The following is excerpted from the book, Rescue 007: The Untold Story of KAL 007 and its Survivors, by Bert Schlossberg, Xlibris 2001, Appendix E, with the author's permission.

Last Moment Comparisons

Unique to our generation is the awful ability to hear the last words of a man, from whom we are removed in time and space, about to die. In every age, soldiers overhear their comrades' last words. Wardens, chaplains and other select personages often hear the last testaments of prisoners about to be executed. But in our generation, the black box—or the component of it called the Cockpit Voice Recorder (CVR)—allows us the privileged and horrific ability to hear the voices of people in the process of being overtaken by death.

US Air Flight 427
September 8, 1994—Pittsburgh, Pennsylvania

Flight 427, for reasons still unknown, has turned over onto its back and in another 16 seconds will hit the ground.

Copilot:
Oh, shit.

Captain:
Hang on. What the hell is this?

Cabin:
[*Sound of stick shaker vibrations indicating imminent stall; sound of altitude alert.*]

Captain:
What the…

Copilot:
Oh…

Captain:
Oh God, Oh God…

Approach:
USAir.

Captain:
Four twenty-seven, emergency!

Copilot:
[Screams.]

Captain:
Pull.

Copilot:
Oh…

Captain:
Pull… pull…

Copilot:
God…

Captain:
[*Screams.*]

Copilot:
No…

End of tape.[1]

Yukla 27
September 22, 1995—Elmendorf Air Force Base, Alaska

Immediately upon takeoff, Yukla 27, an Air Force Boeing 707 configured as a radar E-3A, took several Canadian geese in engines one and two, disintegrating fan blades. All 24 aboard were lost in the ensuing crash.

Cabin:
Yukla Two Seven heavy's [*indicating large or wide-bodied plane*] coming back around for an emergency return. Lower the nose. Lower the nose.

Tower:
Two Seven heavy, roger.

Captain:
Goin' down.

Copilot:
Oh my God.

Captain:
Oh shit.

Copilot:
Okay, give it all you got, give it all you got. Two Seven heavy, emergency…

Tower:
Roll the crash [*equipment*] roll the crash—

Copilot:
[Over public address system] Crash [*landing*]!

Captain:
We're going in. We're going down.

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[1] All transcripts in this appendix, except that of KAL-007, are taken from The Black Box, Malcom MacPherson (ed.) (Quill William Morrow, New York: 1998)

End of tape.

Atlantic Southeast Airlines Flight 529
August 21, 1995—Carrolton, Georgia

21 minutes into its flight, Flight 529's left engine has fallen apart or exploded. Parts of the propeller blades are wedged against the wing and the front part of the cowling is destroyed. The captain and seven passengers will die. The copilot will survive with burns over 80% of his body.

Captain:
[*To copilot*] Help me. Help me hold it. Help me hold it. Help me hold it.

Cabin:
[*Vibrating sound of the stick shaker starts warning of stall.*]

Copilot:
Amy, I love you.

Cabin:
[*Sound of grunting; sound of impact.*]

End of tape.

The transcripts of real-life tragedies as they happen are presented to us in this generation through the marvel known as the Cockpit Voice Recorder, a 2 1/2 pound orange (rather than black) box containing a 30 minute magnetic loop—always recording the previous 30 minutes at any point in an aircraft's flight (CVRs of new commercial aircraft contain two hours of self-erasing solid-state recorders). CVRs have been required by federal law in passenger aircraft since 1966. Only one CVR has yet to be recovered from the ocean floor—that of an Alitalia jet shot down off the coast of Libya, most probably by Libyan interceptors.

Aside from instances of electrical failure in an aircraft, which, we will see, was not the case with KAL 007, only one CVR that was recovered contains no last moments and no last words—KAL 007's. This incongruity with the reality of the way things ought to happen has been previously explored, but here it ought be noted that an anomaly has occurred comparable with other unique anomalies associated with the case of KAL 007—such as KAL 007's "crash" being the only one in which not a single body or suitcase has been found floating on the surface of the sea, or that of KAL 007's "devastation" crash disgorging only debris from the upper passenger cabin portion of the aircraft and nothing from the lower cargo section.

