

MEETING OBJECTIVES

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I would like to welcome everyone again on behalf of the FAA Office of Aviation Medicine. As you know, this meeting is one in a series to address specific issues in Human Factors in Aircraft Maintenance and Inspection. Today's meeting addresses topics concerning "The Aviation Maintenance Technician." We all recognize that the aviation maintenance technician is our first line of defense as we strive to ensure maximum safety and efficiency for a growing air carrier fleet which includes new advanced technology aircraft as well as a growing number of older aircraft. It is most important that we understand the aviation maintenance workforce and that we take all necessary steps to provide an adequate and fully qualified workforce in the coming years.

The FAA Office of Aviation Medicine supports a comprehensive research program on human factors in aviation maintenance. The structure of this program is shown in [Figure 1](#). As you can see, we seek input from three principal sources which include industry, Government research programs, and contributions from all elements within the private sector. A major route for us to obtain and synthesize these inputs is through conferences such as the one you are attending today. We then use the information and recommendations provided through these conferences to develop a series of work statements and protocols for the research we support. Our ultimate goal is to develop research products, principally in the form of information items, which can be returned to the maintenance industry and to our own FAA employees concerned with maintenance oversight.

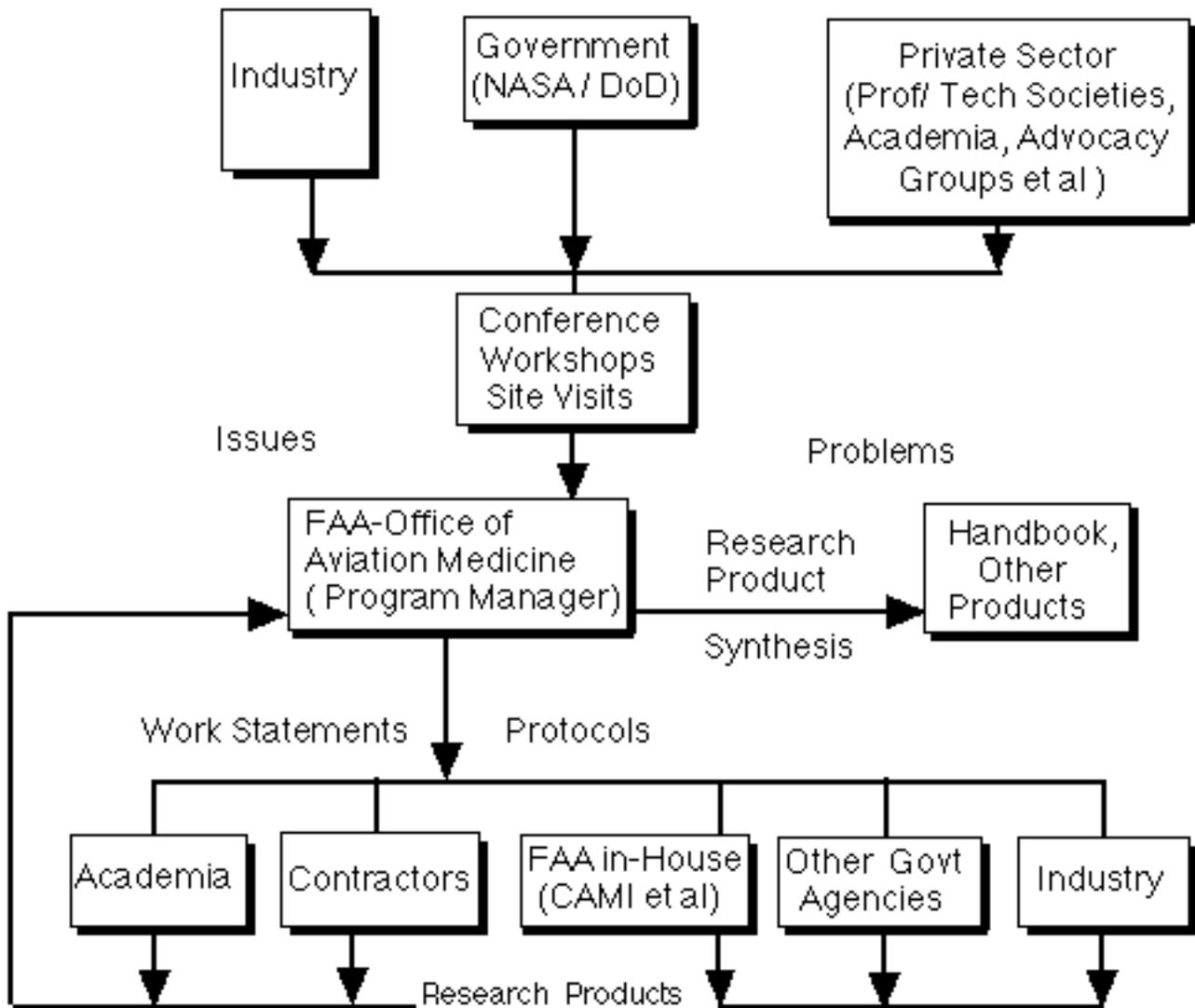


Figure 1

Progress has been made in aviation maintenance. There is good understanding of metal-oriented matters. We know what corrosion is and we are developing a better understanding of metal fatigue. These are matters we can address. More and more, however, we are realizing that human factors issues -- problems related to visual inspection, recruiting and training, ensuring an adequate supply of qualified workers -- represent the pressing issues today. These are the kinds of issues we would like to cover in our research program and then provide appropriate feedback to our industry audience. Hopefully, industry then will be better equipped to deal in the future with topics concerning the maintenance workforce.

The theme today is the aviation maintenance workforce and the coming decade of change. Looking to the 1990's, we see that the forces driving change are population dynamics, industry dynamics, and technology dynamics. In terms of population dynamics, we see definite changes. The number of young people in the 19-25 year old age group, the group from which maintenance technicians are drawn, is getting smaller. The declining supply of potential male workers will be competed for by other occupations. This will be particularly true for high tech and computer-oriented industries. Increasing employment of women and minorities will be mandatory. There also is a need to understand geographical shifts in the population. For example, states in the sunbelt, from Florida across through the southwestern states, are showing significant increases in population. These shifts will bear on the location of maintenance facilities. Finally, as we consider population characteristics, we must take note of the decreasing number serving in the Armed Forces. This pool of potential maintenance technicians will no longer be as large.

