Results of a Q-M/PSK Data Modem Performing in a Hybrid, Voice and Data Mode, Through the ATS-6 Satellite

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ABSTRACT

The Transportation Systems Center (TSC), under the sponsorship of the FAA, has been involved in the development of advanced voice/data multiplexed modems applicable to ground-aircraft communications via satellite in support of the AEROSAT program. TSC was assisted by the Canadian Ministry of Transport (MOT), Communications Research Center (CRC), in the planning and conducting of recent flight test experiments using the NASA ATS-6 satellite.

The purpose of these experiments was to gather additional performance data on the error statistics of the digital data channel in the Q-M/PSK Voice and Data Modem, while operating in the hybrid (simultaneous) voice and data mode. This data is to supplement the data collected in the 1974-75 ATS-6 satellite tests and hopefully provide some answeres to questions about the performance of the data portion of the modem when operating in a Gaussian noise (no multipath) environment.

Flight tests were conducted from March 14 to March 24, 1977, in three locations: two in Canada at a 9° elevation angle to the satellite and one near Bermuda at a 5° elevation angle. Signals were transmitted from the CRC ground station at L-band (1650 MHz) to the ATS-6, where they were relayed to the aircraft at 1550 MHz and received and recorded for post-flight tests.

All flight tests were successfully completed and a large amount of data was collected. This data is presently being reduced and analyzed. Preliminary results indicate a bit error rate on the order of 2 dB closer to the theoretical for DECPSK than in the previous ATS-6 tests. The complete test results and conclusions are presented in the paper.