

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



ANC23FA008

COMMUNICATIONS MODULE

Specialist's Factual Report

May 30, 2023

A. ACCIDENT

Location: Kaupo, HI
Date: December 15, 2022
Time: 21:14 Hawaii-Aleutian standard time (HST)
Aircraft: Raytheon Aircraft Company C90A, Guardian Flight LLC, N13GZ

B. COMMUNICATIONS MODULE SPECIALIST

Specialist: Sean Payne
Branch Chief - Vehicle Recorder Division
National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

A recorded flight data group was not convened.

The NTSB Vehicle Recorder Division received the following electronic device:

Recorder Manufacturer/Model: Skytrac ISAT-200A
Part Number: 101-200-07
Recorder Serial Number: 40902

1.0 SkyTrac ISAT-200A Description

The SKYTRAC ISAT-200A is a GPS and Iridium® transceiver that facilitates real-time fleet awareness, group communications, and systems performance trending and analysis. The ISAT-200A is integrated with SKYTRAC's SkyWeb, a cloud-based data management portal. SkyWeb extends access to remote hardware configuration tools and interactive reports. The ISAT-200A is certified for use with Iridium Push-to-Talk, which allows two-way satellite communications. A micro-secure digital (SD) card is contained in the device and samples at 1 Hz. Potentially up to 44 parameters are collected.

1.1 SkyTrac ISAT-200A Data Recovery

The SkyTrac ISAT-200A received by the NTSB Recorders Lab was shown to have suffered impact damage and water damage, as shown in figure 1. The device was transported to the laboratory in fresh water. The unit was disassembled to extract the device's memory unit. In this version of the device, the memory unit is a microSD card which is housed in a protected area near the device's front screen, as shown in figure 2. Figure 3 shows the same region after the backing plate had been removed. Note that there is a concave impression in this area. The area containing the microSD card is circled in red. Figure 4 is an alternate view of the same concave impression.

Figure 5 is a view of the cross-sectional area where the concave impression was present. This area also houses the microSD card chassis, which is tan in color. Figure 6 is the same area, but with the board containing the concave impression/microSD card removed. This area contains a gasket and a void space.

The recovered microSD card is pictured in figure 7 under 20x magnification. The microSD card contained a crack that appeared to extend across the front face of the microSD card, annotated in the figure with yellow arrows. The back of the microSD card appeared largely undamaged and is shown in figure 8.

The microSD card was unable to be read on various laboratory PCs using a variety of methods. The microSD card was sent to a third party laboratory for additional data recovery attempts. The third party lab reported that the data was unrecoverable.

Therefore, no data was recovered from the device.

The Transportation Safety Board of Canada (TSB) was contacted as the accredited representative for the state of manufacturer of this device. The TSB Canada shared this report and the results of this investigation with the manufacturer.



Figure 1. The SkyTrac ISAT-200A as received by the NTSB Recorder's Lab.

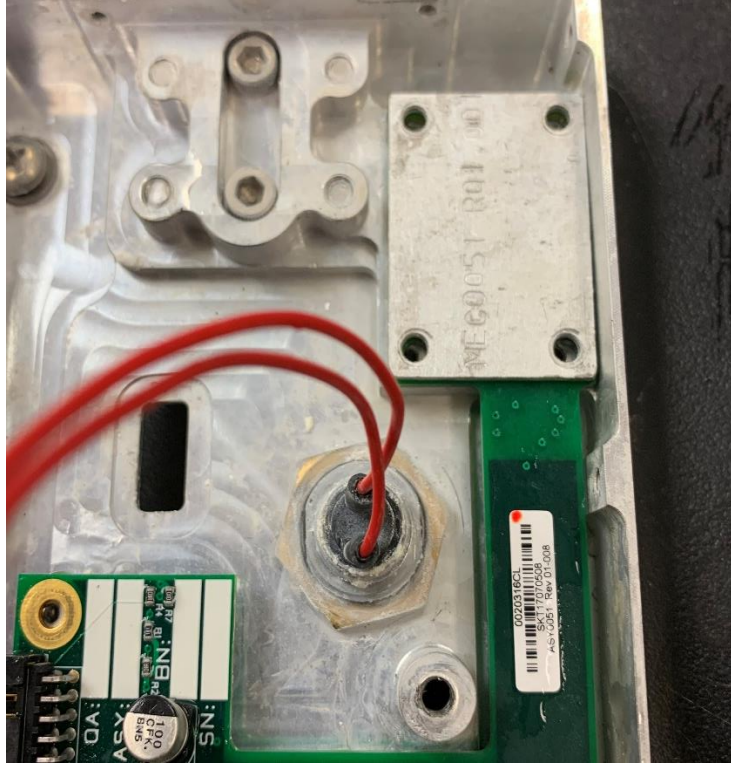


Figure 2. The area of the unit that holds the microSD card. Note in this image, the screws holding the backing plate have been removed by the specialist.



Figure 3. The area of the unit that holds the microSD card with the backing plate removed. Note the area of the concave impression.



Figure 4. An alternative view of the same area with the concave impression.

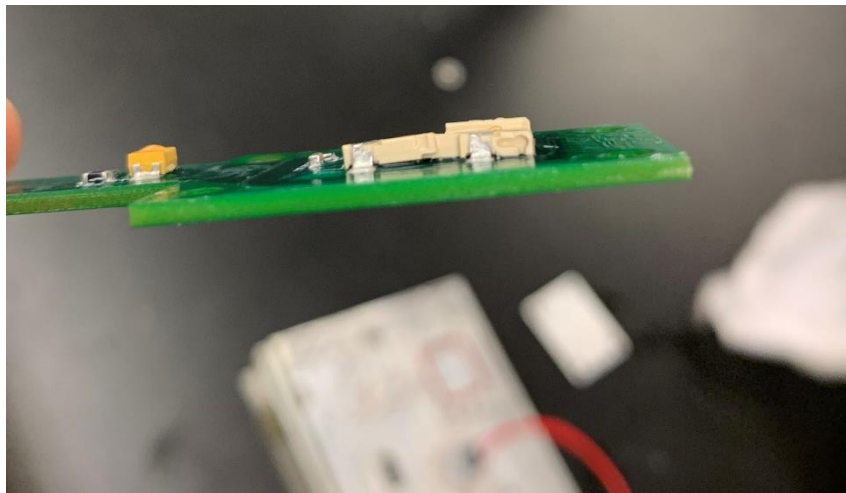


Figure 5. A side view of the mounting area of the SD card. This partially shows the reverse side of the area of concave impression. Note that the microSD card chassis is visible in tan. There is a small amount of deformation to the microSD card chassis.



Figure 6. The area of the unit that holds the microSD card with the backing plate removed and the board containing the concave impression/microSD card mount removed. A sealed void space is present.



Figure 7. The front the microSD card. The area of the crack is noted with yellow arrows.



Figure 8. The reverse side of the microSD card.

1.2 SkyTrac ISAT-200A Summary

The unit sank with the wreckage and was recovered from a depth of approximately 6000 feet of sea water. The water pressure at this depth is approximately 2600 pounds per square inch (psi). The unit's memory device is contained within a sealed gasketed area containing a void space. The area that housed the microSD card in the area of the void space exhibited a concave area consistent with crush damage. The microSD card, which was mounted to this area by design, was found cracked and data was unrecoverable. No data was recovered from this device.

The device is not designed, nor required to survive, sea water immersion, or meet any kind of survivability standard. This report was shared with the manufacturer of the device via the TSB Canada.

Submitted by:

Sean Payne
Branch Chief - Vehicle Recorder Laboratory - NTSB