DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, DC

In the Matter of: **HORIZON AIR INDUSTRIES, INC.**	FAA Order No. 95-11 Served: May 10, 1995 Docket No. CP93NM0329

ORDER AND DECISION

Respondent Horizon Air Industries, Inc., appeals from Administrative Law Judge Burton S. Kolko's determination that Respondent violated the regulations.[1] After a hearing on November 16 and 17, 1993, the law judge found that Respondent, a Part 121 air carrier,[2] returned an aircraft to passenger-carrying, revenue service on several occasions without first repairing the altitude pre-select controller.[3] The law judge assessed an $8,000 civil penalty.

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[1] Attached is a copy of the law judge's written initial decision.

[2] *I.e.*, Respondent's operations are governed by Part 121 of the Federal Aviation, 14 C.F.R. Part 121.

[3] Specifically, the law judge found that Respondent violated 14 C.F.R. § 121.628(a)(5), which provides, in pertinent part, as follows:

> (a) No person may take off an airplane with inoperable instruments or equipment installed unless the following conditions are met:
> . . .
> (5) The airplane is operated under all applicable conditions and limitations contained in the Minimum Equipment List . . . .

The law judge also found that Respondent violated 14 C.F.R. § 121.153(a)(2), which provides, in pertinent part, as follows:

> (a) . . . [N]o certificate holder may operate an aircraft unless that aircraft--
> (1) . . .

[Footnote continues on next page.]

This case arose when the altitude pre-select controller on one of Respondent's de Havilland DHC-8-102 (Dash 8) aircraft failed to display accurate readings. The altitude pre-select controller, which is manufactured by Honeywell, Inc., is one of the components of the altitude warning system.[4] (1 Tr. 140.) The altitude warning system is comprised of: (1) the altitude pre-select controller; (2) two digital air data computers (the #1 DADC and the #2 DADC); and (3) the wiring connecting the DADCs to the pre-select controller. (1 Tr. 140; Respondent's Exhibit Book 2 at Tab 1.) The altitude warning system performs the following functions:

1. When approaching and departing from a selected altitude, the system gives the pilot both an aural and a visual warning.

2. Under the pre-select function, the system uses the autopilot system to level the aircraft at a selected altitude automatically.

(*Id.*)

The DADCs are considered the "brains" of the altitude warning system. (1 Tr. 45.) The DADCs detect the altitude a pilot enters into the altitude pre-select controller. They "know" the aircraft's current altitude, and when the aircraft approaches the altitude set by the pilot, the particular DADC in use will warn the pilot both visually and aurally. (1 Tr. 45.)

Except for the single display on the altitude pre-select controller, the altitude warning system is a dual, redundant system,[5] because it has two air data

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(2) Is in an airworthy condition and meets the applicable airworthiness requirements of this chapter, including those related to identification and equipment.

[4] This system is also referred to, on the Minimum Equipment List (MEL), as the "altitude alerter/preselector system." (Respondent's Exhibit Book 1 at Tab 3, MEL p. 34-4.)

[5] 1 Tr. 141.

computers. The #1 DADC, which is on the captain's side, provides data to the #1 altitude indicator. (1 Tr. 46-47.) The #2 DADC, which is on the first officer's side, provides data to the #2 altitude indicator. (*Id.*) The altitude pre-select controller can use data from either the #1 DADC or the #2 DADC. The captain and first officer are able to select one DADC or the other using the button labeled "HSI SEL" on the autopilot control. (1 Tr. 47.)

The maintenance manual for the de Havilland Dash 8 aircraft prescribes a diagnostic test for the altitude warning system called the "Built-In Test Equipment" test (BITE). (1 Tr. 127-128.) After repairs have been performed on a malfunctioning altitude warning system, it must pass the BITE before it can be returned to service. (*Id.*; 2 Tr. 43.) The BITE is the only diagnostic test prescribed in the maintenance manual for the altitude warning system. (1 Tr. 127.)

