

16 April 1996

Exhibit 1
Particulars of Operation

Frequency: A single channel of 2 contiguous MHz around previously granted center frequency of 966 MHz.

Power: 50 peak (Change)

Maximum Effective Radiated Power From Antenna: 50 peak (Change) airborne terminal (0 dBi antenna), 200W peak (Change) ground terminal (6 dBi antenna)

Emission: 1MF1D

- 2 LFM modulation
- 450 kbaud
- +/- 250 kHz frequency deviation from carrier
- 1 pulse per second at 10 ms duration max.
- >60 dB attenuation of signal outside of 2 MHz assigned operating channel

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Exhibit 2
Proposed Locations of Transmitters

Tx Locations: Locations of field tests of the Universal Access Transceiver (UAT) system. The following is the list of airport sites currently planned for testing: (NOTE: Experimental operation will not occur at more than four sites simultaneously)

- ✓ Bedford, MA (Hanscom Field—BED; 42 28 N, 71 17 W)
- ~~Salt Lake City, UT (Salt Lake City Int'l. SLC; 40 47 N, 111 58 W) [Delete]~~
- ✓ Melbourne, FL (Melbourne Regional—MLB; 28 06 N, 80 39 W)

[Add]

- ~~Olathe, KS (FAA Air Traffic Control Center; 38 51 00 N, 94 50 00 W)~~
- ~~Atlanta, GA (Hartsfield Int'l. Airport; 33 36 00 N, 84 12 00 W)~~
- ~~Daytona, FL (Airport; 37 54 00 N, 75 30 00 W)~~
- ✓ ~~Wallops Island, VA (Airport; 37 54 00 N, 73 30 00 W)~~
- ~~Anchorage, AK (Int'l. Airport; 61 12 00 N, 150 00 00 W)~~
- ~~Oshkosh, WI (Airport; 43 54 00 N, 88 36 00 W)~~
- ~~Lakeland, FL (Airport; 27 54 00 N, 82 00 00 W)~~

A ground transmitter would be operated at all sites. In addition, airborne transmitters would operate within a 100 nmi radius of each site at altitudes of up to 10,000 feet.

Number of Mobile Units: 20 aircraft maximum

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Exhibit 3
Research Program Description

Universal Access Transceiver (UAT)

UAT is an internally funded project at MITRE/CAASD started in December 1994 to develop and demonstrate a transceiver system designed specifically to support the function of Automatic Dependent Surveillance-Broadcast mode (ADS-B). The ADS-B concept involves autonomous transmissions of position from aircraft and vehicles operating on the airport surface in order to support air-air and air-ground surveillance. Since ADS-B is a cooperative system that relies on a high degree of user equipage, the goal of the project is to develop and demonstrate a new alternative data link approach "tuned" for the ADS-B application that can meet aviation's needs in a cost effective manner.

The UAT is a research project to develop, demonstrate and evaluate a simple, inexpensive, and robust data link medium for the ADS-B application. To meet this objective, the design will employ a single channel transceiver with a bandwidth of approximately 2 MHz. The UAT will operate on the same frequency for transmit and receive in order to allow full air-air connectivity with a minimum of new hardware. In order to keep channel management simple and robust, all aircraft access the channel autonomously at random, *without* the need for centralized ground control or on-board logic to "self organize" channel access amongst aircraft.

In addition to supporting ADS-B, the UAT system will also support uplink broadcast of data from ground stations in a time coordinated fashion using only a small portion of the UAT channel bandwidth. Uplink broadcast data could include a variety of flight information services (FIS) products of general interest (e.g., ground-based weather radar imagery and ATIS messages). Current project plans include demonstration of such a capability in addition to the ADS-B application. This uplink broadcast capability is believed to be very important to foster equipage in the early phases before a significant population of aircraft is equipped for ADS-B. In order to minimize complexity in terms of communications protocols, use of only a broadcast mode is envisioned for all traffic on the UAT common channel.

Flight demonstrations are a key part of the research project. An experimental license is being pursued in order to support this research. Operation in the band 960-970 MHz has been selected and a frequency of 966 MHz was previously assigned by the Commission. The applicant has fully coordinated this revision with the Federal Aviation Administration Office of Spectrum Management and Policy (ASR-1).

This modification requests approval to increase the transmitter power from 20W to 50W and to add possible experimental test sites. No more than four sites will be used simultaneously.