

**DOCKET NO.: SA-519**  
**EXHIBIT NO. 10C**

**NATIONAL TRANSPORTATION SAFETY BOARD**  
**WASHINGTON, D.C.**

**TABULAR PRINTOUT OF SSFDR DATA**

**(40 pages)**

## **Attachment II**

### **Tabular Printout of SSFDR Data**

American Airlines Flt 1420, Little Rock, AR, 6/1/99, DCA99MA060  
 Plot 1, Created: January 12, 2000, Vehicle Recorders Division - NTSB

CVR Local Time	AIRSPEED	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
11:49:50	152	645	40.931	350.4	0.8050 0.9012 0.8898 0.9287 0.9424 0.9974 1.1004 1.1118	-0.0315 -0.0396 -0.0294 -0.0111	0.0418 0.0743 0.0438 0.0560	DWN LCK
11:49:51	155	631	40.416	339.4	1.1851 1.2149 1.2240 1.1737 1.1943 1.2194 1.1828 1.2469	-0.0071 -0.0152 -0.0091 -0.0010	0.0194 0.0275 0.0214 -0.0172	
11:49:52	158	607	39.362	337.5	1.1370 1.1691 1.1073 1.0363 1.0271 0.9264 0.9310 0.8852	-0.0193 -0.0355 -0.0376 -0.0274	0.0133 -0.0071 0.0296 0.0214	DWN LCK
11:49:53	156	586	39.629	326.6	0.8943 0.9287 0.9218 0.9928 0.9699 0.9355 0.9905 0.9745	-0.0355 -0.0335 -0.0355 -0.0355	0.0377 0.0682 0.0764 0.0743	
11:49:54	157	577	39.894	315.2	1.0363 1.0203 1.0317 1.0775 1.0523 1.0638 0.9882 1.0111	-0.0294 -0.0315 -0.0376 -0.0335	0.0113 0.0235 -0.0030 0.0051	DWN LCK
11:49:55	156	558	39.629	285.5	0.9310 0.9562 0.9218 0.8531 0.8852 0.8417 0.8600 0.9584	-0.0355 -0.0417 -0.0478 -0.0396	-0.0152 0.0031 -0.0111 0.0316	

CVR Local Time	AIRSPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
11:49:56	151	546	39.629	287.5	0.9653	-0.0376	0.0479	DWN LCK
					1.0386	-0.0355	0.0479	
					1.0134	-0.0376	0.0784	
					1.0203	-0.0376	0.0703	
					1.1370			
					1.1187			
					1.1920			
					1.1324			
11:49:57	156	527	40.156	255.4	0.9768	-0.0478	0.1333	
					0.9813	-0.0335	0.0987	
					0.8531	-0.0417	0.0886	
					0.8692	-0.0457	0.0642	
					0.9241			
					0.8714			
					0.9287			
					0.8737			
11:49:58	158	526	39.894	232.8	0.9195	-0.0437	0.0438	DWN LCK
					0.9607	-0.0437	0.0296	
					0.9562	-0.0335	-0.0132	
					0.9951	-0.0294	0.0194	
					0.9791			
					1.0248			
					1.0248			
					1.0798			
11:49:59	155	497	37.999	245.3	1.1096	-0.0417	0.0051	
					1.0432	-0.0355	0.0682	
					1.1531	-0.0233	0.0092	
					1.1027	0.0092	0.0194	
					1.0867			
					1.1050			
					1.1233			
					1.1897			
11:50:00	154	474	36.870	221.5	1.2194	0.0296	-0.0132	DWN LCK
					1.2423	0.0153	0.0031	
					1.2744	0.0072	-0.0111	
					1.2469	0.0072	-0.0233	
					1.2080			
					1.1210			
					1.0500			
					0.9997			
11:50:01	153	476	36.582	220.3	0.9745	0.0092	-0.0254	
					0.9195	-0.0030	-0.0335	
					0.9378	-0.0010	0.0235	
					0.9081	0.0072	0.0194	
					0.8714			
					0.8829			
					0.8966			
					0.8966			
11:50:02	152	457	37.999	190.2	0.9195	0.0133	0.0499	DWN LCK
					0.9584	0.0296	0.0947	
					0.9882	0.0458	0.0723	
					1.1141	0.0397	0.0621	
					1.1416			
					1.1782			
					1.1256			
					1.0546			

CVR Local Time	AIR SPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
11:50:03	151	441	38.550	198.8	1.0111 0.9218 0.8211 0.7799 0.7959 0.9012 0.8875 0.9722	0.0194 0.0153 0.0194 0.0336	0.0133 -0.0030 0.0438 0.0418	
11:50:04	153	435	38.276	178.5	0.9974 0.9951 1.0821 1.1118 1.0363 1.0226 1.0111 0.9882	0.0316 0.0336 0.0214 0.0235	0.0601 0.0479 0.0214 0.0397	DWN LCK
11:50:05	154	426	37.720	181.6	1.0386 0.9539 0.9882 0.9813 0.9539 0.9195 0.9791 0.9928	0.0092 0.0113 0.0296 0.0051	0.0336 0.0235 0.0397 0.0051	
11:50:06	155	413	37.439	185.9	0.9676 0.9997 0.9928 0.9562 0.8005 0.8142 0.7982 0.8142	-0.0071 -0.0213 -0.0355 -0.0233	0.0051 0.0031 0.0519 -0.0152	DWN LCK
11:50:07	156	398	37.720	166.0	0.8737 0.9241 0.9997 1.0363 1.1096 1.0615 1.0821 1.0821	-0.0274 -0.0254 -0.0274 -0.0152	0.0133 0.0479 0.0682 0.0886	
11:50:08	155	386	38.550	138.6	1.0523 1.0523 1.0180 1.1027 1.0363 0.9882 0.9974 0.9081	-0.0193 -0.0152 -0.0152 -0.0152	0.0336 0.0519 0.0214 0.0540	DWN LCK
11:50:09	155	377	39.094	124.9	0.9493 0.9195 0.9310 1.0226 0.9997 1.0729 1.1622 1.0638	-0.0071 0.0011 -0.0091 -0.0233	0.0764 0.0723 0.0723 0.0153	

CVR Local Time	AIRSPEED	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
11:50:10	154	365	39.362	105.8	1.0157	-0.0132	0.0438	DWN LCK
					1.0157	-0.0010	0.0275	
					0.9470	-0.0111	0.0316	
					0.9493	-0.0111	0.0458	
					0.9722			
					0.9401			
					0.9127			
					0.8829			
11:50:11	154	350	39.894	87.1	0.8371	-0.0132	0.0214	
					0.7524	-0.0254	0.0784	
					0.7959	-0.0213	0.0560	
					0.7478	-0.0132	0.0479	
					0.8600			
					0.8692			
					0.9081			
					0.9493			
11:50:12	156	332	40.675	68.7	0.9997	-0.0091	0.0499	DWN LCK
					1.0500	-0.0091	0.0601	
					1.1439	0.0031	0.0235	
					1.2240	-0.0050	0.0174	
					1.1118			
					1.2080			
					1.1828			
					1.1897			
11:50:13	157	304	41.438	53.8	1.2011	-0.0172	0.0499	
					1.1279	-0.0254	0.0784	
					1.1141	-0.0294	0.0458	
					1.1187	-0.0294	0.0499	
					1.1302			
					0.9974			
					0.9218			
					0.9058			
11:50:14	159	297	42.429	37.8	0.8463	-0.0396	0.0682	DWN LCK
					0.8211	-0.0437	0.1293	
					0.8966	-0.0396	0.1028	
					0.8760	-0.0417	0.0825	
					0.8875			
					0.9653			
					1.0317			
					1.0661			
11:50:15	160	291	43.390	25.7	1.0180	-0.0335	0.0764	
					1.1370	-0.0274	0.0479	
					1.2652	-0.0355	0.0560	
					1.2858	-0.0437	0.0499	
					1.2149			
					1.0775			
					1.2446			
					1.2607			
11:50:16	160	256	43.625	15.6	1.2309	-0.0640	0.0336	DWN LCK
					1.1691	-0.0579	0.0947	
					1.0798	-0.0620	0.0581	
					1.0226	-0.0722	0.0804	
					1.0386			
					1.0661			
					1.1233			
					1.2584			

CVR Local Time	AIRSPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
11:50:17	157	228	43.859	10.9	1.3133	-0.0946	0.1272	
					1.1073	-0.0885	0.1517	
					0.9653	-0.0885	0.1578	
					1.0019	-0.0762	0.1354	
					0.9447			
					0.9859			
					0.9333			
					0.9813			
11:50:18	163	232	43.625	6.2	1.0661	-0.0640	0.0235	DWN LCK
					0.9974	-0.0844	-0.0233	
					1.0683	-0.0864	-0.0193	
					0.9722	-0.0925	0.0031	
					1.0661			
					1.0340			
					1.0935			
					1.1553			
11:50:19	157	210	40.931	1.9	1.0844	-0.0783	-0.0498	
					0.9333	-0.0640	-0.0478	
					0.9401	-0.0579	-0.0518	
					0.7615	-0.0559	0.0113	
					0.8211			
					0.8073			
					0.8165			
					0.8623			
11:50:20	140	171	40.416	-0.5	1.2286	-0.1698	-0.0071	DWN LCK
					1.5514	-0.1027	0.0499	
					1.7002	-0.0946	0.0540	
					1.5583	-0.0844	-0.0233	
					1.2790			
					1.0546			
					0.9791			
					0.8989			
11:50:21	145	167	40.675	-0.9	0.7295	-0.0885	-0.0213	
					0.7684	-0.1047	-0.0193	
					0.8096	-0.1108	-0.0315	
					0.9447	-0.1149	-0.0640	
					0.9928			
					1.1645			
					1.1370			
					1.1943			
11:50:22	149	170	40.156	-0.1	1.1233	-0.1108	-0.0071	DWN LCK
					1.0134	-0.1169	0.0031	
					0.9653	-0.1271	-0.0213	
					0.9195	-0.1373	-0.0417	
					0.8920			
					0.8600			
					0.8394			
					0.8760			
11:50:23	149	152	39.094	-1.2	0.9951	-0.1698	-0.0478	
					0.9562	-0.1963	-0.0478	
					0.9012	-0.1943	-0.0600	
					0.9928	-0.1963	-0.0376	
					1.0340			
					1.0729			
					1.0867			
					1.0569			

CVR Local Time	AIRSPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
11:50:24	146	165	37.439	-1.2	1.1714	-0.2187	-0.0539	DWN LCK
					1.0775	-0.2187	-0.0376	
					1.0821	-0.2085	0.0194	
					0.9172	-0.2146	-0.0762	
					0.8737			
					0.8417			
					0.8440			
					0.8989			
11:50:25	143	163	36.001	-0.5	1.0180	-0.2472	-0.0010	
					1.0981	-0.2472	-0.0620	
					1.0775	-0.2512	-0.0355	
					0.9997	-0.2716	-0.0885	
					0.9745			
					0.9905			
					0.9745			
					1.0432			
11:50:26	140	167	34.203	-2.8	1.0500	-0.2777	-0.0823	DWN LCK
					1.0157	-0.2757	-0.0946	
					0.9630	-0.2431	-0.1312	
					0.9722	-0.1556	-0.0885	
					0.9951			
					0.9676			
					0.9791			
					0.9287			
11:50:27	137	178	31.030	-1.2	0.9333	-0.0600	-0.0885	
					1.0294	-0.0539	-0.1475	
					0.9768	-0.0559	-0.1332	
					1.0775	-0.0742	-0.1251	
					1.0180			
					1.0500			
					1.0180			
					1.0546			
11:50:28	134	200	29.017	-1.2	1.0042	-0.0925	-0.1312	DWN LCK
					0.9997	-0.1759	-0.1149	
					1.0134	-0.1739	-0.0762	
					1.0065	-0.1800	-0.0600	
					0.9562			
					0.9401			
					0.9813			
					0.9882			
11:50:29	133	211	29.697	-2.8	0.9928	-0.1841	-0.0742	
					1.0752	-0.1882	-0.0783	
					1.0271	-0.1983	-0.0437	
					1.0409	-0.2044	-0.0600	
					0.9836			
					1.0111			
					1.0180			
					0.9745			
11:50:30	133	192	30.700	-2.8	0.9539	-0.1963	-0.0396	DWN LCK
					0.9516	-0.2004	-0.0823	
					0.9951	-0.2004	-0.0355	
					1.0317	-0.2004	-0.0823	
					1.0271			
					0.9882			
					1.0248			
					1.0203			