Industry dynamics also will affect aviation maintenance. [Table 1](#) shows a 52 percent growth forecast for domestic and international passenger enplanements for the next decade. By the year 2000, these forecasts see 715 million passengers being carried. To accommodate this growth, the number of large jet aircraft will grow. The 19 percent increase may be somewhat conservative since it considers the retirement of a large number of the current narrow-bodied fleet. This retirement may or may not happen as scheduled. Certainly, a great deal of money is being spent today on repair and refurbishing of these older aircraft. As long as safety permits, most will remain in service.

Table 1
Industry dynamics- Airline Growth

Passenger enplanements (domestic and international)

Year	Number
1990	471 million
2000	715 million

(52% growth forecast)

Number of large jet aircraft

Year	Number
1990	4,055
2000	4,835

(19% growth forecast)

Another important feature of aviation maintenance is its rising cost. [Table 2](#) shows that, through the years 1983-1988, the cost of aviation maintenance effectively doubled. However, a more critical aspect is that this cost increased by about two and one-half percent as a percentage of aircraft operating expenses. Undoubtedly, this increase reflects in part the additional maintenance requirements of aircraft growing older during this period. In future years, there also may be increased maintenance requirements due to the introduction of high technology aircraft.

Table 2
Industry Dynamics - Maintenance costs
(Percent of aircraft operating expenses)

1983	9.2%	\$2.9 billion
1984	9.4%	\$3.2 billion
1985	9.8%	\$3.6 billion
1986	11.2%	\$4.5 billion
1987	11.3%	\$5.0 billion
1988	11.8%	\$5.6 billion

Source: FAA, 1988

Aircraft introduced in recent years, such as the Airbus A-300 series and the Boeing 757-67 planes, represent a new generation of technology. Other aircraft planned for the next decade will push the bounds of technology even farther. The glass cockpit will become standard; control systems will employ fly-by-wire and fly-by-light technology; aircraft structures will employ composites and other materials not now in use. Taking all of this into account, the skills and knowledges required of the maintenance workforce in the coming decade will be different from those of today. The demands on the training establishment necessarily will increase.

All of the above variables point to a major situation confronting the aviation industry in the next ten years. Many forces will impact the maintenance workforce. The objectives of this meeting are to examine these forces, as we now understand them, and to work toward recommendations for appropriate actions both by industry and by the FAA. I look forward to the contributions of each of you to our meeting objectives. These contributions will be of value as we all work toward a 1990's workforce that is adequate in number, works productively and efficiently, and strives for error-free operations. Thank you.