

Research Program

Complete program of research and experimentation including description of equipment and theory of operation:

The equipment being utilized in conjunction with this experimental license is avionics equipment that is being developed as replacements for an existing product line which was previously granted FCC-type approval (The VHF-22 in the case of the VHF 4000 and the DME-42 in the case of the DME 4000). The two new products are the VHF-4000 VHF Communications Transceiver and the DME-4000 Distance Measuring Equipment. The VHF-4000 provides aeronautical communications in the VHF frequency range of 118.000 MHz to 136.975 MHz. The DME-4000 provides aeronautical navigation utilizing the civil aviation DME system that operates in the frequency band of 962 to 1213 MHz.

The VHF-4000 provides a two-way communication path between an aircraft and ground-based air traffic control or aircraft operational control facilities. It can utilize one of four modes to provide that communication. For voice communications the equipment can operate on either 25 kHz channel spacing which is standard for worldwide aeronautical communications or on 8.33 kHz channel spacing which has been adopted for certain areas in Europe. Data communications can utilize either Mode A – MSK modulation at 2.4 kbps or Mode 2 – D8PSK modulation at 31.5 kbps. All of these modes of operation have been developed and specified under the auspices of the U.S. FAA and the International Civil Aviation Organization (ICAO). FAA Technical Standard Orders C37d and C38d control specification of this equipment.

The DME-4000 transmits pulses on a pre-determined fixed frequency to DME ground equipment that in turn responds to these interrogations on a different fixed frequency. The airborne equipment measures the time interval between its interrogation and the ground station reply in order to determine the distance to the ground station. FAA Technical Standard Order C66b controls specification of this equipment.

All cooperating ground stations will be existing FAA facilities - FAA VHF stations or DME ground stations.

Objectives sought to be accomplished:

The purpose of the experimental license is to permit the communications and navigation equipment that is being developed to be used as an integral part of the aircraft flight test program. The equipment will be operated under normal operating conditions but in the controlled environment of an aircraft test program. The primary objective will be to permit all of the equipment interfaces with the aircraft (i.e. – audio panel, frequency selector, navigator interface, etc.) to be exercised under actual flight conditions.

How the program of experimentation has a reasonable promise of contribution to the development, extension, expansion or utilization of the radio art, or is along line not already investigated.

Testing of the new transceiver equipment as part of the aircraft test program will permit use of the equipment in its normal environment. It permits all human factors related to operation of the equipment to be explored. It allows observation of any interactions with other receivers or equipment that are aboard the aircraft. It permits observation of any effects caused by aircraft dynamics or altitude.