Comparisons of CVR transcripts of actual air emergencies are invaluable tools for understanding what the pilots of KAL 007 could have done, and indeed did do, to ensure the survival of their aircraft and safety of its passengers. These comparisons also provide us with a scenario of what could have happened to KAL 007 if its pilots had been less skillful and/or less able to work together in bringing their airplane to a safe water ditching.

Firstly, the 1993 ICAO report examined damage done to the aircraft—but none of the areas of damage, not all put together, can account for the sudden termination of its flight. The report would conclude that "all four engines must still have been functioning normally. The flight engineer also twice stated that the engines were normal. This suggested that the infrared guidance missile had not homed directly onto an engine."[2] But this "normal" working of engines

[2] ICAO report, 1993, pg. 55, section 2.16.10.

strengthened the indications, as did the Digital Flight Data Recorder information and the cockpit electronic transmits, that the electrical systems were also working normally.

Furthermore, aside from the damage to the tail portions from the Anab missile detonated 50 meters from the aircraft (a missile containing 20 kg high explosive warhead designed to produce 1,400 steel fragments, each of three to 18 grams.[3]), there was no evidence of damage to the jumbo jet anywhere except "holes with a total area of 1.75 square feet."[4]

This meant that structural damage itself to the fuselage of this aircraft could not account for the supposed disintegration of the aircraft or its "crash." The 11 second lapse between fragment impact and the warning alert of escaping air furthermore indicated, supported by CVR transcripts (pilot now speaking through his oxygen mask) that the plane could not have gone out of control because of pilot disorientation due to oxygen insufficiency.

This then left the malfunctioning of the control surfaces due to the missile impact itself (tail section) or due to loss or damage of hydraulic systems as the only apparently supportable explanation for both the supposed loss of pilot control and supposed loss of aircraft ability—required to explain a cataclysmic (and undocumented) crash.

The damage to the tail section involved damage to, and almost immediate unraveling of, the cable that connected the left inboard elevator to the right outboard elevator,[5] which resulted in the ensuing upward pitch of the aircraft. The CVR reveals this to be the immediate concern of the pilots.

Captain: (6:26:24)
Altitude is going up. Altitude is going up!

Captain: (6:26:25)
Speed brake is coming out.

Copilot: (6:26:26
What? What?

Captain: (6:26:29)
Check it out.

Copilot: (6:26:33)
I am not able to drop altitude—now unable.

Captain: (6:26:38)
Altitude is going up.

Captain: (6:26:40)
This is not working. This is not working…[6]

The effect of the above mechanical damage would be evaluated by ICAO investigators in the light of failures in KAL 007's hydraulic systems as an aircraft's hydraulic systems are

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[3] ibid., pg. 39, section 1.16.22.

[4] ibid., pg. 54, section 2.16.4.

[5] ibid., pg. 54, section 2.16.2

[6] ibid., pg. 13.

designed to maintain control of its moveable surfaces during its flight ensuring stability of the aircraft's three axes.[7]

Based on the triple axes Digital Flight Recorder charts of KAL 007's post-hit flight (charts which also provide other information such as altitude and acceleration changes), as well as investigators' conclusions from these charts which bear on hydraulic functioning, we can recreate the in-cockpit drama from the time of missile impact relating that to aircraft functioning—until the end of the black box recording—a span of one minute and thirteen seconds. For our purposes, we need only deal with the first 50 seconds of the post-hit flight.

Here, then, is the reconstruction. The missile detonates. Captain Chung calls out, "What was that?" The plane has suddenly increased its forward acceleration and begins to both pitch its nose upward and to ascend in altitude. The copilot responds, "What?" The aircraft, now a few seconds after missile impact, begins roll to the right. This motion will eventually end after 40 seconds, with the right wing down 50 degrees. 60 degrees is considered dangerous. "The aircraft rolled very slightly right wing down."[8] The captain calls out, "Reduce throttles." The copilot responds, "What?" The rate of aircraft acceleration decreases slightly, but the aircraft is still rising. Yaw, which had begun immediately upon missile detonation, diminishes slightly. Chun, who had been turning the wheel (to control aircraft roll) with large movements, at eight seconds after detonation has been able to reduce his movements to small corrections. But at eight seconds after detonation, Chun says, "Altitude is going up. Altitude is going up." The control column, which ought to have moved forward automatically to put the nose down (the plane was on autopilot), does not move forward. This failure indicates that hydraulic system number three, which operates the autopilot Actuator A control system of the elevators was damaged or out. Hydraulic system number three also provided one half of the power for the inboard left and outboard right elevator surfaces. KAL 007 was flying with one half power to its elevator surfaces.

