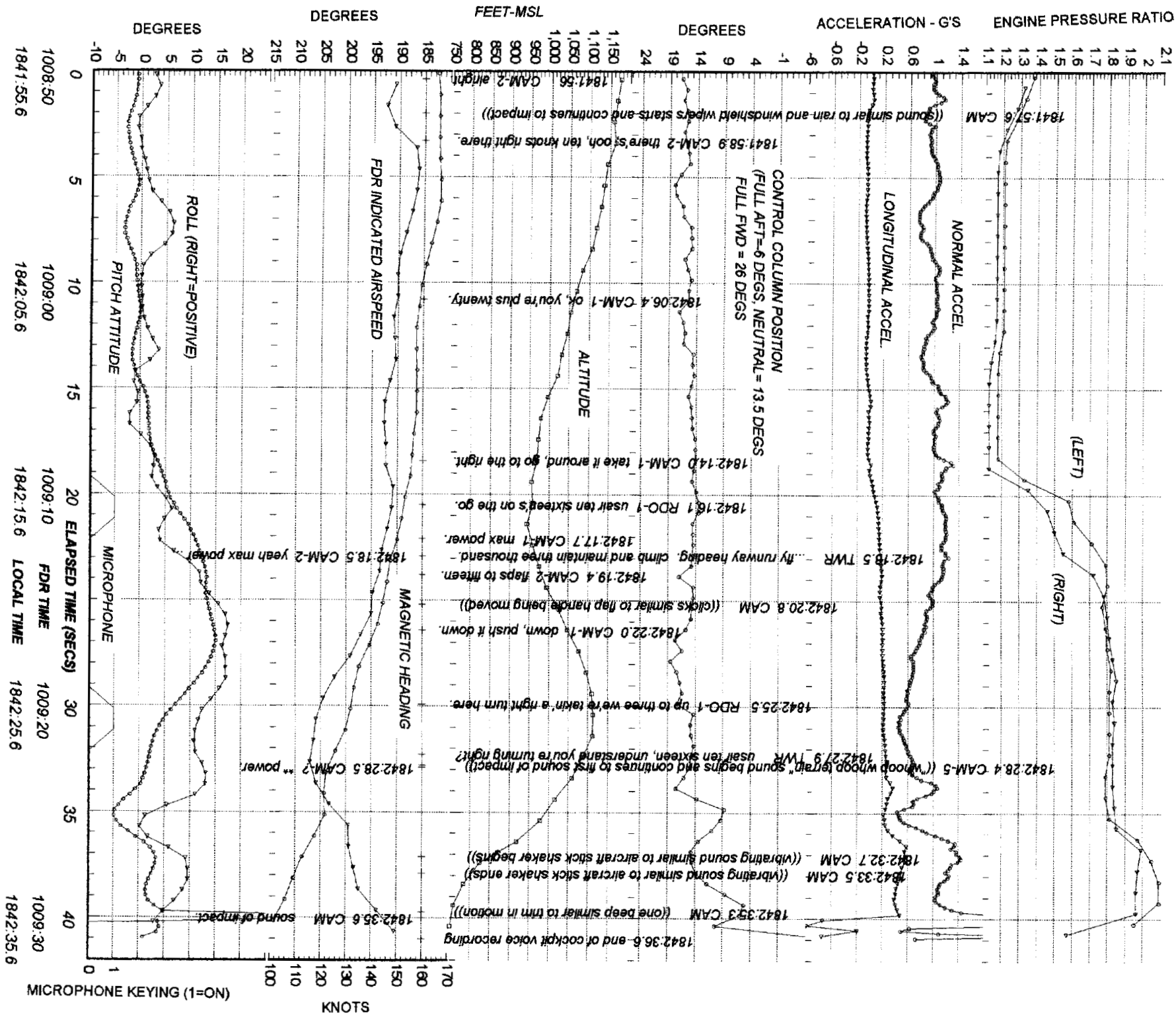# NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

SUPPLEMENT I TO THE AIRPLANE PERFORMANCE STUDY

by

Jim Ritter

USAIR FLIGHT #1016 FLIGHT DATA RECORDER (FDR) GRAPHS

ENGINE PRESSURE RATIO

ACCELERATION - G'S

DEGREES

FEET-MSL

DEGREES

DEGREES

DEGREES

(LEFT)

(RIGHT)

NORMAL ACCEL.

LONGITUDINAL ACCEL.

