NASA-CR-200816

FLIGHT TRAINING AND MANAGEMENT FOR HIGH-TECHNOLOGY TRANSPORT AIRCRAFT

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7N-53-CR

Principal Investigator:

Earl L. Wiener, Ph.D.
Department of Management Science
Box 248327
University of Miami
Coral Gables, FL 33124

305/284-1996

Contract Technical Monitor:

Mark Rosekind, Ph.D.
MS 262-4
NASA-Ames Research Center
Moffett Field, CA 94035-1000

NCC 2-843

APR 1 2 1996
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Semi-Annual Status Report No. 5
1 October 1995 - 31 March 1996

BACKGROUND

This is the fifth semi-annual report on this project. This is a cooperative project between the Unversity of Miami and NASA Ames. The purpose of this research is to investigate the interaction between humans and complex machines which operate essentially automatically, but must be programmed and monitored by humans. In particular this project will focus on the transition of airline pilots from older technology aircraft such as the DC-9, B-727, and B-737-100/200/300 into a fleet of new aircraft that their company has purchased. The modern aircraft employ electronic flight instrument systems (EFIS; or colloquially "glass cockpits") and very sophisticated flight management computers (FMCs). The airline has ordered the following EFIS aircraft: 757, 767, and 737-500. The 767 order has been delayed. The Boeing 777 has also been ordered, but will not be obtained within the duration of this study. The study ends 30 September 1997.

CURRENT STATUS OF PROJECT

Work on the project began during the late summer of 1993. A series of meetings was held with flight management of Continental, and a rough plan for the conduct of the research was worked out. Since then the principal investigator (PI) and his research associate from Ames has visited Continental in Houston, attended meetings of the 757/767 instructor staff, and participated in planning and decision making.

A cohort of pilots taking transition training for the B757 was being formed. These pilots, all volunteers, are being followed as they go through training, initial operating experience (IOE), and entry onto the line. They will fill out questionnaires on their training and their attitude toward automation, and a sub-sample is being interviewed after their training.

Data are currently being collected from the first cohort, and is being entered into a database program at Ames. At this time there are approximately 160 pilots who have volunteered and have submitted first-stage questionnaires. The data from these forms have been entered into a computer database at Ames, and the databases have been transferred to the University of Miami. Work is underway at the University of Miami to perform statistical analyses on these data. A mid-term report on the project is being planned for Ames in December of this year.

Volunteers fill out questionnaires at three stages: 1) during the first week of transition training; 2) after approximately four months of flying the line; and 3) after approximately one year of flying the line.

In addition to questionnaires, a sub-sample of volunteers have been interviewed by the P.I. in both face-to-face and telephone interviews. The telephone interviews will continue.

Unfortunately, the delay of the acquisition of 767 modes has adversely affected the project. A large number of the original cohort bid off of the plane due to their disappointment over the delay in acquisition of the 767, and the unattractive schedules of the 757.

Pilot training for the 757 has take place at numerous locations, including NATCO at Minneapolis, Boeing in Seattle, America West and American Airlines flight simulation facilities in Phoenix and Dallas/Ft. Worth. Ground school was consolidated in Houston this summer at Continental's flight training center, and simulator training will all take place when the company's new 757 simulator is certified near the end of this year. The P.I attended pilot training during the summer of 1995.

We have constructed and mailed out the second-stage questionnaire on pilot attitudes toward automation. About 80 returns have come in, and they have been being loaded into the database at Ames for analysis later in Miami. The most recent database transferred from Ames to Miami consisted of 150 pilots in the primary database, and 60 second-stage questionnaire results.

The P.I. and Ms. Rebecca Chute traveled to Houston in September to attend a meeting of the 757 standards group. The P.I. was given the assignment of writing an article on standardization for the 757 newsletter (completed and published). The video tape made by the P.I. for Continental is now in use in their introduction to automation course.

CURRENT EFFORTS AND NEXT STEPS

Currently we are working on statistical analyses and graphics from the 150-pilot database. We intend to stop taking new volunteers this month.

In December the host airline requested that we do a questionnaire series on pilots transitioning to the B-737/300-500 glass cockpit aircraft. They were eager to use our research methods to help evaluate their 737 program, before and after a change in training technology. The change consists of use of computer-based instruction (CBI) in the ground school. We agreed to cooperate with the company, and are preparing to form a 737 cohort starting this month. We will restrict the coverage of the 737 program -- it will be a much more modest effort than the 757 program, due to the termination date of the project in September 1997.

PERSONNEL

Dr. Earl L. Wiener of the University of Miami is principal investigator on the project.

Ms. Rebecca Chute, MS is in charge of the work at Ames.

Mr. John Moses, a graduate student in Industrial Engineering at the University of Miami is in charge of the database in Miami. Ms. Melisa Dunbar, a graduate student at San Jose State University, heads the database effort under Ms. Chute's supervision at Ames.

Ms. Moumita Roy, an MBA graduate student, is provided to the project by the University of Miami School of Business. Ms. Roy assists in the area of computer graphics, and computer communication. She will graduate in May.

Only the P.I. and Mr. Moses are funded under this grant. Ms. Chute and Ms. Dunbar are funded by a grant from Ames to San Jose State University.