



RECORD OF CONVERSATION

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Persons Contacted: Nathaniel Johansson, Pilot

NTSB Accident Number: ANC21LA006, N400PW PC-12

Narrative: Mr. Johansson was the pilot-in-command during the PC-12 ditching in the Pacific Ocean that occurred on November 6, 2020. He was interviewed by telephone. This is a summary of his statements.

Mr. Johansson provided a description of his aviation background that included time as a flight instructor and a ferry pilot. He enjoyed the challenges of flying different airplanes to different areas and all the regulatory research and compliance that was required. He learned to respect safety and technical knowledge after a frightening first solo flight experience when he was a teenager. He did most of his advanced flight training at American Flyers in California, where he met Kelly Michaels (the copilot). He began his Johansson Aviation LLC ferry service company in 2014. He also attended college at that time. He began flying for PSA airlines as a first officer in 2018 and obtained FAR part 121 flight experience. He appreciated the great level of training and crew resource management. In early 2020 he was furloughed from the company due to the Covid 19 economy.

In mid-2020, he was hired to ferry the PC-12 from California to Australia by the airplane's new owner. Mr. Johansson had ferried an SR-22 for the owner before and it went very well. Mr. Johansson asked pilot Kelly Michaels to fly with him because she was an excellent pilot with much PC-12 time and was very technically proficient. They attended PC-12 NGX training at Simcom Aviation in Arizona, which included 5 days and 20 hours of simulator training. He and Ms. Michaels ran through all the normal and emergency checklist per the SIMCOM syllabus, including multiple air starts, overweight takeoff and performance operations and a water ditching per their request. The simulator was a static model. One CAS message and emergency that was not covered was the EPECS FAIL procedures, which in hindsight he wished they had done. Following approval by the aircraft owner and aircraft manufacturer, Pilatus, Mr. Johansson ~~also~~ contracted Mr. Fred Sorenson of Flight Contract Services at the North Las Vegas Airport to engineer, approve, and install an internal ferry fuel system for the journey. Mr. Sorenson was recommended by various pilots in the ferry industry.

Mr. Johansson and Ms. Michaels first flew the accident airplane first from McMinnville, Oregon, to Hillsboro Airport, Oregon, where Aero Air, a Pilatus approved repair station modified a fuel pump in accordance with an airworthiness directive (AD). Following the maintenance, the crew was to reposition

from Hillsboro to North Las Vegas airport. During that flight on October 6th, they had a right fuel quantity fault indication, which could not be duplicated on the ground. The aircraft was approved by Aero Air to continue to North Las Vegas. Later that evening they flew to North Las Vegas Airport where the ferry fuel system was to be installed. The right fuel quantity indicator fault occurred again, and a Pilatus approved technician fixed that in Las Vegas. Mr. Sorenson described the first ferry system installed to have two tanks with valves that fed the left main fuel tank. Mr. Sorenson provided a checklist for use and operating guidance. Mr. Sorenson stated that all the required FAA paperwork was done. Mr. Johansson understood that Pilatus and the airplane owner were also involved in the design or approval of the installed system.

On November 1 they repositioned the airplane to Santa Maria Airport (SMX). During that leg, they could not transfer any fuel from the ferry tanks to the main tanks per their ferry transfer check procedures, so they contacted Mr. Sorenson by phone upon landing at SMX. He ensured them that the system would work if they disable the main boost pumps during ferry transfers by pulling the two boost pump circuit breakers. The following morning on November 2 they departed for Hilo Airport (PHTO) and performed the ferry system check which still did not satisfy the pilots. After contacting Mr. Sorenson via voice and text satellite communications, the crew elected to return to California. Mr. Sorenson instructed them to divert to Merced Airport, California, for inspection, repair, or modification. There, Tom Lopes of Gateway Air Center modified the system by installing 2 transfer pumps per his communications with Mr. Sorenson. During a ground run after the ferry system was modified, a line to a transfer pump began to leak, so the crew shut down the airplane. Mr. Johansson cancelled the mission for that day because he wanted the whole ferry system defueled and inspected again, and for all parties involved to rest and re-approach the issue on the same page with clear communication. Mr. Sorenson arrived on site by November 5th and worked all day directly with Pilatus technicians through multiple phone and email exchanges. There was now a better understanding of the fuel system which contrary to Mr. Sorenson's initial description to the pilots, required 25 PSI to open a check valve and fed directly to the engine feed line, not the left main tank. The crew had a successful ground test of the system and Mr. Sorenson advised them that all existing paperwork was sufficient to include the modification made. No new approvals were required, and the aircraft was airworthy according to Mr. Sorenson.

