



Air Transport Association

DEPT. OF TRANSPORTATION
DOCKETS

00 JAN 10 PM 2:55

70240

ORIGINAL

January 5, 2000

U.S. Department of Transportation Dockets
Docket No. [FAA-1999-6482] -- / 2
400 Seventh Street, SW
Room Plaza 401
Washington, DC 20590

Subject: Docket No. FAA-1999-6482, Notice No. 99-19, Revisions to Digital Flight Data Recorder Regulations for Boeing 737 Airplanes and for Part 125 Operations; Request to Withdraw NPRM or Extend Comment Period

Reference: ATA Letter to Docket No. [FAA-1999-6482], December 21, 1999

Ladies/Gentlemen:

On November 18, 1999, the Federal Aviation Administration issued a Notice of Proposed Rulemaking (NPRM) which, if adopted, would require that three new parameters be integrated with the Flight Data Recorder of B737 airplanes, in addition to other parameter upgrades required under 14 CFR § 121.344. The referenced letter provided comments the Docket regarding this proposed Rule, and comments of individual member airlines of the Air Transport Association of America^{1/} (ATA) were attached. Subsequent to submitting the letter, ATA received tabular data that should have been appended to the comments of US Airways. That data is attached and is respectfully submitted for inclusion in the referenced letter.

If any further information is required, please call me at (202) 626-4036/4019.

Sincerely,

Joseph W. White
Director, Aircraft Systems Engineering

^{1/} ATA Members: Airborne Express, Alaska Airlines, Aloha Airlines, America West Airlines, American Airlines, American Trans Air, Atlas Air, Continental Airlines, Delta Air Lines, DHL Airways, Emery Worldwide, Evergreen International, Federal Express, Hawaiian Airlines, Midwest Express Airlines, Northwest Airlines, Polar Air Cargo, Reeve Aleutian Airways, Southwest Airlines, Trans World Airlines, United Airlines, United Parcel Service, US Airways.

ATA Associate Members: Aeromexico, Air Canada, Canadian Airlines International, KLM Royal Dutch Airlines, Mexicana.

Docket No. FAA-1999-6482
January 8, 2000
Page 2

Attachment

Cc: Mr. G. Kaseote, AIR-1 30
G. Kemp
9-NPRM-CMTS@faa.gov

B737 FDR Survey Form

12/22/1999

B737	No. of B737s in each Category	Parameters Currently Required per CFR 121.343	No. of Parameters Currently Installed	Equipment Necessitated Solely by NTSB Proposal					
				Number of New Sensing Systems Required	New DFDAU Required?	Other New Interface Unit Required?	New or Second DFDR Required?	DFDR or DFDAU Hardware Modifications Required?	Software Revisions Required?

("Non-FDAU Planes") by **8/20/01**

Sample Data Entry	23	(c)1-11	12	9	Yes	No	Yes	NA	NA
-1/200	64	(c)1-11	11	10	yes	yes	yes	n/a	n/a
-300	78	(c)1-11	11	10	yes		yes	n/a	n/a
-400	6	(c)1-11	11	10	yes		yes	n/a	n/a
-500	0								

FDAU or DFDAU on 7/16/96
("17 Parameter Planes") by **8/4/00**

-1/200									
-300	7	(d)1-17	many	6	yes	no	yes	n/a	n/a
-400	48	(d)1-17	many	6	yes	no	yes	n/a	n/a
500	0								

Mfrd after 1 O/I 1/91
"29 Parameter Planes" (f) 1-29 by **8/4/00**

-300	0								
-400	0								
-500	0								

"Next Generation Planes" (f) 1-29 by **8/4/00**

-6/7/8/900	0								
------------	----------	--	--	--	--	--	--	--	--

B737 FDR Survey Form

12/22/1999

B737	Would NTSB -Recommended Parameters be Installed under SB or STC ?	Total Number of STCs Required by the Airline?	Per Airplane cost of Certification	Estimated Time Required for Certification (specify mos/wks)	Per-Airplane Cost of Other Non -Recurring Engineering	Per-Airplane Cost of New Avionics Necessitated solely by New NTSB Parameters	Per-Airplane Cost of New Sensors, Wiring, Kits & H/W Necessitated solely by New NTSB Parameters
-------------	--	--	------------------------------------	--	--	---	--

Mfrd before 10/12/91

No **FDAU** on 7/16/96

("Non-FDAU Planes")

