

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



SPECIALIST'S FACTUAL REPORT OF INVESTIGATION

WPR21LA110

**By
Michael Portman**

WARNING

The reader of this report is cautioned that the summary of a cockpit voice recorder audio recording is not a precise science but is the best product possible from an NTSB investigative effort. The summary or parts thereof, if taken out of context, could be misleading. The summary 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 summary as the sole source of information.

NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division

July 1, 2021

Cockpit Voice Recorder

Specialist's Factual Report
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1. EVENT SUMMARY

Location: San Diego, CA
Date: February 13, 2021
Aircraft: Dassault Falcon 900, Registration N823RC
Operator: Aerospike Iron Aero, LLC
NTSB Number: WPR21LA110

2. GROUP

A group was not convened.

3. DETAILS OF INVESTIGATION

The NTSB Vehicle Recorder Division received the following CVR:

Recorder Manufacturer/Model: **L3 SRVIVR**
Recorder Serial Number: **010-01888**

3.1 CVR Carriage Requirements

Per federal regulation, multiengine, turbine-powered aircraft with more than six passenger seats and requiring two pilots manufactured after April 7, 2010, 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. The incident aircraft was manufactured in 2013.

3.2 Recorder Description

This model CVR, the L3 SRVIVR, records a minimum of 6 hours of digital audio stored on solid state memory modules. Four channels are recorded: one channel for each flight crew, one channel for a cockpit observer, 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 not sustained any heat or structural damage and the audio information was extracted from the recorder normally, without difficulty.

3.4 Audio Recording Description

Each channel's audio quality is indicated in Table 1.¹

Table 1. Audio Quality.

Channel Number	Content/Source	Quality	Duration (hh:mm:ss)
1	Captain	Excellent	06:18:04
2	First Officer	Excellent	06:18:04
3	Observer	Excellent	06:18:04
4	CAM	Excellent	06:18:04

3.5 Timing and Correlation

Timing on the transcript was established by correlating the CVR events to common events on the flight data recorder (FDR). Specifically, the last five radio transmissions that the aircraft made were correlated to the radio transmit microphone key parameter from the FDR. Each of the five radio transmissions acted as an anchor point for a linear interpolation between the remaining CVR events. Once a correlation between the two recorders was established, a reference to local time was determined. The CVR and FDR times were offset to reflect the local Pacific standard time (PST) of the accident.

3.6 Description of Audio Events

In agreement with the Investigator-In-Charge, a CVR group did not convene. A summary of events from the CVR follows. The first approximately 4-hours and 23-minutes of the recording captured the arrival into Montgomery-Gibbs Executive Airport in San Diego, numerous power cycles, as well as some engine testing that occurred in between flights. These events appear to have transpired uneventfully. The incident flight recording began at 09:52:48 with the captain engaged in powering on and pre-flighting the aircraft. The recording ended at 11:47:21.

¹ See attached CVR Quality Rating Scale.

Time (PST)	Observations
09:52:47.8	The aircraft was powered on, and the CVR began recording.
09:52:53.4	The captain was engaged in a generally unintelligible phone conversation but was in the process of starting up the Auxiliary Power Unit (APU).
10:13:45.3	The captain made a phone call about general flight planning and trip planning.
10:19:39.0	The captain had a discussion with an unknown person about getting fuel, mentioning, regarding the amount of fuel to obtain, that he "preset it."
10:22:28.4	Passengers arrived and boarded the aircraft.
10:30:22.5	The captain obtained Automatic Terminal Information Service (ATIS) information Alpha, published at 1753 Zulu, which reported winds at 170 degrees at 9 knots, visibility 10 miles, clouds at 2,100 feet overcast, temperature 14 degrees Celsius, dewpoint 8 degrees Celsius, altimeter setting 29.97 inches of Mercury (inHg), Instrument Landing System (ILS) approach runway 28R in use, landing and departing runways 28R and 28L.
10:33:32.6	The captain was engaged in a discussion with the flight attendant about onboard drinks.
10:38:48.0	The captain called to obtain their departure clearance as follows: fly runway heading, then radar vectors to MMOTO, then direct to the Santa Catalina VOR, then C1177 to FICKY, then as filed, climb and maintain 3,000 feet, then expect Flight Level 360 10 minutes after departure, departure frequency of 125.3, squawk 7303. The captain read back the clearance.
11:05:13.2	An unknown individual arrived at the aircraft and engaged in non-pertinent conversation with the captain, including the planned routing to Hawaii.
11:14:20.8	Further non-pertinent conversation continued as the first officer arrived at the cockpit.
11:15:21.5	The crew obtained ATIS information Bravo, published at 1853 Zulu, which reported winds at 190 degrees at 11 knots, visibility 10 miles, clouds at 2,400 feet broken, ceiling at 2,900 feet overcast, temperature 14 degrees Celsius, dewpoint 8 degrees Celsius, altimeter setting 29.97 inHg, ILS approach runway 28R in use, landing and departing runways 28R and 28L.

