareo units were recovered from the airplane and secured in fresh water for transport to the NTSB lab.

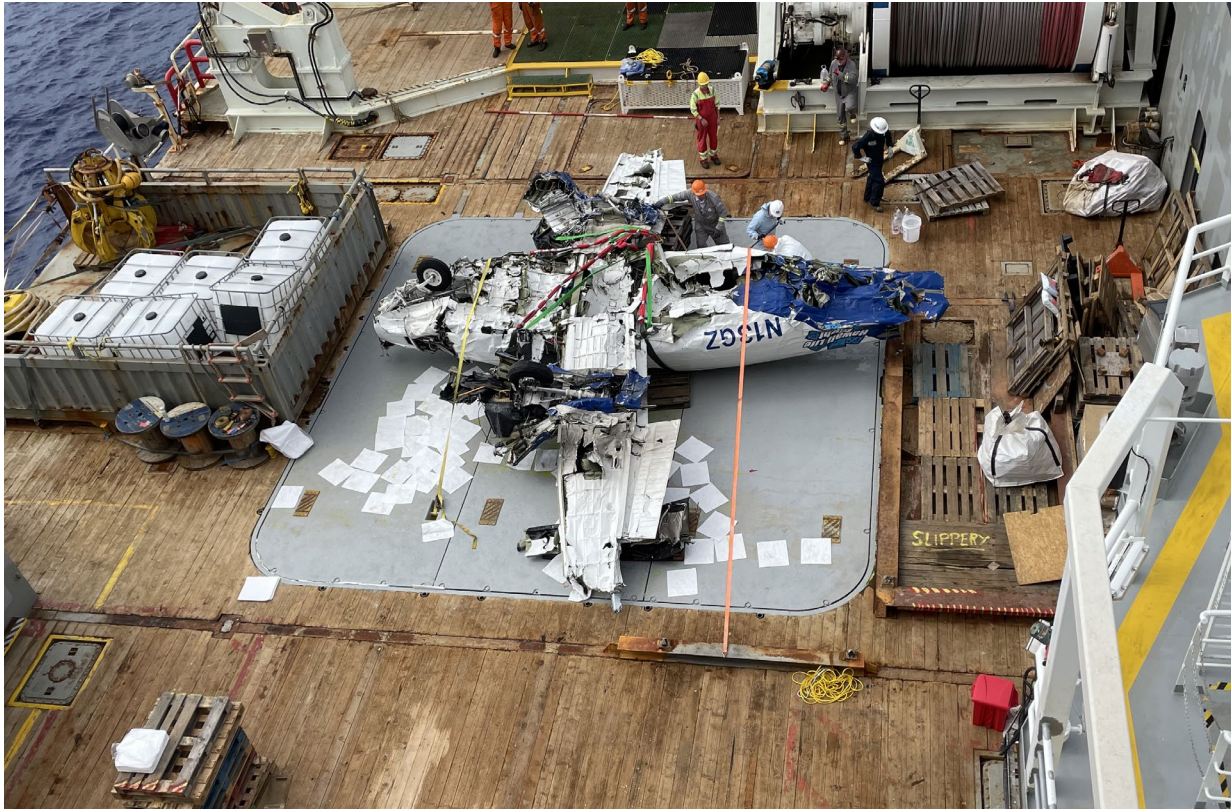


Figure 11. Main airplane wreckage secured to deck (OI photo)

The ROV was redeployed following the recovery of the main fuselage to recover both engines with attached propellers (Figure 12) and a section of wing flap identified in the AUV sonar data. The recovery operation was completed the afternoon of January 11 and the *M/V Island Pride* transited to Honolulu overnight. The airplane wreckage was offloaded to waiting trucks and Guardian Flight and NTSB personnel disembarked. The operation was completed about 14:00 HST January 12, 2023.

