

PROPOSED STUDY TO DETERMINE POTENTIAL FLIGHT APPLICATIONS AND HUMAN FACTORS
DESIGN GUIDELINES OF VOICE RECOGNITION/SYNTHESIS SYSTEMS

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ABSTRACT

This study will evaluate the human factors aspects and potential of voice recognition/synthesis techniques and the application of present and near-future (5 years) voice recognition/synthesis systems as a pilot/aircraft cockpit interface capability in an operational environment. The analysis shall emphasize applications for single pilot IFR operations but shall also include applications for other categories of aircraft with various levels of complexity.

The study will concentrate on the pilot/aircraft cockpit interface and on how this interface integrates into the total aircraft system from an operational human factors point of view. The study will encompass all aircraft categories including both single- and multi-crew operations, but will emphasize single-pilot operations in the ATC IFR environment. It is expected that applications for this more demanding type of operation will also be applicable to most of the multi-crew operational requirements.

Applications in the cockpit will include the independent use of voice recognition and voice synthesis techniques as well as the integration of the two in solving problems, performing functions, or meeting any other requirement for interfacing with aircraft systems.

SCOPE: THE STUDY WILL:

- o CONCENTRATE ON THE PILOT/AIRCRAFT COCKPIT INTERFACE AND ON HOW THIS INTERFACE INTEGRATES INTO THE TOTAL AIRCRAFT SYSTEM FROM AN OPERATIONAL HUMAN FACTORS POINT OF VIEW
- o ENCOMPASS ALL AIRCRAFT CATEGORIES INCLUDING BOTH SINGLE- AND MULTI-CREW OPERATIONS, BUT WILL EMPHASIZE SINGLE-PILOT OPERATIONS IN THE ATC IFR ENVIRONMENT
- o INCLUDE THE INDEPENDENT USE OF VOICE RECOGNITION AND VOICE SYNTHESIS TECHNIQUES AS WELL AS THE INTEGRATION OF THE TWO IN SOLVING PROBLEMS, PERFORMING FUNCTIONS, OR MEETING ANY OTHER REQUIREMENT FOR INTERFACING WITH AIRCRAFT SYSTEMS
- o ONE YEAR EFFORT (WINTER 83 - WINTER 84)

This study will investigate human factors aspects and the potential for using voice recognition/synthesis techniques in the cockpit environment for reducing workload, increasing safety, and increasing aircraft utility. More specifically, the study will: 1) review the state of the art of voice recognition/synthesis and the projection of this technology five years into the future, 2) define and analyze the potential of the technology for control of flight systems and for information transfer applications in the aircraft cockpit environment, 3) determine the suitability of the above applications in an operational environment, and 4) identify and recommend, through a hierarchy of benefits, specific applications.

OBJECTIVE: TO INVESTIGATE HUMAN FACTORS ASPECTS AND THE POTENTIAL FOR USING VOICE RECOGNITION/SYNTHESIS TECHNIQUES IN THE COCKPIT ENVIRONMENT FOR REDUCING WORKLOAD, INCREASING SAFETY, AND INCREASING AIRCRAFT UTILITY.

METHOD: o REVIEW THE STATE OF THE ART OF VOICE RECOGNITION/SYNTHESIS AND THE PROJECTION OF THIS TECHNOLOGY FIVE YEARS INTO THE FUTURE.

 o DEFINE AND ANALYZE THE POTENTIAL OF THE TECHNOLOGY FOR CONTROL OF FLIGHT SYSTEMS AND FOR INFORMATION TRANSFER APPLICATIONS IN THE COCKPIT ENVIRONMENT.

 o DETERMINE THE SUITABILITY OF THE ABOVE APPLICATIONS IN AN OPERATIONAL ENVIRONMENT.

 o IDENTIFY AND RECOMMEND, THROUGH A HIERARCHY OF BENEFITS, SPECIFIC APPLICATIONS.