

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



**GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION**

**CEN12FA534**

**By  
Bill Tuccio**

**WARNING**

The reader of this report is cautioned that the transcription of video 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.

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February 14, 2013

## **Video Factual Recorder**

### **Group Chairman's Factual Report By Bill Tuccio**

#### **A. EVENT**

Location: Taylorville, Illinois  
Date: August 11, 2012  
Aircraft: Hawker Beechcraft G18S, N697Q  
Operator: Barron Aviation Private Flight Services, LLC  
NTSB Number: CEN12FA534

#### **B. GROUP**

A group was convened on January 3, 2013.

Chairman: Bill Tuccio  
Aerospace Engineer  
National Transportation Safety Board

Member: Mike Folkerts  
Air Safety Investigator  
National Transportation Safety Board

Member: Floyd A. (Tony) James  
Air Safety Investigator  
Federal Aviation Administration

#### **C. SUMMARY**

On August 11, 2012, about 1124 central daylight time (CDT), a Hawker Beechcraft Corporation G18S airplane, N697Q, was substantially damaged when it impacted terrain in a residential neighborhood in Taylorville, Illinois. The commercial pilot sustained fatal injuries. The twelve parachutists were not injured and no persons on the ground were injured. The airplane was registered to Barron Aviation, LLC; Perry, Missouri, and operated by Barron Aviation Private Flight Services, LLC; Perry, Missouri, under the provisions of 14 Code of Federal Regulations Part 91, as a sport parachuting flight. Day visual meteorological conditions prevailed and no flight plan was filed. The local flight originated from Taylorville Municipal Airport (TAZ), Taylorville, Illinois.

Helmet mounted video recordings from parachutists onboard the flight were sent to the National Transportation Safety Board's Recorder Laboratory for readout. The video group meeting convened on January 3, 2013 and a transcript was prepared of the pertinent video recordings (see attached).

#### **D. DETAILS OF INVESTIGATION**

The NTSB Vehicle Recorder Division's Recorder Laboratory received a DVD and two SD cards.

##### **Recording Description**

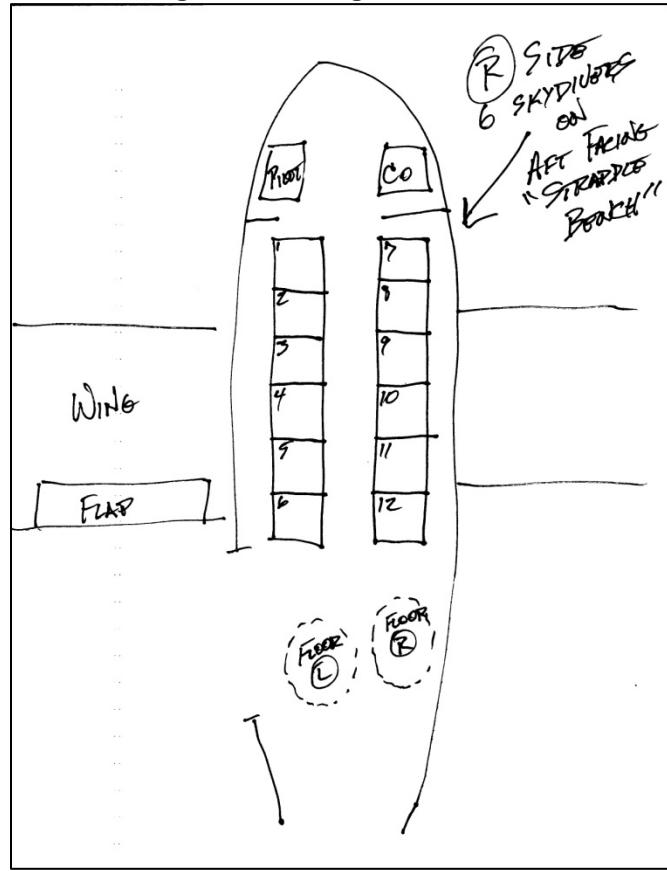
A total of 10 video recordings were received on the DVD and SD cards. Some of the files were duplicates. Seven of the 10 recordings were determined not to be relevant to the investigation. The remaining three recordings were determined to be relevant to the investigation. The videos were recorded from portable cameras mounted on the helmets of three different parachutists onboard the aircraft.

