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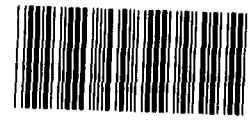

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Meeting the Aging Aircraft Challenge: Status and Opportunities

Statement of
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Before the
Subcommittee on Aviation
Committee on Public Works and Transportation
House of Representatives

Mr. Chairman and Members of the Subcommittee:

We appreciate this opportunity to testify on the joint Federal Aviation Administration (FAA)-aviation industry response to the challenge of ensuring the safety of the nation's aging commercial transport fleet. As you know, the Aloha Airlines tragedy in April 1988 and subsequent incidents have made meeting this challenge more urgent.

Our testimony today provides an update to the statement we submitted to you on September 27, 1989, and focuses on two areas:

(1) the status of the many actions being taken by FAA and the aviation industry to respond to the aging aircraft problem and

(2) several opportunities FAA has to more actively deal with emerging aircraft maintenance problems.

For the past 16 months, FAA and the industry have been responding to recommendations that were made at the June 1988 international conference on aging aircraft. This important industry-wide conference provided, in our opinion, a clear statement of the aging aircraft problem and a reasonably complete series of recommendations. Included were suggestions for FAA to perform more physical inspections of aircraft and to conduct research into the aging aircraft problem. The initial efforts of

both FAA and the industry to address these recommendations are highly encouraging. Moreover, the direction that these efforts are taking was reinforced at the industry's second aging aircraft conference held last week in Baltimore. However, because several recommendations call for additional study, a complete set of corrective actions has not been developed. Moreover, adequate oversight and follow through of the actions that have been developed are not occurring because no overall strategy exists for coordinating these actions. Therefore, FAA needs to develop a plan describing (1) actions that are being or will be taken, (2) time frames for these actions, and (3) resources needed for the actions and then report periodically to the Congress on the progress toward accomplishing the plan's goals.

FAA has several opportunities to work more actively with the industry in solving aircraft maintenance problems and, in the process, use its resources more effectively. These are (1) studying approaches to achieving more direct, "hands-on" aircraft inspection to supplement its paperwork review of maintenance records, (2) analyzing trend data on aircraft maintenance and repair so that FAA's inspection resources can be better allocated, and (3) dealing with the emerging problem of capacity shortage in the aircraft repair industry. Responding to these opportunities almost certainly will have resource implications for FAA. Therefore, FAA needs to foresee emerging issues, recognize whether its response to these issues involve additional resources, and, if so, communicate the need for these resources to the Congress.

PERSPECTIVE ON THE AGING AIRCRAFT CHALLENGE

The structural failure on April 28, 1988, of a 19-year-old Boeing 737-200 operated by Aloha Airlines brought international attention to the aging of the existing commercial aircraft fleet. Subsequent analysis shows that Aloha was operating this particular 737 beyond the original design expectations established by Boeing (in terms of the number of take-offs and landings). Exceeding these thresholds, however, does not necessarily render the aircraft unsafe. Experts agree that a properly maintained and inspected aircraft can fly indefinitely. Airlines' decisions to keep older aircraft in service are governed by economics--airlines must weigh the price and availability of new aircraft against the older planes' operating efficiency and the costs to maintain such older planes in safe operating condition.

In the coming years, airline decisions to sell or maintain older planes will be made more frequently. About 31 percent of the U.S. fleet now exceeds the economic design goals originally set by the manufacturer and, by the year 2000, 64 percent of the worldwide fleet of U.S. manufactured aircraft will be 20 or more years old, assuming no replacement or attrition (see app. I for additional details). To make replacement decisions, airlines compare the cost and the time--currently at least 2 years--of acquiring new-design

aircraft with the cost of maintaining older aircraft in a safe and economical manner. Recently reported orders for new aircraft put their average cost at about $55 million, while a major overhaul for an older aircraft can cost over $2 million for a 727 and from $4 million to $20 million, depending on how much work is done, for a 747.

