

Explanation of Experiment and Need for an STA

Orion Space Solutions (“Orion Space”) is working with the US Space Force on the design and implementation of a new constellation of earth sensing satellites. The sensors are expected to generate a significant amount of data that will need to be downlinked to ground stations for processing. Because the current radios available on the market are not sufficient for the high volume of data downlinks, Orion Space is developing a customized radio. This application seeks authorization for the independent research and development testing of its customized radio.

Need for an STA:

Orion Space is developing the radio for future testing on an experimental satellite that is scheduled to launch in Q4 of 2024. Thus, the radio testing needs to start as soon as possible to ensure that the radio is ready to use. To get this process started as quickly as possible, Orion Space is requesting an STA.

Technical Synopsis:

Spectrum Needed:	2200 to 2290 MHz, 8000 to 8400 MHz
Power levels:	S band: 2 W, 7 dBi gain, X band: 8 W, 16 dBi gain
Location of testing:	Indoors, in the lab
Emission Designators:	S Band: 10M0G1D, X band 120MG1D and 149MG1D

Description of Operations:

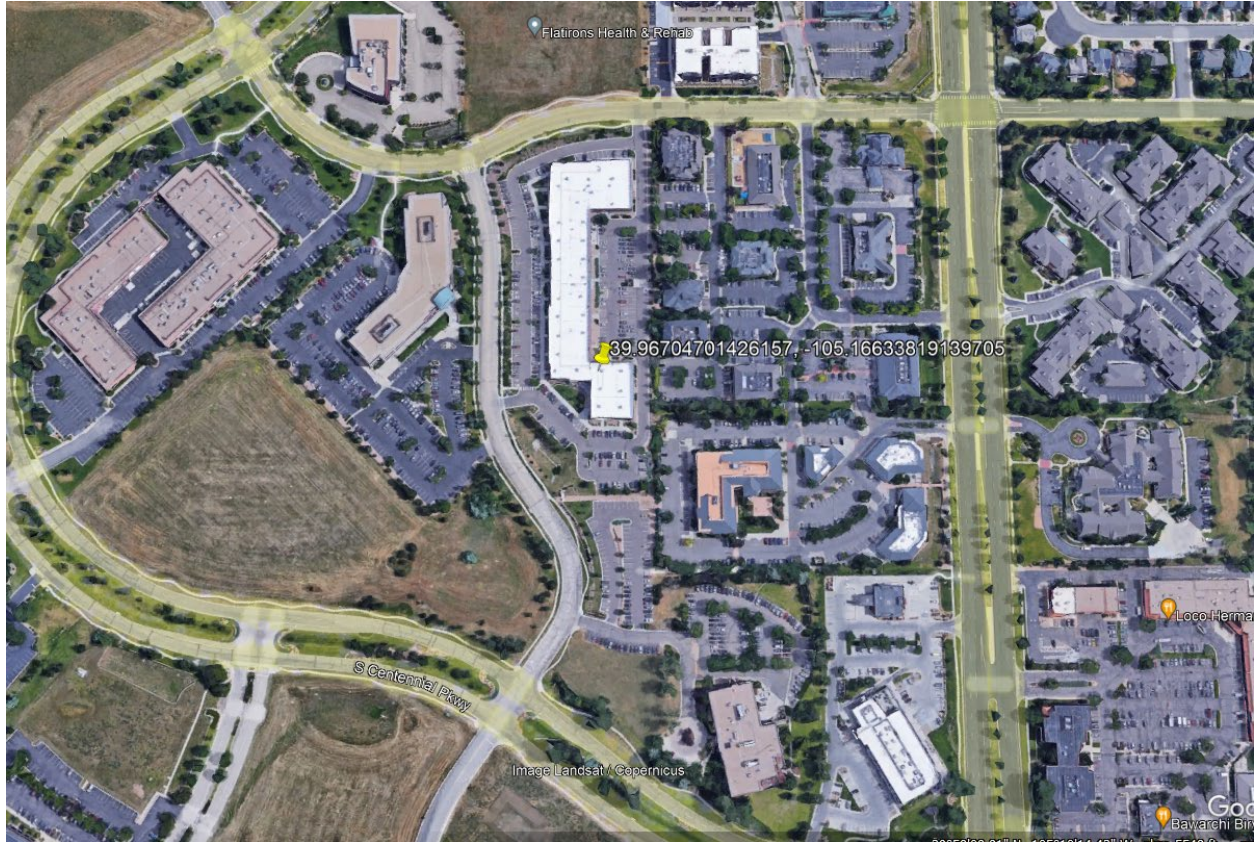
Testing of radio components and measurement of data throughput. Orion Space is developing a new radio that has performance advantages over any of the radios that are commercially available in the market today. To develop an effective radio, Orion needs to test a variety of parameters in the radio, including testing various emissions, beamwidths, and data throughput levels. It is trying to develop a system with a high symbol rate. To get to the rate needed, the testing will explore a combination of parameters to examine the performance of various configurations of the radio.

The proposed operations request large occupied bandwidth, particularly in the 8400 MHz band. The goal is to test these radios to see how quickly large volumes of data could be transmitted over a robust link. If the data throughput is sufficiently robust, the time required for the radios to be in use can drop significantly, which could better facilitate sharing the spectrum.

Location of Operations:

Orion Space is developing the radios at its lab facilities in Louisville, Colorado. The testing will be indoors. The distances needed for effective testing of signal propagation make it impossible to test in an anechoic chamber, so the license requests authorization for indoor testing over the air.

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A search of the Commission's databases shows that the nearest commercial satellite earth stations that might be receiving signals on these frequencies are in Rock Springs, Wyoming approximately 261 miles away or Maddock, North Dakota approximately 624 miles away. Indoor operations in Louisville, Colorado are unlikely to have any deleterious affect on those ground stations.

Additional searches of the FCC's databases show that:

- In the 2200-2290 MHz band, the only licenses within 10 km of the proposed operations are two experimental licenses.
- In the 8000-8400 MHz band, the only license within 10 km of the proposed operations is one experimental license.

The proposed indoor operations are unlikely to cause harmful interference to any other operations licensed by the FCC, because the signal propagation would be blocked by the lab walls, other buildings and other natural features.

Time of Use

Orion Space anticipates that these radios will be in use only 10 hours per week. This limited amount of usage makes it possible to schedule testing to avoid any prospect of harmful interference to other

operations, even though no such harm is anticipated based on the indoor testing and limited signal propagation.

Half Power Beamwidth

S-Band – HPBW = 90°

X-Band – HPBW = 18°

The antennas are directional. The S band antenna has a wider half power beamwidth because the signal propagates in the 2200-2290 MHz band further than it does at higher frequencies. The X band antenna has more gain, allowing the antenna to concentrate the RF energy to deliver higher quantities of data on a reliable link in a short period of time. Ultimately, the goal of developing these new radios is to produce a radio with performance characteristics that will serve high data throughput operations reliably, even when the pass over an earth station is limited to just a few minutes.

Stop Buzzer POC

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Conclusion

Orion Space is working on the development of a new radio system that may be incorporated into some of the company's future satellite systems. This application seeks authorization for the testing and demonstration of that radio indoors at the Orion Space facilities in Louisville, Colorado. The operations are limited in time, about 10 hours per week, and there is no chance of harmful interference to other FCC-licensed operations. The development of this radio offers significant improvement in downlink capabilities for satellites which may be collecting large volumes of data. This could streamline the use of ground stations by having robust, reliable, high speed communications links.

If there are any questions about this application, please contact Anne Cortez, Counsel to Orion Space , 520-360-0925 or anne@washingtonfederalstrategies.com