NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, DC 20594

September 1, 2015

Cockpit Voice Recorder

Specialist's Factual Report
By Bill Tuccio, Ph.D.

1. EVENT

Location:	Homer, Alaska
Date:	October 23, 2013
Aircraft:	Beechcraft 1900C, N575U
Operator:	ERA Alaska, Flight 878
NTSB Number:	DCA14FA002

2. GROUP

A group was not convened.

3. SUMMARY

On October 23, 2013, at about 1530 Alaska daylight time (AKDT), ERA Alaska flight 878, a Beechcraft 1900C, N575U, experienced a nose and main landing gear collapse during landing on runway 22 at Homer Airport (HOM), Homer, Alaska. The two flight crew members and 13 passengers were not injured and the airplane sustained substantial damage. The scheduled, domestic passenger flight was operating under the provisions of 14 *Code of Federal Regulations* Part 121 from Ted Stevens Anchorage International Airport (ANC), Anchorage, Alaska. A solid-state cockpit voice recorder (CVR) was sent to the National Transportation Safety Board's Audio Laboratory for readout.

4. DETAILS OF INVESTIGATION

The NTSB Vehicle Recorder Division's Audio Laboratory received the following CVR:

Recorder Manufacturer/Model:	**L-3/Fairchild FA2100-1020**
Recorder Serial Number:	**356941**

4.1. Recorder Description

Per federal regulation 14 CFR 121.359, turbine engine powered aircraft operating under 14 CFR Part 121, must be equipped with a CVR that records a minimum of the last 2 hours of aircraft operation; this is accomplished by recording over the oldest audio data. When the CVR is deactivated or removed from the airplane, it retains only the most recent 2 hours of CVR operation. This model CVR, the L-3/Fairchild FA2100-1020, is a solid-state CVR that records 2 hours of digital cockpit audio. Specifically, it contains a 4-channel recording of the last 2 hours of operation. The recording contains 4 channels of audio data; one channel for each flight crew, one channel for the CAM audio information, and a fourth channel for the public address or third crewmember.

4.2. Recorder Damage

Upon arrival at the audio laboratory, it was evident that the CVR had not sustained any heat or structural damage and the audio information was extracted from the recorder normally, without difficulty.

4.3. CVR Channels

The recording consisted of four channels of audio information. Two of the channels contained audio information from the captain's and first officer's audio panels. The quality of these two channels was excellent[1]. One channel contained the cockpit area microphone (CAM) audio information. The quality of this channel was excellent. The fourth channel contained audio information from the aircraft's Public Address (PA) system. The quality of this channel was excellent.

4.4. Timing and Correlation

The times used in this report are expressed as local time of the accident (AKDT).

Timing of the transcript was aligned with local accident time as provided by the Investigator-in-Charge. Specifically, the crew reported an "off" time out of ANC, recorded in the aircraft logbook as 1459 AKDT. This off time was correlated to the same event on the CVR recorded at 0135:52 CVR Elapsed Time (time from the start of the recording).

Accordingly, for the accident flight, 1323:08 was added to all CVR Elapsed Times to convert to AKDT.

4.5. Summary of Recording Contents

In agreement with the Investigator-In-Charge, a CVR group did not convene and only this summary report was prepared.

The recording began when ERA flight 802 was approaching Valdez for landing. After flight 802, ERA flight 803 was recorded from Valdez to ANC. A crew different from the accident flight crew operated flights 802 and 803.

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[1] See Attachment I for the CVR Quality Rating Scale

At about 1452, the crew of the accident flight, ERA flight 878, began the before starting engines checklist. After the engines were started, in response to the checklist item for crew brief, the captain responded "Anchorage six Homer."

At about 1459, the flight departed ANC with the captain acting as flying pilot. The gear was retracted shortly after take-off.

Air traffic control (ATC) initially cleared the aircraft to 10,000 feet. At about 1502, ATC amended the altitude to 6,000 feet and the first officer acknowledged, then called out "one to go" on the intercom.

At about 1503, ATC cleared the aircraft to 10,000 feet. At about this time, the crew began non-pertinent conversation until about 1524. At about 1505, the first officer changed frequencies, and advised ATC the aircraft was leaving 8,000 feet for 10,000 feet.

At about 1516, ATC cleared the aircraft for a pilot's discretion descent to 5,000 feet and asked the aircraft if they had information Juliet at Homer. The first officer acknowledged the descent and confirmed the aircraft had information Juliet. The crew then continued the non-pertinent conversation.

At about 1517, the 2250 Zulu ATIS information Juliet was recorded on the CVR for HOM. Information Juliet reported winds from 030 degrees as 7 knots, weather better than 5000 foot ceilings and visibility better than 5 miles, temperature 6 degrees Celsius, dewpoint -3 Celsius, altimeter 29.79, and right traffic for runway 4. The captain noted the winds were from 030 at 7 knots, the first officer corrected the captain, saying the winds from 030 at 4 knots.

