

MEMORANDUM OF UNDERSTANDING (MOU)
BETWEEN
DEPARTMENT OF TRANSPORTATION/
FEDERAL AVIATION ADMINISTRATION (FAA)
AND
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)
FOR THE CONDUCT OF
HUMAN FACTORS RESEARCH

I. BACKGROUND

Traditionally, the FAA and NASA have worked closely together to advance new technologies that would enhance the operating efficiency and safety of civil aircraft. Six program areas have been defined for major activities that are mutually beneficial to the mission of both agencies. These six areas are human factors, severe weather, cockpit/air traffic control integration, airworthiness, environmental compatibility, and program support. Each area has a separate MOU giving the rationale, objectives, and examples of the types of research activities in that area. This MOU defines the FAA/NASA activities that will be conducted under the category of aeronautical human factors.

II. RATIONALE

A review of accident data over the past 10 years reveals that pilot error has been identified as a causal factor in about 66 percent of U.S. air carrier fatal accidents, 79 percent of commuter fatal accidents and about 88 percent of general aviation fatal accidents. Causal factors associated with pilot error range from inadequate procedures, inattention to or misunderstanding of ATC procedures, insufficient cockpit crew coordination, and crew/ATC controller fatigue, to poor information transfer and information interfaces between crew and controllers. This has been a source of increasing concern to both industry and government. Stemming from this concern has evolved the need to understand human factors problems as they may apply to other areas affecting air safety, such as ATC, aircraft maintenance, and airport facility operations.

III. OBJECTIVE

The objective of this MOU is to establish an understanding between the FAA and NASA in human factors research and to provide the basis for pursuing cooperative efforts in research that would improve the efficiency of air- and ground-based flight operations and enhance safety by reducing the consequences of human error.

Key areas for cooperative or joint activities will include, but not be limited to, the following:

A. National Aviation Human Factors Research Plan

The objective is to develop a comprehensive national plan for the conduct of aeronautical human factors research. FAA has overall responsibility for compliance with the provisions of the Aviation Safety Research Act of 1988, but NASA will play a major role in development of the plan. The plan will be directed toward the improvement of aviation safety through a better understanding of the factors affecting human performance and the implementation of this knowledge into the development of improved technology, training, and regulations.

One means by which NASA and the FAA will jointly work toward development of the national plan will be the establishment of Scientific Task Planning Groups (STPG's) made up of experienced FAA and NASA operational specialists and principal investigators. The purpose of the STPG's will be to plan specific scientific investigations in all of the areas specified by this MOU and the national plan. The STPG's will develop plans for the scientific tasks only and will not be responsible for program management or oversight. STPG's will be established for (1) studies in flight deck design and the operations environment, (2) studies in the ATC design and operational environment, (3) studies needed for improved aircraft/ATC interface, and (4) studies in aircraft maintenance and associated ground operations environment. The function and management of the STPG's will be described fully in a separate Memorandum of Agreement (MOA) covering joint development of the national plan.

B. Human Interface to Automated Systems

The objective is to determine the most effective and safe interfaces, interactions, and roles of flight crews and controllers with automated systems, as well as the appropriate roles of automation in the cockpit and at ATC stations.

C. Causes of Human Error

The objective is to identify causes of human error including problems in procedures, training, equipment, maintenance programs, facilities, and aircraft/airport interfaces which increase the probability of human error incidents and accidents. Additionally, solutions to problems in information transfer, automation, crew coordination and resource management, crew and controller fatigue, and controls and displays will be sought. The appropriate use of the Aviation Safety Reporting System (ASRS) as a primary source of information on human error, and the identification of new methods and techniques for using ASRS as a data source, shall be identified.

D. Information Transfer and Management

The objective is to determine the most effective means for exchange of information between air and ground or air to air using technology such as digital (or other) data links with, or in place of, conventional voice communications, including improved data entry methods to reduce operator errors.

E. Flight Crew/Controller Performance

The objective is to determine the most effective and safe means of achieving productive individual (aviator, FAA inspector, and ATC controller) and crew performance associated with scheduling parameters, duty times and cycles, other job-related stressors, crew coordination, communications patterns, resource management, workload, and human performance limitations.

F. Aircraft/ATC Procedures and Integration

The objective is to evaluate the human factors associated with new cockpit and ATC techniques and procedures in order to enhance the integration of the air and ground elements of the national aviation system.

G. Controls and Displays Technologies

The objective is to develop guidelines and standards for the design of controls and displays for flight crew and controller work stations that are most closely aligned with the capabilities and characteristics of the human information processing system.

IV. AUTHORITY

A. NASA

This agreement is entered into on behalf of NASA under authority of the National Aeronautics and Space Act. of 1958, as amended, 42 USC 2473(c) (5) and (c) (6), as implemented by NASA Management Instruction 1050.1C.

B. DOT/FAA

The acquisition of services described herein between the FAA and NASA is authorized under section 302K of the FAA Act of 1958.

V. COOPERATIVE MANAGEMENT/DIRECTION

Cooperative direction shall be implemented at four levels:

- A. Policy direction shall be provided, after joint conference, by the Executive Director for System Development of the FAA and the Associate

Administrator for Aeronautics, Exploration and Technology of NASA, or their appointees.

- B. Program coordination shall be provided by the Associate Administrator for Advanced Design and Management Control of the FAA and the Director for Aeronautics of NASA. They will jointly review and recommend for approval any Memorandum of Agreement (MOA) or Inter-Agency Agreement (IAA) for specific human factors research programs being conducted under the overall objectives of this MOU and within the policy guidelines of "A" above.
- C. Program coordination shall be provided by the FAA Chief Scientific and Technical Advisor for Human Factors and the NASA Director of the Information Sciences and Human Factors Division, or their appointees. They will prepare jointly technical program plans and MOA's/IAA's, as needed, for specific human factors research programs. MOA's/IAA's will normally be required for programs having a transfer of funds or resources between agencies. (Any agreement entered into which involves the expenditure of funds will be processed through normal procurement channels.)
- D. Specific program implementation and direction shall be provided by the appropriate organization director within the FAA and the appropriate division director within the Office of Aeronautics, Exploration and Technology of NASA, or their appointees. They or their appointees will jointly prepare technical program plans and MOA's/IAA's as needed for specific human factors research programs.

VI. MILESTONES AND REPORTS

Detailed objectives, schedules, and reports will be developed as part of each individual MOA/IAA.

VII. FUNDING

The intent of the FAA and NASA is to share in the funding of any cooperative/joint program, consistent with the approved operating plan of each agency. Each MOA/IAA will identify the task assignment and incremental funding over the period of performance.

VIII. PERIOD OF PERFORMANCE

This MOU shall be effective when signed by both parties and shall remain in effect unless modified, extended, or terminated by written request of either party and subsequent agreement by both parties. All subsequent MOA's/IAA's shall incorporate appropriate periods of performance.

AGREED:

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

BY: Joseph M. Del Balzo DATE: 8-14-90

TITLE: Executive Director for System Development

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

BY: [Signature] DATE: March 15, 1990

TITLE: Associate Administrator for
Aeronautics, Exploration and Technology