CAM

ALTITUDE

CONTROL COLUMN POSITION
(FULL AFT=-6 DEGS, NEUTRAL = 13.5 DEGS
FULL FWD = 26 DEGS

FDR INDICATED AIRSPEED

MAGNETIC HEADING

ROLL (RIGHT=POSITIVE)

PITCH ATTITUDE

MICROPHONE

MICROPHONE KEYING (1=ON)

KNOTS

ELAPSED TIME (SECS)
LOCAL TIME
FDR TIME

1841:56 CAM-2 alright.
1841:58.9 CAM-2 there's ooh, ten knots right there.
((Sound similar to rain and windshield wipers starts and continues to impact))
1842:06.4 CAM-1 ok, you're plus twenty.
1842:14.0 CAM-1 take it around, go to the right.
1842:16.1 RDO-1 usair ten sixteen's on the go.
1842:17.7 CAM-1 max power.
1842:18.5 TWR ...fly runway heading, climb and maintain three thousand.
1842:18.5 CAM-2 yeah max power.
1842:19.4 CAM-2 flaps to fifteen.
1842:20.8 CAM ((clicks similar to flap handle being moved))
1842:22.0 CAM-1 down, push it down.
1842:25.5 RDO-1 up to three we're takin' a right turn here.
1842:27.9 TWR usair ten sixteen, understand you're turning right?
1842:28.4 CAM-5 ((whoop whoop terrain" sound begins and continues to first sound of impact))
1842:28.5 CAM-2 ** power.
1842:32.7 CAM ((vibrating sound similar to aircraft stick shaker begins))
1842:33.5 CAM ((vibrating sound similar to aircraft stick shaker ends))
1842:33.3 CAM ((one deep beep similar to trim in motion)))
1842:35.6 CAM sound of impact.
1842:36.6 end of cockpit voice recording

1841:57.6 CAM
1008:50   1841:55.6
1009:00   1842:05.6
1009:10   1842:15.6
1009:20   1842:25.6
1009:30   1842:35.6

① 1

Selected Events, USAir Flight #1016

(1) 18:30:15, RDO-1 we're gonna swing just uh, five degrees to the right here just uh, for about a quarter half mile.

(2) 18:30:44, CAM-1 bumpy in there.

(3) 18:32:18, CAM-1 looks like that's settin' just off the edge of the airport.

(4) 18:33:14, CAM-2 let's go right through that hole.

(5) 18:33:19, RDO-1 we're showin' a, little build-up here at uh, looks like it's sittin' on the radial. like to go about five degrees to the left, to the west.

(6) 18:33:27, APR1 how far ahead are you lookin' ten sixteen?

(7) 18:33:30, RDO-1 'bout fifteen miles.

(8) 18:33:32, APR1 I'm goin' to turn you before you get there. I'm goin' to turn you in about five miles northbound.

(9) 18:35:01, APR1 USAir ten sixteen, descend and maintain six thousand.

(10) 18:35:04, RDO-1 out of ten for six. US ten sixteen.

(11) 18:35:32, CAM-1 OK, your cabin's down, four pumps on, seat belt sign's on, hydraulics', on high on check, altimeters flight instruments thirty oh one, set.

(12) 18:35:52, CAM-1 approach brief?

(13) 18:35:53, CAM-2 visual back up ILS.

(14) 18:35:54, APR2 USAir ten sixteen turn ten degrees right, descend and maintain two thousand three hundred vectors to visual approach to one eight right.

(15) 18:36:24, CAM-1 slats out.

(16) 18:36:59, APR2 I'll tell you what, USAir ten sixteen, may get some rain just south of the field. might be a little bit comin' off north, just expect the ILS now. amend your altitude maintain three thousand.

(17) 18:38:27, APR2 USAir ten sixteen, turn right heading one seven zero, four from SOPHE, correction four from yeah SOPHE, cross SOPHE at or above three thousand cleared ILS one eight right approach.

(18) 18:38:38, CAM-1 looks like it's sittin' right on the [unreadable due to unrelated ATC transmission through cockpit speaker] .

(19) 18:38:47, CAM-2 flaps to five.

(20) 18:39:02, CAM-1 if we have to bail out *-

(21) 18:39:06, CAM-1 it looks like we bail out to the right.

(22) 18:39:09, CAM-2 amen.

(23) 18:39:09, CAM-1 ten miles to the VOR which is off the end of the runway. 'bout a mile off the end of the runway.

(24) 18:39:14, CAM-2 yeah.

