

World View
Experimental STA Exhibit
File No.: 0105-EX-ST-2018

Explanation of Experiment and Need for STA

World View is a Tucson, Arizona based company that has developed a stratospheric balloon platform, the Stratollite ®, which it launches for a range of customers. The 50-80,000 ft. operational height of the balloon, along with its ability to fly for up to 10 days at a time, makes the Stratollite a unique platform for testing communications technologies.

World View was recently engaged to assist in the testing of a synthetic aperture radar (SAR) system. This application seeks authorization for that testing.

Need for an STA

World View is seeking to begin ground testing of the communications configuration for its upcoming testing by February 19, 2018. This will be followed by one or two stratollite flights that will test the SAR, to evaluate the system capabilities, described more fully below.

An STA is appropriate since the duration of testing is expected to be less than 6 months. The application seeks approximately 6 months, to ensure that World View has the flexibility to adjust its schedule according to weather concerns. In reality, the testing will take place for less than 30 days of the requested period.

Description of Experiment

World View is working with Artemis Inc, the developer of a synthetic aperture radar (SAR) to test the characteristics of a radar system. The SAR is the subject of a DD 1494 that was submitted on January 3, 2018. The radar system in question is being developed to enhance target detection for surveillance and reconnaissance. This system is particularly designed for targets that are not visible in optical or IR imagery.

The antenna is a phased array, with each element having a dedicated TX/RX module, but it is not electronically steerable. The radar system does not have a regular scanning pattern; it can be adjusted during flight to create optimal coverage of a certain area on the ground. Putting this system on a stratollite, with its high altitude, relatively slow flight, gives World View and Artemis the ability to conduct extensive testing of the capabilities of the radar system in a real-world situation, which will advance the radio art.

The system has the ability to notch out frequencies, as needed, which can protect radio operations on the ground.

The system is meant to operate in a ping-pong two-channel mode. The two TX channels may be H and V polarizations, or they may be left and right side of the aircraft. In two-channel mode, the SAR will transmit the 2200 pulses per second noted in the application, with the channels alternative every other pulse.

Limited Time of Use

The duty cycle of the radar system is limited to less than 10%. The maximum spectrum use would sweep through the frequencies requested, 1240 MHz to 1350 MHz, 2200 times per second. Thus, a sweep through the frequencies would take 0.45 milliseconds. The amount of time that the radar would be on any frequency is less than 0.0045 milliseconds for a sweep.

When the stratollite is in flight, the system would be on and in use approximately 10 hours per day. This testing proposes at most two 10-day flights during the period from Feb. 19, 2018 to August 18, 2018. There is expected to be a two-week ground-testing period prior to any flights. The ground testing will be at the World View headquarters, with some operations indoors for system configuration purposes.

When the low duty cycle is factored in with the sporadic nature of the testing, it is not expected that this system will create interference issues for other spectrum users in the area.

Geographic Area requested

World View is requesting an operational area of 200 miles around its headquarters, limited to the radius that is in the US. The shaded area below, *Figure 1*, shows the requested operational area for this testing. World View requests an operational area of this size to allow it to take advantage of the varying stratospheric winds.

