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Air Transport Association

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December 21, 1999

U.S. Department of Transportation Dockets
Docket No. [FAA-1 999-6482] —
400 Seventh Street, SW II
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

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 (FDR) of B737 airplanes. These parameters would be in addition to those parameters required, under 14 CFR § 121.344, to be integrated by August 20, 2001. Specifically, the proposal would require that all B737 airplanes be equipped to record the parameters listed in § 121.344 as (a)(1) through (a)(22), and (a)(88), plus the three new parameters, which would be designated as (a)(89) through (a)(91). The three new parameters are yaw damper status, yaw damper command, and standby rudder status. In addition, the required sampling rate of control force parameter (a)(88) would be doubled for B737 airplanes. In B737s that were not equipped with a Flight Data Acquisition Unit (FDAU) on July 16, 1996, compliance would be required by August 20, 2001. In B737s that were FDAU-equipped on July 16, 1996, compliance would be required by August 18, 2000. The NPRM states that comments to the Docket must be received by December 20, 1999.

Pursuant to 14 CFR §§ 11.33 and 11.29(c), the Air Transport Association of America (ATA), on behalf of its member airlines', petitions the Administrator to withdraw the NPRM or, alternatively, to extend the time allowed for the submission of comments at least to the time requested in our letter of December 16, 1999. ATA requests that the NPRM be withdrawn or the comment period be extended in order to develop a reliable estimate of the time that will be required to design, certificate, provision and retrofit the proposed modifications using a comprehensive Service Bulletin, and to allow the FAA to organize a public meeting of all interested stakeholders to discuss the design, manufacture and scheduling issues arising from the NPRM.

^{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.

ATA-member airlines have estimated that the requirements of the NPRM cannot be met before the expiration of the proposed compliance periods. In fact, it appears that no "FDAU-equipped" airplanes could be brought into compliance until four to seven months after the compliance period, which would result in the grounding of 652 B737s and a reduction in the total scheduled departures of ATA-member airlines during that period by over eighteen percent. Nominally, three months would be available before the expiration of the compliance period for "non-FDAU" B737s, during which 427 airplanes would have to be retrofitted. Accordingly, a majority of these planes would also be grounded. These projections stem from estimates of the time required to design, certificate, and provision service instructions for retrofitting the proposed modifications. Survey data provided earlier to FM indicated that once service instructions were available, an absolute minimum of two to three years would be required for retrofit. The proposed Rule would require, in the absence of approved service instructions, the retrofit of "FDAU-equipped" airplanes within the next eight months, and the retrofit of "non-FDAU" airplanes within the next 20 months.

The absence of approved service instructions is of major concern to operators, in that the proposal would mandate the installation of components and systems which have not yet been designed. With the exception of the sensor for the proposed rudder pedal force parameter, no other elements of the proposed modification are addressed in a retrofit Service Bulletin. Control wheel force sensors and transducers for B737-100 through -500 series airplanes have not been designed. Control wheel and control column force sensors that meet proposed accuracy requirements have not been designed for any B737 series. Sensors for yaw damper status and yaw damper command parameters are not addressed in a retrofit Bulletin. Sensors for the standby rudder status parameter have not been designed for any B737 series airplanes. Assurance of an appropriate production capacity of these components and associated avionics cannot be established until after system design has matured. If adopted, foreign civil aviation authorities can be expected to mandate the Rule, increasing demands on component and avionics production to that needed to support up to 3,000 airplanes.

The positive contributions of several rudder-associated Airworthiness Directives and the analyses, findings, and recommendations of the FAA/Boeing "Engineering Test and Evaluation Board" should be taken into consideration, particularly in view of the potential impact of the proposed Unfunded Mandate. We believe that emphasis should be given to exploiting the efforts of the Board in order to identify possible rudder system failures and corrective actions that will prevent their occurrence.

The proposed Rule retains the July 16, 1996, date for assigning "FDAU-equipped" or "non-FDAU" status. Retention of this date may reduce the potential impact of the proposal on operators who, on their own initiative, upgraded their FDR systems well in advance of the date required under CFR 121.344. *However, a recent analysis by Boeing indicated that certain upgraded airplanes might require new FDRs and FDAUs in order to meet frame rate*

requirements, both penalizing operators who acted proactively on the 1997 FDR Rule and reducing industry's incentives to take proactive steps in the future. Although the proposal invites comments regarding a compliance period extension to August 20, 2002, for airplanes which were upgraded in advance, avionics costs incurred by early upgrading would be lost.

ATA and its members are extremely disappointed that we were excluded from the planning and development of this NPRM. This rulemaking is precisely the type of activity that should be governed by the principles of the Airworthiness Concerns Coordination, or a similar partnership approach. Had that occurred, the obvious problems with the NPRM's time frame could have been avoided and a practical schedule could have been developed. As discussed above, the NPRM proposes modifications that are not yet designed and contain many unknowns and variables.

The NPRM proposes extensive and significant changes to B737 flight data recorder systems. A proposal of this magnitude requires more than 30 days to develop responsive information and prepare informative comments. This is particularly true of the proposed Rule, which was developed without meaningful industry participation due to unreasonable treatment of *ex parte* circumstances, and which poses highly complex and unresolved technical and supply issues, convoluted regulatory requirements, and dramatic potential impacts on scheduled service and maintenance planning.

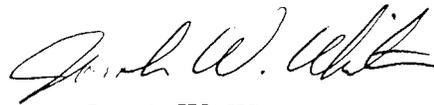
For all of these reasons, ATA urges the FAA to withdraw the NPRM to permit an appropriate government-industry informational meeting involving all stakeholders. Such a meeting would greatly assist the FM in understanding the problems associated with the NPRM and to identify reasonable solutions to the engineering, manufacturing and scheduling problems associated with the NPRM. Alternatively, FAA should extend the comment period and call a public meeting as soon as possible to accomplish these goals. As it now stands, the NPRM is wholly arbitrary and sets impossible goals.

The member airlines of ATA are totally committed to the safety of commercial aviation and the best interests of the flying public, and believe that their historic performance in aviation safety and global leadership testifies to that commitment. In view of those interests, ATA recommends that the proposed Rule be thoroughly reviewed with industry representatives, particularly with regard to compliance periods.

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Preliminary information supporting this petition is attached. If any further information is required, please call me at (202) 626-4036/40 19.

Sincerely,



Joseph W. White
Director, Aircraft Systems Engineering
Air Transport Association
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Washington, DC 20004-1 707

Attachment

Cc: Ms. E. Erickson, AIR-1
Mr. R. Wojnar, AIR-101
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ATA Information Concerning Docket No. FAA-1999-6482

Revisions to Digital Flight Data Recorder Regulations for Boeing 737 Airplanes
and for Part 125 Operations
(December 20, 1999)

1. Proposed compliance times cannot be met. Information obtained from airlines and manufacturers demonstrates that the compliance schedule in the NPRM is not reasonable and cannot be met. A more thorough assessment of the amount of time that would be required to develop, approve, and adequately support a generic Service Bulletin, certificate associated Supplemental Type Certificate (STCs), and retrofit in-service airplanes is needed. An OEM estimate, presented to ATA members as "highly preliminary and aggressive," indicates that a generic retrofit Bulletin could be developed, approved and validated by mid-December, 2000, four months after the expiration of the proposed compliance period for FDAU-equipped planes.

