

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



GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION

CEN14LA015

**By
Ben Hsu**

WARNING

The reader of this report is cautioned that the transcription of a video recording is not a precise science but is the best product possible from a National Transportation 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.

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February 9, 2015

Onboard Video Transcript

Group Chairman's Factual Report By Ben Hsu

1. EVENT

Location: Galveston, Texas
Date: October 23, 2013
Aircraft/ID: North American P-51D / N4151D
Operator: Lone Star Flight Museum
NTSB Number: CEN14LA015

2. SUMMARY

On October 23, 2013 about 1130 central daylight time, a North American P-51D airplane, N4151D, impacted water near Galveston Bay near Galveston, Texas. The airline transport pilot and passenger were fatally injured and the airplane was substantially damaged. The airplane was registered to the Texas Aviation Hall of Fame, Galveston, Texas, and operated by Lone Star Flight Museum, Galveston, Texas. Visual meteorological conditions prevailed and a flight plan was not filed for the 14 Code of Federal Regulations Part 91 flight. The flight originated from the Scholes International Airport (KGLS), Galveston, Texas, about 1120.

3. DIGITAL VIDEO RECORDER GROUP

A digital video recorder (DVR) group was convened on November 18, 2014 at the National Transportation Safety Board's (NTSB) Vehicle Recorder Laboratory to transcribe approximately 7 minutes and 32 seconds of video and audio recovered from the accident aircraft.

Chairman: Ben Hsu
Vehicle Recorder Specialist
National Transportation Safety Board

Member: Craig Hatch
Investigator In Charge
National Transportation Safety Board

Member: Clinton Crookshanks
Aerospace Engineer
National Transportation Safety Board

Member: David Gerlach
Aircraft Accident Investigator
Federal Aviation Administration, AVP-100

Member: Tom Gregory
Chief Pilot
Lone Star Flight Museum

4. DETAILS OF DEVICE INVESTIGATION

The NTSB's Vehicle Recorder Division received data from the following device:

Recorder Description: RO-1000 DVR
Recorder Serial Number: KAJM-0007

The device was recovered from Galveston Bay and, in accordance with NTSB procedures, was transported to the Vehicle Recorder Laboratory immersed in fresh water inside a sealed container. Laboratory examination indicated significant damage due to salt water immersion (Figure 1). The device was disassembled and cleaned using deionized water. The device's electronic components were dried in a vacuum oven for a period of 8 hours prior to data recovery.



Figure 1: RO-1000 DVR (S/N KAJM-0007)

4.1. Device Description

The RO-1000 is a digital video recorder that is capable of accepting and storing video from an external video source. The device has a 3.5" LCD screen, internal lithium-ion

battery, and is capable of recording video up to a resolution of 1280x960 pixels at up to 30 frames-per-second. Video is stored on removable non-volatile* memory.

4.2. Data Recovery Description

A binary image of the memory component was made using forensic tools. Initial examination indicated that the non-volatile memory contained no data files of interest. Additional data files were recovered using binary data-carving techniques. These additional files included a video file containing approximately 7 minutes and 32 seconds of audio and video from the accident flight.

4.3. Data Description

The video file recovered was recorded at a resolution of 720x480 pixels at 30 frames-per-second. The recorded video was from two cameras installed on the aircraft. The primary view was from a forward-facing camera mounted to the tail of the aircraft showing the aircraft's wings, forward fuselage section, and cockpit. Also visible in the primary view are the backs of the front-seat pilot's and rear-seat passenger's heads. The secondary view was from an aft-facing camera mounted in the cockpit of the aircraft showing the rear-seat passenger. The secondary view was displayed as an inset to the primary view in the lower-right corner. Audio was also recorded from the headset microphones which included intra-cockpit communication and radio and no issues were encountered during the transcription process.

* Non-volatile memory is semiconductor memory that does not require external power for data retention.

**Transcript of cockpit audio and video recorded in the accident aircraft (N4151D)
on October 23, 2013.**

LEGEND

HOT	Flight crew audio panel voice or sound source
RDO	Radio transmission from the aircraft
TWR	Radio transmission from the airport control tower
-1	Voice identified as pilot
-2	Voice identified as passenger
?	Unidentified voice
*	Unintelligible word
#	Expletive
@	Non-pertinent word
()	Questionable insertion
[]	Editorial insertion

Note 1: Times are expressed in elapsed time from start of video.

Note 2: Words shown with excess vowels, letters, or drawn out syllables are a phonetic representation of the words as spoken.