Time (PST)	Observations
11:16:48.5	The crew set up and briefed the departure and general routing, including the following conversation items: • Planned altitudes, including that they were cleared to Flight Level 360, but would plan to go to Flight Level 400 • Radio frequencies to be used • Use of Controller Pilot Data Link Communications (CPDLC) • A discussion about fuel use, including that they needed "19.5 required," were going to burn "11.5," but that they had an extra "6-7 onboard" • A discussion about cruising at Mach 0.75 • A discussion that they will plan a slow climb to altitude
11:21:59.6	The crew engaged in additional non-pertinent conversation about the ForeFlight mobile app with the aforementioned unknown individual.
11:27:52.0	The unknown individual departed the aircraft.
11:30:07.0	A sound similar to the main cabin door being closed was noted.
11:31:24.7	The crew briefed the flight attendant about the short field takeoff.
11:32:37.4	The crew performed a pre-start checklist, which included the following items: • Preflight inspection, completed • Covers, removed • Emergency lights, on • Fasten seatbelt sign, on • No smoking sign, on • Yaw damper, (unintelligible response) • Pre-start tests, done • Fuel quantity, "20.5" onboard, "19.5" needed, fuel used "0" • Hydraulic quantity, full • Oxygen, (unintelligible response) • Gross weight and cg, "checked" • Speeds, "they're there" • Departure plan, fly runway heading • Autothrottles, on auto • Altimeters, set to 29.97 inHg • Parking brake, set • Anti-collision light, on.
11:34:17.1	The crew engaged in procedures to start the engines.

Time (PST)	Observations
11:36:58.0	The crew performed an after-start/before-taxi checklist, which included the following items: Circuit breakers checked, overhead panel checked, standby pump on, anti-ice checked, windshields on normal, weather radar set, ATC/TCAS standby, trims (a brief discussion ensued on what the preferred trim setting should be) "checked" (with an additional comment by the crew that "we're pretty far aft"), flight controls checked, speeds "green 112", windows closed, APU off, cabin ready, and taxi lights on.
11:39:39.8	The crew called Montgomery ground for clearance to taxi and were cleared to taxi to runway 28R via taxiways H and A.
11:40:05.9	The crew performed a brake check.
11:40:41.9	The crew discussed checking the thrust reversers and sounds similar to lever actuation were noted.
11:40:57.6	The crew engaged in miscellaneous conversation during taxi including a discussion regarding general working conditions.
11:42:16.3	The crew called ATC to request a momentary takeoff delay in order to perform a short field takeoff.
11:43:28.4	The crew reviewed the departure plan, discussed their abort plan, primarily their intention not to abort after 80 knots, and discussed diversion options.
11:44:53.2	The crew called Montgomery tower to request takeoff clearance and were cleared for takeoff on runway 28R with a momentary delay for a short field takeoff.
11:45:19.1	The Enhanced Ground Proximity Warning System (EGPWS) announced approaching runway 28R.
11:45:29.2	The crew performed a line up checklist, including the following items: Slats/flaps set to "S-F-2", landing lights on, TCAS set to TA/RA mode.
11:46:01.5	The EGPWS announced on runway 28R with 4,600 feet remaining.
11:46:13.5	The crew initiated the takeoff, and the first officer announced that he had tops.
11:46:19.1	The captain responded that he had brakes.

Time (PST)	Observations
11:46:22.1	An increase in ambient noise was noted, consistent with increasing the engines to takeoff power.
11:46:29.2	The captain called that power was set, and the first officer confirmed that power was checked and looking good.
11:46:36.5	The crew noted that the airspeed indicator was alive.
11:46:44.9	The crew announced and cross checked 80 knots. The first officer commented that they were committed to the takeoff.
11:46:49.8	The crew called out "V-1".
11:46:51.6	The captain stated that he was taking control of the aircraft, and the first officer confirmed that the captain had the controls.
11:46:52.8	The first officer called "rotate."
11:46:55.5	The captain made an auditory exclamation.
11:46:57.5	The first officer asked what happened.
11:46:59.3	The captain responded that they "couldn't take off."
11:46:59.7	The first officer called for full reverser.
11:47:01.0	The captain responded that he was unable.
11:47:02.8	The first officer made an auditory exclamation.
11:47:03.2	The captain repeated the exclamation "we can't" numerous times.
11:47:04.8	Sounds consistent with departing the paved surface were noted.
11:47:11.0	Several master caution aural alerts were noted.
11:47:12.1	The captain repeatedly issued instructions to "kill it."

Time (PST)	Observations
11:47:14.6	A sound consistent with a power cycle was noted.
11:47:20.7	The recording ended.

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.