Based on the attached operator comments, the OEM's estimate, and ATA-member survey data previously forwarded to FM, a complete estimate of the time required to commence the proposed retrofit is as follows:

	<u>Elapsed Time</u>	<u>Total Elapsed Time</u>
	(Some elapsed times overlap)	
Non-recurring engineering	8 ½ months	8 ½ months
Generic Service Bulletin development	4 ½ months	10 months
Service Bulletin approval	1 ½ months	11 ½ months
Service Bulletin validation	1 month	12 ½ months
Development of STC, coordinated with the generic Bulletin, if required *	3-4 months	15 months
STC certification *	3-4 months	18 months
Initial Parts availability	4-5 months	20-22 months
Commence retrofit per:		
'Generic Bulletin' only		16 ½ -17 ½ months
'Coordinated STC' *		20-22 months

* "Non-FDAU" and certain other B737-100 through -500 series airplanes would require 'coordinated STC' modifications in addition to the generic Service Bulletin.

On December 1, 1999, Boeing commenced non-recurring engineering in the development of a generic Service Bulletin. The remainder of the above **timeline** projects that the proposed retrofit of airplanes that would require only this generic Bulletin, most of which are FDAU-equipped B737-600 through -800 series (Next Generation (NG)) airplanes, cannot commence before mid-March, 2001. If a B737 NG operator were to develop an 'independent STC' instead of using the generic Bulletin, the operator might be able to commence retrofits two months earlier, in January, 2001. However, applicants for 'independent STCs' would be expected to create a certification load, similar to that created by cargo bay conversion rulemaking, in which operators have routinely experienced STC certification times of five to eight months. 'Independent STCs' for non-FDAU airplanes or airplanes with limited-capacity FDAUs or FDRs are estimated to require the same amount of time to commence retrofit as with the generic Bulletin approach. (Technical and other reasons to avoid reliance on 'independent STCs' are also contained in a following discussion.)

The preceding **timeline** also projects that a retrofit of airplanes that would require a 'coordinated STC', which includes all non-FDAU B737s and other B737-100 through -500 series airplanes with limited-capacity FDR systems, cannot commence before July, 2001. The **timeline** must be regarded as preliminary, primarily due to the lack of **firm** availability and production capacity estimates for parts which have not yet been defined or designed in the non-recurring engineering process, and due to a lack of definition of FDR and FDAU production requirements and capacities. However, the **timeline** clearly illustrates that the proposed compliance periods cannot be complied with without a significant grounding of B737 airplanes. Based on the above timeline, a summary of the projected impacts is as follows:

FDAU-equipped airplanes. All 652 US-registered B737s would be grounded on August 19, 2000 under the NPRM. Any airplanes that were modified under an 'independent STC' might begin to be returned to service in December, 2000, but would protract the certification process of other airplanes. Otherwise, those modified in accordance with the generic Bulletin, approximately 450 airplanes, would begin returning to service in March, 2001. Those that would require a STC in addition to the generic Bulletin, approximately 202 airplanes, could begin returning to service in July, 2001, provided parts, hanger space, and technicians remained available.

By August 20, 2001, 74 of these FDAU-equipped airplanes have to be brought into compliance with parameter requirements (a)(23) through (a)(34) of CFR 121.344. These parameters would be installed in conjunction with the proposed modifications to avoid two inductions into modification lines, and the resultant delays in efforts to return all of an operator's airplanes to service. The net effect is to further accelerate the requirements of CFR 121.344.

Non-FDAU-equipped airplanes. Provided that certification loads had not caused delays, and that DFDAUs, FDRs, parts, hanger space, and technicians remained available, operators could modify airplanes under an 'independent STC' beginning in March, 2001. Operators could modify airplanes under a generic Bulletin and 'coordinated STC' beginning in July, 2001. Considering these variables, a nominal three months would be available before the expiration of the compliance period to accomplish the retrofit work on 427 US-registered B737s. There are concerns that the majority of these airplanes would be grounded on August 21, 2001.

To illustrate the deficiencies of the proposed compliance periods, the NPRM would require that airplanes manufactured after August 18, 2000, have the proposed modifications. However, the OEM has advised operators that it has not yet determined whether it can include the modifications in the first airplane delivered after that date; the NPRM nevertheless would require that 652 in-service airplanes be retrofitted by that time.

2. Impact on scheduled air transport service. Based on the preceding timeline, certain member airlines have provided an estimate of the impact of the NPRM in terms of the percentage of reduction in their total daily scheduled departures, as follows:

<u>Airline</u>	<u>Reduction in Total Scheduled Departures,</u> Aug. 19, 2000 to March 2001	<u>Reduction in Total Scheduled Departures,</u> after Aug. 21, 2001 *
A	62 %	
B	30 %	95 %
C	33 %	
D	3 % ASM **	5 % ASM **
E	39 %	53 %
F	5 %	10 %
G	66 %	
H	17%	40 %
Overall for <u>All US</u> ATA Member Airlines	18.2% (100,747 departures lost/month)	tbd

* Based on commencement of the retrofit of non-FDAU airplanes in July, 2001.

** Units are Available Seat Miles instead of departures.

3. Urgency of the proposed modifications. The member airlines of ATA are totally committed to the safety and best interests of the traveling public, and believe that their historic performance in aviation safety and global leadership testifies to that commitment. Accordingly, we must question whether the urgency of the proposed modifications, manifest in the proposed compliance periods, is warranted. The NPRM provides no analysis of, and grants no consideration for, the degree to which several Airworthiness Directives (ADS), applicable to the B737 rudder system, have improved the reliability or safety of the system. Ten ADS, issued since 1995, are listed as follows:

<u>AD Number</u>	<u>Compliance Date</u>
99-11-05 *	Within 16 months after June 28, 1999
98-13-12	Within 90 days after July 6, 1998
98-02-01	Within 3,000 hours after February 17, 1998 and every 9,000 hours thereafter
97-14-03 *	August 1, 2000
97-06-09	April 21, 1999
97-09-14 *	Within 5 years or 15,000 flight hours after June 6, 1997, or next rudder Power Control Unit (PCU) shop visit.
97-14-04 *	August 4, 1999
97-09-15 *	Within 5 years or 15,000 hours after June 9, 1997. (Yaw Damper Shut-Off Valve Solenoid Replacement.)
96-26-07	Within 30 days after January 17, 1997
95-06-53	Within 5 flights after May 1, 1995

* ADs applicable to the PCU

The proposed rule states that although a number of ADs have been issued for B737 rudder systems, "incidents of suspected uncommanded rudder movement continue to be reported, including five incidents in 1999." However, the proposal does not document which rudder-associated ADs were installed in the incident airplanes or provide investigative findings, stating only that "some... had been modified with the upgraded rudder PCU." It should be noted that AD 97-14-04 was issued to address certain B737 rudder issues on an expedited basis. Subsequent to compliance with this AD, cracks began to develop in the secondary slides of PCUs, which may have induced rudder anomalies. AD 99-11-05 was then issued as a corrective measure. Before proceeding with the NPRM, FAA should provide information and analysis regarding the status of the five incident planes with respect to AD 97-14-04 and AD 99-11-05. In view of the ADs' effective and compliance dates, it appears that most of the incident airplanes were in compliance with the former, problematic AD, but not the latter.

The proposed Rule cites a June 9, 1996 upset event, involving roll and yaw that terminated after the flight crew secured the yaw damper. The date of that incident implies that the airplane was in compliance with only one of the previously listed ADs.

FM has adopted several ADs, including improvements in flight crew training and procedures, in order to counter suspected rudder anomalies. These measures impose measurable improvements which should have been considered when developing the NPRM. Specifically, their effectiveness in preventing or controlling any anomalies should be taken into consideration in determining a reasonable compliance period.