CVR Local Time	AIRSPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
11:50:31	127	183	30.700	-2.4	1.0088	-0.2004	-0.0335	
					0.9951	-0.1983	-0.0742	
					0.9836	-0.1882	-0.0722	
					0.9722	-0.2044	-0.0885	
					0.8898			
					1.0340			
					1.0134			
					1.0271			
11:50:32	122	190	29.697	-2.4	1.0226	-0.1943	-0.0620	DWN LCK
					1.0271	-0.1922	-0.0681	
					0.9607	-0.1780	-0.0701	
					0.9378	-0.1841	-0.0823	
					0.9791			
					0.9768			
					1.0432			
					0.9493			
11:50:33	119	189	28.673	-2.0	0.9562	-0.1861	-0.1088	
					0.9630	-0.2105	-0.1027	
					0.9951	-0.2227	-0.1088	
					0.9745	-0.2289	-0.1108	
					0.9997			
					0.9722			
					0.9172			
					0.9974			
11:50:34	122	199	26.922	-2.0	1.0226	-0.2289	-0.0946	DWN LCK
					1.0340	-0.2411	-0.0946	
					0.9676	-0.2553	-0.1088	
					0.9928	-0.2390	-0.0925	
					0.9722			
					1.0134			
					1.0111			
					0.9722			
11:50:35	113	200	25.481	-2.4	1.0523	-0.0681	-0.0925	
					0.9081	-0.0335	-0.1454	
					0.9836	-0.0518	-0.1882	
					0.9058	-0.0396	-0.1658	
					1.0065			
					1.0042			
					0.9974			
					0.9470			
11:50:36	108	196	23.629	-1.2	0.9584	-0.0498	-0.1536	DWN LCK
					1.0248	-0.0620	-0.1536	
					1.0592	-0.0681	-0.1576	
					1.0180	-0.0620	-0.1373	
					1.0454			
					1.0134			
					0.9699			
					0.9127			
11:50:37	108	224	25.844	-1.2	0.8966	-0.0701	-0.1088	
					1.0180	-0.0722	-0.1068	
					1.0386	-0.0783	-0.0640	
					1.0111	-0.0946	-0.0661	
					1.0088			
					0.9539			
					0.9951			
					0.9768			

CVR Local Time	AIRSPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
11:50:38	111	221	31.682	-2.0	1.0042 0.9745 1.0386 1.0088 0.9447 0.9539 0.9676 1.0317	-0.1047 -0.1617 -0.1678 -0.1821	-0.0213 -0.0010 0.0133 0.0092	DWN LCK
11:50:39	105	220	38.276	-1.2	1.0248 1.0180 0.9699 0.9516 0.9333 0.9630 1.0248 1.0432	-0.1719 -0.1251 -0.1230 -0.1210	0.0255 0.0784 0.1191 0.1659	
11:50:40	103	214	44.091	-1.2	1.0386 1.0088 0.9355 0.9493 0.9539 1.0271 1.0317 1.0226	-0.1190 -0.1434 -0.1434 -0.1454	0.1374 0.1659 0.1639 0.1618	DWN LCK
11:50:41	95	217	48.311	-0.9	0.9836 0.9401 0.9905 0.9836 1.0294 0.9630 0.9607 0.8898	-0.1332 -0.1495 -0.1943 -0.2207	0.1578 0.1740 0.1659 0.1862	
11:50:42	90	234	51.724	-1.6	1.0477 1.0500 1.2721 0.9584 0.9516 0.9562 0.9149 0.8829	-0.3265 -0.3143 -0.2614 -0.2573	0.2147 0.2188 0.1903 0.2005	DWN LCK
11:50:43	78	235	55.797	-1.6	1.0569 1.0889 1.2080 1.0500 0.8302 0.7890 0.8531 1.0912	-0.2451 -0.1047 -0.0966 -0.1129	0.3002 0.2025 0.2330 0.2025	
11:50:44	70	246	59.967	-2.0	0.9745 0.9447 0.5601 0.5601 0.8119 1.3293 1.4415 1.1622	-0.0803 -0.1129 -0.3998 -0.1353	0.1618 0.1923 0.4447 0.2005	DWN LCK

CVR Local Time	AIRSPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
11:50:45	52	269	63.794	-2.0	0.8692 0.7776 0.8577 0.9378 1.0386 1.1599 1.2446 0.9928	-0.1271 -0.1393 -0.1902 -0.1658	0.1639 0.1944 0.2086 0.1903	
11:50:46	59	275	67.507	-2.0	0.7180 0.6059 0.8371 1.3889 1.2423 1.1828 1.1118 0.5875	-0.1210 -0.2573 -0.2309 -0.1169	0.2208 0.3389 0.2473 0.0906	DWN LCK
11:50:47	41	270	71.030	3.4	0.5853 0.6929 1.1210 2.0208 1.4324 0.3815 0.4341 -0.0810	-0.1658 -0.9105 0.0458 -0.5463	0.1333 -0.4669 0.1171 -1.0835	
11:50:48								
11:50:49								
11:50:50								

American Airlines Flt 1420, Little Rock, AR, 6/1/99, DCA99MA060  
 Plot 2, Created: August 30, 1999, Vehicle Recorders Division RE-40 - NTSB

CVR Local Time (hh:mm:ss)	ROLL (DEG.)	PITCH (DEG.)	THRST REV LH	THRST REV RH	GPWS WARN	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT QBD	SPOILER RT INBD	G-S DEV 1 (dots)	LOC. DEV 1 (dots)
11:49:50	-6.0	-3.2	STW		Off	3.5	3.9	0.6	0.6	0.5	-0.6	-0.4
	-3.9	-1.8					6.7		1.4	2.1		
11:49:51	-2.1	-0.7		STW	Off	-5.3	9.2	2.7	5.6	2.1	-0.6	-0.5
	-2.5	0.0					9.0		3.5	2.1		
11:49:52	-3.5	0.0	STW		Off	-9.8	7.5	-2.0	0.6	1.8	-0.5	-0.4
	-4.6	-1.1					7.4		0.6	0.9		
11:49:53	-3.9	-1.4		STW	Off	-2.8	6.7	7.8	0.6	1.5	-0.6	-0.6
	-2.8	-1.4					2.9		8.1	2.1		
11:49:54	-5.6	-1.1	STW		Off	-9.0	2.2	-3.3	8.4	2.1	-0.6	-0.6
	-9.1	-1.4					4.2		0.6	7.2		
11:49:55	-9.1	-2.1		STW	Off	-0.8	6.9	-4.7	0.6	5.8	-0.7	-0.7
	-6.0	-2.5					7.7		0.6	0.6		
11:49:56	-2.5	-2.1	STW		Off	-8.9	7.9	1.6	2.8	2.0	-0.6	-0.9
	-1.8	-1.4					5.0		2.4	2.0		
11:49:57	-1.1	-2.1		STW	Off	1.6	-1.8	7.4	8.1	1.9	-0.7	-0.8
	-2.5	-2.5					-0.6		8.4	2.1		
11:49:58	-5.3	-2.1	STW		Off	3.6	3.2	-0.6	7.0	2.0	-0.6	-0.9
	-7.4	-0.7					8.8		0.6	2.6		
11:49:59	-7.7	0.7		STW	Off	-4.4	9.2	-0.4	0.6	1.7	-0.7	-0.9
	-7.4	1.4					8.7		0.6	0.5		
11:50:00	-6.3	1.4	STW		Off	-9.7	8.8	-4.5	0.6	3.4	-0.7	-1.0
	-4.9	0.7					10.0		0.6	4.2		
11:50:01	-3.9	-1.1		STW	Off	3.9	10.0	-2.0	0.6	5.5	-0.9	-1.0
	-2.8	-1.4					1.4		0.6	1.5		
11:50:02	-2.5	-0.7	STW		Off	-9.9	-6.1	8.5	2.4	2.1	-1.1	-0.8
	-4.6	0.0					-6.5		9.1	1.9		
11:50:03	-8.1	-0.7		STW	Off	0.9	3.1	-6.7	0.6	7.8	-1.4	-0.9
	-7.7	-0.7					5.9		0.6	2.8		
11:50:04	-4.9	0.0	STW		Off	-8.7	10.0	-0.7	0.6	1.9	-1.5	-0.9
	-3.5	0.0					11.2		0.6	1.8		
11:50:05	-2.8	-1.4		STW	Off	-0.5	9.3	1.7	0.6	1.9	-1.7	-0.9
	-3.2	-2.5					6.7		2.1	1.9		
11:50:06	-4.6	-2.5	STW		Off	-2.9	10.3	-3.9	0.6	7.2	-2.0	-0.8
	-4.6	-2.5					11.2		0.6	1.1		
11:50:07	-3.2	-1.4		STW	Off	-8.4	6.0	7.1	0.6	2.0	-2.1	-0.7
	-2.1	-0.7					4.1		8.1	2.0		
11:50:08	-3.9	-0.7	STW		Off	-8.3	8.0	-6.5	1.0	6.0	-2.3	-0.7
	-3.2	-1.1					11.4		0.6	7.7		

CVR Local Time (hh:mm:ss)	ROLL (DEG.)	PITCH (DEG.)	THRST REV LH	THRST REV RH	GPWS WARN	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	G-S DEV 1 (dots)	LOC. DEV 1 (dots)
11:50:09	-0.4	-1.4		STW	Off	0.6	7.5	3.2	0.6	2.0	-2.6	-0.5
	1.4	-1.1					14.8		4.5	1.7		
11:50:10	2.8	-2.1	STW		Off	-8.8	16.9	-2.2	0.6	4.6	-2.8	-0.4
	4.6	-3.2					12.0		0.6	1.2		
11:50:11	6.0	-4.6		STW	Off	11.5	7.4	-0.6	0.3	1.8	-2.9	-0.3
	7.4	-3.9					11.1		0.6	2.0		
11:50:12	8.4	-2.1	STW		Off	-8.9	11.7	5.8	7.0	2.1	-2.9	-0.1
	7.0	-1.1					15.7		7.7	1.9		
11:50:13	5.3	-1.8		STW	On	-9.7	7.9	-1.0	0.6	1.8	-3.1	-0.1
	4.6	-3.2					12.8		0.6	5.5		
11:50:14	5.3	-3.9	STW		Off	10.2	7.9	1.6	0.6	0.9	-3.1	0.0
	6.0	-2.8					7.0		2.1	2.2		
11:50:15	6.0	-1.1		STW	Off	2.2	11.9	4.3	4.9	2.1	-3.0	0.1
	5.3	0.0					16.0		6.3	2.0		
11:50:16	4.9	-0.7	STW		Off	5.8	7.0	4.3	3.1	2.0	-2.7	0.1
	4.6	-1.1					6.0		5.9	2.2		
11:50:17	4.6	-1.4		STW	Off	6.0	-4.8	6.3	6.6	2.0	-1.0	0.2
	5.3	-1.1					-12.4		7.7	1.8		
11:50:18	4.9	-0.7	STW		Off	8.0	16.9	3.5	3.8	2.0	2.3	0.1
	3.2	0.0					19.2		5.6	1.9		
11:50:19	0.7	-0.7		STW	Off	6.8	21.7	1.2	0.3	1.2	0.1	0.0
	-1.8	-0.7					-4.6		1.4	1.7		
11:50:20	-1.4	-0.7	STW		Off	-3.9	0.2	4.3	2.8	1.6	-2.9	-0.1
	3.5	-1.1					0.0		7.4	1.8		
11:50:21	2.1	-1.8		STW	Off	-0.3	-8.3	4.7	8.4	1.8	-2.5	-0.2
	-1.1	-1.4					1.2		7.0	1.8		
11:50:22	-1.8	-1.8	UNL		Off	-12.6	-7.6	-1.3	0.6	1.8	-0.4	-0.3
	-0.4	-2.5					5.0		0.3	1.8		
11:50:23	0.7	-2.1		UNL	Off	-17.2	7.2	-1.7	0.3	1.8	-1.5	-0.4
	0.4	-1.8					4.6		0.3	1.8		
11:50:24	-0.7	-1.8	DPL		Off	-15.7	0.5	-2.2	0.3	1.4	-1.8	-0.5
	-0.4	-2.1					4.1		0.3	0.9		
11:50:25	1.1	-1.8		DPL	Off	-17.2	7.4	-4.6	0.3	0.6	-0.9	-0.6
	1.1	-1.8					16.3		0.3	5.8		
11:50:26	0.7	-1.8	DPL		Off	-15.6	15.7	-9.5	0.3	5.9	-1.3	-0.7
	0.0	-1.8					14.5		0.3	9.9		
11:50:27	-0.4	-1.4		UNL	Off	-14.6	14.8	-11.5	0.3	10.4	-0.7	-0.8
	0.0	-1.1					14.8		0.3	10.5		
11:50:28	0.4	-1.4	UNL		Off	-17.0	15.7	-9.8	0.3	10.2	-1.5	-0.9
	0.4	-1.4					7.4		0.3	0.4		