On November 6, once the airplane was returned to service, they flew from Merced to SMX and tested the ferry fuel transfer process with both the front and rear internal tanks and both transfer pumps up to an altitude of 17,500 ft. The system worked properly. They refueled at SMX and departed for Hawaii about 1000.

During the ocean crossing flight, the internal transfer system worked well. Mr. Johansson and Ms. Michaels followed the checklist and guidance provided by the ferry system installer. They burned off the main tanks from full (402 gallons) down to 300 gallons, then activated the ferry system transfer process. The internal ferry fuel was plumbed to the Pilatus factory fitting, which directed ferry fuel directly to the engine. Fuel is sent to the engine in excess of what the engine requires. All unused fuel is returned to the main tanks. They did get a "FUEL IMBALANCE" caution light occasionally, but that was expected as excess transfer fuel was sent back to the main tanks after passing through the engine. Ms. Michaels managed the internal fuel tank operation in the cabin area. Successful transfer was demonstrated from the front and rear tanks with each transfer pump.

About 3.5 to 4 hours into the flight, the airplane was light enough to climb from FL 200 to FL 280. The rear internal tank had reached almost empty and they planned to get it as low as possible without porting air into the fuel system. The new NGX model did not have a fuel/air separator in the system. They needed to use all of the usable fuel for the long 10 hour flight, and the ferry system was designed to use "all" of the fuel and approval instructions were to deplete ferry fuel from the cabin as soon as possible. They picked up a tailwind and were right on schedule with their flight planning per oceanic planning cross

checks. They used calculations to time the end use of the rear fuel tank. The tanks were aluminum, and the fuel level sight gages were difficult to read. Ms. Michaels used a flashlight to watch the fuel in a clear tube line to the bulkhead connection to make sure it was filled with fuel, and she shut off the transfer process before the rear tank fuel was exhausted. About 5 or 10 or 20 seconds after that, (Mr. Johansson wasn't sure exactly how much time passed) the CAS "FUEL LOW PRESSURE" light illuminated. He had already placed the IGNITION switch to on during the ferry transfer, and now set the two aircraft BOOST PUMPS to the "ON" position for the end of transfer process. He instantly confirmed the pumps were ON with the two green "PUMP PUMP" CAS message and green "IGNITION" messages. About 5 seconds after the low pressure light illuminated, the engine surged and then completely shut down and feathered. He commenced a rapid emergency descent because they were losing pressurization. Ms. Michaels came back to the cockpit and they commenced the emergency checklist for Engine Failure In Flight from the POH.

He and Ms. Michaels used the checklist to perform an air start. The engine started and the propeller unfeathered; however, the engine never reached idle rpm and manipulation of the power control lever did not affect the engine. The engine would not fully start. The crew shut off the engine per the checklist and they attempted another air start. During the next start sequence, the engine made a loud grinding noise and then a loud catastrophic "bang." There was no evidence of smoke or flames from the exhaust on either side of the aircraft. The CAS panel lit up. At some point, the EPECS FAIL light illuminated, but he could not recall exactly when. As the airplane descended, they attempted multiple air starts, including the procedures for an EPECS FAIL light on. The propeller never moved, and the engine never started. About 8,000 ft, they committed to ditching the airplane and they commenced the ditching checklist.

Mr. Johansson and Ms. Michaels each, one at a time, went to the back of the airplane to prepare the survival gear. They each donned a life vest. They had a 6 man raft onboard that he was delivering to Pilatus Australia, and they prepared it for deployment. He made mayday calls on the VHF radio because the HF radio was not powered without the generator. He spoke with an Alaska Airlines crew on guard (121.5) frequency and provided a position for ditching.

