

**NATIONAL TRANSPORTATION SAFETY BOARD
Office of Research and Engineering
Vehicle Recorder Division
Washington, D.C. 20594**



GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION

ERA17FA135

**By
Christopher Babcock**

WARNING

The reader of this report is cautioned that the transcript of a cockpit voice recorder audio recording is not a precise science but is the best product possible from a Safety Board group investigative effort. The transcript or parts thereof, if taken out of context, could be misleading. The transcript should be viewed as an accident investigation tool to be used in conjunction with other evidence gathered during the investigation. Conclusions or interpretations should not be made using the transcript as the sole source of information.

NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division

March 19, 2018

Cockpit Voice Recorder

Group Chairman's Factual Report
By Christopher Babcock

1. EVENT SUMMARY

Location: Marietta, Georgia
Date: March 24, 2017
Aircraft: Cessna 500, Registration N8DX
Operator: Private
NTSB Number: ERA17FA135

On March 24, 2017, about 1924 eastern daylight time, a Cessna 500, registration N8DX, collided with terrain in Marietta, Georgia. The private pilot and sole occupant was fatally injured. The airplane was destroyed by the impact and post-impact fire. The airplane was registered to Shelter Charter Services Inc and operated as a Title 14 *Code of Federal Regulations* Part 91 business flight. Visual meteorological conditions existed near the accident site at the time of the accident and the flight was operated on an instrument flight rules flight plan. The flight originated from Cincinnati Airport-Lunken Field (LUK), Cincinnati, Ohio, about 1812, and was destined for Fulton County Airport-Brown Field (FTY), Atlanta, Georgia. A tape cockpit voice recorder (CVR) was sent to the National Transportation Safety Board (NTSB) Vehicle Recorder Division for evaluation. The CVR group meeting convened April 6, 2017, and a full transcript was prepared for the 30-minute, 34-second recording (see attached).

2. GROUP

Chairman: Christopher Babcock
Aerospace Engineer
National Transportation Safety Board

Member: Jay Eller
Air Safety Investigator
Honeywell

Member: Dave Gerlach
Air Safety Investigator
Federal Aviation Administration

Member: Captain Dan Morris
Flight Test Manager/Chief Pilot
Cessna/Textron Aviation

3. DETAILS OF INVESTIGATION

The NTSB Vehicle Recorder Division received the following CVR:

Recorder Manufacturer/Model: **Fairchild GA-100**
Recorder Serial Number: **894**

3.1 CVR Carriage Requirements

Per federal regulation, multiengine aircraft with more than six passenger seats and requiring two pilots manufactured prior to April 7, 2010, and operated under 14 CFR 91, must be equipped with a CVR that records a minimum of the last 30 minutes of aircraft operation. This is accomplished by recording over the oldest audio data. The accident aircraft was manufactured in 1976, but was certified for single pilot operation and was not required to have a CVR.

3.2 Recorder Description

This model CVR, the Fairchild GA-100, records a minimum of 30 minutes of analog audio on a continuous loop tape in a four-channel format: one channel for each flight crew, one spare channel for a cockpit observer or public address system, and one channel for the cockpit area microphone (CAM).

3.3 Recorder Damage

Upon arrival at the laboratory, it was evident that the CVR had sustained light structural damage that did not preclude extracting the audio information normally, without difficulty.



Figure 1. CVR, as received, showing impact damage.



Figure 2. CVR, as received, showing impact damage.

3.4 Audio Recording Description

Each channel's audio quality is indicated in Table 1.¹ Channel number four did not contain any audio information (nor was it required by federal regulations).

Table 1. CVR audio quality and contents.

Channel Number	Content/Source	Quality
1	Pilot Audio Control Panel (ACP)	Excellent
2	CAM	Good
3	Right Seat ACP	Excellent
4	NA	NA

3.5 Timing and Correlation

Timing on the transcript was established by correlating the air traffic control recording transmission time to the corresponding CVR event. Specifically, the CVR times of the 4 final radio transmissions from N8DX were linked to the corresponding ATC local times, and all CVR events were offset to reflect the local eastern daylight time of the accident. Where there was a question during the transcription process whether a statement by the pilot was broadcast on the radio, the recording from the ATC facility was used to confirm.

¹ See attached CVR Quality Rating Scale.

3.6 Description of Audio Events

A full transcript was prepared for the entire recording. The recording and transcript began at 18:53:46 EDT and covered events during cruise and descent into the Atlanta terminal area as well as the accident sequence. The recording ended at 19:24:20 EDT.

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.