The challenge of maintaining aging aircraft is multifaceted, with actual repair being only one facet. Serious problems also exist in predicting fatigue and cracking and preventing corrosion. For example, existing technologies to detect structural flaws, such as ultrasonic scanning and eddy-current probing, require trained technician and are extremely tedious. Furthermore, it will take time and research to economically apply more advanced technologies such as the thermography used on the space shuttle to commercial aircraft inspection. However, the applicability of such research will not be limited to older aircraft. Indeed, both aging and newer aircraft will benefit from enhanced knowledge about non-destructive testing and the treatment and prevention of corrosion.

The need for this kind of research and other actions was made clear to FAA and the industry by the Aloha tragedy. Shortly thereafter, FAA hosted a 3-day international conference in June 1988 that defined the issues related to aging aircraft and provided a series of specific actions to be taken by FAA and the aviation industry. A second conference was held last week to

discuss the status of the initial actions and to chart new directions.

PROGRESS IS BEING MADE, BUT OVERALL PLAN AND STATUS REPORTING ARE NEEDED

Following the June 1988 conference, FAA and the aviation industry began taking many promising actions to respond to the aging aircraft problem.

Constructive Actions Are Underway

Examples of initiatives in process are:

-- An industry-based task force on aging aircraft was established. The task force has five objectives: (1) to recommend model-specific changes to carrier maintenance programs that would require modifications instead of continued, more frequent inspection by the carrier, (2) to develop programs for corrosion inspection and prevention, (3) to review the adequacy of each carrier's structural inspection program, (4) to review and update existing Supplemental Structural Inspection Documents,[1] and (5) to assess the quality of aircraft repair. To date, the first of these objectives has been accomplished for older Boeing

[1]These documents have been created by the manufacturers of specific older transport aircraft as a means of ensuring that the aircraft are subject to a more intense structural inspection program.

and McDonnell Douglas aircraft, resulting in a recommended $1.4 billion in repairs, such as replacing the "belly skins" of older 727s. This action represents a significant shift in aircraft maintenance philosophy, moving from a policy of requiring more frequent inspection of older aircraft to one of requiring more absolute action by repairing and replacing structural members and other parts. The task force is still considering changes to the maintenance programs for Lockheed and foreign-made aircraft.

-- FAA teams are conducting a series of special inspections to gain a better understanding of carriers' compliance with their maintenance programs, the degree of fatigue and corrosion of older aircraft, and the human factors--fatigue, boredom, and work environment--associated with the man-machine interface. In February 1989, these teams began reviewing not only maintenance paperwork but also selected older aircraft and the results of their maintenance. To date, 10 team visits have been made of the 30 to 60 that FAA expects to make over an 18-month period. During the visits, the teams expect review up to 90 transport and commuter aircraft. Although no interim reports will be issued, FAA expects a final report in August 1990 that will analyze the teams' findings.

-- FAA has established a budget of $5 million per year for an aging aircraft research and development (R&D) program that will run through 1991. This program includes exploratory research to

determine the effects of corrosion on crack growth rates and a review and validation of boredom, fatigue, and tedium experienced by maintenance personnel in their performance of inspection and repair activities.

Appendix II to our statement summarizes the status of the FAA and industry's response to the 21 recommendations generated at the June 1988 conference. While these actions represent a significant and constructive effort, they are mostly independent and an overall plan to coordinate the individual actions has not been developed.

On October 3, 4, and 5, 1989, FAA hosted the second conference on aging aircraft to discuss the status of the actions begun as a result of the 1988 conference. Although the conference did not develop additional recommendations, participants reinforced many of last year's conclusions by continuing to believe that hands-on inspection, corrosion control, and increased communication play major roles in maintaining the safety of the older planes in the fleet.

Overall Planning and Reporting Are Needed to Enhance Coordination and Oversight

The critical nature of the aging aircraft issue calls for the development of a unified plan that would enable proper coordination, oversight, and follow through of the actions being

taken. This plan would permit FAA to coordinate the timing, resource implications, and results of the numerous actions. It would also ensure that the Congress and others are made aware of resource needs and expected results. For example, corrosion control is on the agenda of the industry task force, FAA's special inspection teams, and FAA's R&D program; however, FAA officials say that analysts in these three areas probably are unaware of the timing or results of each other's work. In addition, an overall plan should help ensure that the results of numerous study teams, whose efforts will continue for several more years, are adequately monitored and made available to other parts of the aviation industry and the Congress.