CVR Local Time (hh:mm:ss)	ROLL (DEG.)	PITCH (DEG.)	THRST REV LH	THRST REV RH	GPWS WARN	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	G-S DEV 1 (dots)	LOC. DEV 1 (dots)
11:50:29	0.0	-1.4		DPL	Off	-16.8	2.7	-1.1	0.3	1.1	-1.1	-1.0
	0.0	-1.4					3.6		0.6	1.4		
11:50:30	-0.4	-1.4	DPL		Off	-14.7	4.7	-2.0	0.6	1.3	-0.3	-0.9
	-0.4	-1.1					13.9		0.3	0.8		
11:50:31	0.4	-1.1		DPL	Off	-15.3	11.7	-8.8	0.3	6.5	0.0	-1.0
	1.8	-1.1					19.8		0.3	10.2		
11:50:32	2.5	-1.1	DPL		Off	-12.6	5.5	-12.7	0.3	11.7	0.5	-0.9
	2.1	-0.7					18.8		0.3	14.3		
11:50:33	2.1	-1.1		DPL	Off	-4.7	21.3	-12.8	-0.1	13.7	0.0	-0.8
	3.2	-1.1					23.9		-0.1	13.9		
11:50:34	2.5	-1.1	DPL		Off	-2.2	21.3	-13.3	-0.1	14.3	-0.9	-0.8
	2.8	-1.1					24.3		-0.1	17.7		
11:50:35	3.9	-1.4		UNL	Off	-2.1	22.1	-14.5	-0.1	46.1	-0.8	-0.7
	3.9	-1.1					21.3		-0.1	58.2		
11:50:36	2.1	-1.4	UNL		Off	-4.0	21.4	-14.5	-0.1	58.9	-0.3	-0.7
	1.4	-1.4					21.3		-0.1	55.3		
11:50:37	2.1	-1.4		UNL	Off	-2.8	21.7	-13.7	-0.1	32.5	-0.4	-0.4
	1.4	-1.4					22.0		-0.1	17.3		
11:50:38	1.8	-1.4	UNL		Off	-2.1	22.6	-4.7	-0.1	5.2	-0.2	0.1
	1.4	-1.4					22.7		-0.1	3.7		
11:50:39	1.4	-1.4		DPL	Off	-0.2	21.4	-0.6	-0.1	0.4	0.0	0.8
	1.8	-1.4					6.5		-0.1	0.4		
11:50:40	1.1	-1.4	DPL		Off	-0.9	4.6	2.4	-0.1	0.6	0.6	1.8
	0.7	-1.4					7.2		1.7	0.6		
11:50:41	0.4	-1.4		STW	Off	-2.6	15.0	-1.2	0.6	1.0	0.5	2.7
	0.0	-1.4					15.6		-0.1	7.8		
11:50:42	1.8	-1.4	DPL		Off	-0.8	17.4	1.3	-0.1	0.8	0.7	3.2
	2.1	-1.4					14.4		-0.1	0.0		
11:50:43	2.1	-1.1		STW	Off	5.8	2.0	11.2	7.4	0.6	1.0	3.4
	1.4	-1.1					-2.6		9.1	0.5		
11:50:44	2.5	-2.1	DPL		Off	11.4	-4.3	10.4	8.4	0.5	0.6	3.5
	2.1	-2.1					-4.8		7.0	0.6		
11:50:45	1.1	-1.8		STW	Off	8.6	-5.5	10.1	8.1	0.5	1.0	3.4
	1.8	-2.1					-9.7		7.4	0.7		
11:50:46	1.4	-2.5	DPL		Off	11.7	-8.7	9.9	6.6	0.4	0.3	3.4
	1.1	-2.1					-15.7		7.0	0.5		
11:50:47	0.7	-2.5		STW	Off	9.6	-20.7	6.6	5.2	0.6	0.4	3.2
	1.1	-5.3					-20.5		4.5	0.1		
11:50:48												
11:50:49												
11:50:50												

American Airlines Flight 1420, Little Rock, AR, 6/1/99, DCA99MA060  
 Engine Data, Created: August 30, 1999, Vehicle Recorders Division RE-40 - NTSB

CVR Local Time (hh:mm:ss)	PRESSURE (Fine) (FEET)	N1 LEFT ENGINE (%)	N1 RIGHT ENGINE (%)	EPR LT. ENGINE	EPR RT. ENGINE	THRST REV LH ENG	BRAKE PED. POS (LT.) (DEG.)	BRAKE PED. POS (RT.) (DEG.)	THRST REV RH ENG	EGT LT. ENGINE DEG-C	EGT RT. ENGINE DEG-C
11:49:50	645	69		1.30	1.30	STW	3.4			393	385
11:49:51	631		68	1.31	1.31			-0.6	STW	395	394
11:49:52	607	68		1.31	1.32	STW	3.5			397	395
11:49:53	586		68	1.30	1.30			-0.6	STW	396	390
11:49:54	577	68		1.30	1.30	STW	3.3			393	389
11:49:55	558		67	1.29	1.29			-0.4	STW	389	382
11:49:56	546	66		1.30	1.30	STW	3.5			387	383
11:49:57	527		69	1.30	1.32			-0.5	STW	392	390
11:49:58	526	67		1.27	1.28	STW	3.3			387	379
11:49:59	497		64	1.26	1.26			-0.5	STW	381	373
11:50:00	474	66		1.31	1.29	STW	3.4			389	385
11:50:01	476		70	1.37	1.36			-0.3	STW	398	397
11:50:02	457	73		1.45	1.42	STW	3.4			407	406
11:50:03	441		76	1.50	1.48			-0.4	STW	418	415
11:50:04	435	78		1.52	1.50	STW	3.2			422	418
11:50:05	426		77	1.50	1.49			-0.5	STW	425	419
11:50:06	413	77		1.41	1.43	STW	3.4			422	410
11:50:07	398		71	1.33	1.34			-0.4	STW	404	392
11:50:08	386	69		1.33	1.33	STW	3.3			398	395
11:50:09	377		71	1.36	1.37			-0.5	STW	404	403
11:50:10	365	72		1.38	1.39	STW	3.4			406	407
11:50:11	350		73	1.39	1.40			-0.3	STW	407	409
11:50:12	332	73		1.39	1.40	STW	3.4			410	408
11:50:13	304		71	1.35	1.34			-0.4	STW	405	397
11:50:14	297	70		1.32	1.32	STW	3.3			400	393
11:50:15	291		66	1.25	1.27			-0.3	STW	389	379
11:50:16	256	62		1.17	1.22	STW	3.4			376	366
11:50:17	228		54	1.13	1.14			-0.6	STW	353	341
11:50:18	232	50		1.12	1.11	STW	3.5			347	347
11:50:19	210		46	1.12	1.10			-0.5	STW	354	367
11:50:20	171	48		1.11	1.09	STW	3.3			355	372
11:50:21	167		47	1.11	1.12			-0.4	STW	378	408
11:50:22	170	46		1.10	1.09	UNL	3.1			362	380
11:50:23	152		43	1.17	1.09			0.1	UNL	377	380
11:50:24	165	55		1.35	1.14	DPL	2.9			432	434
11:50:25	163		57	1.77	1.25			2.8	DPL	471	489
11:50:26	167	91		1.89	1.67	DPL	2.2			500	516
11:50:27	178		70	1.33	1.41			6.7	UNL	440	424

CVR Local Time (hh:mm:ss)	PRESSURE ALT (Feet)	N1 LEFT ENGINE (%)	N1 RIGHT ENGINE (%)	EPR LT. ENGINE	EPR RT. ENGINE	THRST REV LH ENG	BRAKE PED. POS (LT.) (DEG.)	BRAKE PED. POS (RT.) (DEG.)	THRST REV RH ENG	EGT LT. ENGINE DEG-C	EGT RT. ENGINE DEG-C
11:50:28	200	56		1.24	1.13	UNL	1.8			378	371
11:50:29	211		52	1.47	1.19			15.3	DPL	438	431
11:50:30	192	76		1.51	1.23	DPL	19.2			456	450
11:50:31	183		62	1.46	1.28			18.0	DPL	438	427
11:50:32	190	73		1.30	1.27	DPL	19.0			421	400
11:50:33	189		57	1.58	1.25			18.6	DPL	416	418
11:50:34	199	86		1.98	1.64	DPL	7.1			486	497
11:50:35	200		84	1.59	1.74			18.5	UNL	502	465
11:50:36	196	63		1.16	1.19	UNL	17.3			402	386
11:50:37	224		48	1.13	1.11			18.6	UNL	375	368
11:50:38	221	50		1.21	1.10	UNL	17.4			395	378
11:50:39	220		47	1.23	1.15			18.4	DPL	454	433
11:50:40	214	54		1.15	1.10	DPL	17.8			396	397
11:50:41	217		41	1.12	1.08			18.9	STW	375	379
11:50:42	234	44		1.11	1.07	DPL	17.5			372	377
11:50:43	235		31	1.10	1.04			18.7	STW	373	351
11:50:44	246	40		1.08	1.04	DPL	17.4			369	378
11:50:45	269		30	1.08	1.04			18.7	STW	365	398
11:50:46	275	35		1.08	1.04	DPL	17.3			368	406
11:50:47	270		30	1.09	1.04			13.9	STW	386	408
11:50:48											
11:50:49											
11:50:50											



American Airlines Flt 1420, Little Rock, AR, 6/1/99, DCA99MA060  
 Control Surface Data, Created: August 30, 1999, Vehicle Recorders Division RE-40 - NTSB