In response to suspected uncommanded rudder movements and rudder reversals, Boeing convened an "Engineering Test and Evaluation Board" with membership that includes FM and other government and industry experts. The Board is scheduled to report on March 31, 2000. In addition to the positive contributions of rudder-associated ADs, the engineering tests and

analyses, findings, and recommendations of Board should be taken into consideration in order to assess the need for the NPRM and its concomitant significant impact on the traveling public.

Finally, the NPRM's benefit analysis hypothesizes that if the proposed FDR parameters reveal the source of B737 rudder events and corrective measures are subsequently taken which prevent a single B737 loss, then the proposed action is justified. However, the analysis offers no estimate of the benefits of actions that already have been taken, or are in process, to prevent rudder events. Such an estimate should be made because actions taken to date may have already provided direct protection against rudder events, whereas FDR modifications cannot. Moreover, the analysis fails to adequately quantify the risk of such an event occurring in light of the previously issued ADs.

4. Approved Service Instructions. To develop comprehensive comments on the NPRM, affected ATA member airlines initiated discussions with the OEM regarding a plan for retrofitting the proposed modifications into in-service airplanes. Those discussions indicate that the best approach would be a "generic" Service Bulletin, developed in coordination with the original system integrator, that would apply to all 1,224 of the applicable US-registered B737 airplanes to the greatest extent possible. Currently, these airplanes are subject to one of three distinct sets of parameter requirements under 14 CFR § 121.343, each having unique upgrade requirements, and each posing unique retrofit challenges under the NPRM. In order to accomplish upgrades required under 14 CFR § 121.344 (which are currently in progress) and 14 CFR § 121.343, many airplanes have been modified under STCs. A comprehensive technical assessment of the proposed modifications is recommended to address the numerous airplane configurations and their requirements, and to achieve an acceptable degree of confidence in estimates of the scope and impact of the proposed modifications. The development of a generic Service Bulletin would, as a matter of course, include an authoritative technical assessment. Discussions with the OEM to date have resolved that a Bulletin should include:

- Common elements and hardware,
- Interface definitions for avionics racks,
- All new sensor systems that are required under the NPRM or CFR 121.344,
- Interface definition/target for:
 - Data frames,
 - Optional use of the ARINC 717 data standard, and
 - Optional use of a data-loadable / programmable digital FDAU.
- 100 percent coverage of in-service B737s, including worldwide inventories.

A generic bulletin approach would minimize the overall time and resources required for the design, approval, certification and provisioning of service instructions, and the supplemental instructions and associated STCs which some planes will require. The most expeditious method for a single operator to achieve the first B737 retrofit in accordance with the proposal may be pursuit of design and certification under an 'independent STC'. However, a generic Service Bulletin could produce a more standardized FDR system configuration among the in-service airplanes of all operators, provide system growth capabilities, reduce the impact of any future changes to FDR Rules, and allow the most expeditious retrofit of the entire B737 inventory.

Discussions of the generic Bulletin have surfaced the following issues, indicating the technical complexity of the proposed modifications:

- a. The OEM's preliminary analysis of data frame requirements indicates that a significantly greater number of B737s than projected in the NPRM may require a new FDR in order to comply with the proposal. The 202 'FDAU-equipped' B737s operated by members, which were manufactured before October 12, 1991, typically have FDRs capable of 64 words per second (wps). Under operator initiatives, some of these airplanes were brought into compliance with CFR 121.344 (a)(18) or (a)(22) well before the required date of August 20, 2001. The OEM's data frame analysis, planned for completion in February, 2000, will probably show that these airplanes would require new FDRs and FDAUs capable of 256 wps to comply with the proposed modifications. Of note, FDRs with 128 wps capability are cited in the proposal, however, 128 wps is not an industry standard and such FDRs are not in production.
- b. Provisions for one of the three proposed new sensors (i.e., rudder pedal force) are addressed in a retrofit Service Bulletin applicable to certain B737 series; however, no other elements of the proposed modification are addressed in a retrofit Bulletin. As examples, the proposed control wheel force sensors would require installation of dual force transducers and a position sensor for the first officer's control wheel. A first officer's control wheel position sensor for B737-100 through -500 series airplanes has not been designed. Control wheel and control column force sensors that meet CFR 121 Appendix M accuracy requirements have not been designed for any series. Sensors for yaw damper status and yaw damper command parameters are not addressed in a retrofit Bulletin. Sensors for the standby rudder status parameter have not been designed for any B737 series airplanes. As with any Airworthiness Directive, schedule and quality risks are incurred when actions are evaluated and mandated without reference to approved service instructions.
- c. Of note, initiation of a retrofit Bulletin before release of the proposed Rule would not have been prudent. As anticipated, differences significant to system design exist between NTSB Safety Recommendations A-99-28 and A-99-29, and modifications in the proposal. These differences were first made known to operators with release of the proposal, and include: the number of rudder pedal force sensors; sample rates for the three new parameters; and parameter accuracy requirements which apply to certain sensors. Operators are concerned that other differences could emerge between the proposed configuration and that ultimately required by an AD, which would frustrate any advanced design effort and reduce the effective compliance period.



December 13, 1999

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Subject: Response to NPRM for 737 Flight Data Recorder Expanded Parameters

Reference: Docket No. FAA-1999-6482, Notice No. 99-19

Dear Joe,

Alaska Airlines is strongly committed to the efforts to enhance the safety of the Boeing 737 aircraft and encourages a rulemaking that gives a more realistic time frame to increase the Boeing 737 Flight Data Recorders parameters.

If the NPRM were adopted as written, it would have a drastic and severe impact on Alaska Airlines flights. It is our belief that the engineering for the added parameters will not be developed by August 18, 2000, the date listed in the NPRM as the completion date for the FDAU equipped 737 aircraft. After the engineering is developed and verified, it would be necessary to produce parts, service bulletins, obtain FAA approval for the STC and PMA, and then finally schedule and modify the aircraft. While the NPRM discusses the costs of the rule in detail, it states incorrectly that the aviation industry can meet the goal of modifying the vast majority of 737 aircraft by August 20, 2000. To support this opinion, we offer the following:

- According to Boeing estimates, adding control wheel force sensors would require installation of dual force transducers and a position sensor for the First Officers Control Wheel. The First Officers Control Wheel Position Sensor has never been developed for the 737-100 through 737-500 aircraft. And the control wheel and control column force sensors that meet FAR 12.1 Appendix M do not exist today, they are only engineering concepts at this time.
- The NPRM discusses increasing the capability of the existing FDAUs and FDRs to meet the added parameter. However, Boeing does not plan to develop a new 128 WPS dataframe for the 737 classic aircraft to meet this NPRM. Instead, Boeing plans to modify the 256 WPS dataframe used on the 737-NG aircraft and use this modified dataframe for the 737-300 through

Alaska Airlines

737-500 aircraft. This modified dataframe would require replacement of the existing DFDAUs and SSFDRs on all of Alaska Airlines 737-400 aircraft. It is unknown when the modified 256 WPS dataframe will be released by Boeing, or when the DFDAUs and SSFDRs will be available.

- It is the experience of Alaska Airlines that FAA approval for an FDR STC will take approximately 3-4 months after the data is submitted to the FAA. This is based on projects currently in work by Alaska Airlines to comply with FAR 121.344.

If the NPRM is adopted as written, Alaska Airlines will be forced to cancel approximately 62% of its scheduled daily departures each day after August 18, 2000. These departures would be cancelled each day until the engineering, service bulletins, parts, FAA certification, and finally aircraft modification could be accomplished. Because of the high level of uncertainty regarding adding these parameters, Alaska Airlines is not able to calculate when the necessary modifications to its 737 aircraft could commence or when they could be completed.