Table 1 identifies each of the videos as referenced in this report. Table 1 indicates the video resolution, total recording time, and the initial seating position of the parachutist-videographer. The seating layout is shown by the sketch in figure 1.

**Table 1. Video identification.**

<b>ID</b>	<b>Video Resolution</b>	<b>Length (minutes:seconds)</b>	<b>Initial Seat Position</b>
A	1280x960	02:03	#3
B	1280x960	07:33	#1
C	1920x1080	03:57	#6 or #12

Figure 1. Seating sketch.



### Timing and Correlation

Timing on the transcript to CDT was established by first correlating the timelines of the three recordings to common events between the recordings. The common video timeline was then correlated to an IIC supplied air traffic control (ATC) radar plot.

The between-video timing is shown in table 2. The offset of each video was determined by aligning the Video Elapsed Time with another video ("Other ID") as shown in table 2.

Table 2. Between-video timing.

ID	Video Elapsed Time (secs)	Other ID	Other Video Elapsed Time (secs)	Offset (secs)
A	7.50	B	239.93	232.43
B	239.93	A	7.50	0.00
C	87.47	A	23.83	168.79

The ATC reported position at 1123:14 CDT was aligned with video imagery observed 64.0 seconds from the start of Video C. Applying the Video C's between-video offset of 168.79 seconds to the 64.0 second Video Elapsed Time of Video C, resulted in a common Video Elapsed Time of 232.79 seconds for the observed aircraft position. Using this relationship, 40761.21 seconds was added to the common Video Elapsed Time to align the video timeline with CDT. The error bounds of the alignment of video imagery to the ATC reported position was not estimated.

## **Description of Audio Events**

Throughout the attached transcript, the parachutist who is the source of the particular recording is referred to as the *parachutist-videographer*. All the recordings began inside the aircraft and transitioned to outside the aircraft after the parachutist-videographer exited the aircraft.

The recording sequence began at about 1119:21 by parachutist-videographer B, who was initially positioned just behind the pilot in the forward part of the cabin. Parachutist-videographer B was the last parachutist off the aircraft, exiting the aircraft while it was in an abnormal flight attitude. The next video source began at 1122:10 by parachutist-videographer C, who was initially positioned farthest aft of all the video sources. Parachutist-videographer C was the first to exit the aircraft normally onto the exterior jump platform of the aircraft. The last video source began at 1123:14 by parachutist-videographer A, who was initially positioned just forward of the jump door. Parachutist-videographer B exited the aircraft during the aircraft upset.

Unless stated otherwise, aircraft positions and attitude descriptions are relative to the aircraft coordinate system. That is, left refers to the aircraft's left, and nose-up refers to the aircraft's nose up position, irrespective of aircraft attitude at the time of the observation.

The attached transcript was produced by the video group transcribing each of the three video sources independently. As such, the transcript may contain redundant observations. Further, the camera vantage point and field of view was constantly changing, especially during the aircraft upset.

The aircraft upset between 1123:33 and 11:23:41 was described by the group as follows. The aircraft rolled rapidly to the left, through inverted. As the left roll continued through inverted, the elevator evidenced a nose-down input. As the aircraft rolled back towards upright flight, the nose was between 40 and 70 degrees nose down.