Transcript of a Fairchild GA-100 tape cockpit voice recorder, serial number 894, installed on a Cessna 500 (N8DX), which crashed after departing controlled flight in Marietta, Georgia.

LEGEND

CAM	Cockpit area microphone voice or sound source
HOT	Flight crew audio panel voice or sound source
RDO	Radio transmissions from N8DX
CTR	Radio transmission from Atlanta Center controller
EGPWS	Enhanced Ground Proximity Warning System sound source
-1	Voice identified as the pilot
*	Unintelligible word
#	Expletive
[]	Editorial insertion
?	Unknown Source

Note 1: Times are expressed in eastern daylight time (EDT).

Note 2: Generally, only radio transmissions to and from the accident aircraft were transcribed.

Note 3: Words shown with excess vowels, letters, or drawn out syllables are a phonetic representation of the words as spoken.

Note 4: A non-pertinent word, where noted, refers to a word not directly related to the operation, control or condition of the aircraft.

TIME and
SOURCE

INTRA-COCKPIT COMMUNICATION
CONTENT

18:53:46.3

START OF RECORDING
START OF TRANSCRIPT

18:54:01.4

CAM [sound of click followed by 0.9 second whirring noise]

18:54:07.8

HOT [sound of click]

18:54:20.8

HOT [sound of click]

TIME and
SOURCE

AIR-GROUND COMMUNICATION
CONTENT

18:54:56.4

RDO-1 center eight delta x-ray over.

18:54:58.5

CTR yes sir go ahead.

18:54:59.5

RDO-1 I have the Buckhead One arrival and uh after Choo Choo
[GQO VOR] I would go to HAVVE H-A-V-V-E...then HLNDS H-L-
N-D-S...and then F-T-Y.

18:55:17.8

CTR november eight delta x-ray uh cleared direct HAVVE at this
time and then direct HLNDS for the Buckhead One.

18:55:25.7

RDO-1 okay direct HAVVE and then direct HLNDS for the Buckhead
One. eight D-X.

**TIME and
SOURCE**

**INTRA-COCKPIT COMMUNICATION
CONTENT**

18:55:36.2

CAM [sound of click followed by 0.9 second whirring noise]

18:55:57.0

HOT [sound of click]

18:55:57.0

CAM [sound of click followed by 0.9 second whirring noise]

18:56:03.8

HOT [sound of click]

18:56:06.9

HOT [sound of click]

18:56:38.5

HOT [sound of click]

**TIME and
SOURCE**

**AIR-GROUND COMMUNICATION
CONTENT**

18:55:29.0

CTR delta x-ray readback correct. thank you.

18:56:26.7

CTR november eight delta x-ray traffic is uh eleven o clock and one zero miles northbound regional jet flight level two four zero.

18:56:32.7

RDO-1 no joy on the traffic. eight D-X.

**TIME and
SOURCE**

**INTRA-COCKPIT COMMUNICATION
CONTENT**

18:59:04.1
HOT-1 [sound of 2600 Hz tone lasting 0.2 seconds]

18:59:05.1
HOT-1 [sound of 2600 Hz tone lasting 0.2 seconds]

18:59:08.9
HOT-1 [sound of 2600 Hz tone lasting 0.6 seconds]

**TIME and
SOURCE**

**AIR-GROUND COMMUNICATION
CONTENT**

18:58:57.3
CTR november eight delta x-ray descend and maintain flight level two two zero.

18:59:00.9
RDO-1 two two zero. eight D-X.

18:59:05.3
RDO-1 center I'm having a little problem with my G-P-S...could you give me direct uh routings in? put me on that arrival.

18:59:14.9
CTR center eight delta x-ray. I'm sorry. say again your request?

18:59:17.4
RDO-1 well I'm having some difficulty with my G-P-S. it's not picking up this arrival. I was wondering if you could give me uh direct routings in. instead of going to the arrivals.

18:59:29.8
CTR center eight delta x-ray I have your request. stand by.

**TIME and
SOURCE**

**INTRA-COCKPIT COMMUNICATION
CONTENT**

18:59:36.7

HOT-1 tellin' ya..I'm tellin' ya this is just...this is # nuts.

18:59:43.2

HOT-1 *.

19:00:01.4

HOT [sound of click]

19:00:06.6

CAM [sound of click followed by 0.9 second whirring noise]

19:00:43.9

CAM [sound of 2800 Hz tone lasting 12.5 seconds]

19:00:53.6

HOT-1 two eight.

**TIME and
SOURCE**

**AIR-GROUND COMMUNICATION
CONTENT**

18:59:46.8

CTR november eight delta x-ray cleared direct Fulton County Airport at this time.