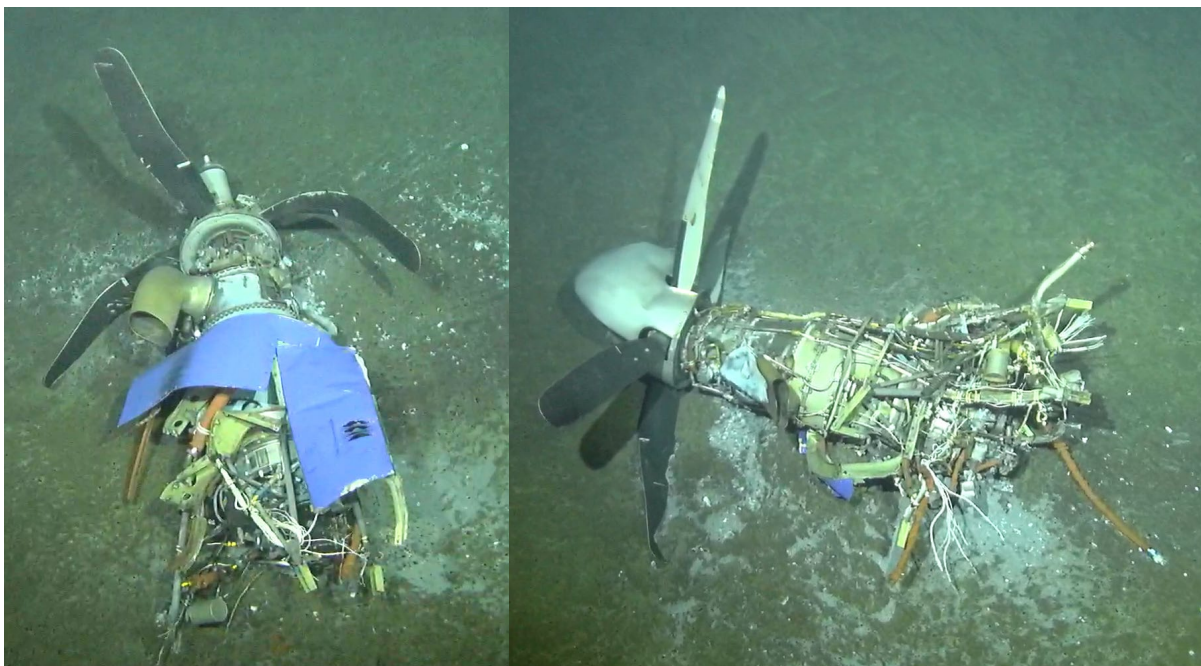


Figure 12. Airplane engines (OI photo)

2.5 Crew Member Recovery

The *M/V Island Pride* was outfitted with three chest freezers to properly store any remains recovered. Once the wreckage was secured on deck, the NTSB TDA Chief entered the airplane to document and extricate the crew members with assistance from the NTSB IIC and the ship's medic. The remains were placed into individual body bags and placed in the freezers. The remains were transferred to the Honolulu Department of the Medical Examiner at Honolulu Harbor - Pier 1 on January 12, 2023, about 0900 HST.

3.0 Federal and State Consultations

The group contacted several federal and state agencies following the accident to inform them of the wreckage recovery efforts and receive guidance on the requirements for Endangered Species Act (ESA), Essential Fish Habitat (EFH) and other environmental consultations. The contact was based on lessons learned from the TransAir 810 737 airplane wreckage recovery near Honolulu in October 2021.

3.1 US Coast Guard (USCG) Consultations

The NTSB was in contact with USCG Sector Honolulu immediately after the accident and throughout the planning, search, and recovery. The USCG responded to the probable accident location immediately after the accident with the CGC *William Hart* and a 45-foot Response Boat-Medium. They found a fuel sheen on the water and recovered some small items of floating debris.

Once the recovery operation was contracted and the schedule was set, the NTSB provided the details to the USCG on January 3, 2023. The USCG published and broadcasted the following Notice to Mariners and notified the Hawaii Department of Transportation and the Hawaii Pilots Association of the recovery operation. The broadcast notice was concluded on January 12, 2023.