In our view, such a plan should state at least the following:

-- the program's overall goals, objectives, schedules, and general level of resource needs;

-- the specific problems and anticipated or initial methodology for defining or addressing the problems, including key assumptions and reasons for establishing time lines that are based on safety and economic considerations; and

-- the expected resource commitments, time frames, outcomes or products, and responsible organizational entity, such as an industry working group or FAA service or division, for each

distinct problem (e.g., corrosion, non-destructive testing, or communications).

As an adjunct to an overall plan, FAA should establish a regular means of reporting its and the industry's progress toward meeting the aging aircraft challenge. Although either FAA or the task force have initiated many actions to address the conference recommendations, the results or benefits of these often are not expected for several years. And, in many cases, the nature of the specific actions cannot be contemplated now because the issues have not been sufficiently studied. For example, the conference recommended that aircraft be certified for a limited lifetime based on the tested lifetime of a representative sample. This recommendation is important because formally limiting aircraft lifetimes has economic ramifications for air carriers. FAA plans to develop a notice of proposed rule-making based on a report from the industry task force. However, the task force does not plan to report until next year, and FAA officials say that it will require 3 to 5 years after that to resolve this issue with a regulation.

In our view, regular reporting of FAA's progress toward achieving the objectives set forth in a plan would be beneficial. It would facilitate congressional oversight and allow the Congress to hold FAA and the industry accountable for their actions.

OPPORTUNITIES FOR FAA TO ENHANCE AIR SAFETY

Many actions that FAA and the industry are taking in response to the conference recommendations are relatively short term in nature, such as having special teams inspect selected carriers' maintenance programs. Other initiatives, however, seem to be questioning--at least temporarily--some of FAA's current practices and suggest several opportunities for FAA to take a more active role in air safety. These opportunities include

-- exploring, as several experts have recommended, the feasibility of incorporating more "hands-on" inspection of aircraft into FAA's inspection practice, particularly as it affects FAA's ability to measure industry's compliance with airworthiness directives;[2]

-- taking better advantage of FAA's system for service difficulty reporting (SDR) to develop airworthiness directives, identify repair trends in the fleet, and allocate inspection resources; and

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[2]FAA issues an airworthiness directive when it deems a condition in an aircraft, such as cracking or corrosion, is unsafe and could occur in other similar aircraft. When establishing time frames for airlines to implement airworthiness directives, FAA considers several interrelated factors including the (1) perceived safety risk, (2) potential economic impact on the aviation industry, and (3) availability of parts. FAA relies on carriers to comply with airworthiness directives, monitoring compliance through the airline inspection program and through "spot checks" of airline records.

-- identifying changes in the aircraft repair station industry that could have ramifications for FAA's inspection resources.

In recent months, all of these issues have come to the attention of the Congress. At the request of this Subcommittee, we are conducting work on FAA's airworthiness directives and on the issue of repair station capacity. At the request of the Senate Aviation Subcommittee, we have initiated work on FAA's SDR system.

Feasibility of More "Hands-on" Inspection

Although FAA now ensures aircraft safety primarily through records checks with some direct inspection of the planes themselves, a greater proportion of direct inspection may offer FAA an opportunity to more effectively oversee aircraft safety. Several aircraft safety experts, including the National Transportation Safety Board and the participants at the 1988 aging aircraft conference, have expressed concern that FAA relies too much on airline records to verify carriers' compliance with airworthiness directives.

In its draft report on the Aloha accident, the Board found that without proper FAA inspection of aircraft, "less responsible or knowledgeable airlines can operate airplanes of dubious structural and mechanical integrity." The Board recommended that

FAA's inspection program place greater emphasis on evaluating the actual condition of each aircraft and the airlines' compliance with specific airworthiness directives. Participants at last year's conference similarly recommended that "FAA inspectors and engineers visit operators to gain 'hands-on' experience in compliance with inspection airworthiness directives." And again, the aging aircraft task force also has recommended that, to ensure that airlines are complying with their maintenance programs, FAA inspectors need to examine airplanes directly.