Bill Tuccio  
Vehicle Recorder Division

CDT	Source	Summary Text
1119:21.2	B	Camera was facing parachutist-videographer who was wearing a white suit, blue harness, and goggles. Camera was facing towards the front of the aircraft. Two ventilation fans, in the cockpit door, were visible.
1119:23.3	B	Engine/propeller sound was recorded, consistent with normal, twin engine operation and propellers in sync.
1119:26.6	B	Unidentified parachutist yelled to another parachutist, "hey @*."
1119:27.4	B	Purple and green/yellow striped, jump suited female, turned her head towards the camera. A bearded male with a white jumpsuit and blue helmet, looked towards the camera. Further aft from bearded male was a white helmeted male; his helmet covered his mouth and nose and he was wearing a blue/black jumpsuit, and a helmet mounted camera. Counting from the aft bulkhead of the aircraft forward to the forward opening of the jump door, there were five parachutists. Remaining parachutists were forward of the jump door.
1119:28.3	B	Camera panned to the aft of the aircraft; parachutists were talking to each other; jump door was closed. Jump door was a transparent material with horizontal ribs; it was a roll up door. Door was on the left side of the aircraft and opened upwards, from left to right.
1119:34.4	B	Red jump light on aft bulkhead was on.
1119:41.1	B	All the parachutists forward of the jump door were seated, other than the parachutist-videographer, who was standing in the front of the plane.
1119:53.7	B	12 total parachutists were on the plane. Aft bulkhead of the plane had, from left to right, green, amber, and red jump lights. Red light was on.
1120:25.7	B	Camera panned towards the cockpit, showing the pilot in the left seat, an unoccupied right seat, and some gauges. The slip-skid ball indicator was centered. Altimeter indicated 10,400 feet. Manifold pressures were about 22 inHg. RPMs both indicated 2350. Both MP and RPMs were the same values for the left and right engine. The lower VOR needle was active and to the left.

\* @ refers to a person's name that has been redacted.

CDT	Source	Summary Text
1120:27.1	B	A very slight left turn was indicated on the attitude directional indicator. Vertical speed was about 300 feet per minute in a climb. Heading indicator was a two digit direction (the exact value could not be determined). The landing gear was up. The flap handle was up. The right and left fuel selectors were pointing at the inboard tanks. All manifold heats were off. The engine controls (from left to right) for propeller, throttle, and mixture were nearly full forward, and the left/right positions were nearly aligned for each of the propeller, throttle, and mixture levers (i.e., the same lever positions for the left and right engines). The left control yoke was deflected slightly left wing down; the right control yoke was not deflected at all (i.e., the left and right lateral displacement was not the same). The left yoke was farther aft than the right yoke. There were abrasion marks on the right side panel, where the right yoke showed evidence of rubbing against the right side panel. Engine instruments were all in the normal operating range. The tail wheel was locked. The left and right air vents were open.
1120:27.1	B	The pilot was wearing an orange shirt, parachute, and David Clark headsets with a boom microphone. Both his hands were on the yoke. He had a watch on his left wrist. The pilot was wearing a single shoulder harness over his left shoulder.
1120:27.8	B	The pilot was wearing glasses. The pilot's feet were both flat on the floor. Aircraft was flying approximately 100 miles per hour.
1120:29.2	B	The pilot's left thumb was on the yoke mounted push-to-talk switch (PTT), and the pilot was talking. On the overhead panel above the pilot were a set of three colored switches: red, amber, and green (from aft to forward). The red switch was positioned to the right, the amber and green switches were positioned to the left.
1120:34.5	B	The camera panned left towards the aft of the aircraft. There were parachutist instruction placards titled "Twin Beech" on the left and right hand walls of the aircraft; at least 2 placards per side.
1120:40.8	B	A parachutist asked, "Do you guys want me to shut the door?"
1120:58.6	B	A parachutist asked, "Hey @ do you want me to shut the door when I leave?" Another parachutist, with a black outfit and a camera mounted on his helmet, turned his head and spoke (unintelligible), while nodding his head up and down.
1121:18.5	B	The parachutists appear to be conversing normally under no stress.
1121:45.3	B	The parachutist-videographer held up his digital, wrist mounted altimeter, which read "943"
1122:02.8	B	A parachutist toward the front of plane pointed at the aft bulkhead and said "green light."
1122:05.0	B	Two parachutists, adjacent to the jump door, opened the jump door (rolling it up and towards the right of aircraft).