HI ISLANDS - MAUI - SALVAGE OPS

Vessel Island Pride will be conducting salvage operations begin [sic] on January 7 through January 14. The work will be centered around the probable impact location at 20°30'00" N, 156°11'25" W, conducted in a circle radius of 10 nautical mile around this point. The search vessel will be doing some sonar work from the surface and will be deploying AUVs for the underwater work. The recovery operation will utilize an ROV and crane to recover the wreckage. For additional information, you may contact vessel Island Pride on marine radio VHF 16, or phone: (472) 239-8080. In the interest of safety, all vessels not involved in the above event are requested to remain clear of this area.

3.2 NOAA National Marine Fisheries Service (NMFS) - ESA Consultation

The NTSB made initial contact with NMFS on December 21, 2022, for ESA consultation and provided the probable location of the accident. The NTSB classified the search and recovery effort as an emergency response after consultation with NMFS. Under the ESA, as soon as practicable after the emergency is under control, the action agency (NTSB) initiates formal consultation with the NMFS if listed species or critical habitat have been adversely affected.

NMFS provided the following list of protected marine species in the Hawaiian Islands to include mammals, sea turtles, and fish. Additionally, areas in the Hawaiian Islands are listed as critical habitat for ESA-listed Hawaiian monk seals and Hawaiian insular false killer whales.

- Blue Whale - Endangered
- False Killer Whale - Hawaiian Insular - Endangered
- Fin Whale - Endangered
- North Pacific Right Whale - Endangered
- Sei Whale - Endangered
- Sperm Whale - Endangered
- Hawaiian Monk Seal - Endangered
- Central North Pacific Green Sea Turtle - Threatened
- Hawksbill turtle - Endangered
- Leatherback Turtle - Endangered
- North Pacific Loggerhead Turtle - Endangered
- Olive Ridley Turtle - Threatened
- Giant Manta Ray - Threatened

3.2.1 ESA Best Management Practices

NMFS provided best management practices (BMPs) for protected species in pre-operation ESA consultations similar to those provided for the TransAir recovery. The BMPs were implemented at all times to the extent practicable. The BMPs provided are listed below with a response as to how each was addressed during the operation.

- 1) All workers associated with this project should be fully briefed on these BMPs and the requirement to adhere to them for the duration of their involvement in this project.
RESPONSE: The NTSB provided the BMPs to OI prior to the operation. The BMPs were supplied to all crew members on the *M/V Island Pride*, discussed with everyone prior to the operation, and reiterated in daily meetings throughout the operation.
- 2) Constant vigilance by an observer should be kept for the presence of any ESA-listed marine species during all aspects of the proposed activities.
RESPONSE: There was no dedicated observer onboard the *M/V Island Pride*. Each member of the crew was responsible to act as an observer along with NTSB and Guardian flight personnel. No ESA-listed marine species were observed in proximity to the operation at any time. There were some sightings of unidentified whales and turtles well in excess of 50 m from the vessel during transit.
- 3) All work should be postponed or halted when ESA-listed marine species are within 50 meters of the proposed work and should only begin/resume after the animals have voluntarily departed the area.
RESPONSE: No ESA-listed marine species were observed in proximity to the operation at any time.
- 4) When piloting vessels, vessel operators should alter course to remain at least 50 meters from marine mammals and sea turtles.
RESPONSE: No ESA-listed marine species were observed in proximity to the vessel at any time. There were some sightings of unidentified whales and turtles well in excess of 50 m from the vessel during transit.
- 5) Reduce vessel speed to 10 knots or less when piloting vessels at or within the ranges described above from marine mammals and sea turtles. Operators should be particularly vigilant to watch for turtles at or near the surface, and if practicable, reduce vessel speed to 5 knots or less.

RESPONSE: No ESA-listed marine species were observed in proximity to the vessel at any time. There were some sightings of unidentified whales and turtles well in excess of 50 m from the vessel during transit.