FAA's own experience with direct inspection supports these views. In 1986, FAA's in-depth reviews of Eastern Airline's adherence to FAA regulations combined review of records with direct inspection of aircraft. FAA found, among other problems, that one Eastern 727 made over 10,000 flights while not in airworthiness directive compliance. Subsequently, the aircraft was damaged when the landing gear--which was the subject of an airworthiness directive--failed. Another 727 flew more than 8,900 flights while not in compliance with the same airworthiness directive. Furthermore, during one 6-day period, Eastern operated 37 aircraft on over 1,100 flights without properly complying with an airworthiness directive that required recurrent inspections for cracks. On the basis of this review, FAA imposed a $9.5 million fine for a variety of violations, including airworthiness directive non-compliance. In another case, FAA's 1987 "white glove" inspection of 8 airlines found 26 instances of airworthiness

directive non-compliance. In March 1988, when FAA conducted similar inspections at 35 commuter airlines, 12 percent did not meet applicable airworthiness directive requirements. And most recently, hands-on inspection might have prevented the Aloha tragedy by identifying the flaws in the structure of the plane's fuselage.

Although "hands-on" has yet to be defined for inspection procedures, FAA should take this opportunity to determine the implications that a shift to more direct inspection may have on the size of its inspector work force and the training it should provide.

FAA Can Make Better Use of Existing SDR Data Base

A second opportunity is for FAA to make better use of its SDR data base. Because FAA has limited inspection resources, it is essential that the agency use available data, such as that contained in the SDR system, to help allocate its resources and to achieve the maximum effectiveness from its inspection program. Currently, FAA's national inspection work program sets goals for inspecting aircraft, pilots, and repair stations. The program does not specify which aircraft should be inspected; instead, the goals state, for example, that one repair facility or a given number of aircraft should be inspected annually in each FAA region. The SDR

system also can be a valuable source of raw material in developing airworthiness directives.

In 1988, commercial airlines reported to FAA's SDR system approximately 19,000 mechanical difficulties, including difficulties with extending landing gear, identification of corrosion and cracking, and engine shutdowns. While FAA has been maintaining this data for over 2 decades, the agency does not use this information to focus its routine inspection efforts. Nor is the system's potential for contributing to the airworthiness directive process being realized. According to FAA officials, the system's products are untimely, contain too much unnecessary information, and lack enough detail to be useful. Moreover, because of insufficient staffing and data quality problems, officials say that FAA under-utilizes the system to develop trends or to identify problems with specific aircraft.

Although FAA and the aging aircraft task force want to improve the SDR system's usefulness, neither has specific plans to do so now. With this in mind, we did a preliminary analysis to explore the possible use of FAA's SDR to augment FAA's inspection process and provide more useful input to airworthiness directive development. We reviewed a limited number of SDRs by aircraft type, such as the Boeing 727 and McDonnell Douglas DC-9, to determine if the data base could be used to allocate inspection resources. When we examined SDRs submitted between January 1983

and June 1989, we noted a wide range in the frequency of problems reported across aircraft type and airlines in the frequency of problems reported. For example, 37 instances of structural problems were reported for one aircraft, 4 instances for another, and none for a third. One aircraft reported 74 service difficulties over 6 years, while a similar aircraft operated by another airline reported only 10 service difficulties during the same period. Analysis of other types of aircraft indicated similar results.

While our analysis is preliminary, it shows that SDR data--with improvements in quality--has the potential to help FAA determine which aircraft and which airlines to target for inspection. This is not the first time we have raised this issue. In the past, we have recommended that FAA use safety data to target its inspector resources at high-risk conditions.[3] One element of resource targeting involves risk precursors--factors or conditions that can predict, on a reasonably reliable basis, which carriers are likely to present a level of risk exceeding established guidelines. FAA should begin to explore how to use the SDR data base as well as others maintained by the agency to develop risk precursors for more effective allocation of its limited inspection resources.

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[3]Department of Transportation: Enhancing Policy and Program Effectiveness Through Improved Management (GAO/RCED-87-3, April 13, 1987).