Captain: (6:26:38)
Altitude is going up.

Captain: (6:26:40)
This is not working. This is not working.

The autopilot is either tripped or switched off by Captain Chun—presumably to move the column forward himself. The column does move sharply forward but the aircraft does not respond and continues its upward arc.

Captain: (6:26:41)
Manually.

Copilot: (6:26:42)
Cannot do manually.

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[7] These three axes are:
Lateral axis—conceptually an axis through the side of the plane, rotation about which is called "pitch" (determining the positioning of the plane relative to the forward horizon.) The elevators located in the trailing edge of the horizontal tail section control this axis.
Longitudinal axis—conceptually an axis through the length of the plane, rotation about which is called "roll" (determining the positioning of the plane relative to the lateral horizon). The ailerons located in the trailing edge of the wings control this axis.
Vertical axis—conceptually an axis through the plane, top to bottom, rotation about which is called "yaw" (determining the positioning of the plane relative to its flight path). The rudder located in the trailing edge of the vertical tail controls this axis.

8 ibid., pg. 54, section 2.16.

This failure of the elevator to respond to manual control of the column indicates that there were failures in hydraulic systems one and two. These systems also controlled the yaw dampers, which explain why oscillating, yawing motions were experienced immediately upon missile detonation.

CVR transcripts of actual air emergencies provide us with an incident that fleshes out for us what it might have been like in the cockpit of KAL 007. There are striking similarities in the cases of KAL 007 and this incident, but KAL 007 might indeed have been in a more enviable position.

The incident unfolds with United Airlines Flight 232, a DC-10 piloted by 58-year-old Captain Al Haynes on July 19, 1989, on a flight from Denver, Colorado, to Chicago, Illinois. The aircraft was at 37,000 feet altitude, about 2,000 feet higher than KAL 007 when it was hit, when the jet experienced an explosion of its number two engine, located in its tail. Engine and fan blade parts severed and destroyed all three of its hydraulic systems (Flight 007 retained full operational capability of one of its hydraulic systems—number four). There is no indication of damage to hydraulic system number four. "With the wing flaps up, lateral control of the Boeing 747 aircraft was achieved with the inboard ailerons and the five outer spoiler segments on each wing. When the only hydraulic power available was system number four, control was reduced to the right inboard aileron and the innermost of the spoiler segments on each side." (ICAO, 1993, pg. 54, section 2.16.4.) Like Flight 007, Flight 232 was able to execute turns in only one direction—to its right. Like Flight 007, Flight 232 had sufficient engine power (engines one and three in the wings were operating normally). Oxygen was likewise sufficient and there was no evidence, aside from the tail section, of significant structural damage.

Common problems had to be faced—stability with minimal rudder and elevator power, maneuvering turns (232 was able to do this by increasing and decreasing power alternately to its two remaining engines), ensuring stability in banks, however slight, lowering the landing gear, either by gravity or by cranking (Flight 007's crew were possibly presented with this problem as a ground landing on Sakhalin Island might have been contemplated at first), and precise calculations for the dumping of fuel, guaranteeing enough left over to ensure arriving at the desired destination but not enough to cause an explosion if the landing were "hard." Quite like Flight 007's final flight path, Captain Haynes and his flight crew brought his DC-10 down in large spirals, seeking to land at Sioux City, Iowa. The DC-10 had traveled more than 18 miles after descending from 37,000 feet to 33,000 feet with zero hydraulics.