Sample Data Entry	STC		\$10, 000	3 mos	\$2,000	\$27,000	\$23,000
-1/200	See NOTE 1	1	\$22,500	3 mos	\$20,000	\$48,000	\$42,500
-300	See NOTE 1	1 - See NOTE 2	\$22,500	3 mos	\$10,000	\$48,000	\$35,000
-400	See NOTE 1	1 - See NOTE 2			\$10,000	\$48,000	\$35,000
-500							

FDAU or **DFDAU** on 7/16/96

(" 17 Parameter Planes")

-1/200							
-300	See NOTE 1	1 - See NOTE 3	\$22,500	3 mos	\$10,000	\$48,000	\$27,500
-400	See NOTE 1	1 - See NOTE 3			\$10,000	\$48,000	\$27,500
-500							

Mfrd after 10/11/91

"29 Parameter Planes"

-300							
-400							
-500							

"Next Generation Planes"

-6/7/8/900							
------------	--	--	--	--	--	--	--

B737 FDR Survey Form

12/22/1999

B737	Per-Airplane Cost of Software/ Mapping Changes Necessitated solely by New NTSB Parameters	Per-Airplane Labor Hours to Install NTSB -Recommended Configuration	Per-Airplane, Amount of Out-of-Service (OOS) Time Needed to Comply with impending CFR 121.344 upgrades (days)	Per-Airplane, OOS Time Needed to Comply with both CFR 121.344 and NTSB Recommendation by New Proposed Deadline (days)	From 1 /3 1/00, Minimum Elapsed Time Needed to Comply with with both CFR 121.344 and NTSB Recommendation (mos)
-------------	--	--	--	---	--

Mfrd before 10/12/91

No **FDAU** on **7/16/96**

("Non-FDAU Planes")

Sample Data Entry	\$9,000	275	1	5	24 mos
-1/200		700	5 - See NOTE 5	9	See NOTE 4
-300		500	5 - See NOTE 5	8	See NOTE 4
-400		500	5 - See NOTE 5	8	See NOTE 4
-500					

FDAU or DFDAU on 7/16/96

("17 Parameter Planes")

-1/200					
-300		300	4 - See NOTE 5	7	See NOTE 4
-400		300	4 - See NOTE 5	7	See NOTE 4
-500					

Mfrd after 10/11/91

"29 Parameter Planes"

-300					
-400					
-500					

"Next Generation Planes"

-6/7/8/900					
------------	--	--	--	--	--

B737 FDR Survey Form

12/22/1999

B737	From 1 /3 1 /00, Minimum Elapsed Time Needed to Comply with with both CFR 121.344 and NTSB Recommendation without Incurring Additional OOS Time (mos)	Per-airplane Reduction in Cost, Labor Hours and OOS Time if Single Rudder Force Sensor Configuration is allowed (ie , if force sensors on each pedal are not required)
-------------	--	---

Mfrd before 1 0/12/9 1

No **FDAU** on 7/16/96

("Non-FDAU Planes")

Sample Data Entry	36 mos	\$10,000/50 hrs/1 day
-1/200	60 mos	\$10,000/75hrs/1 day
-300	60 mos	\$10,000/75hrs/1 day
-400	60 mos	\$10,000/75hrs/1 day
-500		

FDAU or **DFDAU** on 7/16/96

(" 17 Parameter Planes")

-1/200		
-300	60 mos	\$10,000/75hrs/1 day
-400	60 mos	\$10,000/75hrs/1 day
-500		

Mfrd after 1 0/1 1 /91

"29 Parameter Planes"

-300		
-400		
-500		

"Next Generation Planes"

-6/7/8/900		
------------	--	--

B737 FDR Survey Form

12/22/1999

B737	Comments
Mfrd before 10/12/91 No FDAU on 7/16/96 ("Non-FDAU Planes")	
Sample Data Entry	NOTE: 1. At present Boeing is the only source for force sensors A Service Bulletin would be req'd for sensor inst'l The total inst'l would require an STC NOTE: 2. Only 1 STC required for both aircraft types NOTE: 3. Only 1 STC required for both aircraft types
-1/200	
-300	
-400	
-500	
FDAU or DFDAU on 7/16/96 ("17 Parameter Planes")	
-1/200	NOTE: 4. 1/31/00 is NOT a realistic start date due to the lack of a firm service bulletin and parts availability date from Boeing The minimum elapsed time would be the due dates 8/00 & 8/01 These due dates would require 5 aircraft OOS per day until 8/00 and 3 aircraft OOS per day until 8/01. Additional maintenance facilities would be required to accomplish these OOS aircraft
-300	
-400	
-500	
-500	
Mfrd after 10/11/91 "29 Parameter Planes"	
-300	NOTE: 5. This OOS time includes the inst'l of the Yaw Damper upgrade which is req'd by AD
-400	
-500	
"Next Generation Planes"	
-6/7/8/900	