Repair Station Maintenance and Inspection

Finally, the third opportunity FAA has to more actively ensure aircraft safety is to resolve how it will deal with the emerging issue of the growing aircraft repair station industry. Our concerns center on two facets of this issue. First, many in FAA and the industry believe that an aircraft repair capacity shortage is about to occur due to heavier demands caused, in part, by mandated repairs to aging aircraft. Both American and United Airlines have announced that they have closed their doors to contractual maintenance for other carriers that have little or no maintenance capability themselves. This action will put an added burden on the independent repair station industry. If a national repair capacity shortage does materialize, some planes could be grounded, especially those of carriers that do not own their repair facilities. Similarly, such a shortage would have a clear negative impact on the expeditious repair of aging aircraft.

Secondly, we are concerned about FAA's ability to sustain inspection surveillance over an industry that is expanding to meet the demand for its services. The primary question is whether FAA's inspectors can both certify new repair stations and provide adequate surveillance over existing facilities in the face of such growth. A similar dilemma faced FAA shortly after deregulation occurred in 1978 when many new carriers entered the industry. This forced FAA to focus on certifying new entrants at the expense of

inspecting existing firms. It also showed that FAA was ill-equipped then to accurately estimate its inspector work force needs. Although FAA currently plans to supplement its inspector work force by adding about 300 inspectors per year until a goal of 3,000 is reached in 1991, this work force still may be inadequate. In determining what the appropriate size of this work force should be, FAA did not consider the burden that recently has been added to the repair station industry and the resulting expansion of that industry that is now expected. This argues even more strongly for FAA to target its resources at the conditions of highest risk.

In addition to the number of inspectors perhaps not being adequate, our work has shown that certain kinds of inspectors are not receiving all the training necessary to maintain currency and proficiency in their skill areas. For example, training in such critical areas as composite structures used in some new aircraft and advanced safety analysis had to be postponed because the courses were not developed. In addition, six of FAA's nine regions reported to us that the amount of training available on new aircraft such as the A-300 Airbus was little to none. An inadequate number of instructors has adversely affected the development of training courses and results in FAA's emphasizing training, with course development receiving a lower priority. FAA plans to remedy this by revising the inspector training curricula and providing incentives to attract additional instructors.

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In conclusion, although for the most part reasonable steps are underway to identify and implement solutions to the aging aircraft problem, FAA needs to develop a long-term plan for ensuring proper coordination of and accountability for those steps. Furthermore, we believe a follow-up system is needed for ensuring that appropriate actions are taken and progress is made by all concerned parties.

Taking advantage of opportunities to enhance air safety has implications for the size and type of inspection work force needed. Opportunities exist to use existing FAA resources more effectively. FAA's need for additional staff also should be considered. Having more hands-on inspection, without sacrificing the necessary records check and continued surveillance at the current level in an expanding repair station industry, translates into more inspectors. Similarly, while more extensive analysis of SDR data could lead to more effective deployment of the inspector work force by targeting inspectors at high-risk conditions, it will also mean an increased investment in the resources needed to analyze the data.

Mr. Chairman, this concludes our statement. We would be pleased to answer questions you might have at this time.

PROFILE OF AGING U.S. FLEET

Age Distribution of U.S. Airline Fleet
(as of July, 1989)

Age in Years	Number of Aircraft	Percent
Under 5	891	22.6%
5-10	680	17.2
10-15	578	14.7
15-20	556	14.1
20 or older	1,241	31.5
Total	3,946	100.0

Source: Aviation Data Services

Table I.2: Average Age of U.S. Manufactured Aircraft in Worldwide Use
(As of July, 1989)

Manufacturer	Type	Aircraft in service	Average age in years
Boeing	707/720	235	21.8
	727	1,682	16.3
	737 (100/200)	1,048	11.7
	737 (300/400)	586	2.1
	747	685	11.1
	757	229	2.9
	767	269	3.6
McDonnell-Douglas	DC-8	279	21.6
	DC-9	848	18.2
	DC-10	369	12.8
	MD-80	617	3.5
Lockheed	L-1011	230	12.5
Total		7,077	

Source: Aviation Data Services

Table I.3: Projected U.S. Manufactured Aircraft 20 Years Old or More in Worldwide Use for Calender Years 1989, 1995, 2000