Upon touchdown at runway 22 at Sioux City Airport, the right wing tip made contact with the runway, subsequently breaking the right main landing gear. The airliner skidded off the runway and turned upside down in a corn field. Most of the right wing and tail section were broken off. Of the 296 passengers and crew aboard, 185 survived, including Captain Haynes.

For the purposes of comparison with Flight 007, only those portions of the transcript, which illuminate the process, and experience of flying without hydraulic power are here presented. This will amply illustrate and support the contention that Flight 007 certainly could have been flown a short distance on at least one-quarter hydraulic power if a DC-10 could be flown a longer[9] distance on no hydraulic power whatsoever.

SAM[10]:
United Two thirty-two, is all hydraulic quantity gone?

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[9] General Kornukov ordered the shooting down of KAL 007 as it was leaving Soviet airspace and about to enter international waters. Flight 007's flight after missile impact would have been about 14 to 16 miles. See chart in Appendix G.

10 United Airlines Systems Aircraft Maintenance representative.

Flight Engineer:
Yes, all hydraulic quantity is gone.

Copilot:
Level off.

Approach:
United Two thirty-two heavy, souls on board and fuel remaining?

Copilot:
Souls on board and fuel remaining. We have thirty-seven six [*on fuel*].

Flight Engineer:
We've got thirty-seven four on fuel.

Approach:
Roger…

Copilot:
What's the hydraulic quantity?

Flight Engineer:
Down to zero.

Copilot:
On all of them?

Flight Engineer:
[*On*] all of them.

Haynes:
Quantity, quantity is gone?

Flight Engineer:
Yeah, all of the quantity is gone. All pressure is [*gone*].

Haynes:
[*Did*] you get hold of SAM?

Flight Engineer:
Yeah, I've talked to him.

Haynes:
What's he saying?

Flight Engineer:
He's not telling me anything.

Haynes:
We're not going to make the runway, fellas. We're going to have to ditch this son of a bitch and hope for the best.

Cabin:
[*Sound of three knocks.*]

Haynes:
Unlock the damn door.

Copilot:
Unlock it.

Haynes:
We've lost… no hydraulics. We have no hydraulic fluid. That's part of our main problem…

Jumpseat Captain:
[*Returning to cockpit*] Okay, both your inboard ailerons are sticking up. That's as far as I can tell. I don't know…

Haynes:
Well, that's because we're steering, we're turning maximum turn right now.

Jumpseat Captain:
Tell me. Yell what you want and I'll help you.

Haynes:
Right throttle. Close one, put two up. What we need is elevator control. And I don't know how to get it.

Jumpseat Captain:
Okay, ah…

Flight Engineer:
[*To Dispatch*] Roger, we need any help we can get from SAM, as far as what to do with this. We don't have anything. We don't [*know*] what to do. We're having a hard time controlling it. We're descending. We're down to seventeen thousand feet. We have… ah, hardly any control whatsoever…

Haynes:
You want full aileron and full elevator. No, no, no, no, no, not yet. Wait a minute. Wait till it levels off. Now go.

Flight Engineer:
[*To Dispatch*] Well, we can't make Chicago. We're going to have to land somewhere out hear, probably a field.

Haynes:
How're they doing on the excavation [*preparations*]?

Jumpseat Captain:
They're putting things away, but they're not in any big hurry…

SAM:

United Two thirty-two, we [*understand that you]* have to land [*at*] the nearest airport, the nearest airport. Ah, I'm tryin' to find out where you've lost all three hydraulic systems.

Haynes:
Well, they'd better hurry. We're going to have to ditch, I think.

Jumpseat Captain:
Get this thing down. We're in trouble…

Flight Engineer:
[*To SAM*] That is affirmative. We have lost all three hydraulic systems. We have no quantity and no pressure on any hydraulic system…

Haynes:
[*To Sioux City Approach*] Sir, we have no hydraulic fluid, which means we have no elevator control, almost none, and very little aileron control. I have serious doubts about making the airport. Have you got someplace near there, ah, that we might be able to ditch? Unless we get control of this airplane we're going to put it down wherever it happens to be.

SAM:
Ah, United Two thirty-two, you have lost all manual flight-control systems?