Mr. Johansson performed a gear up, full flap landing at an angle to the direction of the ocean swells, roughly into the wind. The swells were about 5 to 10 ft high with 20 ft between the crests. The airplane touched a crest with the tail, then it impacted the next crest with the tail first. He held back pressure on the control column as the airplane settled into the water. Ocean spray never hit the window screen. He had Ms. Michaels finish securing the airplane as he went to the cabin and opened the right over wing exit. He deployed the raft and put the survival pack in it. They had a satellite phone, and marine VHF radio, and PLB/EPIRB, and life raft ELT, thermal blankets, food, and water. He was wearing shorts and a short sleeved shirt because he wanted to be comfortable for the long flights. Ms. Michaels entered the raft. The airplane stayed upright floating on the surface. They pushed away from the airplane and it stayed insight for about 30 minutes. He was not sure if it sunk or they travelled too far to see it. His satellite phone (Iridium Go model) had limited calling capability, but he was able to text through his connected mobile phone. He called Oakland Center and asked for a telephone number to text to for rescue purposes. He then coordinated via text until the unit died during the night for unknown reasons, possibly water damage.

About 4 to 5 hours later, during the night, a USCG C-130 was overhead, and they coordinated with a nearby oil tanker M/V Ariel on channel 16. Mr. Johansson was unable to transmit on the radio which was equipped with Digital Selective Calling (DSC). The use of the SOS DSC function earlier on had depleted the battery on the VHF such that no transmissions could be made, but they could hear nearby radio traffic on VHF 16. The M/V Ariel made multiple fast passes by the raft, and sometimes looked like it would hit the raft, and threw down lines for them to grab. Mr. Johansson and Ms. Michaels could not grab the lines due to the speed. The ocean waves and wind were getting worse. Mr. Johansson signaled to the Ariel that

they did not want any more attempts until sunrise. He crossed his arms across his chest. It was too dangerous.

He closed up the top cover of the raft and they waited for the USCG to come. The waves and wind became worse and occasionally waves went over the raft, but they never overturned. The raft was covered and had a good sea anchor which provided much needed stability. After a while, the ocean calmed down. They heard a loud horn, opened up the cover and saw the M/V Ariel coming straight for the raft. Mr. Johansson was able to source two new out of the 6 required AAA batteries for the VHF radio. It gave him just enough power to make one transmission: "Ariel this is the life raft. Thank you for your attempts but they are too dangerous, we prefer to wait for USCG assistance." The Ariel called the raft on channel 16 and said that the USCG was not coming and that the Ariel was their only hope at rescue, "follow our directions." This was very upsetting to Mr. Johansson because the previous attempts were very dangerous. The weather conditions were getting worse, again, but at least it was daytime. They were able to catch a line and tie the raft to it, then the crew yelled down for them to "jump, jump!" Both Mr. Johansson and Ms. Michaels jumped onto lines being held by boat crew members, but instead of being pulled up, they were dragged through the ocean as the ship motored forward. He saw Ms. Michaels being dragged under the water and he was losing his breath struggling. The lines were not pulled in by the crew, so Mr. Johansson let go and was able to get back in the raft and help Ms. Michaels back into the raft. Another ship, the container ship M/V Horizon Reliance, was also in the area, and they offered to try because they had done rescues before. That ship stopped and maneuvered slowly to the raft with it on the leeward side of the ship. When it became close, the crew shot rope cannons at them and they were able to pull on them to get to the ship's side while it was stopped in the water. They were assisted into the ship and delivered to Hawaii a few days later. They had been in the survival raft for 22 hours. Mr. Johansson was very grateful to be alive.

When asked what he thought may have caused the engine flameout or the failed restart, Mr. Johansson suggested that perhaps air, debris, or ice was introduced into the fuel line, and the system did not have a fuel/air separator. Or perhaps when the ferry transfer was closed the main fuel tank lines did not properly re-supply the engine. Also, there was no manual override of the engine controls and start sequence. They could not see what the electronic system was doing and could not override it at all. He stated that the simulator training that they did before the flight was very helpful, but he wished they had provided an EPECS failure scenario.