In closing, Alaska Airlines is strongly committed to the efforts to enhance the safety of the Boeing 737 aircraft and encourages the FAA to adopt a rule with a more realistic compliance period.

Regards,

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Director, Engineering
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Fax: (206) 433-3311

cc: John Melvin
Jim Davey



A I R L I N E S

P.O. Box 30028
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December 9, 1999

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Re: Revisions to Digital Flight Data Recorder Regulations for Boeing 737
Airplanes and for Part 125 Operations; Proposed Rule (Docket No.
FAA-I 999-6482)

Dear Mr. White:

Aloha Airline fleet is comprised of thirteen 737-200's, six 737-200C's, and two 737-700's. Out of the nineteen 737-200/C's, 13 are non-FDAU and 6 are FDAU systems. Due to the different configurations in our fleet, the engineering costs, lost net revenue, and compliance time per aircraft as determined by the proposed rule is grossly underestimated.

Summary of the NPRM's estimated cost:

One time engineering costs (STC application):
\$200,000 per airplane

Total material, parts, labor costs and lost net revenue per airplane is:
200-advanced (No FDAU): \$165,100-185,000
200-advanced (FDAU): \$71,250-94,900
700 airplane: \$52,450-69,775

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Aloha's research has shown the following costs:

200-advanced (No FDAU)

One time FDR engineering costs per plane: (13 aircraft)	\$123,076
Mixed fleet: 8 configurations @ \$200K per configuration (ref note)	
New FDAU install	\$50,000
(200 hours @ \$75 per hour)	\$15,000
New FDR install	\$25,000
(32 hours @ \$75 per hour)	\$ 2,400
Wiring, sensor	
Parameters 19 thru 22	\$20,000
(200 hours @ \$75 per hour)	\$15,000
Parameters 88 thru 91	\$22,000
(360 hours @ \$75 per hour)	\$27,000
Lost net revenue for 7 days	\$265,300
(daily: 14 flights @ 62% capacity)	
TOTAL per aircraft:	\$564,776
TOTAL for 13 aircraft:	\$7,342,100

Note: STC cost is valid if Boeing does not release detailed service bulletin(s).

200-advanced (FDAU)

One time FDR engineering costs per plane: (6 aircraft)	\$166,667
Mixed fleet: 5 configurations @ \$200K per configuration (ref note)	
New FDAU install	\$50,000
(200 hours @ \$75 per hour)	\$15,000
New FDR install	\$25,000
(32 hours @ \$75 per hour)	\$ 2,400
Wiring, sensor	
Parameters 88 thru 91	\$22,000
(360 hours @ \$75 per hour)	\$27,000
Lost net revenue for 4 days	\$151,600
(daily: 14 flights @ 62% capacity)	
TOTAL per aircraft:	\$459,667
TOTAL for 6 aircraft:	\$2,758,000

Note: STC cost is valid if Boeing does not release detailed service bulletin(s).

700

One time FDR engineering costs per plane: (2 aircraft) 1 configuration @ \$200K per configuration (ref note)	\$100,000
FDAU reprogramming (40 hours @ \$75 per hour)	\$10,000 \$3,000
Wiring, sensor Parameters 88 thru 91 (160 hours @ \$75 per hour)	\$12,000 \$12,000
Lost net revenue for 4 days (Daily: 2 flights @ 60% capacity)	\$119,000
<i>TOTAL per aircraft:</i>	\$256,000
TOTAL for 2 aircraft:	\$512,000

Note: STC cost is valid if Boeing does not release detailed service bulletin(s).

Cumulative total engineering, parts, labor, and lost \$10,612,100 net revenue cost (737-200/C, and -700):

The economic impact to Aloha is understated in the NPRM. The proposed rule's assumption of the one-time cost of \$200,000 per STC application is that each airline maintains a common fleet. We have 14 different aircraft configurations for a total engineering cost of \$2.8 million. Also, our estimated lost net revenue amount is higher than the NPRM's estimate. The estimated out-of-service revenue for -200 (No FDAU), -200 (FDAU), and 700 are \$48,175 per day and our total amount is calculated at \$535,900.

737 operators have determined that Boeing's scope of action to comply with the additional parameters plays a major role in the direction that we will undertake. Presently, Boeing does not have service bulletins in place to address the entire NPRM. As a group, 737 operators agreed that Boeing should release service bulletin(s) that offer in-depth design guidance to allow quicker compliance time and lower cost by standardizing the fleet's modification. Also, standardizing the fleet will ensure commonality in the future for any additional parameter requirement.

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On 12/01/99, Boeing issued a top-level workscope with estimated timeline. The timeline starting from their engineering effort through service bulletin(s) validation requires a year of work covering the entire year of 2000. Subsequent to the release of Boeing's service bulletin(s), Aloha's engineering time to obtain FDR system STC is estimated to be 5 months as experienced in past history. Therefore, only a 3-month window is left to comply with the August 2001 proposed date for Aloha's entire fleet of 21 airplanes. The August 2000 compliance time definitely will not be met with the FDAU aircraft. Aloha's hangar capacity plan has been scheduled for upcoming checks. In the hangar, there are only 7 days out of the 3 months when no checks are scheduled. One non-FDAU airplane would be accommodated without maintenance disruption before August 2001. The remainder of the fleet will be non-compliant.

Calculating the hangar time needed, the FDAU and non-FDAU aircraft will require a total of 32 hangar days and 91 hangar days respectively for our existing fleet. Given an available free space of 50 days per year in the hangar (capacity of two aircraft), Aloha requests the compliance time for FDAU systems aircraft be extended by two year (August 2002) and four years for non-FDAU systems aircraft (August 2004). With the adequate time, the additional parameters can be incorporated to comply with the ruling without severe economic impact.

Aloha competes with one operator in the Hawaii inter-island air travel market. We operate Boeing 737 aircraft solely while our competitor operates MD DC-9. With no released engineering in place by the proposed compliance date of August 2000, 100% of the FDAU planes or 30% of our fleet will be grounded. At the August 2001 compliance date, only 5% of our fleet will have complied with the NPRM. This places aloha in a major disadvantage to compete, resulting in a substantial loss of market share, loss revenue, and loyal customer base.

Aloha's other concern is the issue of parts availability versus compliance time. Currently, Boeing has no production sensor to meet the required force parameter. They planned to design and produce enough quantities by the 4th quarter of 2000 to supply not only the US fleet but the worldwide fleet. A number of 737 operators will require the same items to be upgraded, retrofitted, or purchased simultaneously in a short period of time to meet the compliance time proposed. Aloha may lose priority to large operators due to our limited quantity demands, which will affect our compliance timeline.

Mr. Joe White
Page 5
December 9, 1999

In summary, Aloha agrees that public safety is vital. We concur with the proposed rule with the exception of the estimated engineering cost, lost net revenue, and compliance time. The flight data recorder system is a recording device not directly affecting the safety of aircraft systems airworthiness. Aloha requests the compliance time be extended to allow the design and implementation of a more practical and viable solution that will comply with present and future proposed parameter additions.

Sincerely,



Warren Chun
System Support Engineer

WC:pkm

(Let99-1)

bcc: J. Buckingham
J. Goo
K. Kiyon-Collu

From: Barbara Goodman-taylor [Barbara_Goodman-taylor@amrcorp.com]
Sent: Tuesday, December 14, 1999 5:43 PM
To: White, Joe
Subject: Docket No. FAA-1 999-6482; Notice No. 99-19

December 9, 1999

Mr. Joe White
Engineering, Maintenance & Materiel
Air Transport Association of America
1301 Pennsylvania Ave., Suite 1100
Washington, DC 20004-1707

ATTN: Joe White - jwhite@air-transport.org

Subject: Proposed Digital Flight Data Recorder (DFDR) Rule - B737 Aircraft

Reference: Docket No. FAA-1 999-6482; Notice No. 99-19

The proposed rule requires the modification of the B737 aircraft to incorporate various flight data recorder parameters dependent upon manufacture date and configuration of the specific B737 aircraft. The following are comments based upon the proposed rule and the effects of the rule on American Airlines' operations.