The first officer then told ATC that HOM was in sight. ATC cleared the aircraft for a visual approach and advised the aircraft to contact Homer Radio.

At about 1518, the first officer began the approach checklist in a challenge/response manner. For the crew brief item, the captain responded "two two," to which the first officer responded, "no questions." The first officer then briefed speeds for a weight of 16,000 pounds of 113, 124, and 130 knots. The captain acknowledged. The crew then resumed the non-pertinent discussion.

At about 1520, the first officer called Homer Radio, advising the aircraft was 17 miles north, planning runway 22. Homer Radio noted another aircraft was close in for runway 4 and advised the wind was from 070 at 5 knots.

At about 1524, the crew completed non-pertinent conversation. Thereafter, the first officer reported a 4 mile final for runway 22.

At 1525:05, the captain asked for flaps take-off. The first officer acknowledged and confirmed.

At 1525:15, the captain asked for gear down and final checks. The first officer confirmed, followed by the sound of a high pitched motor, similar to a gear related motor, for about 4 seconds. Both crewmembers then confirmed gear down, 3 green, no red. The first officer continued the final checks checklist.

At 1525:28, the captain asked for flaps approach. The first officer acknowledged and confirmed.

At 1525:50, the captain asked for flaps landing. The first officer acknowledged and confirmed.

At 1525:58, an automated voice called out "one thousand."

At 1526:00, the captain asked for propeller RPM 1,700. This was followed by an increase in background noise, similar to propellers operating at higher RPM. The first officer then confirmed the final checklist was done.

At 1526:21, a c-chord tone, similar to an altitude alert, was recorded for about 2 seconds.

At 1526:32, an automated voice called out “five hundred.”

At 1527:05, the background sound decreased, similar to a power reduction.

At 1527:08, the captain said, “errr-tttt.”

At 1527:09, the captain said, “what the hell.”

At 1527:10, the first officer said, “where's the runway?”

At 1527:11, the captain said, “where did it go?”

At 1527:12, the first officer said, “hopefully the gear is down,” concluding with a chuckle.

At 1527:15, the sound of three rumbles was recorded on the CAM.

At 1527:15, the first officer said, “oh.”

At 1527:16, the captain said, “awe. That was terrible.” The first officer said, “we found it.”

At 1527:17, the sound of a c-chord was recorded for about 2.3 seconds. This was followed immediately by an alternating high pitch tone (about .3 seconds of tone/.3 seconds of silence) that continued about 10 times until the end of the recording. The tone was similar to the gear unsafe warning.

At 1527:18, the captain said loudly, “haaaaa. you put the [expletive] gear up.”

At 1527:19, the first officer said, “oh...oh...oh...” This was followed immediately by the sound of a high pitched whine similar to the gear related motor; the whine continued until the end of the recording.

At 1527:21, the captain said, “God. [expletive] [expletive].” The first officer made an unintelligible comment as the sound of a cyclic rumbling began and continued until the end of the recording.

The recording ended at 1527:22.

Bill Tuccio, Ph.D.
Vehicle Recorder Division

Attachment I

CVR Quality Rating Scale

The levels of recording quality are characterized by the following traits of the cockpit voice recorder information:

Excellent Quality	Virtually all of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate only one or two words that were not intelligible. Any loss in the transcript is usually attributed to simultaneous cockpit/radio transmissions that obscure each other.
Good Quality	Most of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate several words or phrases that were not intelligible. Any loss in the transcript can be attributed to minor technical deficiencies or momentary dropouts in the recording system or to a large number of simultaneous cockpit/radio transmissions that obscure each other.
Fair Quality	The majority of the crew conversations were intelligible. The transcript that was developed may indicate passages where conversations were unintelligible or fragmented. This type of recording is usually caused by cockpit noise that obscures portions of the voice signals or by a minor electrical or mechanical failure of the CVR system that distorts or obscures the audio information.
Poor Quality	Extraordinary means had to be used to make some of the crew conversations intelligible. The transcript that was developed may indicate fragmented phrases and conversations and may indicate extensive passages where conversations were missing or unintelligible. This type of recording is usually caused by a combination of a high cockpit noise level with a low voice signal (poor signal-to-noise ratio) or by a mechanical or electrical failure of the CVR system that severely distorts or obscures the audio information.
Unusable	Crew conversations may be discerned, but neither ordinary nor extraordinary means made it possible to develop a meaningful transcript of the conversations. This type of recording is usually caused by an almost total mechanical or electrical failure of the CVR system.