Manufacturer	Type	1989	1995	2000
Boeing	707/720	197	232	235
	727	664	1,048	1,549
	737 (100/200)	201	380	634
	737 (300/400)	0	0	0
	747	4	242	448
	757	0	0	0
	767	0	0	0
Lockheed	L-1011	0	116	178
McDonnell-Douglas	DC-8	242	279	279
	DC-9	475	678	824
	DC-10	0	200	322
	MD-80	0	0	5
Totals		1,783	3,175	4,474

Source: Aviation Data Services

SUMMARY OF ACTIONS IN RESPONSE TO CONCLUSIONS AND RECOMMENDATIONS MADE AT AGING AIRCRAFT CONFERENCE

1. Recommendation: Certain maintenance records should be kept with aircraft for life.

   Action: The task force has provided FAA with proposed record-keeping requirements.

   Time frame: FAA plans to publish an advisory circular in late 1989 and a notice of proposed rulemaking in the spring of 1990.

   Comments: FAA and the task force believe that maintenance record-keeping is adequate in the U.S. but are concerned about aircraft purchased from overseas. Agreements with other countries concerning maintenance record-keeping could face obstacles because of varied national standards.

2. Recommendation: Airline inspectors should be certified to meet minimum requirements.

   Action: The task force is developing a training curriculum for nondestructive testing (NDT). FAA is evaluating the need for certification of airline NDT inspectors and is updating FAA's NDT training programs for maintenance inspectors and engineers.

   Time frame: The task force expects to complete its training curriculum in October 1990. FAA has postponed indefinitely the evaluation of NDT certification and development of new NDT training due to other priorities.

   Comments: The task force believes this recommendation specifically addresses NDT inspectors. However, the effect of the task force's curriculum may be limited because it is not mandatory. FAA expects industry opposition to a certification requirement for NDT inspectors.

3. Recommendation: Aircraft should be certified for a limited lifetime based on the tested lifetime of a representative sample.

   Action: FAA is planning to release a notice of proposed rule-making; options include mandatory tests, partial fatigue tests, or replacement of components.

Time frame: The task force is scheduled to report to FAA in early 1990; FAA expects a rule in 3-5 years.

Comments: FAA envisions no constraints in responding to this recommendation other than the long and cumbersome rule-making process.

4. Recommendation: New aircraft models should not be added to an existing certificate unless the manufacturer has complied with current fatigue requirements.

Action: The task force is taking no action. FAA is working with European Joint Airworthiness Authorities to develop methods to classify new aircraft.

Time frame: If FAA decides to take action, changes will not be contemplated for another 2 years.

Comments: FAA and the task force do not believe this recommendation addresses an aging aircraft problem. FAA and the task force believe this recommendation addresses the economic issues associated with the manufacture and certification of new aircraft.

5. Conclusion: Certification rules for new aircraft are not the problem; rather it is the interpretation of the rule that poses the problem.

Action: No FAA or task force action.

Time frame: N/A

Comments: FAA and the task force do not believe this conclusion addresses an aging aircraft problem because it focuses on new aircraft. However, FAA recognizes that European manufacturers may have difficulty interpreting FAA certification rules.

6. Conclusion: The effects of corrosion are more critical than fatigue factors.

Action: After receiving task force recommendations, FAA plans to implement a mandatory corrosion control program through an airworthiness directive or through the rule-making process.

Time frame: According to FAA officials, a corrosion program will be mandated by late 1989 or early 1990.

Comments: Because of the various types of aircraft in service, their components, and the varied conditions in which they operate, a single program may be difficult to develop. In addition, some carriers with limited maintenance facilities will find it difficult to meet new FAA-mandated standards.

7. Recommendation: An FAA National Resource Specialist in Nondestructive Inspection (NDI) should be established.

   Action: FAA is in the process of selecting a specialist from a list of 28 candidates.

   Time frame: The appointment of an NDI specialist is not expected until early fiscal year 1990.

   Comments: FAA sees no obstacles other than federal pay scales are not commensurate with those of private industry.

8. Recommendation: It should be determined whether a Supplemental Structural Inspection Program is needed for commuter aircraft.