American Airlines is currently operating twenty-two (22) B737-800 aircraft and is receiving two (2) new aircraft per month. This proposed DFDR rule will affect all AAL B737-800 aircraft, both those already delivered, and future delivery aircraft. It is assumed that Boeing, at some point, will incorporate the required modifications during production aircraft prior to the rule compliance date. All aircraft delivered up to that point would require modification to comply with the proposed DFDR rule.

The B737-800 aircraft is equipped with the latest flight data recorder system installed on any Boeing model aircraft recording 88+ parameters, yet still will not meet the requirements of the proposed DFDR rule. In order to comply with the requirements as specified, the following modifications will be required for ML aircraft:

- 1) The addition of the Standby Rudder ON/OFF Discrete to the on-board Digital Flight Data Acquisition Unit (DFDAU).
- 2) DFDAU Mandatory DFDR Data Map must be modified via software revision to accommodate the following:
 - a) Increase of the Control Wheel Position Sampling Rate from 1X/sec to 2X/sec.09
 - b) Increase of the Rudder Pedal Force Sampling Rate from 1X/sec to 2X/sec.
 - c) Addition of the Standby Rudder Discrete Parameter

- 3) Installation of a sensor on the First Officer Control Wheel for Position Monitoring.
- 4) Upgrade of the existing force transducers (4 ea.) to obtain new range limits.
- 5) Upgrade of the 3 on-board Flight Control Computers (FCC)

An initial cost estimate of these modifications are as follows:

Aircraft Parts:	~\$4000 per aircraft
DFDAU Software:	~\$7,500 per unit (1 per a/c)
Force Transducer Modifications:	~\$2,000 per unit (4 per a/c)
FCC Modifications:	~\$5,000 per unit (2 per a/c)
Manpower:	~250 hr/aircraft @ \$71/hr 3D \$17,750
Project Cost:	~\$47,250 per aircraft + aircraft out-of-service time of 2 days +

AAL aircraft will fall under the compliance category of August 18, 2000 per requirements of the proposed rule. Boeing has provided a schedule of the program to the ATA and industry operators showing that Boeing cannot be ready to offer a retrofit service bulletin or kits until well after the proposed compliance date. Once a retrofit is available, Boeing must then supply over 3000 kits worldwide. The magnitude of this modification is extreme for AAL aircraft and must be accomplished during a heavy maintenance visit. Since AAL's aircraft are new, the heavy maintenance visits will not occur for at least 3-4 years. This will facilitate the need for a special maintenance visit line increasing the costs of this modification by \$3-4 Million in out of service time.

AAL and the industry overall cannot adhere to the extreme compliance times offered by this NPRM. ML suggests that the entire compliance time issue be revisited with more accurate information supplied via comment to this NPRM. Realistically, this modification proposal should be incorporated during the next "heavy" scheduled maintenance visits.

Since an onboard flight data recording system does not directly enhance the safety of the operations of the airplane in which it is carried, the requested extension of the compliance time until heavy maintenance visits could be implemented while maintaining a level of safety equivalent to existing FAR 121.344 requirements.

Sincerely,

R. H. Phillips
Managing Director
Aircraft Engineering

cc: T. Bishop
J. Jones
T. Degner
R. French
R. Yorman
M. Keller
R. Hardmeyer
L. Gibbs
R. Schank
G. Pergande
M. King
B. Goodman-Taylor
G. Burns
B. Bartelt
L. Wagner

Continental



Continental Airlines, Inc
PO Box 4623 HQJAV
Houston TX 772 1 0-4607

December 13, 1999

Air Transport Association
1301 Pennsylvania Avenue, NW, Suite 1100
Washington, DC 20004-1707

Att: Joe White
Director, Aircraft Systems Engineering

Subj: B737 Flight Data Recorders - Proposed Part 91 Rule - Comments

Ref: Docket No. FAA-1999-6482

Dear Joe

Continental Airlines has the following comments on the subject proposed rule:

- General

Continental firmly believes that the proposed new Flight Data Recorder (FDR) parameters should be only required to be installed during production of new B737 aircraft.

The extensive costs that would be incurred to retrofit existing aircraft (over \$15M for labor and material alone in Continental's case) cannot be justified, due to the numerous improvements that have been made to the rudder systems of both new and in-service B737 aircraft.

- Modifications to the B737 Rudder System

The FAA has issued the following AD's relevant to the B737 rudder system:

<u>AD Number</u>	<u>Compliance Date</u>
99-11-05	Within 16 months from June 28, 1999
98-13-12	Within 90 days from July 6, 1998
98-02-01	Within 3000 hours from February 17, 1998 and 9000 hours repetitive thereafter
97-14-03	August 1, 2000
97-06-09	April 21, 1999
97-09-14	Note 1
97-14-04	August 4, 1999
97-09-15	Note 2
96-26-07	Within 30 days from January 17, 1997
95-06-53	Within 5 flights from May 1, 1995

Note 1: Applicable to Rudder PCU (Chrome Plating). Compliance: Within 5 years or 15,000 flight hours from June 6, 1997, or next PCU shop visit.

Note 2: Yaw Damper Shut-Off Valve Solenoid Replacement. Compliance: Within 5 years or 15,000 hours from June 9, 1997.



Of the above AD's, 97-09-14, 97-14-04, 99-11-05, 97-14-03, and 97-09-15 are applicable to the Rudder PCU. The remaining AD's address other areas in the rudder system. The NPRM states "... some of the B737 airplanes that recently experienced suspected uncommanded rudder movements, . . . had been modified with the upgraded PCU. . ." This statement is provided as evidence that all of the problems in the B737 rudder system have not been solved. However, it ignores whether or not the AD's that are applicable to areas outside of the PCU were done to the aircraft that had the incidents.

Continental has complied with or is in process of complying with corrective actions offered and mandated by the OEM and FAA regulations. The following is a summary of the changes to the rudder and yaw damper system to date:

1. All of the rudder PCU's have been modified to install stops which limit the servo valve slides travel
2. Special instructions were entered in the Aircraft Flight Manual, which provides procedures for the pilots to shut down electrically and hydraulically the rudder PCU in case the aircraft is experiencing an uncommanded roll event.
3. An initial internal leak test at 4600 flight hours and repetitive every 6400 flight hours is required to ensure the integrity and correct functioning of the rudder PCU.
4. New rudder PCU's with redesigned dual servo valves and new engage solenoid shut off valves are being installed on all B737 aircraft by August 4, 1999.
5. A displacement test is accomplished on every newly modified rudder PCU to ensure that the secondary slide of the servo valve is free of cracks.
6. All the standby rudder PCU's are to be modified to install a new input shaft with improved bearings to eliminate the possibility of galling and subsequent high operational forces which can back drive the main rudder PCU and cause an uncommanded roll.
7. A new hydraulic rudder pressure limiter is being installed on each aircraft which will reduce the supplied hydraulic power to the rudder system above 1000 feet on climb out through the flight and on descent up until 700 AGL. This will prevent the rudder from deflecting excessively and overpower the roll axis due to malfunction of the rudder system (AD 97-14-03).

In order to comply with AD 97-14-03 by August 1, 2000, Continental is taking aircraft out of service for special holds of three days.