CVR Local Time (hh:mm:ss)	HEADING	ROLL (DEG.)	PITCH (DEG.)	VERTICAL ACCEL (G'S)	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	LAT ACCEL (G'S)	LONG ACCEL (G'S)	ELEV RT POS (DEG.)	
11:49:50	40.9	-6.0	-3.2	0.8050	3.5	3.9	0.6	0.6	0.5	0.0418	-0.0315	-0.4	
		-3.9	-1.8	0.9012		6.7		1.4	2.1	0.0743	-0.0396		
				0.8898							0.0438	-0.0294	
				0.9287							0.0560	-0.0111	
				0.9424									
11:49:51	40.4	-2.1	-0.7	1.1851	-5.3	9.2	2.7	5.6	2.1	0.0194	-0.0071	-1.5	
		-2.5	0.0	1.2149		9.0		3.5	2.1	0.0275	-0.0152		
				1.2240							0.0214	-0.0091	
				1.1737							-0.0172	-0.0010	
				1.1943									
11:49:52	39.4	-3.5	0.0	1.1370	-9.8	7.5	-2.0	0.6	1.8	0.0133	-0.0193	0.2	
		-4.6	-1.1	1.1691		7.4		0.6	0.9	-0.0071	-0.0355		
				1.1073							0.0296	-0.0376	
				1.0363							0.0214	-0.0274	
				1.0271									
11:49:53	39.6	-3.9	-1.4	0.8943	-2.8	6.7	7.8	0.6	1.5	0.0377	-0.0355	-2.0	
		-2.8	-1.4	0.9287		2.9		8.1	2.1	0.0682	-0.0335		
				0.9218							0.0764	-0.0355	
				0.9928							0.0743	-0.0355	
				0.9699									
		0.9355											
		0.9905											
		0.9745											

CVR Local Time (hh:mm:ss)	HEADING	ROLL (DEG.)	PITCH (DEG.)	VERTICAL ACCEL (G'S)	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	LAT ACCEL (G'S)	LONG ACCEL (G'S)	ELEV RT POS (DEG.)	
11:49:54	39.9	-5.6	-1.1	1.0363	-9.0	2.2	-3.3	8.4	2.1	0.0113	-0.0294	-3.7	
		-9.1	-1.4	1.0203		4.2		0.6	7.2	0.0235	-0.0315		
				1.0317							-0.0030	-0.0376	
				1.0775							0.0051	-0.0335	
				1.0523									
				1.0638									
				0.9882									
11:49:55	39.6	-9.1	-2.1	0.9310	-0.8	6.9	-4.7	0.6	5.8	-0.0152	-0.0355	3.5	
		-6.0	-2.5	0.9562		7.7		0.6	0.6	0.0031	-0.0417		
				0.9218							-0.0111	-0.0478	
				0.8531							0.0316	-0.0396	
				0.8852									
				0.8417									
				0.8600									
11:49:56	39.6	-2.5	-2.1	0.9653	-8.9	7.9	1.6	2.8	2.0	0.0479	-0.0376	-6.1	
		-1.8	-1.4	1.0386		5.0		2.4	2.0	0.0479	-0.0355		
				1.0134							0.0784	-0.0376	
				1.0203							0.0703	-0.0376	
				1.1370									
				1.1187									
				1.1920									
11:49:57	40.2	-1.1	-2.1	0.9768	1.6	-1.8	7.4	8.1	1.9	0.1333	-0.0478	2.2	
		-2.5	-2.5	0.9813		-0.6		8.4	2.1	0.0987	-0.0335		
				0.8531							0.0886	-0.0417	
				0.8692							0.0642	-0.0457	
				0.9241									
				0.8714									
				0.9287									
11:49:58	39.9	-5.3	-2.1	0.9195	3.6	3.2	-0.6	7.0	2.0	0.0438	-0.0437	-2.0	
		-7.4	-0.7	0.9607		8.8		0.6	2.6	0.0296	-0.0437		
				0.9562							-0.0132	-0.0335	
				0.9951							0.0194	-0.0294	
				0.9791									
				1.0248									
				1.0248									
		1.0798											

CVR Local Time (hh:mm:ss)	HEADING	ROLL (DEG.)	PITCH (DEG.)	VERTICAL ACCEL (G'S)	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	LAT ACCEL (G'S)	LONG ACCEL (G'S)	ELEV RT POS (DEG.)
11:49:59	38.0	-7.7	0.7	1.1096	-4.4	9.2	-0.4	0.6	1.7	0.0051	-0.0417	-4.7
				1.0432		8.7		0.6	0.5	0.0682	-0.0355	
				1.1531						0.0092	-0.0233	
				1.1027						0.0194	0.0092	
				1.0867								
11:50:00	36.9	-6.3	1.4	1.2194	-9.7	8.8	-4.5	0.6	3.4	-0.0132	0.0296	-1.5
				1.2423		10.0		0.6	4.2	0.0031	0.0153	
				1.2744						-0.0111	0.0072	
				1.2469						-0.0233	0.0072	
				1.2080								
11:50:01	36.6	-3.9	-1.1	0.9745	3.9	10.0	-2.0	0.6	5.5	-0.0254	0.0092	4.6
				0.9195		1.4		0.6	1.5	-0.0335	-0.0030	
				0.9378						0.0235	-0.0010	
				0.9081						0.0194	0.0072	
				0.8714								
11:50:02	38.0	-2.5	-0.7	0.9195	-9.9	-6.1	8.5	2.4	2.1	0.0499	0.0133	-3.6
				0.9584		-6.5		9.1	1.9	0.0947	0.0296	
				0.9882						0.0723	0.0458	
				1.1141						0.0621	0.0397	
				1.1416								
11:50:03	38.6	-8.1	-0.7	1.0111	0.9	3.1	-6.7	0.6	7.8	0.0133	0.0194	2.6
				0.9218		5.9		0.6	2.8	-0.0030	0.0153	
				0.8211						0.0438	0.0194	
				0.7799						0.0418	0.0336	
				0.7959								
				0.9012								
				0.8875								
				0.9722								

CVR Local Time (hh:mm:ss)	HEADING	ROLL (DEG.)	PITCH (DEG.)	VERTICAL ACCEL (G'S)	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	LAT ACCEL (G'S)	LONG ACCEL (G'S)	ELEV RT POS (DEG.)	
11:50:04	38.3	-4.9	0.0	0.9974	-8.7	10.0	-0.7	0.6	1.9	0.0601	0.0316	-9.9	
		-3.5	0.0	0.9951		11.2		0.6	1.8	0.0479	0.0336		
				1.0821							0.0214	0.0214	
				1.1118							0.0397	0.0235	
				1.0363									
				1.0226									
11:50:05	37.7	-2.8	-1.4	1.0386	-0.5	9.3	1.7	0.6	1.9	0.0336	0.0092	2.2	
		-3.2	-2.5	0.9539		6.7		2.1	1.9	0.0235	0.0113		
				0.9882							0.0397	0.0296	
				0.9813							0.0051	0.0051	
				0.9539									
				0.9195									
11:50:06	37.4	-4.6	-2.5	0.9676	-2.9	10.3	-3.9	0.6	7.2	0.0051	-0.0071	3.6	
		-4.6	-2.5	0.9997		11.2		0.6	1.1	0.0031	-0.0213		
				0.9928							0.0519	-0.0355	
				0.9562							-0.0152	-0.0233	
				0.8005									
				0.8142									
11:50:07	37.7	-3.2	-1.4	0.8737	-8.4	6.0	7.1	0.6	2.0	0.0133	-0.0274	-2.6	
		-2.1	-0.7	0.9241		4.1		8.1	2.0	0.0479	-0.0254		
				0.9997							0.0682	-0.0274	
				1.0363							0.0886	-0.0152	
				1.1096									
				1.0615									
11:50:08	38.6	-3.9	-0.7	1.0523	-8.3	8.0	-6.5	1.0	6.0	0.0336	-0.0193	2.1	
		-3.2	-1.1	1.0523		11.4		0.6	7.7	0.0519	-0.0152		
				1.0180							0.0214	-0.0152	
				1.1027							0.0540	-0.0152	
				1.0363									
				0.9882									
		0.9974											
		0.9081											

CVR Local Time (hh:mm:ss)	HEADING	ROLL (DEG.)	PITCH (DEG.)	VERTICAL ACCEL (G'S)	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	LAT ACCEL (G'S)	LONG ACCEL (G'S)	ELEV RT POS (DEG.)
11:50:09	39.1	-0.4	-1.4	0.9493	0.6	7.5	3.2	0.6	2.0	0.0764	-0.0071	-11.1
		1.4	-1.1	0.9195		14.8	4.5	1.7	0.0723	0.0011		
				0.9310					0.0723	-0.0091		
				1.0226					0.0153	-0.0233		
				0.9997								
				1.0729								
11:50:10	39.4	2.8	-2.1	1.0157	-8.8	16.9	-2.2	0.6	4.6	0.0438	-0.0132	-1.4
		4.6	-3.2	1.0157		12.0	0.6	1.2	0.0275	-0.0010		
				0.9470					0.0316	-0.0111		
				0.9493					0.0458	-0.0111		
				0.9722								
				0.9401								
11:50:11	39.9	6.0	-4.6	0.8371	11.5	7.4	-0.6	0.3	1.8	0.0214	-0.0132	6.5
		7.4	-3.9	0.7524		11.1	0.6	2.0	0.0784	-0.0254		
				0.7959					0.0560	-0.0213		
				0.7478					0.0479	-0.0132		
				0.8600								
				0.8692								
11:50:12	40.7	8.4	-2.1	0.9997	-8.9	11.7	5.8	7.0	2.1	0.0499	-0.0091	-7.7
		7.0	-1.1	1.0500		15.7	7.7	1.9	0.0601	-0.0091		
				1.1439					0.0235	0.0031		
				1.2240					0.0174	-0.0050		
				1.1118								
				1.2080								
11:50:13	41.4	5.3	-1.8	1.2011	-9.7	7.9	-1.0	0.6	1.8	0.0499	-0.0172	6.8
		4.6	-3.2	1.1279		12.8	0.6	5.5	0.0784	-0.0254		
				1.1141					0.0458	-0.0294		
				1.1187					0.0499	-0.0294		
				1.1302								
				0.9974								
		0.9218										
		0.9058										

CVR Local Time (hh:mm:ss)	HEADING	ROLL (DEG.)	PITCH (DEG.)	VERTICAL ACCEL (G'S)	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	LAT ACCEL (G'S)	LONG ACCEL (G'S)	ELEV RT POS (DEG.)
11:50:14	42.4	5.3	-3.9	0.8463	10.2	7.9	1.6	0.6	0.9	0.0682	-0.0396	8.1
		6.0	-2.8	0.8211								
				0.8966								
				0.8760								
				0.8875								
11:50:15	43.4	6.0	-1.1	1.0180	2.2	11.9	4.3	4.9	2.1	0.0764	-0.0335	-8.7
		5.3	0.0	1.1370								
				1.2652								
				1.2858								
				1.2149								
11:50:16	43.6	4.9	-0.7	1.2309	5.8	7.0	4.3	3.1	2.0	0.0336	-0.0640	-2.9
		4.6	-1.1	1.1691								
				1.0798								
				1.0226								
				1.0386								
11:50:17	43.9	4.6	-1.4	1.3133	6.0	-4.8	6.3	6.6	2.0	0.1272	-0.0946	-7.2
		5.3	-1.1	1.1073								
				0.9653								
				1.0019								
				0.9447								
11:50:18	43.6	4.9	-0.7	1.0661	8.0	16.9	3.5	3.8	2.0	0.0235	-0.0640	-9.9
		3.2	0.0	0.9974								
				1.0683								
				0.9722								
				1.0661								
		1.0340										
		1.0935										
		1.1553										