The BITE is not designed to be performed while the aircraft is in flight. Instead, it must be conducted on the ground. (2 Tr. 6.) It cannot be conducted in the air because doing so would introduce a massive amount of interference into the regular system. (*Id.*)

Respondent's Minimum Equipment List (MEL) permits operation of Respondent's aircraft with a defective altitude warning system, provided that: (1) the autopilot with altitude hold is operable; and (2) Respondent repairs the system within 3 flight days. (Respondent's Exhibit Book 1, Tab 3, Respondent's MEL at p. 34-4.) In this case, Complainant has never argued that the autopilot with altitude hold was at any time inoperable. Instead, the issue in this case involves the second of the two conditions permitting deferral under the MEL--*i.e.*, whether Respondent actually *repaired* the system within 3 flight days.

Below is a chart summarizing the history of the problems with the altitude warning system on Respondent's aircraft, as well as Respondent's efforts to detect and correct the problems:

Date	**Discrepancy or Maintenance Action**
July 16, 1992	"F/O's [First Officer's] altimeter 210 feet different (higher) than Captain's." #2 DADC replaced. Performed Built-In Test Equipment (BITE) test on system. Tests OK; returned to service.[6]
	* * *
[The aircraft flies 10 flights.]	
July 17, 1992	"When selecting HSI SEL from #1 to #2 side DADC message illuminated and . . . readout goes to dashes." #2 DADC replaced. BITE test performed. Tests OK; returned to service.[7]
	* * *
[The aircraft flies three flights.]	
July 17, 1992	"Altitude alerter [altitude pre-select controller] will not maintain numbers dialed in." *Repair deferred per the Minimum Equipment List (MEL).*[8]
[The aircraft flies one flight.]	
July 18, 1992	"Replaced Alt. Alert Controller [altitude pre-select controller]." BITE test performed. Tests OK; cleared MEL and returned to service.[9]
	* * *
[The aircraft flies three flights.]	
July 18, 1992	"Altitude Alerter/Preselector give wrong readings at various times. When selected sometimes will change to wrong # after few minutes. On approach to SEA could not select below 4000. On

[6] Respondent's Exhibit Book 2 at Tab 5, Maintenance Log p. 317853.

[7] *Id.* at 317857.

[8] *Id.* at 317859.

[9] *Id.* at 317860.

shutdown went to 24,500. Sometimes works fine." *Repair deferred per the MEL.*[10]

[The aircraft flies 15 flights.]

July 19, 1992 "Replaced #1 ADC [DADC] computer." BITE test performed. Tests OK; cleared MEL and returned to service.[11]

* * *

[The aircraft flies six flights.]

July 20, 1992 "Alt. select en route changes to 51500 feet, intermittently." *Repair deferred per the MEL.*[12]

[The aircraft flies nine flights.]

July 21, 1992 "Replaced altitude preselector." BITE test performed. Tests OK; cleared MEL and returned to service.[13]

* * *

[The aircraft flies three flights.]

July 22, 1992 "Occasionally unable to set altitude alerter below 50,000." *Repair deferred per the MEL.*[14]

[The aircraft flies 20 flights.]

July 23, 1992 "Performed BIT check [BITE, or built-in test equipment test] on #1 and #2 DADCs. No defects found. Inspected and rang wires from Alt Alert to #1 and #2 DADC. All wires ring good. Could not duplicate problem." MEL cleared and returned to service.[15]

* * *

[The aircraft flies seven flights.]

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[10] *Id.* at 317863.

[11] *Id.* at 317869.

[12] *Id.* at 317871.

[13] *Id.* at 317875.

[14] *Id.* at 317878.

[15] *Id.* at 317886.

July 25, 1992 "Unable to sel. altitude on alt. sel. when sent on F.O. [First Officer's] HSI." *Repair deferred per the MEL.*[16]

[The aircraft flies 23 flights.]

July 27, 1992 Aircraft is special routed to Portland, Oregon (PDX). 2 Tr. 25. "Cleaned connector 8911-J101 and P101. Replaced pins 35 through 47 on altitude preselector for pin tension. Checked all associated wiring." Found and cleaned some contamination on one of the connectors at the altitude pre-selector, replaced the pins, and returned to service. (2 Tr. 26.) Advised Honeywell, Inc., the manufacturer of the altitude warning system, of the problem. (*Id.*) BITE test performed. Tests OK; cleared MEL and returned to service.[17]

* * *

[The aircraft flies nine flights.]