In short, the known or suspected causes of uncommanded rudder movements are being thoroughly addressed.

- Compliance date determinations

It appears that these dates (August 18, 2000; August 20, 2001) were arbitrarily selected without due consideration of the activities which must take place before even one (1) aircraft can be modified to comply with the rule. The activities include:

- Engineering of the design
- Fabrication of prototype parts
- Testing and verification of the proposed design
- FAA approval of retrofit OEM (Boeing) Service Bulletin
- Production of installation kits for the newly designed sensors
- Lead times for delivery of installation kits.
- Issuance of follow-on STC's for FDAU configurations.

Boeing has estimated that it would take until December, 2000 to produce an FAA-approved Service Bulletin for the B737-300/-500 aircraft. They also estimated that production cut-in for B737-700/-800 aircraft with the new parameters could not begin until August, 2000, with a retrofit Service Bulletin for in-service B737-700/-800's following sometime later.

It should be noted that for B737-500/-700/ and -800 aircraft, for which the FAA has proposed an August 18, 2000 compliance date, the engineering for the installation of the newly-required sensors has not even begun.



The proposed compliance time for the B737-300 aircraft is August 20, 2001. This date would be unachievable due to lack of sufficient parts, and lack of sufficient time to obtain an STC for the applicable FDAU configuration.

Installation kits for the newly designed sensor installations would be defined by a Boeing Service Bulletin, estimated to be available in December, 2000. Experience and precedence has shown that, once a Service Bulletin is released, there is a significant lead time for obtaining the Service Bulletin kits. For example, Boeing SB 727-31-0059, dated June 19, 1997, listed kits that would be required to install sensors to feed flight data recorders on B727 aircraft in accordance with an earlier rulemaking. The lead time for these kits ran from 44 to 56 n-e&s.

Even if there were to be only a six month lead time for the installation kits and if a follow-on STC were not an issue, airlines could not begin retrofitting aircraft to comply with the new rule until June, 2001, only two months prior to the FAA's proposed compliance date.

- Need for a Boeing Service Bulletin

A Boeing FAA-approved Service Bulletin, rather than a third-party design, is seen as an absolute requirement for the installation of the added sensors feeding the FDR system, for the following reasons:

- **Product Support:** The aircraft operator must have field support for these installations for the lifetime of the aircraft.
- **Maintainability:** Maintainability must be designed into the installation, and the aircraft operator must have recourse if the design proves difficult to maintain. Such recourse is often not possible with third party STC-holders who do not have the resources to support in-service problems, or who may no longer be in business.
- **Criticality of Sensor Readings:** Because sensor data being transmitted to the FDR system is critical, the design should be done by the aircraft manufacturer who is intimately familiar with the design to which the new sensors must be integrated

In addition Continental feels that a Boeing Service Bulletin for the B737 aircraft that are not already FDAU-equipped should include a FDAU mounting tray installation and rack connector with complete wiring for the FDAU. The reasons for this are as follows:

- Since the Service Bulletin would be FAA-approved this approach would greatly lessen the industry and FAA workload in getting STC's approved. STC's for FDAU's of different part numbers would still be required, but they could all be based on approved Service Bulletin data, thereby streamlining the process.

The time allotted to Boeing to produce such a Service Bulletin must be consistent with normal industry precedence for an aircraft modification of this magnitude. Otherwise, there will be an unacceptable risk of inducing a new unsafe condition by rushing the design. An example where this happened was in AD 97-14-04 for the secondary slide for the B737 rudder PCU. After a number of PCU's were modified, cracks were found to be developing on the secondary slide. This resulted in AD 99-11-05 being issued, which caused removal and inspection for this condition which is still being done on a repetitive basis.



- Other Comments

- Rudder Force Parameter

The unequivocal acceptability of the single force transducer must be stated in the Final Rule. This cannot be left as an open item that may change in the future.

- FDR Memory Capacity

The statement that the increase of memory capacity for an FDR from 64 wps to 128 wps "would involve a software change" is incorrect for most FDR's. In most cases the FDR itself would need to be replaced at a cost of approximately \$13,000 per unit.

- FAA Approval Times

Based on recent experience, the estimates given for obtaining FAA approvals for FDAU integrations seem unrealistically low. The following are two recent examples of FAA approval times:

- Eight (8) months from submission to approval for a B72718 parameter FDR mod.
 - Eight (8) months from project start to FAA approval for an FDR Rule '97 upgrade that involves "only" a software change to a FDAU.

In fact, there is a general problem with lead times in getting STC's approved at FAA ACO's, apparently due to FAA's hiring practices. It is understood that a directive exists which prohibits hiring staff in fiscal 2000 to replace those who leave, retire, or expire.

For example, in the Los Angeles ACO, it is understood that five (5) people in the Systems and Equipment branch left in the last year and have not been replaced. This represents 50% of the staff that must approve STC's similar to those for Flight Data Recorders. A similar problem is known to exist in the Ft. Worth ACO. For the Atlanta ACO, it has been reported that project turn-around times have increased by at least 65%.

FAA approval is a critical part of the modification process, and the NPRM ignores this current shortcoming within the FAA

- □♦♦

Continental basically agrees with the FAA's cost estimates for the FDR system modifications. However, as this proposed rule has been discussed within the industry, it has become apparent that it would not be possible to modify the current FDAU's being used on some of our B737-300 aircraft, and all of our B737-500 aircraft, for the higher data rates required by the rule.

Therefore, we take issue with the FAA's statement. "... the existing FDAU's in 810 B737's would need to be reprogrammed." In truth, these FDAU's would have to be replaced. A minimum cost of \$71,500 equipment and labor costs has been calculated to comply with this NPRM on B737-300 (FDAU) and B737-500 (FDAU) aircraft

- Reasonable Retrofit Period

As previously stated, Continental considers it unjustifiable to retrofit in-service aircraft with the newly proposed parameters. However, if retrofit is mandated, it should be done at a reasonable pace that minimizes service disruptions and economic impact.



The following compliance time would therefore be recommended:

Must be complied with by [date = eight (8) years from effective date of rule]. but no later than the first heavy check after [date = two (2) years from effective date of rule.] {For all B737 aircraft, with and without FDAU's}

Commentary The two(2) year initiation period would allow a reasonable time for the following:

1. Production of an FAA-approved Boeing Service Bulletin, expected to take about one (1) year.
2. Parts lead times for the Boeing kits (expected to take up to 56 weeks).
3. An approximate one-year lead time for issuance of follow-on STC's for particular FDAU installations based on the Boeing Service Bulletin. Since these STC's would be based to a large part on the Boeing Service Bulletin, the STC design and application could not take place until after issuance of that Service Bulletin.

Recent experience (see "Other Comments") shows that a one year period from project initiation to FAA approval for a project of this magnitude is about what can be expected.

- Consequences

If the rule is adopted as proposed, the following will be the consequences to Continental Airlines:

On August 18, 2000, all 73 of Continental's B737-500/-3Q8 aircraft, and all 77 of Continental's B737-700/-800 aircraft, would be grounded.

On August 20, 2001, all 58 of Continental's B737-300 aircraft would be grounded.

Sincerely,

Chris Allen
Senior Manager
Avionics Engineering

JCA:bhw

A. Delta Air Lines

December 13, 1999

Delta Air Lines, Inc.
Post Office Box 20706
Atlanta, Georgia 30320-6001

Mr. Joe White
Director, Aircraft Systems Engineering
Air Transport Association of America
1301 Pennsylvania Avenue, Suite 1100
Washington, DC 20004-1707

SUBJECT: B737 Requirement for Additional Flight Data Recorder (FDR) Parameters

REFERENCE: /A/ ATA Memo 99-AE-085, B737 Flight Data Recorders - Part 91 NPRM

Dear Joe:

The referenced AD memorandum advises that the FAA has proposed an amendment to Part 91, applicable to applicable to all B737 airplanes operated under Part 121 and certain B737s operated under Part 125, regarding additional Flight Data Recorder (FDR) parameters. If adopted, the proposal would require that FDRs in all B737 airplanes record three parameters, in addition to those required under 14 CFR § 121.344, to be installed by August 20, 2001.