CVR Local Time (hh:mm:ss)	HEADING	ROLL (DEG.)	PITCH (DEG.)	VERTICAL ACCEL (G'S)	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	LAT ACCEL (G'S)	LONG ACCEL (G'S)	ELEV RT POS (DEG.)
11:50:19	40.9	0.7	-0.7	1.0844	6.8	21.7	1.2	0.3	1.2	-0.0498	-0.0783	5.5
		-1.8	-0.7	0.9333		-4.6		1.4	1.7	-0.0478	-0.0640	
				0.9401						-0.0518	-0.0579	
				0.7615						0.0113	-0.0559	
				0.8211								
				0.8073								
				0.8165								
				0.8623								
11:50:20	40.4	-1.4	-0.7	1.2286	-3.9	0.2	4.3	2.8	1.6	-0.0071	-0.1698	4.0
		3.5	-1.1	1.5514		0.0		7.4	1.8	0.0499	-0.1027	
				1.7002						0.0540	-0.0946	
				1.5583						-0.0233	-0.0844	
				1.2790								
				1.0546								
				0.9791								
				0.8989								
11:50:21	40.7	2.1	-1.8	0.7295	-0.3	-8.3	4.7	8.4	1.8	-0.0213	-0.0885	-10.5
		-1.1	-1.4	0.7684		1.2		7.0	1.8	-0.0193	-0.1047	
				0.8096						-0.0315	-0.1108	
				0.9447						-0.0640	-0.1149	
				0.9928								
				1.1645								
				1.1370								
				1.1943								
11:50:22	40.2	-1.8	-1.8	1.1233	-12.6	-7.6	-1.3	0.6	1.8	-0.0071	-0.1108	-11.8
		-0.4	-2.5	1.0134		5.0		0.3	1.8	0.0031	-0.1169	
				0.9653						-0.0213	-0.1271	
				0.9195						-0.0417	-0.1373	
				0.8920								
				0.8600								
				0.8394								
				0.8760								
11:50:23	39.1	0.7	-2.1	0.9951	-17.2	7.2	-1.7	0.3	1.8	-0.0478	-0.1698	-14.1
		0.4	-1.8	0.9562		4.6		0.3	1.8	-0.0478	-0.1963	
				0.9012						-0.0600	-0.1943	
				0.9928						-0.0376	-0.1963	
				1.0340								
				1.0729								
				1.0867								
				1.0569								

CVR Local Time (hh:mm:ss)	HEADING	ROLL (DEG.)	PITCH (DEG.)	VERTICAL ACCEL (G'S)	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	LAT ACCEL (G'S)	LONG ACCEL (G'S)	ELEV RT POS (DEG.)
11:50:24	37.4	-0.7 -0.4	-1.8 -2.1	1.1714 1.0775 1.0821 0.9172 0.8737 0.8417 0.8440 0.8989	-15.7	0.5 4.1	-2.2	0.3 0.3	1.4 0.9	-0.0539 -0.0376 0.0194 -0.0762	-0.2187 -0.2187 -0.2085 -0.2146	-13.6
11:50:25	36.0	1.1 1.1	-1.8 -1.8	1.0180 1.0981 1.0775 0.9997 0.9745 0.9905 0.9745 1.0432	-17.2	7.4 16.3	-4.6	0.3 0.3	0.6 5.8	-0.0010 -0.0620 -0.0355 -0.0885	-0.2472 -0.2472 -0.2512 -0.2716	-13.3
11:50:26	34.2	0.7 0.0	-1.8 -1.8	1.0500 1.0157 0.9630 0.9722 0.9951 0.9676 0.9791 0.9287	-15.6	15.7 14.5	-9.5	0.3 0.3	5.9 9.9	-0.0823 -0.0946 -0.1312 -0.0885	-0.2777 -0.2757 -0.2431 -0.1556	-11.7
11:50:27	31.0	-0.4 0.0	-1.4 -1.1	0.9333 1.0294 0.9768 1.0775 1.0180 1.0500 1.0180 1.0546	-14.6	14.8 14.8	-11.5	0.3 0.3	10.4 10.5	-0.0885 -0.1475 -0.1332 -0.1251	-0.0600 -0.0539 -0.0559 -0.0742	-11.5
11:50:28	29.0	0.4 0.4	-1.4 -1.4	1.0042 0.9997 1.0134 1.0065 0.9562 0.9401 0.9813 0.9882	-17.0	15.7 7.4	-9.8	0.3 0.3	10.2 0.4	-0.1312 -0.1149 -0.0762 -0.0600	-0.0925 -0.1759 -0.1739 -0.1800	-12.9



CVR Local Time (hh:mm:ss)	HEADING	ROLL (DEG.)	PITCH (DEG.)	VERTICAL ACCEL (G'S)	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	LAT ACCEL (G'S)	LONG ACCEL (G'S)	ELEV RT POS (DEG.)	
11:50:29	29.7	0.0	-1.4	0.9928	-16.8	2.7	-1.1	0.3	1.1	-0.0742	-0.1841	-11.9	
		0.0	-1.4	1.0752		3.6		0.6	1.4	-0.0783	-0.1882		
				1.0271							-0.0437	-0.1983	
				1.0409							-0.0600	-0.2044	
				0.9836									
11:50:30	30.7	-0.4	-1.4	0.9539	-14.7	4.7	-2.0	0.6	1.3	-0.0396	-0.1963	-12.3	
		-0.4	-1.1	0.9516		13.9		0.3	0.8	-0.0823	-0.2004		
				0.9951							-0.0355	-0.2004	
				1.0317							-0.0823	-0.2004	
				1.0271									
11:50:31	30.7	0.4	-1.1	1.0088	-15.3	11.7	-8.8	0.3	6.5	-0.0335	-0.2004	-10.4	
		1.8	-1.1	0.9951		19.8		0.3	10.2	-0.0742	-0.1983		
				0.9836							-0.0722	-0.1882	
				0.9722							-0.0885	-0.2044	
				0.8898									
11:50:32	29.7	2.5	-1.1	1.0226	-12.6	5.5	-12.7	0.3	11.7	-0.0620	-0.1943	-8.6	
		2.1	-0.7	1.0271		18.8		0.3	14.3	-0.0681	-0.1922		
				0.9607							-0.0701	-0.1780	
				0.9378							-0.0823	-0.1841	
				0.9791									
11:50:33	28.7	2.1	-1.1	0.9562	-4.7	21.3	-12.8	-0.1	13.7	-0.1088	-0.1861	-3.7	
		3.2	-1.1	0.9630		23.9		-0.1	13.9	-0.1027	-0.2105		
				0.9951							-0.1088	-0.2227	
				0.9745							-0.1108	-0.2289	
				0.9997									

CVR Local Time (hh:mm:ss)	HEADING	ROLL (DEG.)	PITCH (DEG.)	VERTICAL ACCEL (G'S)	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	LAT ACCEL (G'S)	LONG ACCEL (G'S)	ELEV RT POS (DEG.)	
11:50:34	26.9	2.5	-1.1	1.0226	-2.2	21.3	-13.3	-0.1	14.3	-0.0946	-0.2289	-3.0	
		2.8	-1.1	1.0340		24.3		-0.1	17.7	-0.0946	-0.2411		
				0.9676							-0.1088		-0.2553
				0.9928							-0.0925		-0.2390
				0.9722									
				1.0134									
11:50:35	25.5	3.9	-1.4	1.0523	-2.1	22.1	-14.5	-0.1	46.1	-0.0925	-0.0681	1.8	
		3.9	-1.1	0.9081		21.3		-0.1	58.2	-0.1454	-0.0335		
				0.9836							-0.1882		-0.0518
				0.9058							-0.1658		-0.0396
				1.0065									
				1.0042									
11:50:36	23.6	2.1	-1.4	0.9584	-4.0	21.4	-14.5	-0.1	58.9	-0.1536	-0.0498	2.4	
		1.4	-1.4	1.0248		21.3		-0.1	55.3	-0.1536	-0.0620		
				1.0592							-0.1576		-0.0681
				1.0180							-0.1373		-0.0620
				1.0454									
				1.0134									
11:50:37	25.8	2.1	-1.4	0.8966	-2.8	21.7	-13.7	-0.1	32.5	-0.1088	-0.0701	1.3	
		1.4	-1.4	1.0180		22.0		-0.1	17.3	-0.1068	-0.0722		
				1.0386							-0.0640		-0.0783
				1.0111							-0.0661		-0.0946
				1.0088									
				0.9539									
11:50:38	31.7	1.8	-1.4	1.0042	-2.1	22.6	-4.7	-0.1	5.2	-0.0213	-0.1047	-2.1	
		1.4	-1.4	0.9745		22.7		-0.1	3.7	-0.0010	-0.1617		
				1.0386							0.0133		-0.1678
				1.0088							0.0092		-0.1821
				0.9447									
				0.9539									
		0.9676											
		1.0317											

CVR Local Time (hh:mm:ss)	HEADING	ROLL (DEG.)	PITCH (DEG.)	VERTICAL ACCEL (G'S)	ELEV POS	LT RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	LAF ACCEL (G'S)	LONG ACCEL (G'S)	ELEV RT POS (DEG.)
11:50:39	38.3	1.4 1.8	-1.4 -1.4	1.0248 1.0180 0.9699	-0.2 21.4 6.5		-0.6	-0.1 -0.1	0.4 0.4	0.0255 0.0784 0.1191 0.1659	-0.1719 -0.1251 -0.1230 -0.1210	-2.2
11:50:40	44.1	1.1 0.7	-1.4 -1.4	1.0386 1.0088 0.9355 0.9493 0.9539 1.0271 1.0317 1.0226	-0.9 4.6 7.2		2.4	-0.1 1.7	0.6 0.6	0.1374 0.1659 0.1639 0.1618	-0.1190 -0.1434 -0.1434 -0.1454	-5.0
11:50:41	48.3	0.4 0.0	-1.4 -1.4	0.9836 0.9401 0.9905 0.9836 1.0294 0.9630 0.9607 0.8898	-2.6 15.0 15.6		-1.2	0.6 -0.1	1.0 7.8	0.1578 0.1740 0.1659 0.1862	-0.1332 -0.1495 -0.1943 -0.2207	-1.7
11:50:42	51.7	1.8 2.1	-1.4 -1.4	1.0477 1.0500 1.2721 0.9584 0.9516 0.9562 0.9149 0.8829	-0.8 17.4 14.4		1.3	-0.1 -0.1	0.8 0.0	0.2147 0.2188 0.1903 0.2005	-0.3265 -0.3143 -0.2614 -0.2573	1.3
11:50:43	55.8	2.1 1.4	-1.1 -1.1	1.0569 1.0889 1.2080 1.0500 0.8302 0.7890 0.6531 1.0912	5.8 2.0 -2.6		11.2	7.4 9.1	0.6 0.5	0.3002 0.2025 0.2330 0.2025	-0.2451 -0.1047 -0.0966 -0.1129	1.6

CVR Local Time (hh:mm:ss)	HEADING	ROLL (DEG.)	PITCH (DEG.)	VERTICAL ACCEL (G'S)	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	LAT ACCEL (G'S)	LONG ACCEL (G'S)	ELEV RT POS (DEG.)
11:50:44	60.0	2.5	-2.1	0.9745	11.4	-4.3	10.4	8.4	0.5	0.1618	-0.0803	-5.7
		2.1	-2.1	0.9447		-4.8		7.0	0.6	0.1923	-0.1129	
				0.5601						0.4447	-0.3998	
				0.5601						0.2005	-0.1353	
				0.8119								
				1.3293								
				1.4415								
				1.1622								
11:50:45	63.8	1.1	-1.8	0.8692	8.6	-5.5	10.1	8.1	0.5	0.1639	-0.1271	-18.0
		1.8	-2.1	0.7776		-9.7		7.4	0.7	0.1944	-0.1393	
				0.8577						0.2086	-0.1902	
				0.9378						0.1903	-0.1658	
				1.0386								
				1.1599								
				1.2446								
				0.9928								
11:50:46	67.5	1.4	-2.5	0.7180	11.7	-8.7	9.9	6.6	0.4	0.2208	-0.1210	-15.9
		1.1	-2.1	0.6059		-15.7		7.0	0.5	0.3389	-0.2573	
				0.8371						0.2473	-0.2309	
				1.3889						0.0906	-0.1169	
				1.2423								
				1.1828								
				1.1118								
				0.5875								
11:50:47	71.0	0.7	-2.5	0.5853	9.6	-20.7	6.6	5.2	0.6	0.1333	-0.1658	0.0
		1.1	-5.3	0.6929		-20.5		4.5	0.1	-0.4669	-0.9105	
				1.1210						0.1171	0.0458	
				2.0208						-1.0835	-0.5463	
				1.4324								
				0.3815								
				0.4341								
				-0.0810								
11:50:48												
11:50:49												
11:50:50												