July 29, 1992 "When HSI SEL is transferred from Capt's to F/O, Alt Select goes to 10,000 feet. If selector was set above 10,000 or an altitude around 55,000 if SEL was below 10,000. When selected on F/O side you are unable to select any altitudes except 10,000 to 11,000 and 14,000 to 15,000, or 54,000 up. If select knob is not touched altitude returns to previously selected on Capt's side or if touched to any altitude corresponding to the number of turns." *Repair deferred under the MEL.*[18]

[The aircraft flies six flights.]

July 29, 1992 "Replaced all pins on preselector cannon plug. Ops checks normal."[19] Honeywell technician generated a test plan, which was followed. (1 Tr. 144.) The aircraft was special routed to Portland (PDX) for the work, which was accomplished in accordance with the instructions of an on-site Honeywell technician.[20] BITE test performed. Tests OK; cleared MEL and returned to service.[21]

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[16] *Id.* at 317890.

[17] *Id.* at 317899.

[18] *Id.* at 318501.

[19] *Id.* at 318502.

[20] Respondent's Exhibit Book 2 at Tab 11, Exhibit 11-2.

[21] *Id.*

[The aircraft flies 21 flights.]

July 31, 1992 "Altitude alert inop." *Repair deferred under the MEL.*[22]

* * *

[The aircraft flies 17 flights.]

August 1, 1992 "Removed and replaced wires for #2 DADC from connector J101 to Alt. Alerter connector."[23] The aircraft was special routed to Portland (PDX) for "[c]omplete re-wire of altitude preselector to #2 DADC. System tested I/A/W DHC Mtx [in accordance with de Havilland Corporation Maintenance] Manual."[24] Tests OK; cleared MEL and returned to service.

* * *

[The aircraft flies 14 flights.]

August 3, 1992 "Altitude alerter is intermittent, when HSI SEL is on F.O. [First Officer] side. Normal on Capt's side."[25] *Repair deferred under the MEL.*

[The aircraft flies 16 flights.]

August 4, 1994 "Replaced wires from #2 DADC to 9811J/J101. Alerter failed tests. Continues RSI [Rescheduled Item] (MEL)."[26] *Repair deferred under the MEL.*

Note: This was the first time that Respondent was able to duplicate the display malfunction during ground testing.[27]

[The aircraft flies 15 flights.]

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[22] Respondent's Exhibit Book 2 at Tab 5, Maintenance Log, p. 318511. This entry, which is from the maintenance log, differs from that in Respondent's Exhibit 11-2, a summary of the maintenance log, which reads, "Unable to select alt. on pre-selector from #2 side. Deferred I/A/W approved Horizon Air MEL. A/C RON'd [remained overnight] BOI. Accomplished component interface tests--no faults noted. Cont. MEL." Complainant stipulated to the accuracy of Exhibit 11-2, which is a summary of the maintenance log.

[21] *Id.* at 318517.

[24] Respondent's Exhibit Book 2 at Tab 11, Exhibit 11-2.

[25] Respondent's Exhibit Book 2 at Tab 5, Maintenance Log, p. 318521.

[26] Respondent's Exhibit Book 2 at Tab 5, Aircraft Maintenance Non-Routine Sheet, p. 318528.

[27] 1 Tr. 73; 2 Tr. 31.

August 6, 1992 BITE test pointed to a defective #2 DADC.[28] Replaced both the #2 DADC and the altitude pre-selector.[29] Returned the aircraft to service and encountered no further problems with the Altitude Alert System.[30]

Respondent sent the #2 DADC that was removed after the BITE test failure on August 6, 1992, to Honeywell for analysis. Honeywell, the manufacturer of the altitude warning system, later determined that the altitude pre-select problem was caused by defective microcircuits in some DADCs. In a bulletin issued in November 1992, Honeywell advised its authorized repair facilities that DADC units with microcircuits made by National Semiconductor were defective, while those containing microcircuits manufactured by either Motorola or Texas Instruments were not.[31]

Subsequently, the FAA initiated a civil penalty action against Respondent. In the complaint, the FAA alleged that:

> Between July 21, 1992, and August 6, 1992, Respondent operated a de Havilland DHC-8-102 aircraft, N829PH, with an inoperable altitude alerter/preselector, an item of equipment not deferrable for more than 3 flight days without adequate repairs under Respondent's approved Minimum Equipment List. (Prior to July 21st, this inoperable item had already been deferred for three flight days, and the repair attempts made during the specified period were inadequate.)