Note 3: A non-pertinent word, where noted, refers to a word not directly related to the operation, control or condition of the vessel.

Elapsed Time (mm:ss)	Source	Transcription
0:00		[Recording begins]
0:05	RDO-1	Galveston um Mustang four one five one delta is ready for departure one eight museum.
0:08	TWR	Bristow five nine seven you copy.
0:10	?	Yeah five nine seven parallel one eight taxiway left turn on course.
0:14	TWR	Mustang five one delta you see the helicopter off your left departing the parallel taxiway southbound.
0:19	RDO-1	Affirmative.
0:20	TWR	Alright he'll be in a left turnout uh flying the beach south er north uh eastbound. Uh just maintain uh visual separation with him museum departure is approved runway one eight cleared for takeoff wind calm.
0:33	RDO-1	Cleared for takeoff museum departure on one eight four one five one delta.
0:49	TWR	Petroleum two two alpha leaving the delta frequency change approved. Talk to you later.
0:56	?	Zero two two alpha roger have a good day.
0:57	HOT-1	Ok here we go.
2:28	TWR	Bristow five nine seven you gonna continue uh northeast?
2:32	?	Ah five nine seven uh on course is zero seven zero.
2:38	TWR	Bristow five nine seven uh leaving the delta frequency change approved. Have a good day.
2:38	?	Five nine seven.
3:06	HOT-2	It's an amazing sensation this.
3:09	HOT-1	Say again.
3:11	HOT-2	An amazing sensation. The noise the vibration. The smell. It's great.
3:12	HOT-1	Yeah.
4:03		[Begin right turn. Approximately 34 degrees established bank angle.]
4:20		[Wings level. Still climbing.]
4:31		[Begin left turn. Approximately 39 degrees established bank angle.]
4:55		[Wings level.]
5:36	TWR	Mustang five one delta did you want to go off frequency or are you just gonna circle out there for a while?
5:41	RDO-1	Ah we'll be back in twenty ah twenty five thirty minutes um I'll stay on your frequency. I may turn the volume down.
5:46	TWR	Roger.
5:47	RDO-1	Thanks.
5:50	HOT-1	How ya doing?
5:51	HOT-2	I'm doing great. Thanks. It's an amazing experience.
5:52		[Level flight. Begin right turn. Approximately 29 degrees established bank angle.]

Elapsed Time (mm:ss)	Source	Transcription
5:58	HOT-1	You wanna fly it?
6:00	HOT-2	Uh yes (I do), if you'll guide me through it. I'm not a pilot.
6:03	HOT-1	Ok. Just put your right hand on the stick.
6:06	HOT-2	Got it.
6:07	HOT-1	And if you move it to the right it'll roll to the right. If you move it to the left it'll roll to the left.
6:15	HOT-1	Go ahead and roll to the left. And then if you pull back on the stick the nose will come up.
6:16		[As passenger takes control, slight descent and increased bank angle to approximately 39 degrees.]
6:17		[Pilot raises right hand.]
6:23	HOT-1	There you go real small corrections. Very good. Keep it rolling to the left.
6:26		[Wings back to level, nose coming up.]
6:29		[Begin left turn. Approximately 34 degrees established bank angle. Nose slightly up.]
6:30		[Pilot nods head to left and gives hand gesture to left with right hand. Hand remains raised.]
6:44		[Nose begins slicing down.]
6:52	HOT-2	Very responsive.
6:53	HOT-1	What's that?
6:54	HOT-2	It's very responsive.
6:55	HOT-1	Very responsive. Like roll it. Move the stick to the right a little faster.
7:02		[Pilot gestures to right with right hand. Hand remains raised.]
7:03	HOT-1	Pull the nose up a little bit. Pull back. There you go. Pull back.
7:04		[Wings level. Beginning right turn.]
7:08		[Pilot gestures to pull back with right hand.]
7:09		[Pilot raises left hand. Right hand remains raised.]
7:14		[Pilot lowers left hand.]
7:14	HOT-1	As you roll you're gonna lose lift so you gotta pull back on the stick. Go ahead and roll level.
7:17		[Nose slicing down. Maximum bank angle approximately 89 degrees.]
7:20		[Pilot gestures to the left with right hand.]
7:21	HOT-1	Roll to the left.
7:23		[Pilot lowers right hand.]
7:25	HOT-1	Roll to the left.
7:27		[Coming out of turn, beginning to roll left. Nose is beginning to come up.]
7:32		[Banked approximately 15 degrees right. End of recording.]