American Airlines Flt 1420, Prior Landing, DCA99MA060  
 Plot 1 - Prior Landing, Created: January 12, 2000, Vehicle Recorders Division - NTSB

CVR Local Time	AIRSPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
06:58:15	143	766	174.6	15.9	0.9768	-0.0233	0.0092	
					0.9905	-0.0132	0.0051	
					1.0134	-0.0213	0.0174	
					1.0340	-0.0152	0.0255	
					1.1027			
					1.0775			
					1.1324			
					1.1004			
06:58:16	140	751	174.2	10.1	1.1187	-0.0091	0.0214	DWN LCK
					1.1118	-0.0050	0.0092	
					1.1302	-0.0152	0.0153	
					1.0867	-0.0213	0.0092	
					1.1027			
					1.0592			
					1.0523			
					1.0317			
06:58:17	136	729	174.2	6.2	1.0134	-0.0152	0.0194	
					1.0271	-0.0193	0.0235	
					1.0157	-0.0213	0.0031	
					1.0592	-0.0274	0.0133	
					1.1324			
					1.1073			
					1.1164			
					1.1027			
06:58:18	136	713	173.8	3.4	1.0683	-0.0417	0.0051	DWN LCK
					1.0340	-0.0559	-0.0010	
					1.0432	-0.0559	-0.0071	
					1.0065	-0.0518	-0.0071	
					0.9424			
					0.9264			
					0.9127			
					0.9516			
06:58:19	138	703	173.8	2.7	0.9264	-0.0437	-0.0010	
					1.0065	-0.0437	0.0031	
					1.0775	-0.0417	-0.0132	
					1.0958	-0.0396	0.0011	
					1.0867			
					1.0386			
					1.0019			
					0.9813			
06:58:20	135	697	173.8	-0.1	0.9928	-0.0478	-0.0274	DWN LCK
					0.9882	-0.0661	0.0235	
					1.0500	-0.1027	0.0255	
					1.0981	-0.0783	0.0275	
					1.1347			
					1.1370			
					1.1347			
					1.0294			
06:58:21	131	689	174.2	-0.5	0.9447	-0.0640	-0.0010	
					0.8989	-0.1759	-0.0030	
					0.7615	-0.1108	0.0214	
					0.8440	-0.1251	0.0336	
					0.7593			
					0.8966			
					1.0042			
					1.1805			

CVR Local Time	AIRSPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
06:58:22	132	691	175.1	-0.5	1.4598	-0.1393	0.0784	DWN LCK
					1.2217	-0.1353	0.0764	
					1.0729	-0.1291	0.0581	
					0.8302	-0.1251	0.0438	
					0.8463			
					0.9012			
					0.9974			
					1.0546			
06:58:23	129	702	175.5	-1.6	1.1370	-0.1230	0.0662	
					1.0180	-0.1312	0.0723	
					0.9447	-0.1353	0.0397	
					0.8920	-0.1393	0.0296	
					1.0088			
					1.0523			
					0.9791			
					0.9791			
06:58:24	125	703	176.0	-1.2	0.9745	-0.1373	0.0031	DWN LCK
					1.0363	-0.1332	-0.0315	
					1.0203	-0.1291	-0.0437	
					0.9882	-0.1353	-0.0539	
					0.9149			
					0.9447			
					0.9745			
					1.0683			
06:58:25	127	706	174.6	-2.0	1.0546	-0.1210	-0.0559	
					1.0248	-0.1210	-0.0539	
					0.9699	-0.1353	-0.0274	
					0.9424	-0.1495	0.0013	
					0.9470			
					0.9447			
					1.0500			
					1.0912			
06:58:26	124	708	173.8	-1.6	0.9813	-0.1495	-0.0050	DWN LCK
					1.0088	-0.1963	-0.0030	
					0.9539	-0.1922	0.0072	
					0.9997	-0.1922	0.0153	
					0.9653			
					1.0523			
					1.0203			
					0.9584			
06:58:27	123	705	174.6	-1.2	0.9195	-0.1922	0.0275	
					0.9997	-0.1882	0.0275	
					1.0546	-0.1882	0.0235	
					1.0867	-0.1882	0.0560	
					0.9974			
					0.9539			
					0.9401			
					0.9928			
06:58:28	118	701	175.5	-1.6	1.0386	-0.1943	0.0499	DWN LCK
					1.0752	-0.1882	0.0642	
					0.9607	-0.1922	0.0621	
					0.9401	-0.2024	0.0662	
					0.9516			
					0.9470			
					1.1164			
					0.9882			

CVR Local Time	AIRSPEED	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
06:58:29	116	703	176.0	-2.0	1.0661 0.9195 0.9630 0.9333 1.0775 1.0180 0.9447 1.0454	-0.1963 -0.1983 -0.2024 -0.2004	0.0418 0.0214 0.0214 0.0031	
06:58:30	112	708	176.0	-2.0	0.9424 1.0477 0.9149 1.0340 0.9653 1.0454 1.0019 0.9562	-0.1983 -0.1922 -0.1983 -0.1963	0.0275 0.0235 0.0235 0.0113	DWN LCK
06:58:31	108	708	176.0	-1.6	0.9607 1.0134 1.0271 1.0363 1.0226 0.9791 0.9562 0.9905	-0.2044 -0.2126 -0.2187 -0.2187	0.0296 0.0255 0.0153 -0.0050	
06:58:32	108	708	176.0	-2.0	1.0386 1.0340 0.9447 0.9791 0.9951 0.9791 1.0317 0.9493	-0.2085 -0.2044 -0.2044 -0.2065	-0.0010 -0.0132 -0.0030 -0.0050	DWN LCK
06:58:33	103	708	176.0	-2.0	1.0226 0.9997 0.9791 1.0615 0.9149 1.0271 0.9218 1.0271	-0.2105 -0.2065 -0.2044 -0.2085	-0.0233 -0.0172 -0.0172 -0.0111	
06:58:34	98	713	175.5	-2.0	1.0477 0.9562 0.9813 0.9470 1.0019 1.0409 1.0248 0.9676	-0.2044 -0.2085 -0.2126 -0.2044	-0.0172 -0.0437 -0.0111 -0.0294	DWN LCK
06:58:35	96	715	175.1	-1.6	0.9562 0.9974 0.9653 1.0706 0.9905 0.9859 0.9035 0.9355	-0.2166 -0.2044 -0.2004 -0.1963	-0.0071 -0.0010 0.0113 0.0133	

CVR Local Time	AIRSPPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
06:58:36	94	714	175.1	-0.9	1.0248	-0.2248	0.0194	DWN LCK
					1.0981	-0.3265	0.0051	
					1.0317	-0.3001	0.0255	
					0.9218	-0.2390	-0.0152	
					0.9928			
					1.0042			
					1.0409			
					0.9768			
06:58:37	90	718	175.5	-1.6	0.9447	-0.2268	-0.0030	
					0.9745	-0.2309	0.0214	
					1.0088	-0.2553	-0.0213	
					0.9813	-0.3143	-0.0071	
					1.0706			
					0.9791			
					0.9928			
					0.9355			
06:58:38	85	720	175.1	-2.0	0.9882	-0.3021	-0.0213	DWN LCK
					1.0042	-0.2940	-0.0254	
					1.0340	-0.2777	-0.0050	
					0.9813	-0.2675	-0.0193	
					0.9745			
					0.9882			
					0.9997			
					0.9905			
06:58:39	82	719	175.1	-2.4	0.9653	-0.2573	0.0072	
					1.0203	-0.2573	0.0011	
					1.0042	-0.2757	-0.0030	
					0.8852	-0.2716	0.0214	
					0.9768			
					0.9974			
					1.0867			
					0.9836			
06:58:40	77	724	175.5	-2.0	0.9310	-0.2675	0.0255	DWN LCK
					0.9676	-0.2716	0.0214	
					1.0157	-0.2634	0.0194	
					1.0477	-0.2655	0.0133	
					0.9791			
					0.9562			
					0.9630			
					1.0454			
06:58:41	73	727	176.0	-1.6	1.0019	-0.2553	0.0357	
					0.9836	-0.2573	0.0011	
					0.9699	-0.2553	0.0092	
					0.9882	-0.2512	-0.0071	
					0.9882			
					0.9836			
					0.9676			
					1.0088			
06:58:42	68	731	176.0	-1.6	0.9813	-0.2248	0.0072	DWN LCK
					0.9653	-0.2105	0.0072	
					1.0157	-0.2431	-0.0010	
					0.9882	-0.2390	-0.0091	
					0.9813			
					0.9768			
					0.9676			
					1.0294			



CVR Local Time	AIRSPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
06:58:43	65	732	175.5	-1.2	0.9859	-0.2411	-0.0132	
					0.9859	-0.2431	-0.0091	
					0.9447	-0.2431	-0.0172	
					0.9951	-0.2411	-0.0152	
					0.9859			
					1.0500			
					0.9562			
					0.9562			
06:58:44	61	737	175.1	-1.2	1.0203	-0.2492	-0.0132	DWN LCK
					0.9974	-0.2451	-0.0091	
					1.0088	-0.2512	-0.0071	
					0.9516	-0.2411	-0.0050	
					0.9768			
					1.0111			
					1.0180			
					0.9653			
06:58:45	57	739	174.6	-2.0	0.9813	-0.2248	-0.0050	
					1.0019	-0.2105	-0.0050	
					1.0111	-0.2146	-0.0071	
					0.9745	-0.2065	-0.0132	
					0.9539			
					1.0088			
					1.0226			
					0.9882			
06:58:46	53	740	174.2	-2.0	0.9539	-0.2004	-0.0233	DWN LCK
					0.9791	-0.1597	-0.0213	
					1.0340	-0.1353	-0.0233	
					1.0180	-0.1291	-0.0254	
					0.9355			
					0.9676			
					1.0432			
					1.0248			
06:58:47	50	741	172.9	-1.2	0.9745	-0.1230	-0.0335	
					0.9859	-0.1271	-0.0254	
					0.9676	-0.1332	-0.0294	
					1.0271	-0.1271	-0.0274	
					1.0042			
					0.9791			
					0.9882			
					0.9813			
06:58:48	50	744	171.6	-1.6	0.9722	-0.1251	-0.0254	DWN LCK
					0.9974	-0.1210	-0.0274	
					1.0088	-0.1291	-0.0233	
					0.9470	-0.1291	-0.0294	
					1.0042			
					1.0546			
					1.0798			
					0.9905			
06:58:49	48	744	169.8	-1.6	0.9539	-0.1210	-0.0294	
					0.9493	-0.1108	-0.0254	
					0.9974	-0.1027	-0.0233	
					1.0500	-0.0986	-0.0172	
					0.9607			
					0.9333			
					0.9813			
					1.0432			