(Complaint ¶ II.2.)

After a hearing, the law judge ruled that on several occasions, Respondent cleared the MEL entry and returned the aircraft to service without a reasonable

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[28] 2 Tr. 32.

[29] Respondent's Exhibit Book 2 at Tab 5, Maintenance Log, p. 318536.

[30] 1 Tr. 73-74.

[31] Respondent's Exhibit Book 1 at Tab 8.

basis for concluding that it had solved the problem. (Initial Decision at 5.) Although Complainant alleged that the violations began on July 21, 1992, the law judge found that the violations actually began on July 23, 1992. The law judge reasoned that by July 23, 1992, Respondent had either replaced, successfully ground-tested, or both, all components of the altitude warning system--some more than once--but the deficiency remained. (*Id.* at 6.) The law judge found that the violations continued until at least August 6, 1992, when Respondent replaced the #2 DADC.

Arguably, said the law judge, the violations continued even after August 6, since Respondent operated the aircraft for some time after August 6 without reasonable assurance that the pre-select controller was working. However, the law judge did not find any violations after August 6 because the allegations in the complaint did not extend past that date. (*Id.* at 7.) The law judge set the civil penalty at $8,000, rather than the $10,000 sought in the complaint, because he found that the violations began two days later than the date alleged in the complaint.

On appeal, Respondent challenges the law judge's finding that "Respondent on several occasions . . . cleared the MEL from its books without a reasonable basis for concluding that the problem had been solved." (Appeal Brief at 7, citing Initial Decision at 6.) Respondent also takes issue with the law judge's characterization of its repair efforts as "tinkering" and "trial and error." (Appeal Brief at 11-12.) According to Respondent, the law judge's "insulting" remarks demonstrate his lack of understanding of the maintenance procedures it followed. (*Id.* at 12.)

In reply, Complainant argues that Respondent continued to use the airplane in passenger-carrying revenue service, even though Respondent had no reasonable basis to believe it was repaired. (Reply Brief at 22.) Complainant argues that Respondent knew that its maintenance actions had not been effective and that the tests it was using were ineffective. (*Id.*) Nevertheless, Complainant contends, Respondent continued to "experiment" with corrections, sending the aircraft back into revenue service on 128 flights over the 2-week period in which the law judge found violations. (*Id.*)

The law judge properly found that on several occasions starting on July 23, 1992, Respondent cleared the MEL from its books without sufficient evidence to conclude that the system actually had been fixed. The record indicates that Respondent returned the aircraft to service repeatedly after attempting to repair the aircraft. Respondent's repair efforts may have been logical in sequence. However, Respondent repeatedly returned the aircraft to service without reliable evidence indicating that it had fixed the system.

As Complainant noted, Respondent's MEL requires *repair* within 3 flight days--not simply *efforts* to repair. By July 23, Respondent had replaced all the components of the system at least once, and had performed the BITE six times. On each occasion, the "repaired" system passed the BITE test, but shortly after each return to service, the altitude warning system malfunctioned again. Yet Respondent continued to rely on the BITE test alone to determine whether its repair efforts were successful.

It is Respondent's position that it could not deviate from the BITE test, and it is true that under the approved maintenance procedures set forth in the

maintenance manual, Respondent could not return the aircraft to service unless the BITE was performed and the system passed. Nevertheless, where a pattern of discrepancies indicates that a test like the BITE is unreliable, nothing precludes an air carrier from performing other reasonable tests, in addition to the ones set forth in the manual. Indeed, in this case it must have become increasingly clear that something more was required.

Here, at the very least, Respondent should have performed a flight test. Several of Respondent's witnesses testified that a flight test was not performed because the problem never occurred on the first flight. (2 Tr. 5, 18.) However, the problem may not have occurred on the first flight because the #1 DADC rather than the #2 DADC was in use on those particular flights. Had a flight test been conducted, a technician on board could have switched back and forth between the two DADCs in an attempt to determine the source of the problem. Where a pattern of system discrepancies indicates that the existing diagnostic test is unreliable, it is reasonable to require an air carrier to take further steps to identify and resolve the problem before returning the aircraft to service. Furthermore, as the law judge noted, Respondent might have solved the problem at a relatively early stage had it asked its pilots which DADC was in use when the problems occurred. Initial Decision at 6, n.3. Nothing in the record indicates that Respondent checked with its pilots to see which DADC was in use when the failure occurred.

