NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division

October 25, 2017

Cockpit Voice Recorder

Specialist's Factual Report
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1. EVENT SUMMARY

Location:	Tujunga, California
Date:	September 2, 2017
Aircraft:	Leonardo AW139, Registration N304FD
Operator:	Los Angeles Fire Department
NTSB Number:	ANC17LA051

On September 2, 2017, about 0948 Pacific daylight time, a Leonardo (formerly AugustaWestland Philadelphia) AW139 helicopter, N304FD, sustained substantial damage after impacting trees while conducting aerial firefighting operations in a residential area in Tujunga, California. The pilot and crewmember sustained no injuries. The helicopter was registered to the City of Los Angeles and was operated by the Los Angeles Fire Department (LAFD) as a public use visual flight rules aerial firefighting flight, operating as Fire 4. Visual meteorological conditions with moderate smoke were present in the area at the time of the accident and flight following procedures were utilized by the operator. The helicopter departed from the Van Nuys Airport, Van Nuys, California about 0815 to conduct the aerial firefighting operations for the day. A solid-state multi-purpose flight recorder (MPFR) was sent to the National Transportation Safety Board (NTSB) Vehicle Recorder Division for evaluation.

2. GROUP

A group was not convened.

3. DETAILS OF INVESTIGATION

The NTSB Vehicle Recorder Division received the following MPFR:

Recorder Manufacturer/Model:	**Penny & Giles MPFR**
Recorder Serial Number:	**A13360-003**

3.1 Recorder Description

This model MPFR, the Penny & Giles MPFR, records flight and cockpit voice recorder (CVR) data. The CVR portion records 120 minutes of digital audio stored on solid state

memory modules. Four channels are recorded: one channel for each flight crew, an additional channel,[1] and one channel for the cockpit area microphone (CAM).

3.2 CVR Carriage Requirements

As a public use aircraft, federal aviation regulations (i.e., 14 *Code of Federal Regulations Parts* 91, 135, etc.) did not require a CVR. Two factors contributed to the aircraft being equipped with a CVR (MPFR):

- LAFD also used this aircraft for air ambulance flights and had an internal policy commitment that all air ambulance flights would be equipped with a CVR (MPFR).
- The manufacturer equipped this make and model aircraft with a MPFR.

3.3 Recorder Damage

Upon arrival at the laboratory, it was evident that the MPFR 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.[2]

Table 1: Audio Quality.

Channel Number	Content/Source	Quality	Duration
1	Pilot	Excellent	120 minutes
2	Crewmember	Excellent	120 minutes
3	Unknown	Excellent	120 minutes
4	CAM	Excellent	120 minutes

3.5 Timing and Correlation

Timing on the transcript is expressed in recorder elapsed time.

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 recording began when the helicopter was inflight, returning for fuel and water. On the return flight, there were several automated bank angle warnings.

At 04:06, the helicopter landed and refueled and filled the water to three-quarter tank. The crew discussed refueling to a level of 1,100.

At 11:26, the helicopter departed and made a water drop. During the drop there were automated bank angle warnings and a rotor low warning.

By 15:40, the helicopter landed and re-filled water.

[1] This report did not determine the precise source of each CVR channel.
[2] See attached CVR Quality Rating Scale.

By 21:18, the helicopter was airborne again.

Between 21:18 and 23:04, the crew discussed and planned their next water drop.

At 23:04, there was an automated bank angle warning, as the crew began their water drop run.

At 23:43, the flying pilot noted a problem.

At 23:46, there was a “tail too low” warning.

At 23:48, the non-flying crewmember advised the flying pilot to raise the collective and warned about a tree left of the helicopter.

At 23:54, the helicopter engine sound changed and developed a low frequency, cyclical sound that continued until the helicopter landed.

At 23:55, there was a “rotor low” warning.

By 23:58, the crew made a radio call that they had a problem and had struck trees.

At 23:59, there was a single chime annunciation.

At 24:07, the crew advised on the radio they were going to find a landing spot.

At 24:20, there was a single chime annunciation, as the crew identified a football field as their landing site.

Between 24:20 and 25:15, the crew flew the helicopter to a landing.

At 25:07, there was a single chime annunciation.

At 25:11, an automated voice annunciated “altitude. altitude.”

At 25:15, the crew reported they were safely on the ground.

After the landing, the crew discussed what occurred.

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.