   Action: The General Aviation Manufacturers Association (GAMA) is expected to present FAA with recommendations for commuter aircraft. FAA may follow-up with an airworthiness directive on corrosion control for general aviation.

   Time frame: FAA is expected to receive GAMA's report in early 1990.

   Comments: FAA sees no constraints in responding to this recommendation.

9. Recommendation: FAA should increase its emphasis on the inspection of aircraft to monitor maintenance programs.

   Action: FAA established the Aging Aircraft Evaluation Program to assess airline maintenance programs. Over 60 aircraft are to be inspected. Based on guidance from headquarters, FAA field inspectors are now expected to participate in major structural inspections of aircraft.

   Time frame: The first airline evaluation took place in February 1989. A final report is due in August 1990.

   Comments: The lack of travel funds may limit the scope of FAA's Aging Aircraft Evaluation Program.

10. Recommendation: Communications between airlines, manufacturers, and FAA should be improved.

    Action: The task force has established a communications committee to address, among other things, FAA's Service Difficulty Reporting (SDR) system.

    Time frame: The task force plans to hold the third meeting of its communications committee in late October 1989.

    Comments: The task force believes this recommendation is a high priority task because it addresses the issues of maintenance and communication that surfaced as a result of the Aloha tragedy.

11. Recommendation: A task force should be established to continue work begun at the conference on aging aircraft.

    Action: The task force was established with about 160 members from the airlines, FAA, NASA, and aircraft manufacturers. The task force has presented recommendations for the modification of Boeing and Douglas aircraft with similar modifications to follow for Lockheed and foreign aircraft.

    Time frame: The task force will continue work on aging aircraft into the 1990s.

    Comments: This is perhaps the most important action to have come out of the conference. FAA's adoption of the task force recommendations has signaled a major shift in the agency's philosophy regarding inspection versus parts replacement. The task force envisions no obstacles to maintaining the task force at this time.

12. Recommendation: Several human factors issues were raised in regard to inspections for maintenance awareness and design improvements to simplify maintenance.

    Action: FAA has begun human factors research for the development of a handbook but plans no action with respect to maintenance awareness training.

    Time frame: A final human factors handbook is expected in fiscal year 1993.

    Comments: None

13. Recommendation: Research, Engineering, and Development (RE&D) should be conducted to identify the reasons for errors in the

maintenance environment. The effects of boredom, fatigue, and busy flight schedules should be evaluated.

Action: FAA has initiated human factors research but is not planning to address the impact of busy flight schedules on maintenance personnel because of limited resources and the complexity of the issue.

Time frame: A final human factors handbook is expected in fiscal year 1993.

Comments: N/A

14. Recommendation: FAA inspectors and engineers should visit operators to gain hands-on experience in compliance with inspection airworthiness directives.

Action: FAA established an Aging Aircraft Evaluation Program to assess airline maintenance programs. Over 60 aircraft are to be inspected. FAA inspectors are now required to participate in major structural inspections of aircraft.

Time frame: The first airline evaluation took place in February 1989. A final report is due in August 1990.

Comments: The lack of travel funds may limit the scope of FAA's Aging Aircraft Evaluation Program.

15. Recommendation: Airworthiness directives should be reviewed to determine if failures have occurred due to human factors.

Action: FAA will begin human factors research on information transfer and other aspects of human communications to ensure that airworthiness directives can be understood by maintenance personnel.

Time frame: A final human factors handbook is expected in fiscal year 1993.

Comments: None

16. Recommendation: The "alternate fix" and "terminating means" provisions for compliance with airworthiness directives and service bulletins need improvement.

Action: FAA does not agree that alternate fix provisions for airworthiness directives need improvement and is taking no action. The task force is reviewing airworthiness directives to recommend changes.

Time frame: The task force has presented its recommendations in regard to terminating provisions for Boeing and Douglas aircraft to FAA. Recommendations for Lockheed and foreign aircraft are expected to follow in the near future. In addition, the task force will continue work on airworthiness directive and service bulletin compliance through its communications committee.

Comments: The task force believes that FAA has been slow in approving alternative fixes and hopes that their report will stimulate an FAA action.

