

# MEETING WELCOME

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It is a pleasure to be asked to address this *Fifth Meeting on Human Factors Issues in Aircraft Maintenance and Inspection*. We have, over the past three years, come a long way, and I am pleased to see so many familiar faces who have been with us over the span of these five meetings.

The fact that so many of us return to this meeting attests to our commitment to identifying the important human factors issues, and seeing that the FAA and industry make the identification and implementation of solutions a high priority. It is also a testament to the great job Dr. William Shepherd, Dr. James Parker and Ms. Diane Christensen have done in organizing all five meetings.

The newly heightened awareness of maintenance human factors issues -- which is reflected by these meetings -- is occurring at a particularly opportune time. Over the past two years, the FAA has been involved in a large-scale effort to coordinate all Government and industry efforts in aviation human factors. Last December, the FAA published the draft *National Plan for Aviation Human Factors*. One section of the Plan is devoted to maintenance human factors.

The National Plan is a result of several related catalysts ([Figure 1](#)): The United States Congress Office of Technology Assessment's *Safe Skies for Tomorrow: Aviation Safety in a Competitive Environment* (1988), concluded that human factors-related research was not well coordinated among Government agencies and that research funding was inadequate considering the magnitude of the problem. The Air Transport Association of America (ATA) "Human Factors Task Force" offered similar conclusions and proposed the development of a "National Plan to Enhance Aviation Safety Through Human Factors Improve- ments."