CDT	Source	Summary Text
1122:10.0	C	No one was yet out on the exterior jump platform of the aircraft, the jump door was open. One parachutist had his head out of the jump door, looking down and in other varied directions. The parachutist-videographer was nearly abeam the jump door. The camera perspective was 45 degrees left of aircraft longitudinal center, facing out the door. The sound of the engines was consistent with both engines/propellers operating in sync.
1122:16.7	C	The parachutist-videographer put his head out of the jump door, the audio was disrupted by air flow. The left propeller was turning normally. The left flap was retracted and the left aileron was neutral. Both fuel caps were on and the oil door was closed.
1122:27.8	C	The camera captured two parachutists' altimeters; they were indicating between 10,300 and 10,500 feet.
1122:35.2	C	The camera panned briefly towards the tail. No deflection of the left rudder or elevator control surfaces were evidenced.
1122:58.2	C	The aircraft was overhead the jump airport drop zone.
1123:03.8	B	One parachutist was kneeling in the aft, with his head out the door, looking down and in varied directions.
1123:12.8	C	The left flap deflected downward. Deflection of left flap was estimated to be less than 10 degrees.
1123:13.6	A	The parachutist-videographer was just forward of the jump door, on the left hand side of the plane. The camera was pointing aft. The jump door was open. There were five parachutists visible, all aft of the parachutist-videographer. Two were females with purple helmets.
1123:14.3	A	A parachutist said "green light"
1123:14.6	B	A parachutist said "green light." Two parachutists started to move outside the plane, three other parachutists in the aft were moving towards the door. All parachutists had started to stand up.
1123:15.1	A	Three parachutists began to exit onto the exterior jump platform. A parachutist's altimeter was indicating about 10,800 feet.
1123:15.8	A	Amber jump light was illuminated on the aft bulkhead.
1123:15.9	B	Amber jump light was illuminated on the aft bulkhead.
1123:16.7	B	Pilot's right hand was up, the hand was obscured by the ventilation fan in the cockpit door.
1123:16.9	B	Pilot's right hand moved back towards the yoke.
1123:17.0	A	Amber jump light went out and green jump light came on.
1123:17.1	C	The first parachutist fully exited the interior of the plane, and moved outside, aft of the jump door, onto the exterior jump platform.
1123:17.1	B	A parachutist said "green light."



<b>CDT</b>	<b>Source</b>	<b>Summary Text</b>
1123:18.4	B	The sound of the engines decreased. The propeller sound remained synchronized.
1123:19.6	A	The sound of the engines decreased. The propeller sound remained synchronized.
1123:19.8	B	More parachutists exited the jump door onto the exterior jump platform. Other parachutists in the front of the plane moved towards the aft.
1123:20.6	A	A fifth parachutist (female) began to exit onto the exterior jump platform.
1123:20.9	B	The green jump light on the aft bulkhead was on (amber and red light were off).
1123:21.0	C	The left flap had returned to zero deflection.
1123:21.7	B	Seven parachutists were still in the plane, the remaining five parachutists were on the exterior jump platform.
1123:25.6	A	Slight increase in engine sound.
1123:29.2	A	Sixth parachutist (female) kneeled inside, facing the jump door.
1123:29.2	B	Five parachutists were still in the plane.
1123:30.9	A	Slight increase in engine sound.
1123:31.0	B	Engine sound increased slightly and the propeller sound remained synchronized.
1123:33.1	B	Parachutists inside the plane moved single file towards the aft of the plane.
1123:33.2	B	Sound of warbly, high pitch tone, similar to stall warning.
1123:33.3	A	Seventh parachutist, with camcorder strapped to left side of helmet, was also kneeling inside the plane, facing the door, forward of sixth parachutist (female).
1123:33.4	A	Sound of warbly, high pitch tone, similar to stall warning.
1123:33.5	A	Parachutists began to yell "go go go" "get out".
1123:33.7	B	Parachutists began to yell "go go go" "get out".
1123:34.2	C	Unintelligible voice(s) from one or more parachutists (sound obscured as videographer C is outside of the plane standing on the aft, exterior jump platform).
1123:34.4	B	Blue suited parachutist, just in front of videographer (inside the plane, forward of the jump door), moved his hand towards the left side of the fuselage wall, while stumbling towards the front of the plane. Blue suited parachutist then continued towards the aft of plane.
1123:34.5	C	Parachutist-videographer began to depart from the exterior aft jump platform of the aircraft. Aircraft was in a steep, left bank. The left aileron was deflected down.