17. Recommendation: An RE&D program to determine life prediction techniques for engine casings and non-life-limited static structures would be beneficial.

Action: FAA is conducting several RE&D studies that address the issue of static engine components.

Time frame: Various FAA reports are due between September 1991 and October 1995.

Comments: FAA may face obstacles in completing RE&D studies on engines because there may be some reluctance by airlines to provide the FAA with the repair, operational, and environmental data needed to identify factors that affect engine component condition.

18. Conclusion: Engine nondestructive evaluation (NDE) equipment operator certification standards are adequate.

Action: Although no action is recommended, FAA is planning several RE&D projects to study NDE techniques and their application.

Time frame: Various FAA reports are due between September 1991 and October 1995.

Comments: None

19. Recommendation: FAA and manufacturers may benefit from seminars to exchange data in a "lessons learned" format with operators of aging engines.

Action: No seminars are planned.

Time frame: N/A

Comments: None

20. Recommendation: There is a need for FAA control of replacement parts distributors and brokers. The lack of repair status of replacement parts is a concern.

Action: FAA is drafting a notice of proposed rule-making to license parts distributors.

Time frame: FAA expects to publish the notice of proposed rule-making in early fiscal year 1990.

Comments: Parts distributors are expected to oppose licensing.

21. Recommendation: A propeller aircraft task force should be established to address issues related to commuter aircraft.

Action: FAA responded by holding an aging aircraft commuter conference in April, 1989.

Time frame: N/A

Comments: It was decided at the aging aircraft commuter conference that no further action on this issue was needed.

FAA SPECIFIC TASKS

1. FAA Task: FAA inspectors will become more involved with "hands-on" experience during heavy maintenance checks of high time aircraft.

Action: FAA established the Aging Aircraft Evaluation Program to assess airline maintenance programs. Over 60 aircraft are to be inspected. FAA inspectors are now required to participate in major structural inspections of aircraft.

Time frame: The first airline evaluation took place in February 1989. A final report is due in August 1990.

Comments: The lack of travel funds may limit the scope of FAA's Aging Aircraft Evaluation Program.

2. FAA Task: Aircraft certification engineers will visit maintenance facilities to become better informed in the human factors aspects of maintenance and inspection.

Action: FAA certification engineers have participated in the Aging Aircraft Evaluation Program. In addition, FAA has initiated work on a human factors handbook.

Time frame: FAA's Aging Aircraft Evaluation final report is due in August 1990. A human factors handbook is expected in fiscal year 1993.

Comments: The lack of travel funds could limit FAA certification engineers from fully participating in FAA's Aging Aircraft Evaluation Program.

3. FAA Task: FAA will establish agency experts in NDI technology for national utilization.

Action: FAA is in the process of selecting a National Resource Specialist in NDI from a list of 28 candidates.

Time frame: The appointment of an NDI specialist is not expected until the beginning of fiscal year 1990.

Comments: FAA sees no constraints other than federal pay scales are not commensurate with those of private industry.

4. FAA Task: FAA Aircraft Certification Flight Standards and RE&D organizations will jointly develop an RE&D program to promote the continued safety of older aircraft and engines.

Action: FAA has initiated several RE&D projects that focus on aging aircraft and engines.

Time frame: Various FAA RE&D reports are planned for issuance starting in fiscal year 1991 through fiscal year 1995.

Comments: N/A

5. FAA Task: Flight Standards will develop a summary document on engine maintenance experiences found during the evaluation of 22 engine repair stations.

Action: FAA has completed its review of 22 repair stations.

Time frame: FAA's report on 22 repair stations has been delayed indefinitely due to other priorities.

Comments: FAA's review of 22 repair stations focused only on the Pratt & Whitney JT8D engine.

6. FAA Task: Aircraft Certification will promote and work with the industry to develop supplemental structural inspection documents for commuter aircraft.

Action: GAMA is expected to present FAA with recommendations for commuter aircraft. FAA may follow-up with an airworthiness directive.

Time frame: GAMA's report is due in early 1990.

Comments: FAA has designated this effort as a high priority. However, without additional staff, existing aircraft certification regulatory programs could be delayed.