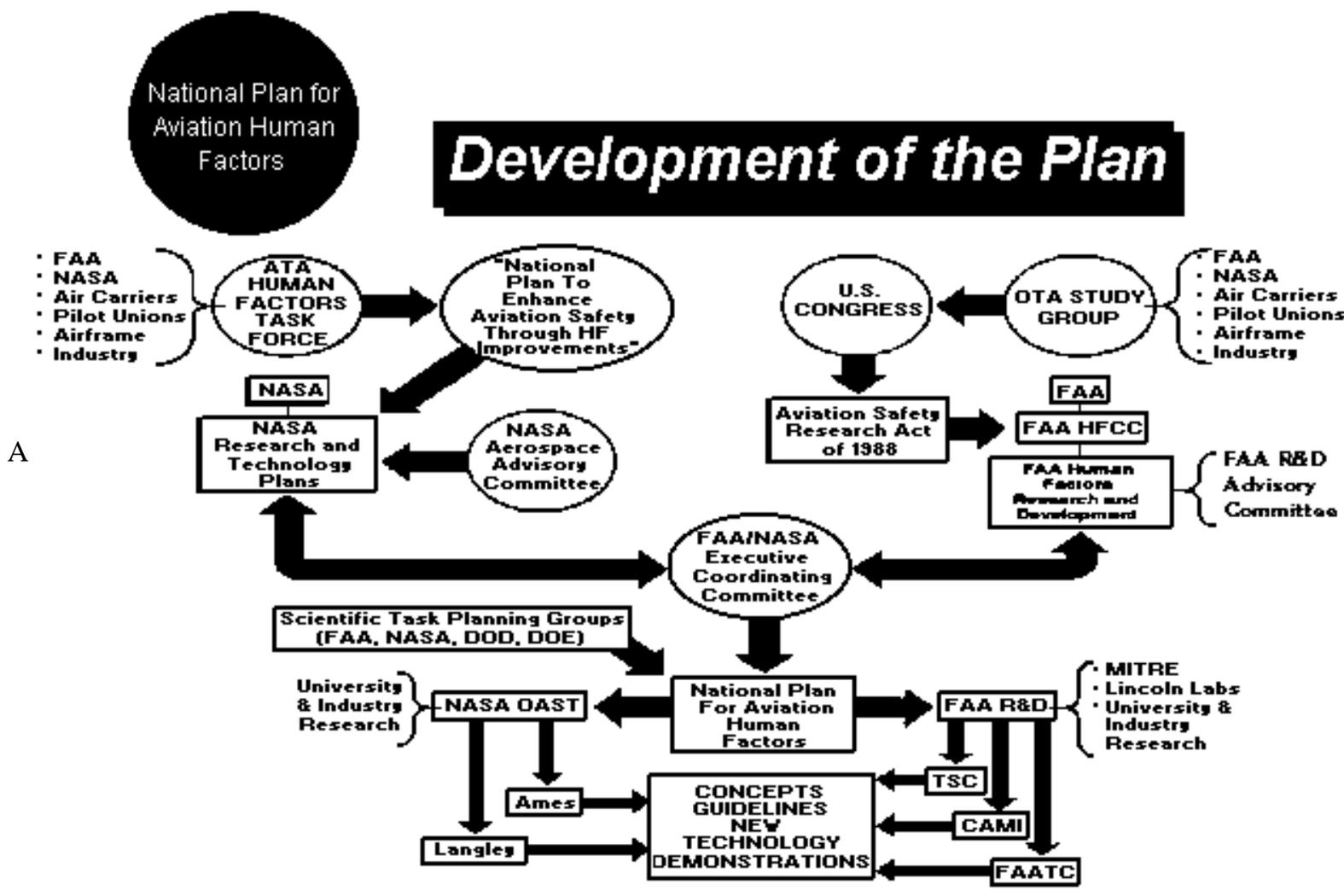


Figure 1

As a result of these efforts, the U. S. Congress in November 1988 enacted "The Aviation Safety Research Act of 1988" (Public Law 100-591), that called for the FAA to augment its research efforts in human factors and to coordinate programs with those of the National Aeronautics and Space Administration (NASA).

The two-volume, 900 page, *National Plan for Aviation Human Factors* is the first step toward a coordinated national program and is the result of a major effort by the FAA in partnership with NASA, with significant assistance from the Department of Defense (DoD), the Research and Special Projects Administration's Volpe National Transportation Systems Center (RSPA/VNTSC), Department of Energy (DOE), and industry. This plan is also a key element of the recently released U.S. Department of Transportation (DOT), National Transportation Policy.

The primary purpose of the plan is to identify and plan the technical efforts necessary to address the most operationally significant human performance issues in aviation as a guide to future project planning, budget formulation, and implementation. The plan also serves to coordinate research programs at various Government laboratories to prevent both gaps and redundancies in efforts. It also communicates research needs to academic and industry "centers of excellence." Perhaps most important, the National Plan will provide a means by which human factors knowledge is transferred to Government and industry.

The National Plan is a highly visible, well supported effort, both inside and outside the agency. Administrator Busey has called for the institutionalization of human factors within the FAA (Figure 2). Some of the steps we are taking toward the institutionalization of human factors include: 1) a Human Factors Coordinating Committee (HFCC), chaired by the Chief Scientific and Technical Advisor for Human Factors, with representatives from all associate and assistant administrators, to track human factors concerns and plans for each organization; 2) increasing the number of human factors specialists in all key agency organizations; 3) developing human factors training courses for agency personnel; and 4) reviewing and modifying all agency orders to assure proper consideration of human performance dimensions.

## NATIONAL PLAN FOR AVIATION HUMAN FACTORS

- The "institutionalization" of human factors
- Emphasis on technology transfer and the development of useful products
- High levels of visibility and management support
- Increases funding of human factors R&D
- Expansion of human factors workforce
- Human factors specialists as members of all design teams
- Formal human factors requirements in all RFPs and in certification standards
- Human factors training for managers and system designers

### Figure 2. National Plan Implementation

The technical agenda for the National Plan was developed by Scientific Task Planning Groups (STPG's). The STPG's were chosen by FAA's Human Factors Coordinating Committee. STPG's were organized to address five areas: (1) Flight Deck, (2) Air Traffic Control, (3) Aircraft Maintenance, (4) Airway Facilities Maintenance, and (5) Flight Deck/ATC Integration.

The STPG's met simultaneously at a series of three week-long research planning retreats, approximately five weeks apart. As a result, some overall coordination of the research planning effort was maintained between environments. And that is significant, since human factors issues in one environment -- cockpit display design for example -- often impact the human in another environment -- for example, aircraft maintenance.

The aircraft maintenance STPG included many of the regular participants at these meetings (Figure 3): Dr. Colin Drury, SUNY Buffalo; Dr. William Johnson, Galaxy Scientific Corporation; Dr. William Shepherd, FAA; Dr. James Taylor, USC; Mr. Dave Hunter, previously from ARI, and now with the FAA; Mr. Robert Johnson, Wright-Patterson Air Force Base, and several others.