Delta has 95 aircraft that would be affected by the proposed rule, in addition to many aircraft on order that would be affected by the proposed rule. Delta has the following comments.

Adding recorded parameters does not offer any immediate safety benefits. Benefits may occur after an accident and the pursuant investigation, should the data recorded offer conclusive insight into probable cause. An airplane (or fleet type) is not made safer as a result of having additional system parameters recorded.

The efforts to improve B-737 safety should focus the resources on an improved/redundant rudder system design. The human resources needed to accomplish such a design improvement include personnel at Boeing, the airlines, the FAA, and system/component manufacturers. Financial resources and facilities are also critical elements needed to increase the operational safety of the world's B-737 fleet by improving the rudder system design.

There is a limit on the availability of resources in the industry as a whole to support other mandatory projects. Airlines are currently preparing the engineering and allocating installation labor and hangar space for a variety of mandated or soon to be mandated projects: 1997 Flight Data Recorder Expanded Parameters, Cargo Smoke Detection and Fire Suppression, Terrain Awareness Warning System (TAWS), and MD88/MD11 Insulation Blanket Replacement. All of these projects will require a large amount of available manpower and most of them are more directly related to airplane safety.

B737 Requirement for Additional Flight Data Recorder Parameters

December 13, 1999

Page 2

If the mandate to add recorded parameters stands, the following should be considered as effects on Delta alone, in addition to the effects on other carriers:

- The estimated cost to Delta (including lost revenue) ranges from \$163M to \$357M depending upon space, manpower and parts availability, and how many aircraft are taken out of service to meet the proposed deadlines.
- The total cost to Delta is unknown due to production cut-in of the additional parameters on B-737NG aircraft since Boeing is unable to positively determine when they will develop and implement the proposed parameters on current production airplanes.
- Estimated cost (excluding lost revenue) to Delta's current fleet of B-737 aircraft (as of 12/7/99) is \$21M.
- Estimated out of service time per aircraft is 4-7 days.
- The percentage of Delta's flights affected could reach as high as 10% per month, thus decreasing the amount of passenger seats available to the general public. This is illustrated in the attached figure.

Delta feels that the current timelines to develop, certify, and implement design changes are unrealistic. Boeing Service Bulletins defining all the necessary design changes and parts have not been accomplished, nor will they be available to support complying with the August 2000 deadlines of the NPRM. In fact, current Boeing estimates show Service Bulletin completion at approximately that same deadline. FM certification process will not likely support the currently proposed deadlines as well, particularly if each operator were to attempt to meet the intent of the required rule on an individual basis rather than establishing an industry standard.

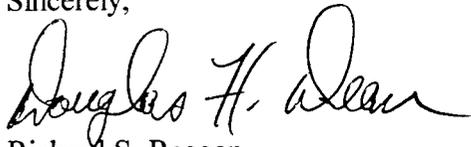
Delta recommends the FM consider the following course of action: focus on corrective action in the rudder system design area, as opposed to recording additional parameters. Realization of an enhancement to safety benefit by the rudder system redesign is at a lower risk than with a recorded parameter increase mandate. The 1997 rule change in the context of yet another mandated recorded parameter increase is a case in point. It is an example of not realizing the intended benefit of a design change.

If mandated recorded parameter increases are inevitable, rely on a single industry wide design solution provided by Boeing. Following introduction of the necessary design changes on production aircraft by Boeing, Service Bulletins should then be developed and made available for retrofit activity. This will offer a much more efficient method for the industry to comply and negate the need for independent solutions and certifications, as has been the case with Cargo Smoke Detection and Fire Protection mandate. This approach will lessen the impact, not only on the airlines and on the FAA, but also on the traveling public, who ultimately pays for such activities. The implementation date should be dependent upon the availability of this solution. The compliance date of the rule should be dependent upon the certification date of each configuration. This date would be a reasonable time after certification occurs.

B737 Requirement for Additional Flight Data Recorder Parameters
December 13, 1999
Page 3

Please forward these comments to the FAA on our behalf. If you have any further questions on this subject, contact Mick Weiland, Program Manager B737-200/-300 AD/Regulatory Compliance, at (404) 714-1083.

Sincerely,

A handwritten signature in cursive script, appearing to read "Douglas H. Dean".

Richard S. Reagan
General Manager - Regulatory Compliance

B737 2000 FDR Rule Impact

'Mod Schedule Allowed to Extend Past August 2001 Compliance Date)

Month	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01	Apr-01
Aircraft Out Of Service	30	30	30	30	30	30	30	22	12
Total Flights Impacted	1890	4050	4185	4050	4185	4185	3410.4	2376.6	1227.4
% of Flights Impacted *	5.09%	5.09%	5.09%	5.09%	5.09%	5.09%	4.59%	3.10%	1.58%

Month	May-01	Jul-01	Aug-01	Sep-01	Oct-01	Nov-01	Dec-01	Jan-02	Feb-02
Aircraft Out Of Service	6	5	59	53	48	44	40	35	31
Total Flights Impacted	605	155	285	7950	7440	6600	6200	5425	4340
% of Flights Impacted *	0.74%	0.19%	0.98%	9.99%	9.05%	8.29%	7.54%	6.60%	5.84%

Month	Mar-02	Apr-02	May-02	Jun-02	Jul-02	Aug-02	Sep-02
Aircraft Out Of Service	27	22	18	14	9	5	1
Total Flights Impacted	4185	3300	2790	2100	1395	775	150
% of Flights Impacted *	5.09%	4.15%	3.39%	2.64%	1.70%	0.94%	0.19%

. Percentages are a daily percentage of flights impacted.

Assumptions:

- 1) Boeing able to begin production in B737NG line August 2000
- 2) Boeing Service Bulletins Available November 2000
- 3) Service Bulletin Validation Complete December 2000
- 4) Service Bulletin Parts are available March 2001
- 5) STC Complete April 2001
- 6) Production paperwork available May 2001
- 7) 2 DFDAU equipped aircraft (~30) accomplished per week
- 8) 1 non-DFDAU equipped (~75) accomplished per week
- 9) All aircraft special schedule

Figure 1

737 2000 FDR Rule Impact

(All Aircraft Accomplished by August 2001 Compliance)

Month	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01
Aircraft Out Of Service	30	30	30	30	30	30	30
Total Flights Impacted	1890	4050	4185	4050	4185	4185	3410.4
% of Flights Impacted *	5.09%	5.09%	5.09%	5.09%	5.09%	5.09%	4.59%

M o n t h	Mar-01	Apr-01	May-01	Jun-01	Jul-01	Aug-01
Aircraft Out Of Service	22	12	30	20	25	5
Total Flights Impacted	2376.6	1227.4	1325	700	875	175
% of Flights Impacted *	3.10%	1.58%	5.26%	3.77%	4.71%	0.94%

* Percentages are a daily percentage of flights impacted.