CVR Local Time	AIRSPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
06:58:50	48	745	168.5	-2.0	1.0294 0.9768 0.9997 0.9653 1.0134 0.9997 1.0203 0.9928	-0.0946 -0.0885 -0.0925 -0.0885	-0.0172 -0.0274 -0.0193 -0.0213	DWN LCK
06:58:51	48	747	166.8	-2.0	0.9951 1.0248 0.9745 0.9676 0.9974 1.0203 1.0180 0.9722	-0.0905 -0.0823 -0.0864 -0.0864	-0.0254 -0.0233 -0.0152 -0.0172	
06:58:52	46	747	165.1	-1.2	1.0042 0.9813 0.9859 1.0180 0.9997 0.9859 0.9699 1.0088	-0.0844 -0.0864 -0.0803 -0.0722	-0.0233 -0.0254 -0.0294 -0.0233	DWN LCK
06:58:53	45	747	163.1	-2.4	1.0317 0.9745 0.9745 0.9836 1.0409 0.9928 0.9722 0.9859	-0.0540 -0.0561 -0.0579 -0.0539	-0.0233 -0.0193 -0.0193 -0.0193	
06:58:54	46	748	161.4	-1.2	0.9928 0.9997 0.9928 1.0042 0.9836 0.9905 0.9974 1.0294	-0.0478 -0.0396 -0.0335 -0.0396	-0.0172 -0.0152 -0.0111 -0.0172	DWN LCK
06:58:55	45	748	159.8	-1.2	1.0180 0.9745 0.9974 1.0065 1.0226 0.9722 0.9882 0.9882	-0.0355 -0.0376 -0.0376 -0.0376	-0.0193 -0.0172 -0.0152 -0.0213	
06:58:56	44	749	157.9	-1.2	1.0065 1.0111 0.9859 1.0042 0.9951 0.9859 1.0157 0.9974	-0.0335 -0.0274 -0.0315 -0.0294	-0.0315 -0.0478 -0.0518 -0.0437	DWN LCK

CVR Local Time	AIRSPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
06:58:57	43	750	155.3	-2.0	0.9905 0.9791 0.9562 0.9768 1.0432 1.0546 1.0042 0.9607	-0.0254 -0.0254 -0.0294 -0.0254	-0.0498 -0.0518 -0.0640 -0.0620	
06:58:58	42	748	151.7	-2.0	0.9699 0.9997 1.0317 1.0042 0.9768 0.9607 0.9951 1.0180	-0.0294 -0.0335 -0.0457 -0.0640	-0.0620 -0.0742 -0.0722 -0.0661	DWN LCK
06:58:59	40	749	148.3	-2.4	1.0042 0.9951 0.9974 0.9997 0.9859 0.9905 1.0180 0.9859	-0.0701 -0.0701 -0.0742 -0.0742	-0.0640 -0.0742 -0.0600 -0.0620	
06:59:00	41	748	146.1	-2.0	0.9836 1.0019 0.9997 1.0203 0.9974 1.0111 0.9745 0.9653	-0.0762 -0.0783 -0.0803 -0.0762	-0.0518 -0.0518 -0.0457 -0.0498	DWN LCK
06:59:01	40	746	144.3	-2.0	0.9791 1.0065 1.0271 0.9584 0.9722 1.0111 1.0409 0.9928	-0.0803 -0.0783 -0.0844 -0.0762	-0.0457 -0.0315 -0.0193 -0.0193	
06:59:02	39	747	143.1	-1.2	0.9836 0.9813 1.0500 0.9882 0.9813 0.9470 0.9951 1.0248	-0.0864 -0.0844 -0.0823 -0.0823	-0.0111 -0.0091 -0.0111 -0.0010	DWN LCK
06:59:03	39	748	142.6	-1.6	1.0019 0.9882 0.9836 1.0317 1.0065 0.9905 0.9699 0.9607	-0.0823 -0.0803 -0.0783 -0.0742	0.0153 0.0153 0.0153 0.0133	

CVR Local Time	AIRSPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
06:59:04	38	748	142.6	-1.6	1.0065 1.0111 1.0065 0.9745 0.9951 1.0065 1.0454 0.9630	-0.0762 -0.0701 -0.0742 -0.0701	0.0113 0.0133 0.0174 0.0316	DWN LCK
06:59:05	36	748	142.6	-2.0	0.9607 0.9859 1.0317 1.0363 0.9584 0.9493 0.9768 1.0226	-0.0722 -0.0722 -0.0681 -0.0742	0.0235 0.0255 0.0357 0.0397	
06:59:06	36	748	142.6	-1.6	1.0706 0.9768 0.9791 0.9722 1.0019 1.0226 1.0111 0.9630	-0.0783 -0.0783 -0.0803 -0.0803	0.0174 0.0153 0.0194 0.0031	DWN LCK
06:59:07	33	749	142.8	-2.0	0.9882 0.9483 1.0383 1.0569 1.0294 0.9630 0.9333 1.0065	-0.0803 -0.0905 -0.0823 -0.0803	0.0051 0.0235 0.0296 0.0031	
06:59:08	34	748	142.8	-2.8	1.0432 1.0157 0.9836 0.9768 0.9699 1.0180 1.0042 1.0317	-0.0905 -0.0905 -0.0905 -0.0864	0.0153 0.0153 0.0072 -0.0030	DWN LCK
06:59:09	34	749	142.6	-1.2	0.9653 0.9745 0.9905 1.0248 1.0477 0.9562 0.9539 0.9584	-0.0844 -0.0966 -0.0864 -0.0823	0.0051 0.0051 0.0194 0.0113	
06:59:10	34	749	142.6	-1.6	1.0248 1.0454 0.9928 0.9562 0.9745 1.0134 1.0592 1.0019	-0.0885 -0.0823 -0.0803 -0.0762	0.0092 0.0092 0.0133 0.0092	DWN LCK

CVR Local Time	AIRSPEED (knots)	PRESSURE ALT (Fine) (FEET)	HEADING	RADIO ALT. COARSE-rev (FEET)	VERTICAL ACCEL (G'S)	LONG. ACCEL (G'S)	LATERAL ACCEL (G'S)	LDG GEAR RH MAIN
06:59:11	34	748	142.6	-2.0	0.9722 0.9584 0.9882 1.0042 1.0317 1.0065 0.9836 0.9676	-0.0742 -0.0742 -0.0762 -0.0742	0.0051 0.0092 0.0072 0.0113	
06:59:12	31	749	142.6	-2.8	0.9630 1.0340 1.0019 0.9974 0.9699 0.9882 1.0180 1.0111	-0.0762 -0.0681 -0.0722 -0.0762	0.0194 0.0194 0.0133 0.0133	DWN LCK
06:59:13	0	750	142.6	-2.4	0.9974 0.9676 0.9836 0.9974 1.0065 1.0111 0.9997 0.9859	-0.0762 -0.0844 -0.0885 -0.0844	0.0153 0.0113 0.0133 0.0092	
06:59:14	0	751	142.6	-2.0	0.9836 0.9905 1.0111 0.9768 0.9836 0.9951 1.0134 0.9928	-0.0864 -0.0844 -0.0864 -0.0864	0.0113 0.0153 0.0133 0.0011	DWN LCK
06:59:15								

American Airlines Flt 1420, Prior Landing, DCA99MA060  
 Plot 2 - Prior Landing, Created: August 30, 1999, Vehicle Recorders Division RE-40 - NTSB

CVR Local Time (hh:mm:ss)	ROLL (DEG.)	PITCH (DEG.)	THRST REV LH	THRST REV RH	GPWS WARN	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	G-S DEV 1 (dots)	LOC. DEV 1 (dots)
06:58:15	-2.1	-1.1		STW	off	-2.0	-0.3	-3.4	0.3	7.0	1.7	0.0
	-1.4	-0.4					0.5		0.3	1.1		
06:58:16	-1.8	0.4	STW		off	-1.0	1.0	-7.2	1.0	4.3	1.6	0.0
	-1.8	0.4					0.7		0.6	0.4		
06:58:17	-0.7	0.4		STW	off	-3.2	1.0	0.5	0.6	1.2	1.0	0.0
	0.4	0.7					1.7		0.6	1.4		
06:58:18	0.4	0.0	STW		off	8.2	2.0	0.5	5.9	1.5	-0.7	0.0
	-1.1	-0.7					1.4		0.3	3.2		
06:58:19	-2.1	0.0		STW	off	-2.4	-0.5	-5.9	0.6	2.7	-1.2	-0.1
	-2.8	0.4					0.4		0.3	7.6		
06:58:20	-1.8	0.4	STW		off	-1.3	1.2	3.7	0.3	0.9	2.1	0.0
	1.4	0.0					4.6		6.3	1.3		
06:58:21	0.4	-1.1		STW	off	3.5	4.7	-3.7	20.8	41.3	5.2	-0.1
	-0.7	-1.8					2.7		56.8	58.0		
06:58:22	0.7	-1.4	STW		off	-2.1	-1.1	-2.8	54.6	57.9	1.6	0.0
	0.0	-1.1					-1.0		57.8	58.0		
06:58:23	0.0	-1.4		STW	off	-0.9	-6.3	-3.7	57.8	57.8	1.7	0.0
	0.4	-2.1					-4.3		58.2	58.3		
06:58:24	0.4	-2.1	STW		off	-1.4	4.4	-4.7	57.8	58.2	1.6	0.0
	0.4	-2.1					9.0		58.2	58.2		
06:58:25	0.4	-1.8		STW	off	-2.4	9.6	-4.6	58.2	58.3	0.1	-0.1
	0.4	-1.8					1.9		58.2	58.2		
06:58:26	0.4	-2.1	UNL		off	-2.6	3.7	-4.2	58.2	58.1	-3.3	0.0
	0.4	-2.1					4.4		58.2	58.0		
06:58:27	0.0	-1.8		DPL	off	-2.5	3.9	-3.8	58.2	58.2	-3.0	0.1
	0.0	-1.8					-3.0		58.2	58.1		
06:58:28	0.0	-1.8	DPL		off	-1.8	-2.5	-3.4	58.2	58.1	-3.8	0.0
	0.0	-1.8					-3.8		58.2	58.1		
06:58:29	0.0	-1.8		DPL	off	-2.0	0.9	-3.3	58.2	58.0	-3.6	-0.1
	0.0	-2.1					1.4		58.2	58.1		
06:58:30	0.0	-2.1	DPL		off	-2.1	2.5	-3.3	58.2	58.2	-3.6	0.0
	0.0	-1.8					-1.8		58.2	58.2		
06:58:31	0.0	-2.1		DPL	off	-2.3	-6.3	-1.2	58.2	58.1	-3.6	0.0
	0.0	-2.1					-4.6		58.2	58.2		
06:58:32	0.4	-2.1	DPL		off	-2.3	-5.3	-1.1	58.2	58.2	-2.7	0.0
	0.4	-2.1					1.7		58.5	58.3		
06:58:33	0.4	-2.1		DPL	off	-1.8	1.0	-1.2	58.5	58.2	-0.2	0.0
	0.4	-2.1					-5.6		58.2	58.4		
06:58:34	0.4	-2.1	DPL		off	-2.6	1.4	-1.2	58.5	58.3	-0.2	0.0
	0.4	-2.1					1.2		58.5	58.5		