## National Plan for Aviation Human Factors

### FLIGHTDECK ATC

Dr. R. Helmreich, Chairman    Dr. R. Simpson, Chairman

U. of Texas    Mass. Inst. of Technology

Dr. R. C. Graeber (NASA-Ames)    Dr. L. Tobias (NASA-Ames)

Mr. B. Scott (FAA-NASA-Ames)    Dr. C. Manning (FAA-CAMI)

Dr. K. Dismukes (NASA-Ames)    Dr. K. Cardosi (VNTSC)

Mr. G. Steinmetz (NASA-Langley)    Dr. E. Buckley (FAATC)

Dr. D. Schroeder (FAA-CAMI)    Dr. R. Roske-Hofstrand (NASA-Ames)

Mr. G. Lyddane (FAA-ANM-100) Dr. E. Salas (USN)  
Mr. T. Metzler (US Army) Mr. V.D. Hopkin (RAF-IAM)  
Dr. J. Reising (USAF) Dr. G. Adam (MITRE)  
Dr. M. Ritchie (FAATC) Ms. M. Picardi (Lincoln Labs)  
Dr. S. Huntley (VNTSC)  
Mr. Roger Green (CAA/RAF-IAM)

### **FLIGHTDECK/ATC MAINTENANCE**

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Mr. M. Burgess (FAA-NASA-Langley) Dr. C. Theissen (Rutgers U.)  
Mr. H. Bergeron (NASA-Langley) Mr. H. Bachner (FAA)  
Dr. K. Kerns (MITRE) Mr. J. Fabry (FAATC)  
Dr. K. Boff (USAF) Dr. W. Johnson (Galaxy)  
Dr. C. Barrett ([DOE](#)-Los Alamos) Dr. R. Thackray (FAA-CAMI)  
Dr. L. Hitchcock (FAATC) Mr. W. Thomas (FAA-MEM ARTCC)  
Dr. P. Kayten (FAA-AXR-3) Dr. R. Smilie (USN)  
Dr. R. Johnson (USAF)  
Dr. D. Hunter (US Army)  
Mr. J. Wiley (FAATC)  
Dr. C. Drury (SUNY-Buffalo)

### **Figure 3. STPG Membership**

The projects in the aircraft maintenance section of the National Plan are grouped into three research domains ([Figure 4](#)): (1) Personnel and Training Systems; (2) Advanced Technology Systems; and (3) Environmental and Organizational Systems.



# Aircraft Maintenance Projects

## Advanced Technology Systems

## Personnel and Training Subsystems

- Civil Aviation Maintenance Work System Descriptions
- Training and Performance Assessment of Aviation Maintenance Technicians

- Design and Utilization of Systems Technology, Tools and Techniques
- Exchange and Management of Technical Information

## Environmental and Organizational Systems

- Environmental Effects on Aircraft Maintenance and Inspection Performance
- Organizational Context for Aircraft Maintenance
- Error Control and Management Systems in Aircraft Maintenance



Figure 4

Each of the projects grouped under these domains address at least one of five primary human factors considerations for maintenance operations: training, the work environment, tools and technology, technical information exchange, and organizational culture (Figure 4).

The National Plan's detailed technical agenda is currently being used to guide FAA budget planning. We presently have work in progress and expected products in each of these areas.

The ATA's Human Factors Task Force presently has "Tiger Teams" reviewing the plans for each environment, and submitting comments and recommendations for additional priorities and tasks. We can expect to see continued interest and support for addressing human factors issues in the aircraft maintenance environment.

The National Plan is a "living document." As we gain more knowledge of human factors in the areas most lacking -- and aircraft maintenance remains one of those areas -- our priorities may change. It is hoped that the human factors organization put into place as a result of this effort will provide the structure needed to assure that needed research gets done, and that relevant, state-of-the-art information is transferred to those who need it.

This meeting, and the ones I am sure will follow, will help to support the goals of the National Plan. Recommendations resulting from these meetings will help guide revisions of the plan, as they helped shape the present one. I look forward to another productive two days, and thank you for the contribution you are making.