

Raytheon Missile Systems

Application for Experimental License for spectrum use on Unmanned Aircraft System

Application Number: 0275-EX-PL-2010

Explanation of Need for Experimental License:

Raytheon Missile Systems (Raytheon) is developing technologies using unmanned aircraft systems (UAS) that are designed to protect and defend the US and to support our armed forces in reconnaissance and surveillance. This application is for the use of radio frequencies that are an essential part of the research and development of the UAS, which are conducted at Raytheon facilities prior to these technologies being transferred to Department of Defense customers.

This application requests the use of several frequencies used variously for command and control of the UAS and for the transmission of real-time video data that is essential to intelligence, surveillance, and reconnaissance requirements. Most of the operations proposed here use commercial off-the-shelf technologies but those technologies are modified – using different antennas – to accommodate the specific needs of the program, and so a license is required. Raytheon is applying for the 225 to 400 MHz frequency to add a secondary command and control communications system as a failsafe for the UAS. This is a commonly used command and control frequency. It is used often by the US military, the primary customer for the Raytheon UAS.

In May 2010, Raytheon requested a special temporary authorization for this proposed operation because it had been testing under the auspices of a Department of the Army frequency authorization which unexpectedly was not renewed, leaving the UAS program with an on-going need to test at the facilities listed but no authority to do so. We filed the STA request to ensure that the program could continue operating in compliance with the FCC's regulations. Raytheon is now filing this request to allow for continued operations to serve our national defense. An experimental license of 5 years will permit the continued development of UAS.

Explanation of Experiment:

As explained in its STA request, Raytheon is developing a UAS for the US military. The testing proposed here is to determine the functioning of some of those systems when they are in development. Geographically limited test flights are a key element of the product development process to ensure that the UAS are operating as needed and are delivering the data needed by the customers. To conduct test flights, it is necessary to operate several radio systems that will control the operation of the UAS and that will test out the data transmission characteristics of the systems to ensure proper operation. All flights will be within a 5 mile radius of the ground control stations, which are the two fixed locations on the application. The flights will be conducted at a height of 2000 feet AGL or less as specified by the FAA and to improve control and communications.

Technical Requirements of the Experimentation:

Because of the distances involved, the commercial technologies operating in the 902-928 MHz and 2.4 GHz bands used here have been modified slightly to operate with higher antenna gains than those that have been pre-approved. This makes it necessary to request this experimental authorization to operate the radios needed by these UAS. Various UAS platforms are being tested, including the Cobra.

Coordination:

The proposed operation has been coordinated with both the FAA at Tucson International Airport as well as the Arizona DoD Area Frequency Coordinator at Ft. Huachuca. Raytheon is prepared to undertake coordination with FAA and DOD as appropriate to allow for the use of the 2204.5 and 225 to 400 MHz frequencies.

Conclusion:

Advances in autonomous operation of unmanned aircraft systems, increasing need for intelligence, surveillance, and reconnaissance by the US military, and enhanced aerial platforms all rely on effective radio links to accomplish the goals of using unmanned aerial systems. The application submitted here requests authorization to operate the UAS using radio systems with antennas that allow the communications links to travel distances needed by the UAS. Every precaution has been taken in designing this system to protect against any potential interference to other users of this spectrum. While the antennas may allow the signals to travel greater distances, the radios employ protocols that protect shared use of the spectrum.

This request for an experimental license follows the grant of an STA that filled in the gap that resulted from an unexpected refusal by the Army to continue to request a frequency assignment for the operations. Further, this application requests the use of additional frequencies 225 to 400 MHz, which are needed for command and control. In all other respects, this application requests the same authorization that was granted in the STA, call sign WE9XJQ. In any event, the testing must continue, and the operations must be properly licensed, so this request is filed to allow for the licensed continuation of the testing.

If there are any questions, please direct them to Tom Fagan, Spectrum Manager, Raytheon Missile Systems, 520-794-0227, tjfagan@raytheon.com or to Anne Linton, 301-980-2335, alc@wfsllc.biz.