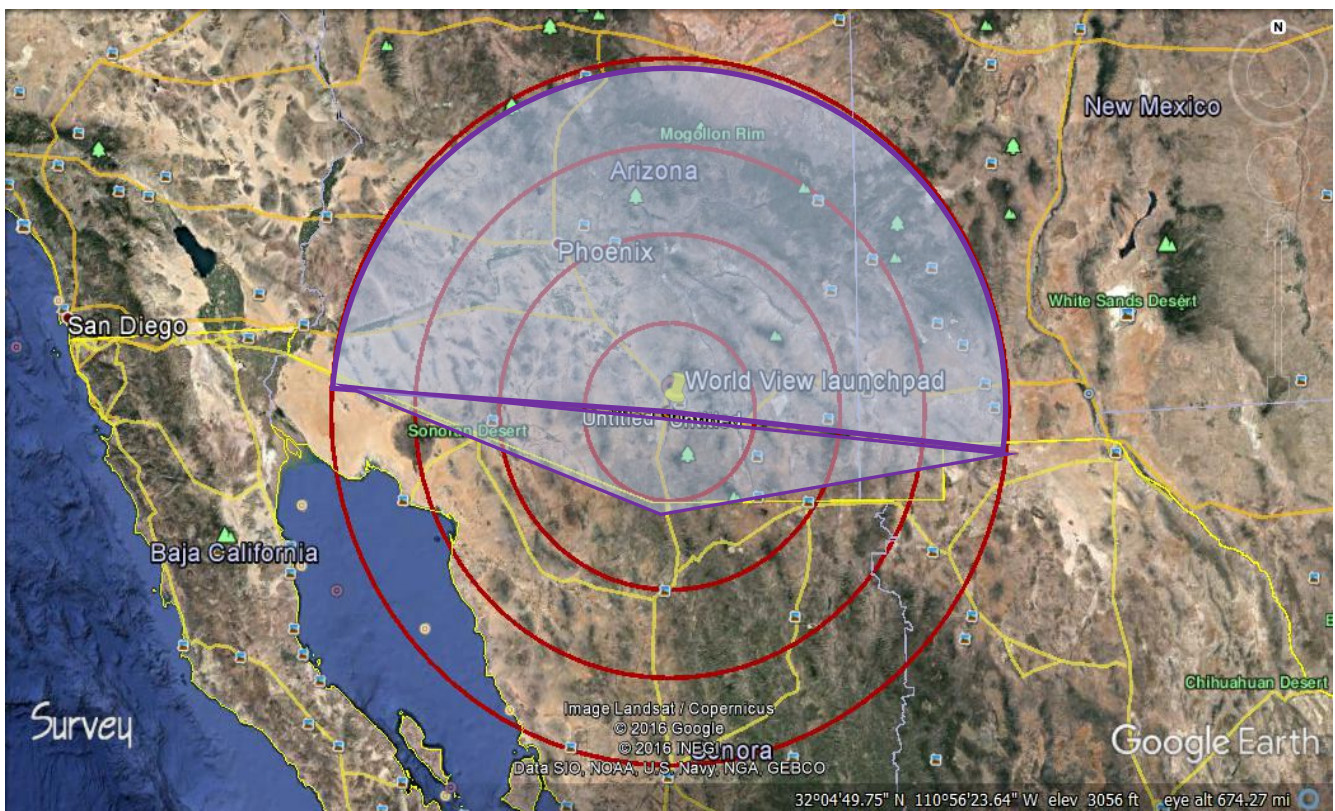


Figure 1. Proposed Area of Operation

Additional Information

The transmitter elevation – 50,000 to 80,000 feet above ground level – means that the power of the signals when they reach the ground will be significantly attenuated, minimizing their impact on other radio uses. The free space pathloss for the transmissions at 1240 MHz and 50,000 feet is expected to be greater than 102 dB, and at 1400 MHz and 80,000 feet, the pathloss will be greater than 107 dB. Thus, the signal levels on the ground will be far lower than the ERP figure at the transmitter.

The transmitters use 13 dBi gain antennas, which narrow the beamwidth, minimizing the areas affected by these signals.

The balloon is going to be in motion during the testing, and the antennas are steerable, which means that the signals are even less likely to be detectable or to cause interference.

Stop Buzzer Point of Contact

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Conclusion

World View is seeking authorization to test a synthetic aperture radar, first on the ground at its headquarters for configuration purposes, and then from its stratollite balloon platform to assist Artemis Inc. with the advanced development of the SAR. The testing will be limited. The signal levels have been reduced as much as possible while still allowing testing to be effective. The duty cycle of operations, when the system is in use, is less than 10%.

For additional information, please contact Anne Cortez, alc@conspecinternational.com or 520-360-0925.