- 6) Marine mammals, sea turtles and other ESA-listed motile species should not be encircled or trapped between multiple vessels or between vessels and the shore.

RESPONSE: No ESA-listed marine species were observed in proximity to the vessel at any time. There were some sightings of unidentified whales and turtles well in excess of 50 m from the vessel during transit.

- 7) Do not attempt to intentionally interact with any ESA-listed marine species.

RESPONSE: No ESA-listed marine species were observed in proximity to the vessel at any time. There were some sightings of unidentified whales and turtles well in excess of 50 m from the vessel during transit.

- 8) The project manager and heavy equipment operators should perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations shall be postponed or halted should a leak be detected and should not proceed until the leak is repaired and equipment cleaned.

RESPONSE: OI standard procedures call for detailed inspection of all equipment each day and prior to operation. No leaks or other issues were detected.

- 9) If the salvaged sections of the aircraft cannot be transported and defueled at a safe location on land, place absorbents around the edge of the barge to make sure fuel products do not return to the ocean.

RESPONSE: Visual inspection of the wreckage on the seafloor confirmed that the wing fuel tanks were breached during the accident and the engines separated from the wings. There was no observed fuel/oil sheen noted on the water surface during the recovery. Absorbent pads were placed around the wreckage once on deck.

- 10) Prepare a plan for how the transfer of fuel products is expected to occur and what contingencies will be taken in the event of unforeseen circumstance (i.e. if a spill occurs and respective clean up) or in the event of leaking or debris loss during the retrieval and what steps will be taken for fuel recovery.

RESPONSE: No fuel remained on the airplane due to accident damage. The *M/V Island Pride* spill response plan was in place for the operation. The FRC was deployed during recovery to retrieve anything dislodged from the wreckage during the lifting operation. No fragments of the wreckage or other items were lost and no spill occurred during the lifting operation.

- 11) Ensure any basket lids are securely closed during deployment and retrieval, and that ESA-listed animals do not become trapped within while baskets are in-water.
RESPONSE: Salvage baskets used did not have lids. The ROV observed the baskets prior to lifting. No ESA-listed marine species were observed in proximity to the operation at any time.
- 12) Keep any retrieval cables and ROV lines as taut as practicable and deployed only as long as needed to properly accomplish the required task.
RESPONSE: The weight of the wreckage and baskets kept the cables taut during deployment and retrieval. The ROV tether and winch cable were only minimally slacked to support operations.
- 13) Use any ROV cameras, if available and practicable, to ensure no presence of ESA-listed species in and around large debris pieces prior to lifting.
RESPONSE: The ROV thoroughly inspected the wreckage with multiple cameras prior to and during retrieval. No ESA-listed marine species were observed in proximity to the operation at any time. Some small fishes and invertebrates were observed in and around the wreckage prior to recovery but most exited the area during recovery.
- 14) If an observer determines an ESA-listed individual has been disturbed, harassed, harmed, injured, or killed, report to NMFS within one business day to ron.dean@noaa.gov.
RESPONSE: No ESA-listed marine species were observed, disturbed, harassed, harmed, or killed at any time during the operation.

3.2.2 ESA Response

On February 21, 2023, the NTSB submitted an ESA/EFH After Action Report to NMFS. The ESA/EFH report concluded the recovery of the King Air C90A airplane from the seafloor south of Maui did no harm to ESA-listed marine species. There were no ESA-listed species observed in proximity to the operation at any time. NMFS responded on February 21 that there was no after-the-fact consultation required under the ESA since no ESA-listed resources were adversely affected.

3.3 NOAA NMFS - EFH Consultation

The NTSB made initial contact with the NMFS Pacific Islands Regional Office on December 23, 2022, for EFH consultation and provided the probable location of the accident. In follow up conversations after the contract was executed, the NTSB provided NMFS with the scope of work for the operation on January 3, 2023. There was insufficient time to complete an EFH consultation before the scheduled beginning of the operation, so the NMFS provided a list of BMPs to minimize or avoid

impacts to EFH in the project area. They also requested a report of the operation after completion to conduct an after-the fact consultation.