Assumptions:

- 1) Boeing able to begin production in B737NG line August 2000
- 2) Boeing Service Bulletins Available November 2000
- 3) Service Bulletin Validation Complete December 2000
- 4) Service Bulletin Parts are available March 2001
- 5) STC Complete April 2001
- 6) Production paperwork available May 2001
- 7) 2 DFDAU equipped aircraft (~30) accomplished per week.
- 8) 5 non-DFDAU equipped (~75) accomplished per week.
- 9) Parts are available to support expedited schedule
- 10) Manpower is available to support expedited schedule
- 11) Space is available to support expedited schedule
- 12) All aircraft special scheduled

Figure 1

New FDR NPRM Comments

Mod Accomplishment Time Frame

- Boeing Cannot Support...some parts do not even exist on paper yet!
- FDAU/FDR Manufacturers Cannot Support
- Certification Office Cannot Support. ..120 day flow for STCs/Revisions
- Airlines Cannot Support Schedule Even if Everyone Above Could without severely impacting the flying public. (As written today, two thirds of SWA's aircraft would be out of service in August, 2000)

Safety Impact of an Unnecessarily Rushed Certification/Mod Program

- Why the short time-line with all of the rudder mods that have been accomplished over the last five years?
- Could create a GENUINE, REAL safety concern due to unnecessarily rushing the process and the modification work.

No Credit for all of the 737 Rudder Mods Accomplished over the Past Five Years

- If the FAA does not give credit/credence to all of the rudder mods that we have done, why did we have to do them??

Technical Inaccuracies in NPRM

- FDRs/FDAUs Require Replacement....not Upgrade as stated in NPRM
- No such thing as a simple software change/fix for the hardware concerns
- No 128 Word Per Second Data Frame Exists in the Industry (64 wps and 256 wps are standard)

Certification Time Frame

- Certification Office Support of STC Certification...current 120 day flow time for STC approval once all documents in FAA's hands
- New Certification of DFDAU Software
- NPRM Timeline only allows 2-3 months for Modification of aircraft after all of the hurdles have been overcome. . .even if all of the other hurdles could be overcome.

Cost Inaccuracies

- FDR/FDAU Replacements in lieu of Upgrades. . .this inaccurate assumption adds \$10.7 million in parts cost to SWA alone.
- Out of Service Cost...NPRM states \$400-\$10,500 per day.....SWA uses \$18,500 per day

Penalization of Airlines' Early Accomplishment of 1997 FDR Rule

- Money spent in early compliance was thrown away
- No Credit given for early effort
- Why start early on initiatives??
-

From: Neal Young [Neal.Young@wnco.com]
Sent: Wednesday, December 15, 1999 4:37 PM
To: Dale Stolzer; Prewitt Reaves
Subject: "Non Penalization Clause"

In the "Compliance Status Determination" section of the proposed rule, the FAA sought not to penalize those airlines for adding a FDAU to meet early compliance of the 1997 rule. The "relief" is for those aircraft retrofitted with a FDAU between July 16, 1996 and November 18, 1999. The relief being in the form of another year to comply with the proposed rule or possibly two "...if the FAA receives sufficient data supporting such a change,....."

This is not a substantial help to SWA because the majority of our -300/-500 fleet (175 airplanes), and all of our -700s (56+ airplanes) had FDAUs either retrofitted prior to July, '96 or were delivered from the factory with a FDAU installed.

From: Dale Stolzer [Dale.Stolzer@wnco.com]
Sent: Wednesday, December 15, 1999 10:28 PM
To: White, Joe; Bob Kneisley
Cc: Neal Young; Prewitt Reaves
Subject: More Comments

Something else to add to our list of comments:

Page 63153

"All Relevant Federal Rules That May Duplicate, Overlap, or Conflict With the Proposed Rule"

The FAA says they are "unaware" of any federal rules that would duplicate, overlap, or conflict with the proposed rule.

The new proposed rule as written does not supercede or replace the 97 FDR rule. In order to meet the installation requirements of the 97 rule within the existing 97 mandated timeline, operators will be required to install equipment that is presently certified and available even though we know that same equipment will have to be removed and replaced in order to comply with the new NPRM....once that new equipment is designed, built, certified, and the paperwork available and approved for that equipment's installation....whenever that may be.

I consider that an overlap and a conflict.

Dale



Maintenance Operations

December 15, 1999

Mr. Joe White

December 15, 1999

Page 2

We recommend that, in the event the **NPRM** is adopted, the **effective** date be no **less** than one year **from** the adopted date. This time is **critical** to permit engineering of the installations, and for suppliers of the needed parts to increase their stock levels. Further, to prevent excessive **out-of-service** revenue losses, compliance time should be lengthened to **permit** installation at scheduled maintenance visits of **14** days or longer. Adding this installation to shorter checks (such as a 3 day 'C' check) will greatly impact the visit, and ensure additional out-of-service time,

Sincerely,



J. M. Gay
Chief Engineer & Director
Aircraft Engineering

cc: G. Borsari, United Airlines - INDEG
R. Bernicchi, United Airlines - INDEG
R. Newman, United Airlines - SFOEG

December 15, 1999

Air Transportation Association of America
1301 Pennsylvania Avenue, N.W.
Suite 1100
Washington, D.C. 20004-1707

ATTENTION: J. White, Director - Aircraft Systems Engineering

SUBJECT: B737 Flight Data Recorder NPRM

REFERENCE: A) ATA Memo No. 99-092, Dated 12/1/99
B) FAA Docket No. FAA-1999-6482

Dear Mr. White:

US Airways has two hundred and three (203) aircraft affected by the proposed draft rule described in Ref (A) which would mandate the installation of additional Flight Data Recorder parameters on B737 aircraft as detailed in Ref (B). Several conference calls have been held to discuss responses to the proposed NPRM. Much of the discussions have centered on the substantially shorter time frame that the FAA wants to impose on operators for installation of the additional parameters from what is currently mandated in the FARs.

After review of the proposed rule in Ref (B), US Airways would like to submit the following comments:

- All installations for these new parameters would require a new DFDAU and Flight Data Recorder.
- The Boeing Service Bulletin will not be available until the first quarter of 2001, which will be beyond the due date of August 31, 2000 for upgrading a portion of the B737 fleet. This is a basic disconnect between the FAA and what Boeing can provide. There appears to have been no coordination of the end date in light of what Boeing can supply regarding documentation and parts.
- The Boeing Service Bulletin does not provide the entire approval package. Operators must use the Boeing SB as part of the package for a final STC. Obtaining the STC would take an additional four (4) months beyond the release date of the Service Bulletin.
- Parts for the modification would not be available until three to four months after the STC is finalized. This would push the earliest start date for modifications to late in the third quarter of 2001.
- The proposed rule would require US Airways to park fifty-five (55) aircraft in August 2000. This equates to 17% of US Airways' capacity. A large portion of US Airways' remaining B737 fleet (approximately 130 aircraft) would have to be parked in August 2001. This equates to an additional 40% of US Airways' capacity.

- Operators are currently impacted by the B737 yaw damper / rudder PCU modifications in their maintenance tracks. The FAA should take this into consideration when assessing the industry's capacity to absorb more mandated modifications to the B737 fleet in such a short period of time as currently proposed. It should also be noted that the yaw damper / rudder PCU modifications are being incorporated to address the problems with B737 rudders which initiated these discussions / proposed rulemaking for additional FDR parameters.
- The attached survey provides US Airways' estimated costs and labor impact for the proposed rule.
- US Airways strongly recommends a minimum five year compliance time after release of the Boeing Service Bulletin, which would give an estimated end date of Jan 2006. An alternate to this time frame would be for the FAA to mandate the FDR parameter expansion to only those aircraft produced after Jan 2001.

Please advise if any additional information is required.

Sincerely,

G. Kemp
Senior Director - Technical Services

GK/JLO

cc R. Beiber
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N. White
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J. Oberdick