18:59:50.1

RDO-1 direct Fulton County. thank you.

19:00:10.7

CTR —vember eight delta x-ray descend and maintain one one thousand eleven thousand. the Atlanta altimeter is three zero two eight.

19:00:17.5

RDO-1 three zero two eight. one one thousand. eight D-X.

**TIME and
SOURCE**

**INTRA-COCKPIT COMMUNICATION
CONTENT**

19:01:30.2

CAM [sound of click followed by 0.9 second whirring noise]

19:01:57.9

HOT-1 [sound of several clicks similar to knob rotating]

19:02:34.1

HOT-1 I have no idea what's going on here.

19:04:01.8

CAM [sound of click followed by 0.9 second whirring noise]

**TIME and
SOURCE**

**AIR-GROUND COMMUNICATION
CONTENT**

19:01:50.7

CTR november eight delta x-ray change to my frequency one three three point one.

19:01:55.4

RDO-1 one two three point one.

19:02:04.1

RDO-1 eight D-X on frequency.

19:02:09.4

RDO-1 do you read? over.

19:04:31.2

RDO-1 center eight delta x-ray. over.

19:04:33.6

CTR center eight delta x-ray. yes sir. go ahead.

**TIME and
SOURCE**

**INTRA-COCKPIT COMMUNICATION
CONTENT**

19:04:43.3
HOT-1 [sound of several clicks similar to knob rotating]

**TIME and
SOURCE**

**AIR-GROUND COMMUNICATION
CONTENT**

19:04:35.2
RDO-1 did you give me one two three point one?

19:04:37.9
CTR * delta x-ray that's one three three point one.

19:04:40.3
RDO-1 one three three point one.

19:04:48.6
RDO-1 eight D-X is on frequency do you read?

19:05:15.0
CTR november eight delta x-ray are you on one three three point one?

19:05:17.8
RDO-1 affirmative. one three three point one.

19:05:19.5
CTR november eight delta x-ray roger. uh the Atlanta altimeter is three zero two eight.

19:05:23.0
RDO-1 three zero two eight. direct F-T-Y.

19:05:29.2
RDO-1 out of sixteen * four.

**TIME and
SOURCE**

**INTRA-COCKPIT COMMUNICATION
CONTENT**

19:06:45.6

HOT-1 Jesus Christ * #...

19:10:26.4

HOT-1 [sound similar to autopilot disconnect tone. one second 4000 Hz]

19:11:27.1

HOT-1 well it's turning to the left.

**TIME and
SOURCE**

**AIR-GROUND COMMUNICATION
CONTENT**

19:05:31.5

CTR roger that.

19:07:42.2

CTR november eight delta x-ray descend and maintain six thousand.

19:07:45.5

RDO-1 out of thirteen one for six. eight D-X.

19:11:01.0

RDO-1 hey center eight delta x-ray we're down to eight thousand going down to six and we're having a steering problem now. uh can't steer the aircraft very well.

19:11:13.0

CTR november eight delta x-ray roger uh if able uh fly heading of one seven five and when able uh direct Fulton County.

**TIME and
SOURCE**

**INTRA-COCKPIT COMMUNICATION
CONTENT**

19:11:33.0

HOT-1 oh what is the ceiling in this area over?

19:11:45.9

HOT-1 I'm doing the best—

19:12:43.1

HOT [sound similar to altitude alert. 0.75 second 2600 Hz]

**TIME and
SOURCE**

**AIR-GROUND COMMUNICATION
CONTENT**

19:11:38.5

CTR november eight delta x-ray do you copy? uh fly heading of one seven five * uh this is vectors uh to Fulton County.

19:11:46.9

RDO-1 I'm doing the best I can. what is the ceiling in this area? I'm at seventy three hundred in— in clouds.

19:11:53.5

CTR alright delta x-ray roger. uh descend and maintain uh five thousand eight hundred.

19:11:58.6

RDO-1 five thousand eight—

19:12:41.8

CTR november eight delta x-ray descend and maintain five thousand.

19:12:46.4

RDO-1 okay down to five. we're in the clouds at sixty eight.

