

EXHIBIT A

The frequency authorization is to be used for fulfilling the requirement of a government grant with the Federal Aviation Administration and the National Aeronautics and Space Administration Langley Research Center under grant NGR-009-017. The name of the grant is : "Joint University Program in Air Transportation Systems." See Exhibit B for a detailed description of the statement of work.

EXHIBIT B

- a) The nature of the research is to uplink weather data to an aircraft in flight using the most efficient modulation scheme possible consistent with the noise environment in the aeronautical VHF communication band. A theoretical study has been completed and the intent in part is to validate this efficiency improvement using a real-world data uplink involving an aircraft.
- b) Attached is a showing that a plan exists and that for it to be practical to the aviator it needs to be validated through experimental means.
- c) Existing communications facilities are inadequate because of the evidence existing with the accident rate relating to general aviation accidents involving weather.

The following is taken from the Research Proposal for Grant NGR-009-017. It shows that a plan exists and that for it to be practical to the aviator it needs to be validated through experimental means.

C. Weather Data Dissemination to Aircraft.

C.1. Background.

Currently, the transmission of weather data for general aviation is handled by voice communication between cockpit crew members and ground based operators. Due to automation of weather data bases, an increasing amount of weather data is becoming available. In addition, structured transmission of cockpit weather data will also require additional use of the finite spectrum available, but will cut down on use of voice channels. Also, the availability of timely and accurate weather information to the pilot is crucial for flight safety, and will allow for increased efficiency.

Developments in the commercial area are monitored, such as the uplink service provided by Radair in Texas. The main disadvantage of Radair's approach is that the transmissions utilize unused spectrum of commercial FM stations. This is a critical vulnerability, since it does not deal with the aeronautical band.

Previous research at Ohio University resulted in a series of reports concerning the efficacy of automated weather data transmission to aircraft. [3-5] These results will be used as a basis for further studies leading to innovative data compression techniques and spectrum conservation. Transmission and coding techniques for weather data might also be applicable to other flight related information such as dependent surveillance.

During last year, an experimental weather data uplink system and avionics test bed were implemented for evaluation of cockpit weather data and data dissemination techniques.

C.2. Proposed Research.

Ohio University proposes to investigate the basic issues dealing with coding and transmission of weather data to aircraft. The technical tasks are listed below:

- a) Identify candidate channels and their data handling capacity for transmission of weather data.

- b) Investigate innovative data compression techniques for weather information with the emphasis on available aeronautical channels.

C.3. Future Research.

Based on the research described above, laboratory prototype equipment will be prepared that will be appropriate for evaluation and demonstration purposes. The study will be extended to include other flight related information in the pilot data link environment.

Bibliography:

McFarland, Richard H., and Parker, Craig B., "Weather Data Dissemination to Aircraft", Published by the American Institute of Aeronautics and Astronautics, Inc. with permission, 1988.

Parker, Craig B., "A Technique for the Automated Dissemination of Weather Data to Aircraft", Thesis, College of Engineering, Department of Electrical and Computer Engineering, Ohio University, June, 1989.

Akos, Dennis A., "A Hybrid Modulation for the Dissemination of Weather Data to Aircraft", NASA Conference Publication 3131, June, 1991.