As the law judge noted, permitting a short deferral of maintenance under the MEL strikes a balance between having all equipment in good working order and the air carrier's operational needs. (Initial Decision at 5.) Deferral under an MEL provision provides an air carrier with the flexibility it needs to manage its

operations efficiently. However, in this case, Respondent in essence abused the flexibility permitted by the MEL by repeatedly returning an aircraft to service when it should have known that in this case the BITE test was not a reliable indicator that the system was actually repaired.[32]

Respondent's assertions that safety was not compromised in any way are unpersuasive. Although the system has two DADCs, which provides some measure of redundancy, there is but a single altitude display. As the law judge pointed out:

> [T]o the extent that the captain or first officer reading the erroneous display required additional time and concentration to determine by alternate means the aircraft's actual altitude, the safety of the aircraft and its passengers and crew was compromised.

(Initial Decision at 6.) Moreover, a finding that the alleged regulations were violated does not depend upon a finding that safety was compromised.[33]

Respondent's other arguments are also unpersuasive. Respondent argues that its witnesses were more experienced and therefore more credible than Complainant's. (Appeal Brief at 4-7.) However, this case does not turn on the experience level of the expert witnesses nor the credibility of any witnesses.

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[32] Aircraft operators often take advantage of a deferral option under an MEL to return their aircraft to a maintenance base where the aircraft can be repaired. (2 Tr. 127.) In this case, however, the aircraft flew through maintenance bases on several occasions without any repair action taken. (1 Tr. 136.)

[33] An aircraft is airworthy when it: (1) conforms to its type design or supplemental type design and to any applicable Airworthiness Directives; and (2) is in a condition for safe operation. 49 U.S.C. § 44704(c). *See also* In the Matter of Watts Agricultural Aviation, Inc., FAA Order No. 91-8 at 17 (April 11, 1991), *review denied*, Watts Agricultural Aviation, Inc., v. Federal Aviation Administration, 977 F.2d 594 (9th Cir. 1992). Without a properly functioning altitude warning system, Respondent's aircraft did not conform to its type design. Therefore, the aircraft was unairworthy even if it was in a condition for safe operation.

Respondent further argues that several statements in the law judge's decision appear to contradict his finding of violations. For example, the law judge stated as follows:

> Respondent points out that it performed all mandated tests--indeed, the only sanctioned tests--and permitted the aircraft to fly only after relevant parts tested normal (references omitted). Horizon did no less than the rulebook required--in fact, it did more (references omitted).

(Initial Decision at 4.) The law judge also stated:

> Additionally, Respondent reasonably believed each time it sent the aircraft up that the altitude warning system would function normally (reference omitted). It also notes that it never took maximum advantage of the three day deferral period permitted by the MEL, often effecting repair or replacement in much less time.

(Initial Decision at 4.) Read in context, however, these statements were simply the law judge's recitation of Respondent's position. They are found in the law judge's "Discussion" section, not his "Findings" section. As for the statement that Respondent never took maximum advantage of the 3-day deferral period permitted by the MEL, that is immaterial to the issue of whether Respondent violated the regulations as alleged.

Turning then to the issue of sanction, the law judge reduced the civil penalty from $10,000, as sought in the complaint, to $8,000. Under the unique circumstances of this case, however, even an $8,000 civil penalty may be unnecessary.

This was an exceptionally difficult maintenance problem to solve. While Respondent should not have returned the aircraft to service until it had a reasonable basis to be satisfied that its repair efforts were successful and it should have sought the assistance of the manufacturer at a much earlier stage, Respondent

did make many reasonable attempts to repair the system. Under the circumstances, a civil penalty of $5,000 is appropriate.

THEREFORE, IT IS ORDERED THAT:

The law judge's finding of violations is affirmed, and a civil penalty of $5,000 is assessed.[34]

DAVID R. HINSON, ADMINISTRATCR
Federal Aviation Administration

Issued this 9th day of May, 1995.

[34] Unless Respondent files a petition for review with a Court of Appeals of the United States within 60 days of service of this decision (under 49 U.S.C. § 46110), this decision shall be considered an order assessing civil penalty. *See* 14 C.F.R. §§ 13.16(b)(4) and 13.233(j)(2) (1994).