**TIME and
SOURCE**

**INTRA-COCKPIT COMMUNICATION
CONTENT**

19:13:30.9

HOT [sound similar to altitude alert. 0.75 second 2600 Hz]

19:14:21.8

CAM [sound of increased background noise, similar to landing gear extension]

19:14:21.8

HOT-1 [sound of 2600 Hz tone lasting 0.4 seconds]

19:14:23.7

HOT-1 [sound of 2600 Hz tone lasting 0.4 seconds]

19:14:34.8

HOT-1 [sound of 2600 Hz tone lasting 0.4 seconds]

19:14:36.0

HOT-1 [sound of 2600 Hz tone lasting 0.3 seconds]

19:14:36.7

HOT-1 [sound of 2600 Hz tone lasting 0.3 seconds]

19:14:39.2

HOT-1 [sound of 2600 Hz tone lasting 0.25 seconds]

**TIME and
SOURCE**

**AIR-GROUND COMMUNICATION
CONTENT**

19:14:29.0

CTR november eight delta x-ray descend and maintain four thousand one hundred now.

19:14:39.2

CTR november eight delta x-ray maintain four thousand one hundred.

TIME and
SOURCE

INTRA-COCKPIT COMMUNICATION
CONTENT

19:14:40.5

HOT-1 [sound of 2600 Hz tone lasting 0.5 seconds]

19:15:25.2

HOT-1 [sound of 2600 Hz tone lasting 1.2 seconds]

TIME and
SOURCE

AIR-GROUND COMMUNICATION
CONTENT

19:14:45.4

RDO-1 four thousand one hundred but I'm not sure I can maintain that.

19:14:49.9

CTR alright delta x-ray uh I need you to maintain that. my minimum I-F-R vectoring altitude is four thousand one hundred in that area. maintain four thousand one hundred.

19:14:59.1

RDO-1 okay maintain four thousand one hundred.

19:15:01.7

RDO-1 how's my heading? is my heading okay?

19:15:05.6

CTR november eight delta x-ray uh fly heading of uh one eight five now.

19:15:11.4

RDO-1 heading of one eight five.

**TIME and
SOURCE**

**INTRA-COCKPIT COMMUNICATION
CONTENT**

19:17:19.4
HOT-1 uhhhh.

**TIME and
SOURCE**

**AIR-GROUND COMMUNICATION
CONTENT**

19:15:43.8

CTR

november eight delta x-ray uh maintain four thousand one hundred. I show you at three thousand six hundred now. uh five hundred feet below my minimum I-F-R vectoring altitude.

19:15:52.6

RDO-1

yeah I understand. I'm going back up but uh I have no— I have very little steering on here and I have mountains around me. Atlanta doesn't have mountains.

19:16:21.0

CTR

november eight delta x-ray low altitude warning show you at three thousand four hundred now. maintain four thousand one hundred when able.

19:16:34.7

RDO-1

eight delta x-ray is going up to four thousand one hundred.

19:16:42.6

RDO-1

well strangely it looks like I have my autopilot back for some reason so...it gives me stability.

19:16:53.0

CTR

alright delta x-ray roger. I show you uh three thousand five hundred now. uh if you're able main— climb and maintain four thousand one hundred for terrain.

**TIME and
SOURCE**

**INTRA-COCKPIT COMMUNICATION
CONTENT**

**TIME and
SOURCE**

**AIR-GROUND COMMUNICATION
CONTENT**

19:17:29.3

RDO-1 okay delta x-ray up to four thousand one hundred.

19:17:39.7

CTR alright delta x-ray roger I show you four thousand one hundred now. contact Atlanta Approach on one two one point zero. good day.

19:17:46.3

RDO-1 one two one point zero. good day.

19:17:53.3

CTR november eight delta x-ray I show you at four thousand one hundred level now. contact Atlanta Approach on one two one point zero.

19:17:58.9

RDO-1 I'm trying to do that. I can't do it.

19:18:10.4

RDO-1 I can't— I can't— I cannot get to one thous— one hundr— one twenty one zero.

19:18:16.2

CTR * delta x-ray one two one point zero for Atlanta Approach.

19:18:20.6

RDO-1 I can't get to one two one point zero.

19:18:25.8

RDO-1 I'm having a problem with my uh Garmin and so evidently the whole thing is kind of messed up.

**TIME and
SOURCE**

**INTRA-COCKPIT COMMUNICATION
CONTENT**

**TIME and
SOURCE**

**AIR-GROUND COMMUNICATION
CONTENT**

19:18:33.6

RDO-1 can you take me in?

19:18:39.8

CTR november eight delta x-ray stand by.

19:18:56.6

CTR november eight delta x-ray you— you're physically unable to switch to one two one point zero?

19:19:00.8

RDO-1 negative. I cannot switch to one two one point zero.

19:19:03.7

CTR alright delta x-ray roger. maintain this frequency

19:19:19.1

CTR alright delta x-ray report the uh Fulton County Airport in sight. I show you uh— I show it at your twelve o clock now and about uh two eight miles uh at your uh eleven to twelve o clock and two eight miles now.