<b>CDT</b>	<b>Source</b>	<b>Summary Text</b>
1123:34.9	B	The parachutist who was on the exterior of the jump door, jumped from the plane. All parachutists began to move rapidly towards the jump door. Still five parachutists inside the plane.
1123:35.1	A	The parachutist on the exterior of the plane began to push away from the aircraft, beginning his free fall.
11:23:35.2	C	The parachutist-videographer was separated from the aircraft and behind the aircraft. The aircraft was in a left bank of approximately 100 degrees. The left aileron was deflected down. The left flap was zero.
1123:36.3	A	Five parachutists had exited the plane by this point, two more were in the door about to exit; parachutists exited nearly simultaneously. The left flap was zero. The left aileron was displaced slightly down. The aircraft had made a left hand roll, past inverted. Aircraft was nose down.
1123:36.5	C	The aircraft was upside down, nose down, roll angle was nearly 180 degrees. The parachutist-videographer was out and away from the plane. Five parachutists were out of the plane and above it. Two parachutists were in the jump door in the process of exiting. The pilot was visible in the cockpit, on the left side. The left wing aileron was deflected down.
1123:36.7	A	The aircraft had left rolled through inverted, and was nose down. Both propellers were rotating at about the same speed and in sync. The elevator was deflected down.
1123:37.2	A	The parachutist-videographer was out of the plane, looking back at the plane. The bottom of the plane was visible, below the parachutist (the ground was below the plane). A white jumpsuited parachutist had exited plane, a blue suited parachutist was just about to exit the plane. The hand of the last parachutist was visible at the bottom, forward of the jump door. Both flaps were zero. Ailerons were both near zero displacement.
1123:37.4	A	Ailerons may be slightly displaced, left aileron slightly down. Half of tail wheel was visible from its stowed position. The main landing gear was retracted. The elevator trim was visible trimmed nose high.
1123:37.6	C	The aircraft was upside down. The elevator was deflected downward (nose down). Eight parachutists were out of the plane and above it, with two more parachutists in the door.
1123:37.9	B	The second to last parachutist (in blue outfit), dived out of the door. Camera is looking up at sky, four parachutists are visible above the plane.
1123:38.1	B	Blue suited parachutist jumps out of the plane.
1123:38.4	A	The elevator was deflected downward (nose down).
1123:38.9	A	The last parachutist exited the plane. The parachutist trajectory, relative to the aircraft motion, was up.
1123:39.0	B	The camera vantage point showed part of the left trailing edge of the wing-flap, exterior jump door, and part of the tail. The plane was in a left hand turn past inverted, nose down approximately 40-60 degrees.

<b>CDT</b>	<b>Source</b>	<b>Summary Text</b>
1123:39.3	B	The last parachutist, who was also the videographer for this source, exited the plane. Aircraft was nose down. Digital wrist-altimeter showed "105".
1123:40.3	A	The parachutist-videographer was above the aircraft. The aircraft attitude was about 70 degrees nose down. The bank angle could not be determined.
1123:40.5	B	The parachutist-videographer had fully exited the aircraft. The exit point was over the airport that the parachutist-videographer ultimately landed at.
1123:41.0	C	The aircraft had left rolled through inverted, and was nose down between 60 and 80 degrees. The roll angle was indeterminate, but the aircraft was upright.
1123:41.5	B	The parachutist-videographer had exited the aircraft, six parachutists were visible at a higher altitude than the parachutist-videographer (the location of the other parachutists is unknown).
1123:43.4	C	The aircraft was nose down about 40-70 degrees, upright, wings were nearly level in the roll axis.
1123:44.7	B	The aircraft was visible for about a half second, nose down of at least 50 degrees.
1123:45.6	C	The aircraft exited the field of view of the camera.
1123:46.3	C	The aircraft briefly re-entered the field of view, well below the parachutist-videographer. The video continued until the parachutist-videographer landed at the airport.
1123:46.3	A	The aircraft was visible well below the parachutist-videographer; it remained in view for about 4 seconds.
1123:57.0	B	The parachutists continued their jump, most (if not all) ultimately landing at the airport.
1124:00.6	A	The parachutist-videographer wrist altimeter indicated 7,000 feet. The video ended shortly after the parachutist-videographer extended his parachute (i.e., well before the parachutist landed).