3.3.1 EFH Best Management Practices

BMPs for essential fish habitat were provided by NMFS in pre-operation EFH consultations. The BMPs were implemented at all times to the extent practicable. The BMPs provided are listed below with a response as to how each was addressed during the operation.

- 1) Prevent trash and debris from entering the marine environment during the project.
RESPONSE: No additional trash or debris entered the marine environment during the operation that was not part of the airplane wreckage. It is likely that small chips of paint, water-soaked insulation fragments, and small pieces of wreckage dislodged into the water during the recovery. The entire airplane was not recovered from the seafloor as portions had separated during impact. The operation recovered all debris identified.
- 2) Maintain all structures, gear, instrumentation, mooring lines, and equipment to prevent failures.
RESPONSE: OI standard procedures call for detailed inspection of all equipment each day and prior to operation. No leaks or other issues were detected.
- 3) In order to minimize malfunction, prior to operations employing submersibles, a pre-deployment test of all operating systems should be run to ensure that equipment is operating correctly, there are no visually apparent physical defects, and conditions are conducive to operations.
RESPONSE: OI standard procedures call for detailed inspection of AUVs and ROVs prior to operation. The vehicles passed inspection prior to each deployment.
- 4) Prevent discharges or chemicals and other fluids dissimilar from seawater into the water column.
RESPONSE: During recovery a distinct, fluorescent green substance was discharged into the water. Observation and research indicated the substance was SAR Fluorescein Dye Marker from the airplane survival kit. The MSDS was attached as B to the report.

- 5) Ensure all equipment and boats used in the marine environment are free of contaminants and invasive species prior to use.

RESPONSE: OI standard procedures call for detailed inspection of the ship's Fast Rescue Craft (FRC), AUVs and ROVs prior to operation. The vehicles passed inspection prior to each deployment. As part of this inspection the FRC is checked for pooled water and pollutants within the bilge. The AUVs and ROVs are cleaned with fresh water after each dive.

3.3.2 EFH Response

On February 21, 2023, the NTSB submitted an ESA/EFH After Action Report to NMFS. The ESA/EFH report concluded the recovery of the King Air C90A airplane from the seafloor south of the Maui coast imposed only minimal, temporary, or short-term effects to EFH. There was minimal disruption to the seafloor and no impact to sensitive habitat.

NMFS responded on February 28 with an after-the-fact EFH consultation pursuant to Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act. The consultation concluded there were likely adverse affects to EFH and the adherence to the BMPs ensured those adverse affects would be no more than minimal. NMFS stated that no additional conservation recommendations were warranted for the operation.

3.4 US Fish and Wildlife Service (USFWS) Consultation

The NTSB made initial contact with the USFWS Pacific Islands Fish and Wildlife Office on December 21, 2022, and provided the probable location of the accident. The USFWS concurred with the recommended BMPs provided by NMFS but did not require any additional practices or follow up reporting for the operation. On February 21, 2023, the NTSB submitted the ESA/EFH After Action Report to USFWS.

3.5 State of Hawaii Consultation

The NTSB made initial contact with the State of Hawaii, Department of Health, Hazard Evaluation, and Emergency Response Office (DOH) on December 21, 2022, and provided the probable location of the accident. Hawaii DOH provided contacts at the US Navy that were able to assist with depth and current information at the accident location. On January 3, 2023, DOH provided the following additional information to supplement the BMPs provided by NMFS.

- No reef coral issues at the depth of 6000 feet for most Hawaiian black (Antipathes) and red (Corallium) corals. They do not occur at those depths.
- Fisheries at the accident location would be the regulated bottom fish species (Snapper, Grouper, etc.).