19:19:30.9

RDO-1 okay let me tell you the problem I'm having. I'm having— I'm just barely able to keep straight on this and wings level. I cannot get to two— one twenty one point zero. and I don't know if I can make a right turn in to the airport.

19:19:46.2

CTR alright delta x-ray roger stand by.

TIME and
SOURCE

INTRA-COCKPIT COMMUNICATION
CONTENT

TIME and
SOURCE

AIR-GROUND COMMUNICATION
CONTENT

19:19:58.1

CTR alright delta x-ray are you able to— to change to any other frequency or are you able— do you just need to stay on this frequency?

19:20:09.9

RDO-1 I can change only to one thirty three six or one thirty three ten.

19:20:38.9

CTR november eight delta x-ray are you uh currently V-F-R or are you still in the clouds?

19:20:44.2

RDO-1 I'm uh V-F-R but it's hazy.

19:20:47.0

CTR alright delta x-ray roger. if able uh turn left and uh fly heading of one seven seven vectors for the airport.

19:20:56.0

RDO-1 left to one seven seven eight D-X.

19:21:01.5

CTR november eight delt— november eight delta x-ray report the uh Fulton County Airport in sight.

19:21:13.3

RDO-1 uh eight D-X should I have it in sight now?

**TIME and
SOURCE**

**INTRA-COCKPIT COMMUNICATION
CONTENT**

**TIME and
SOURCE**

**AIR-GROUND COMMUNICATION
CONTENT**

19:21:16.5

CTR

november eight delta x-ray uh negative uh the airp— the airport is now at your eleven oh clock and about two three miles and uh about a one seven seven heading for the airport.

19:21:30.7

RDO-1

okay I think I have a one seven seven heading...but I do not have the airport in sight.

19:22:08.5

CTR

november eight delta x-ray uh do you need to declare an emergency at this time or you need special assistance at the field?

19:22:13.6

RDO-1

uh I'm not sure and I think that I ought to declare an emergency just in case.

19:22:18.6

CTR

alright delta x-ray roger uh declar— declaring an emergency for you uh looks like that heading will be good um twelve oh clock and uh let's see about uh one niner miles now uh for the airport uh uh looks like that heading's good for you.

19:22:34.6

RDO-1

okay could you have the tower turn up the uh landing lights full?

19:22:39.5

CTR

alright delta x-ray I'll see if I can get them to uh to turn the lights on.

**TIME and
SOURCE**

**INTRA-COCKPIT COMMUNICATION
CONTENT**

19:23:32.1
HOT-1 oh just a minute.

19:23:38.6
CAM [sound similar to decrease in engine power]

19:23:51.1
HOT-1 oh. this—

**TIME and
SOURCE**

**AIR-GROUND COMMUNICATION
CONTENT**

19:22:58.4
CTR november eight delta x-ray do you have the notams uh for uh
Fulton County?

19:23:02.4
RDO-1 I don't have anything at this point in time for Fulton County.

19:23:08.4
RDO-1 well what runway am I running into? am I— is there a runway
going sideways?

19:23:22.4
CTR november eight delta x-ray looks like it's uh runway uh—
runway eight is in use right now I'm just told. there is a
runway uh—

19:23:35.9
CTR runway one four and three two.

19:23:44.0
RDO-1 well I've got my landing gear down but I don't know.

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT COMMUNICATION CONTENT</u>
19:23:55.9 HOT-1	just uh ohh— [straining]
19:23:58.2 HOT-1	oh God. #.
19:24:00.1 HOT-1	oh. ahh. ahh. bad. ahh. [shouting] it's going down. it's going down.
19:24:02.5 HOT-1	[sound similar to autopilot disconnect tone. 4000 Hz 1.2 seconds]
19:24:05.4 HOT	[sound similar to altitude alert 2600 Hz 1.2 seconds]
19:24:07.4 HOT-1	#.
19:24:07.7 EGPWS	sink rate. sink rate.
19:24:11.6 EGPWS	pull up. pull up.
19:24:11.9 HOT-1	oh uh... [straining]
19:24:14.6 EGPWS	pull up. pull up.

<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
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**TIME and
SOURCE**

**INTRA-COCKPIT COMMUNICATION
CONTENT**

19:24:16.3

HOT-1 oh uh... [straining]

19:24:17.7

EGPWS pull up. p—

19:24:19.6

END OF TRANSCRIPT

END OF RECORDING

**TIME and
SOURCE**

**AIR-GROUND COMMUNICATION
CONTENT**

19:24:15.7

CTR alright delta x-ray say souls on board and fuel remaining please.