CVR Local Time (hh:mm:ss)	ROLL (DEG.)	PITCH (DEG.)	THRST REV LH	THRST REV RH	GPWS WARN	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	G-S DEV 1 (dots)	LOC. DEV 1 (dots)
06:58:35	0.7	-2.1		DPL	Off	-1.9	-1.5	-1.1	58.5	58.4	0.1	0.0
	0.4	-2.1					-3.0		58.5	58.3		
06:58:36	0.4	-2.1	DPL		Off	-2.6	-5.5	-1.0	58.5	58.3	0.7	-0.1
	0.4	-2.5					-1.0		58.5	58.5		
06:58:37	0.4	-2.1		DPL	Off	-1.8	1.7	-1.1	58.5	58.5	0.5	0.0
	0.4	-2.5					1.5		58.5	58.6		
06:58:38	0.7	-2.5	DPL		Off	-1.7	-1.3	-1.3	58.5	58.6	-2.3	-0.1
	0.7	-2.1					-2.3		58.5	58.6		
06:58:39	0.4	-2.5		DPL	Off	-2.5	-3.5	-1.1	58.5	58.6	-1.0	0.0
	0.4	-2.1					-3.8		58.5	58.6		
06:58:40	0.4	-2.1	DPL		Off	-2.2	-5.0	-1.1	58.9	58.5	0.3	-0.1
	0.0	-2.1					-3.6		58.9	58.6		
06:58:41	0.4	-2.5		DPL	Off	-2.1	-3.0	-1.2	58.9	58.6	0.8	-0.1
	0.0	-2.1					-2.0		58.9	58.7		
06:58:42	0.4	-2.1	UNL		Off	-1.4	-1.6	-1.2	58.9	58.6	1.0	-0.1
	0.4	-2.1					-1.3		58.9	58.7		
06:58:43	0.4	-2.5		UNL	Off	-1.8	-1.5	-1.3	58.9	58.7	-0.2	0.0
	0.4	-2.1					-1.8		58.9	58.7		
06:58:44	0.4	-2.5	STW		Off	-1.7	-2.1	-1.3	58.9	58.8	0.1	0.0
	0.4	-2.1					-2.3		58.9	58.9		
06:58:45	0.4	-2.5		STW	Off	-1.5	-2.5	-1.2	58.9	58.9	1.1	0.0
	0.4	-2.5					-1.6		58.9	58.9		
06:58:46	0.4	-2.5	STW		Off	-1.4	-0.6	-1.3	58.9	58.9	0.6	0.0
	0.4	-2.5					0.4		58.9	58.9		
06:58:47	0.0	-2.5		STW	Off	-1.2	0.2	-1.3	58.9	58.8	0.6	0.0
	0.0	-2.5					-0.6		58.9	58.9		
06:58:48	0.0	-2.5	STW		Off	-1.4	-1.5	-1.3	58.9	58.9	-0.4	0.0
	0.0	-2.1					-1.1		58.9	58.9		
06:58:49	-0.4	-2.5		STW	Off	-1.5	-1.0	-1.3	58.9	58.9	-0.6	0.0
	-0.4	-2.5					-0.8		58.9	58.9		
06:58:50	-0.4	-2.5	STW		Off	-1.4	-0.8	-1.3	58.9	58.9	0.6	0.1
	-0.4	-2.5					-0.8		58.9	58.9		
06:58:51	0.0	-2.5		STW	Off	-1.4	-1.0	-1.3	58.9	58.8	0.5	0.1
	0.0	-2.5					-1.1		58.9	58.9		
06:58:52	0.0	-2.5	STW		Off	-1.4	-1.3	-1.4	58.9	58.9	0.7	0.4
	0.0	-2.5					-1.1		58.9	58.9		
06:58:53	0.0	-2.8		STW	Off	-1.3	-1.3	-1.3	58.9	58.8	0.7	-0.8
	0.0	-2.5					-1.3		58.9	58.9		

CVR Local Time (hh:mm:ss)	ROLL (DEG.)	PITCH (DEG.)	THRST REV LH	THRST REV RH	GPWS WARN	ELEV LT POS	RUD POS	LT ALR POS	SPOILER LT OBD	SPOILER RT INBD	G-S DEV 1 (dots)	LOC. DEV 1 (dots)
06:58:54	0.0	-2.8	STW		Off	-1.5	-1.0	-1.3	58.9	58.9	0.6	-1.3
	0.4	-2.5					-0.8		58.9	58.9		
06:58:55	0.4	-2.8		STW	Off	-1.5	1.4	-1.3	58.9	58.9	1.0	-1.0
	0.4	-2.5					1.9		58.9	57.9		
06:58:56	0.4	-2.5	STW		Off	-1.7	1.7	-1.4	20.8	6.6	-0.1	0.4
	0.4	-2.5					1.9		-0.1	0.0		
06:58:57	0.7	-2.8		STW	Off	-1.7	2.2	-1.4	0.0	0.3	0.8	0.6
	0.4	-2.5					2.0		0.0	0.3		
06:58:58	0.7	-2.5	STW		Off	-2.0	2.2	-1.4	0.0	0.4	0.9	0.8
	0.4	-2.5					2.2		0.0	0.4		
06:58:59	0.7	-2.8		STW	Off	-1.8	2.2	-1.4	0.0	0.4	0.6	1.0
	0.7	-2.5					2.2		0.0	0.3		
06:59:00	0.7	-2.8	STW		Off	-1.5	2.2	-1.5	0.0	0.4	0.6	1.2
	1.1	-2.8					2.0		0.0	0.4		
06:59:01	0.7	-2.8		STW	Off	-1.6	1.2	-1.4	0.0	0.4	0.6	1.4
	0.7	-2.8					0.2		0.0	0.4		
06:59:02	0.7	-2.8	STW		Off	-1.7	-0.8	-1.4	0.0	0.4	0.4	1.7
	0.4	-2.8					-1.6		0.0	0.4		
06:59:03	0.7	-2.8		STW	Off	-1.7	-1.6	-1.5	0.0	0.4	0.5	2.0
	0.7	-2.8					-1.6		0.0	0.4		
06:59:04	0.7	-2.8	STW		Off	-1.4	-1.8	-1.4	0.0	0.3	0.7	2.2
	0.7	-2.8					-1.6		0.0	0.3		
06:59:05	0.4	-2.8		STW	Off	-1.5	-1.8	-1.5	0.0	0.3	1.5	2.5
	0.4	-2.8					-1.6		0.0	0.3		
06:59:06	0.7	-2.8	STW		Off	-1.6	-1.6	-1.4	0.0	0.3	0.5	2.7
	0.7	-3.2					-1.6		0.0	0.3		
06:59:07	0.4	-2.8		STW	Off	-1.3	-1.8	-1.5	0.0	0.3	0.4	2.9
	0.7	-2.8					-1.6		0.0	0.3		
06:59:08	0.7	-2.8	STW		Off	-1.3	-1.6	-1.4	0.0	0.2	-0.2	3.1
	1.1	-2.8					-1.6		0.0	0.2		
06:59:09	0.7	-2.8		STW	Off	-1.3	-1.6	-1.5	0.0	0.2	0.8	3.1
	1.1	-2.8					-1.6		0.0	0.3		
06:59:10	0.7	-2.8	STW		Off	-1.3	-1.8	-1.5	0.0	0.1	0.1	3.2
	0.7	-3.2					-1.8		0.0	0.2		
06:59:11	0.7	-3.2		STW	Off	-1.4	-1.6	-1.5	0.0	0.2	-0.1	3.3
	0.7	-3.2					-1.5		0.0	0.2		
06:59:12	0.7	-3.2	STW		Off	-1.4	-1.5	-1.4	0.0	0.2	0.2	3.4
	0.7	-3.2					-1.5		0.0	0.3		
06:59:13	0.7	-3.2		STW	Off	-1.6	-1.5	-1.4	0.0	0.2	-0.1	3.5
	0.7	-3.2					-1.5		0.0	0.2		
06:59:14	0.7	-3.2	STW		Off	-1.3	-1.1	-1.4	0.0	0.2	0.9	3.5
	1.1	-3.2					-1.0		0.0	0.3		
06:59:15												



American Airlines Flight 1420, Dallas, TX, 6/1/99, DCA99MA060  
 Engine Data - Gate Push Back in Dallas, Created: September 30, 1999, Vehicle Recorders Division RE-40 -  
 NTSB

CVR Local Time (hh:mm:ss)	PRESSURE ALT (Fine) (FEET)	N1 LEFT ENGINE (%)	N1 RIGHT ENGINE (%)	EPR LT. ENGINE	EPR RT. ENGINE	THRST REV LH ENG	BRAKE PED. POS (LT.)	BRAKE PED. POS (RT.)	THRST REV RH ENG	EGT LT. ENGINE DEG-C	EGT RT. ENGINE DEG-C
10:40:29	702		0	1.65	1.01			63	STW	380	278
10:40:30											
10:40:31											
10:40:32	698	25		1.03	1.05	STW	4			475	440
10:40:33	697		32	1.04	1.06			0	STW	475	449
10:40:34	697	26		1.04	1.06	STW	4			475	454
10:40:35	697		34	1.04	1.07			0	STW	474	453
10:40:36	698	28		1.04	1.07	STW	4			474	449
10:40:37	697		37	1.05	1.07			0	STW	472	442
10:40:38	697	29		1.05	1.07	STW	4			455	418
10:40:39	699		35	1.06	1.07			0	STW	452	420
10:40:40	699	31		1.07	1.07	DPL	4			456	431
10:40:41	699		38	1.07	1.09			0	DPL	463	459
10:40:42	697	35		1.09	1.11	DPL	4			469	479
10:40:43	700		45	1.11	1.12			0	DPL	476	496
10:40:44	699	44		1.14	1.15	DPL	4			479	519
10:40:45	697		55	1.20	1.18			0	DPL	485	535
10:40:46	699	59		1.27	1.18	DPL	4			500	519
10:40:47	697		56	1.28	1.18			0	DPL	475	509
10:40:48	695	64		1.26	1.19	DPL	4			454	503
10:40:49	694		57	1.24	1.20			0	DPL	438	502
10:40:50	698	60		1.25	1.20	DPL	4			433	505
10:40:51	696		58	1.26	1.21			0	DPL	429	507
10:40:52	698	62		1.24	1.22	DPL	4			427	505
10:40:53	699		59	1.22	1.21			0	DPL	418	504
10:40:54	698	58		1.21	1.22	DPL	4			419	505
10:40:55	698		58	1.21	1.20			0	DPL	420	509
10:40:56	698	57		1.21	1.22	DPL	4			422	509
10:40:57	694		59	1.21	1.22			0	DPL	421	506
10:40:58	695	57		1.21	1.22	DPL	4			421	504
10:40:59	697		58	1.20	1.20			0	DPL	423	493
10:41:00	697	56		1.19	1.18	DPL	4			418	485
10:41:01	695		54	1.18	1.17			0	DPL	414	481
10:41:02	699	53		1.18	1.16	DPL	4			410	485
10:41:03	698		52	1.18	1.16			0	DPL	410	489
10:41:04	697	53		1.18	1.15	DPL	4			410	494
10:41:05	698		51	1.20	1.16			0	DPL	414	500
10:41:06	699	56		1.22	1.17	DPL	4			421	508
10:41:07	703		55	1.24	1.18			0	DPL	424	516
10:41:08	699	60		1.25	1.18	DPL	4			422	515
10:41:09	698		56	1.25	1.18			0	DPL	420	520
10:41:10	699	61		1.25	1.20	DPL	4			417	521
10:41:11	698		57	1.25	1.20			0	DPL	418	521
10:41:12	697	61		1.25	1.19	DPL	4			416	522
10:41:13	697		56	1.25	1.19			0	DPL	418	525
10:41:14	695	60		1.23	1.19	DPL	4			416	525
10:41:15	699		54	1.20	1.17			0	DPL	408	512
10:41:16	700	55		1.16	1.16	DPL	4			402	502
10:41:17	699		46	1.11	1.11			0	STW	379	462
10:41:18	701	44		1.10	1.08	STW	4			372	443
10:41:19	701		42	1.12	1.09			0	STW	404	486
10:41:20	701	48		1.15	1.13	STW	4			447	531
10:41:21	704		51	1.15	1.14			0	STW	448	524
10:41:22	703	50		1.12	1.13	STW	4			423	484
10:41:23	705		45	1.11	1.11			0	STW	400	450
10:41:24	701	44		1.10	1.10	STW	4			396	444
10:41:25	700		42	1.09	1.10			0	STW	395	444
10:41:26	703	42		1.09	1.09	STW	4			396	445
10:41:27	702		41	1.09	1.09			0	STW	400	447
10:41:28	700	41		1.09	1.09	STW	4			402	448
10:41:29	700		40	1.09	1.09			0	STW	405	450