Flight Engineer:
That's apparently true…

Approach:
United Two thirty-two heavy, can you hold that present heading, sir?

Haynes:
This is Sioux City, Iowa. That's where we're headed…

SAM:
He has no control. He's using that kind of sink rate, I believe. This is what he's doing. He's got his hands full for sure.

Haynes:
Okay, thank you. [*To Jumpseat Captain*] You're a little more... Let's see if you can make a left turn.

Jumpseat Captain:
Left turn. All right. Your speed is what? I'm worried about [*it*]. I don't want to stall you…

Fitch[11]:
You lost the engine, huh?

Haynes:
Yeah, well, yeah. It blew. We couldn't do anything about it. We shut it down.

Fitch:
Yeah.

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11 A training pilot for United riding in First Class.

Flight Engineer:
[*To SAM*] Go ahead with any help you can give us.

SAM:
United Two Thirty-two, understand that you have one and three engines operating. You have absolutely no hydraulic power. You have no control over the aircraft. Is that correct? …

Haynes:
Come on back, come on back, come on back... As soon as that [*is*] vertical, go for it, go for it. Watch that vertical speed the second it starts to move. Come back, come back, come back. Go for it. If we can get this under control elevator-side we can work on steering later.

Cabin:
[Laughter.]…

Haynes:
Anybody have any ideas about [*what to do about the landing gear*]? He [*the flight engineer*] is talking to SAM.

Fitch:
Yeah, he's talking to SAM. I'm gonna alternate-gear you. Maybe that will help you. [*But*] if there is no [*hydraulic*] fluid, I don't know how the outboard ailerons are going to help you.

Haynes:
How do we get [*landing*] gear down?

Fitch:
Well, they can free fall. The only thing is, we alternate the gear. We got the [*landing gear*] doors down?

Haynes:
Yep.

Copilot:
We're gonna have trouble stopping, too.

Haynes:
Oh, yeah. We don't have any brakes.

Copilot:
No brakes?

Haynes:
Well, we have some brakes [*but not much*]…

[*To Approach*] We're just passing it [*the highway*] right now. We're gonna try for the air[port]. [*To Fitch*] Is that the runway right there? [*To Approach*] We have the runway in sight. We have the runway in sight. We'll be with you shortly. Thanks a lot for your help.

Fitch:
Bring it on down… Ease 'er down.

Copilot:
Oh, baby.

Fitch:
Ease her down.

Haynes:
Tell 'em [*the passengers*] that we're just two minutes from landing.

Approach:
United Two Thirty-two heavy, the wind's currently three six zero at one one three sixty at eleven. You're cleared to land on any runway…

Haynes:
[*Laughs.*] Roger. [*Laughs.*] You want to be particular and make it a runway, huh?

Flight Engineer:
[*On public-address system to passengers*] Two minutes. Two minutes…

Fitch:
Yeah, I can see the runway, but I got to keep control on ya.

Copilot:
Pull it off a little.

Haynes:
See if you can get us a left turn.

Copilot:
Left turn just a hair, Al.

Haynes:
[*To Approach*] Okay, we're all three talking at once. Say it [*the wind*] again one more time.

Approach:
Zero one zero at one one, and there is a runway that's closed, sir, that could probably work to the south. It runs northeast to southwest.

Haynes:
We're pretty well lined up on this one here…

Fitch:
I'll pull the spoilers [*speed brakes*] on the touch[*down*].

Haynes:
Get the brakes on with me.

Approach:
United Two Thirty-two heavy, roger, sir. That's a closed runway, sir, that'll work, sir. We're gettin' the equipment off the runway. They'll line up for that one.

Haynes:
How long is it?

Approach:
Sixty-six hundred feet, six thousand six hundred. Equipment's comin' off.

Haynes:
[*To crew*] Pull the power back. That's right. Pull the left one [*throttle*] back.

Copilot:
Pull the left one back.

Approach:
At the end of the runway it's just a wide-open field.

Cockpit unidentified voice:
Left throttle, left, left, left, left…

Cockpit unidentified voice:
God!

Cabin:
[*Sound of impact.*]