Parameter Comparison

Note: This chart compares parameters by name. Complete correlation of CFR-required and CFR 121.343(c) (11 Parameter Planes)

CFR 121.343(f) (17 Parameter Planes)	CFR 121.344(a)	NTSB Recommended Parameters
-	-	Yaw Damper On/Off Discrete
-	-	Yaw Damper Command
-	-	Standby Rudder On/Off Discrete
<p>(1) Time</p> <p>(2) Altitude</p> <p>(3) Airspeed</p> <p>(4) Vertical acceleration</p> <p>(5) Heading</p>	<p>(1) Time</p> <p>(2) Altitude</p> <p>(3) Airspeed</p> <p>(4) Vertical acceleration</p> <p>(5) Heading</p>	
<p>(6) Time of each radio transmission either to or from air traffic control</p>	<p>(6) Time of each radio transmission either to or from air traffic control</p>	
<p>(7) Pitch attitude</p> <p>(8) Roll attitude</p> <p>(9) Longitudinal acceleration</p>	<p>(7) Pitch attitude</p> <p>(8) Roll attitude</p> <p>(9) Longitudinal acceleration</p>	
<p>(10) Control column or pitch control surface position</p>	<p>(I 0) Pitch trim position</p>	<p>(8) Manual radio transmitter keying, or CVR/DFDR synchronization reference</p> <p>(6) Pitch attitude</p> <p>(7) Roll attitude</p> <p>(11) Longitudinal acceleration</p> <p>(10) Autopilot engagement status</p> <p>(19) Pitch trim surface position or parameters of Pitch Trim paragraph (a)(82) of this section if currently recorded</p> <p>(82) Cockpit trim control input position--pitch</p> <p>(12) Pitch control input</p>
<p>(II) Thrust of each engine.</p>	<p>(14) Thrust of each engine</p> <p>(12) Control wheel or lateral control surface position</p>	<p>(15) Primary pitch control surface position</p> <p>(9) Thrust/power of each engine--primary flight crew reference</p> <p>(13) Lateral control input</p>
	<p>(13) Rudder pedal or yaw control surface position</p>	<p>(I 6) Primary lateral control surface position</p> <p>(14) Rudder pedal input</p>

Parameter Comparison

CFR 121.343(c)
(11 Parameter Planes)

CFR 121.343(f)
(17 Parameter Planes)

CFR 121.344(a)

NTSB
Recommended Parameters

	(17) Primary yaw control surface position	
	(18) Lateral acceleration	
(15) Position of each thrust reverser	(22) Each Thrust reverser position (or equivalent for propeller airplane)	Thrust Reverser Position (each engine)
(16) Trailing edge flap or cockpit flap control position	(20) Trailing edge flap or cockpit flap control selection (except when parameters of paragraph (a)(85) of this section apply)	Trailing Edge Flaps
	(85) Trailing edge flap and cockpit flap control position	
(17) Leading edge flap or cockpit flap control position.	(21) Leading edge flap or cockpit flap control selection (except when parameters of paragraph (a)(86) of this section apply)	Leading Edge Flaps
	(86) Leading edge flap and cockpit flap control position	
	(88) All cockpit flight control input forces (control wheel, control column, rudder pedal).	Control Wheel Force @ 2 cps, Control Column Force @ 2 cp Rudder Pedal Force (sensors on pedals) @ 2 cps

Other 121.344 parameters above number (a)22 do not factor in this comparison/ correlation but are listed as follows:

- (23) Ground spoiler position or speed brake selection (except when parameters of paragraph (a)(87) of this section apply)
- (24) Outside or total air temperature
- (25) Automatic Flight Control System (AFCS) modes and engagement status, including autothrottle
- (26) Radio altitude (when an information source is installed)
- (27) Localizer deviation, MLS Azimuth
- (28) Glideslope deviation, MLS Elevation
- (29) Marker beacon passage

Parameter Comparison

CFR 121.343(c)
(11 Parameter Planes)

CFR 121.343(f)
(17 Parameter Planes)

CFR 121.344(a)

NTSB
Recommended Parameters

- (30) Master warning
- (31) Air/ground sensor (primary airplane system reference nose or main gear)
- (32) Angle of attack (when information source is installed)
- (33) Hydraulic pressure low (each system)
- (34) Ground speed (when an information source is installed)
- (35) Ground proximity warning system
- (36) Landing gear position or landing gear cockpit control selection
- (37) Drift angle (when an information source is installed)
- (38) Wind speed and direction (when an information source is installed)
- (39) Latitude and longitude (when an information source is installed)
- (40) Stick shaker/pusher (when an information source is installed)
- (41) Windshear (when an information source is installed)
- (42) Throttle/power lever position
- (43) Additional engine parameters (as designated in Appendix M of this part)
- (44) Traffic alert and collision avoidance system