(25) 18:39:16, CAM-1 so I think we'll be alright.

(26) 18:39:20, CAM-1 chance of shear.

(27) 18:39:24, APR2 Air ten sixteen, contact tower one two six point four.

The dialogue shown in italics occurred on the tower frequency before US1016 switched on at 18:39:30.

18:39:12, US806 And eight oh six looks like uh we've gotten a storm right on top of the field here

18:39:16, TWR USAir eight zero six affirmative

18:39:20, US806 We'll just delay for a while

(28) 18:39:30, CAM-2 fifteen. [sounds similar to flap handle movement]

(29) 18:39:43, CAM-2 gear down.

(30) 18:39:44, TWR ...Charlotte tower, runway...one eight right. cleared to land. following F one hundred short final. previous arrival reported smooth ride all the way down the final.

(31) 18:39:49, RDO-1 USAir ten sixteen, I'd appreciate a pirep from the guy in front of us.

(32) 18:40:06, CAM-1 twenty five. [clicks similar to flap handle being moved]

(33) 18:40:10, CAM-2 yep, laying right there this side of the airport, isn't it?

(34) 18:40:14, CAM-1 well.

(35) 18:40:15, CAM-2 the edge of the rain is, I'd say.

(36) 18:40:15, CAM-1 yeah.

(37) 18:40:21, CAM-2 flaps forty please.

(38) 18:40:42, TWR USAir ten sixteen, company "FK" one hundred just exited the runway, sir he said smooth ride.

(39) 18:40:48, TWR USAir nine sixteen wind is showing one zero zero at one nine.

(40) 18:40:56, CAM-2 one zero zero at one nine. eh?

(41) 18:40:59, TWR USAir ten sixteen, wind now one one zero at two one.

(42) 18:41:05, CAM-1 stay heads up.

(43) 18:41:06, TWR wind shear alert northeast boundary winds one nine zero at one three.

(44) 18:41:18, TWR Carolina fifty two eleven Charlotte tower, runway one eight right, cleared to land, wind one zero zero at two zero. wind shear alert, northeast boundary wind one nine zero at one seven.

(45) 18:41:32, TWR USAir eight zero six, you want to just sit tight for a minute sir?

(46) 18:41:35, US806 yes sir, we'd like to just sit tight.

(47) 18:41:37, TWR USAir seven ninety seven company aircraft in front of you is going to sit and wait a while sir. do you want to go in front of him?

(48) 18:41:43, US797 no no, it wouldn't sound like a good plan. we'll uh, it didn't look like a whole lot to us on the radar taxiing out so it shouldn't be uh, shouldn't be too many minutes.

(49) 18:41:54, CAM-1 here comes the wipers.

(50) 18:41:56, CAM-2 alright.

(51) 18:41:57.6, CAM [sound similar to rain concurrent with sound similar to windshield wipers starts and continues to impact]

(52) 18:41:58.9, CAM-2 there's, ooh, ten knots right there.

(53) 18:42:06.4, CAM-1 OK, you're plus twenty.

(54) 18:42:14.0, CAM-1 take it around, go to the right.

(55) 18:42:16.1, RDO-1 USAir ten sixteen's on the go. (US1016's altitude equal to approximately 200 feet-agl)

(56) 18:42:17.7, CAM-1 max power.

(57) 18:42:18.5, CAM-2 yeah max power ...

(58) 18:42:18.5, TWR USAir ten sixteen understand you're on the go sir, fly runway heading. climb and maintain three thousand.

(59) 18:42:19.4, CAM-2 flaps to fifteen.

(60) 18:42:20.8, CAM [clicks similar to flap handle being moved]

(61) 18:42:22.0, CAM-1 down, push it down.

(62) 18:42:25.5, RDO-1 up to three we're takin' a right turn here.

(63) 18:42:27.9, TWR USAir ten sixteen, understand you're turning right? (US1016's altitude begins decreasing below 350 feet-agl)

(64) 18:42:28.4, CAM-5 ["whoop whoop terrain" sound begins and continues to first sound of impact]

(65) 18:42:28.5, CAM-? ** power.

(66) 18:42:32.7, CAM [vibrating sound similar to aircraft stick shaker begins]

(67) 18:42:33.5, CAM [vibrating sound similar to aircraft stick shaker ends]

(68) 18:42:35.3, CAM [one beep similar to trim in motion]

(69) 18:42:35.6, CAM [sound of impact]

18:42:36.6, END of CVR RECORDING