- ESA species in those waters include Humpback whales and other marine mammals in the water column.
- The location is beyond the published benthic foraging depth for monk seals.
- There are possible ESA turtles in surface waters (greens, hawksbills, possibly leatherback) but benthic habitat is outside foraging depths.

They requested updates on the progress of the search and recovery. On February 21, 2023, the NTSB submitted the ESA/EFH After Action Report to Hawaii DOH.

3.6 Customs and Border Protection (CBP) Consultation

On January 3, as the *M/V Island Pride* was enroute to Hawaii, the local Hawaiian agent for Ocean Infinity informed the NTSB that coordination with CBP was required for the search and recovery operation to ensure the operation was in compliance with the Salvage Act and the Jones Act. The Salvage Act, as codified in 46 U.S.C. § 80104, requires that vessels performing salvage operations on the Pacific coast or in U.S. territorial waters must not be foreign flagged vessels. The *M/V Island Pride* was a Norway flagged vessel. The Jones Act, as codified in 46 U.S.C. § 55102, prohibits the use of foreign flagged vessels for the transportation of merchandise between points in the U.S. to which the coastwise laws apply. The airplane wreckage was located 8-10 miles off the southern coast of Maui on the outer continental shelf (OCS).

The Group Chair, NTSB Office of General Counsel, OI representative, and insurance company representative met with CBP on January 6 to discuss the search and recovery operation. Following the meeting, CBP provided an informal analysis on the applicability of the Salvage Act and Jones Act to the proposed operation based on previous interpretations and rulings. It had been established in past cases that the U.S. territorial waters extend 3 miles from the U.S. coast. Since the accident airplane wreckage was 8-10 miles from the coast of Maui, this was not considered territorial waters and the Salvage Act prohibition did not apply. The airplane wreckage was located on the OCS but was not affixed to the seafloor for exploration, development, or production. Past cases had established that the wreckage would not be considered a coastwise point and the Jones Act prohibition on transportation did not apply.

4.0 Evaluation of Habitat

The seafloor observed during operations appeared to be vast expanses of low relief (<1 m) substrate with shallow sand and/or sediment on top of hard rock bottom with infrequent visible life. No sensitive complex habitats or corals were observed.

No anchors were deployed by the *M/V Island Pride* throughout the operation. Examination of the main wreckage location and basket locations after lifting revealed

minimal disturbance to the seafloor. See Attachment 1 for representative photos of the seafloor and geologic targets. During the operation a shark was observed (Figure 13). The image was shared with Dr. Kim Holland from the Shark Research Lab at the Hawaii Institute of Marine Biology and Markus Horning from Wildlife Technology Frontiers in Alaska who indicated it was most likely a Pacific Sleeper Shark.



Figure 13. Shark observed during operation (OI photo)

5.0 Flight Recorder Recovery and Shipment

NTSB investigators were able to access the flight recorders once the wreckage was secured onboard the *M/V Island Pride*. The Fairchild A100S CVR was located in the aft fuselage and remained installed in the rack, which was partially separated from the fuselage. The CVR had some deformation to the case. The Appareo Vision 1000 unit remained attached to the cockpit ceiling but was damaged. The SkyTrac ISAT-200A was recovered from the avionics bay in the nose and the Stratus S2 was found loose in the cockpit. The CVR, Appareo unit, Stratus, and SkyTrac units were placed in two 5-gallon containers and submerged in distilled water for shipment to the NTSB lab in Washington, DC (Figure 14).



Figure 14. Recovered flight recorders as packaged (NTSB photo)

The NTSB Special Operations group coordinated the transport of the flight recorders as checked baggage with the NTSB TDA Chief. The NTSB met the inbound flight at Washington-Dulles International Airport and retrieved the two containers with the recorders.

E. LIST OF ATTACHMENTS

1. Attachment 1 - OI Points of Interest ID Sheet

Submitted by:

Clinton R. Crookshanks
Aerospace Engineer (Structures)
Aviation Engineering Division