- (45) DME 1 and 2 distances
- (46) Nav 1 and 2 selected frequency
- (47) Selected barometric setting (when an information source is installed)
- (48) Selected altitude (when an information source is installed)
- (49) Selected speed (when an information source is installed)
- (50) Selected mach (when an information source is installed)

Parameter Comparison

CFR 121.343(c)
(11 Parameter Planes)

CFR 121.343(f)
(17 Parameter Planes)

CFR 121.344(a)

NTSB
Recommended Parameters

- (51) Selected vertical speed (when an information source is installed)
- (52) Selected heading (when an information source is installed)
- (53) Selected flight path (when an information source is installed)
- (54) Selected decision height (when an information source is installed)
- (55) EFIS display format
- (56) Multi-function/engine/alerts display format
- (57) Thrust command (when an information source is installed)
- (58) Thrust target (when an information source is installed)
- (59) Fuel quantity in CG trim tank (when an information source is installed)
- (60) Primary Navigation System Reference
- (61) Icing (when an information source is installed)
- (62) Engine warning each engine vibration (when an information source is installed)
- (63) Engine warning each engine over temp. (when an information source is installed)
- (64) Engine warning each engine oil pressure low (when an information source is installed)
- (65) Engine warning each engine over speed (when an information source is installed)
- (66) Yaw trim surface position
- (67) Roll trim surface position
- (68) Brake pressure (selected system)
- (69) Brake pedal application (left and right)
- (70) Yaw or sideslip angle (when an information source is installed)
- (71) Engine bleed valve position (when an information source is installed)

Parameter Comparison

CFR 121.343(c) (11 Parameter Planes)	CFR 121.343(f) (17 Parameter Planes)	CFR 121.344(a)	NTSB Recommended Parameters
		(72) De-icing or anti-icing system selection (when an information source is installed)	
		(73) Computed center of gravity (when an information source is installed)	
		(74) AC electrical bus status	
		(75) DC electrical bus status	
		(76) APU bleed valve position (when an information source is installed)	
		(77) Hydraulic pressure (each system)	
		(78) Loss of cabin pressure	
		(79) Computer failure	
		(80) Heads-up display (when an information source is installed)	
		(81) Para-visual display (when an information source is installed)	
		(83) Cockpit trim control input position--roll	
		(84) Cockpit trim control input position--yaw	
		(87) Ground spoiler position and speed brake selection and	

NTSB-Recommended Parameters

NTSB Recommendation A-99-28 & -29 Parameters	Corresponding CFR 121.344(a) Parameter Number	Status
Pitch Trim	19	CRF 121.344 (a) parameter 19 would satisfy NTSB Recommendation.
Trailing Edge Flaps	20 or 85	CRF 121.344 (a) parameter 20 or 85 would satisfy NTSB Recommendation.
Leading Edge Flaps	21 or 86	CRF 121.344 (a) parameter 21 or 86 would satisfy NTSB Recommendation.
Thrust Reverser Position (each engine)	22	CRF 121.344 (a) parameter 22 would satisfy NTSB Recommendation.
Yaw Damper On/Off Discrete @ 2 cps	None	Production installations would, at the increased sample rate, satisfy NTSB Recommendation. Retrofit design may be required.
Yaw Damper Command @ 2 cps	None	Production installations would, at the increased sample rate, satisfy NTSB Recommendation. Retrofit design may be required.
Standby Rudder On/Off Discrete	None	Not in production. Production and Retrofit designs would be required.
Control Wheel Force @ 2 cps	88	Production installations would, at the increased sample rate, satisfy NTSB Recommendation. NTSB-Recommended configuration would satisfy current CFR requirements. Retrofit design may be required.
Control Column Force @ 2 cps	88	Production installations would, at the increased sample rate, satisfy NTSB Recommendation. NTSB-Recommended configuration would satisfy current CFR requirements. Retrofit design may be required.

- Boeing is assessing which hull numbers would require the retrofit designs mentioned above, based of delivered configurations.

NTSB-Recommended Parameters

Lubber Pedal Force @ 2 cps	88	It has yet to be determined whether FAA would accept current production and service bulletin configurations (single force sensor in the tail) or require a force sensor on each pedal. Assume the latter. In either case, the increased sample rate would be
----------------------------	----	--

* Boeing is assessing which hull numbers would require the retrofit designs mentioned above, based on delivered configurations.