

World View
Experimental STA Application
File No.: 0515-EX-ST-2020

Explanation of Experiment and Need for STA

Company Description/Overview:

World View, a Tucson, Arizona based company, was founded to build and launch stratospheric, lighter-than-air balloons carrying a range of payloads. See Figure 1 below for an image of a Stratollite. World View's customers range from the US Department of Defense to private citizens to commercial enterprises looking to take advantage of a platform that can bring them to the edge of space.

World View is seeking this authorization to operate a radio system that will carry telemetry data from its stratospheric balloon during its mission. To prepare properly for a safe launch and operation, this application also seeks authorization for ground-based testing prior to the launch.

Need for an STA:

World View has recently purchased a new radio system for this testing. It has some customer missions scheduled in late 2020, and it needs to integrate the radio system into the Stratollite and test its operations as soon as possible to ensure proper operation before the customer missions. Therefore, testing needs to start as soon as possible. For that reason, World View is seeking an initial six-month testing period.

Technical Synopsis:

- Spectrum requested: 2200-2305 and 2360-2500 MHz, with 20 MHz bandwidth
- Power levels:
 - Downlink: 8 W MIMO operations, with 5 dBi gain, ERP 15.4 W
 - Uplink: 8 W with 24dBi gain highly directional (7 deg beamwidth) dish antenna with a direct focus (autotrack) towards the elevated platform, ERP 1225.3 W
- Limited time of use: ground testing: several hours, airborne: only during flights
- Balloon will operate at 50,000 to 75,000 feet

Description of Operations:

World View is seeking authorization for operation of a data link system to transmit information from its Stratollite to a mobile ground station that tracks the balloon while it is in flight. The proposed test flights will operate in Arizona and New Mexico, in the area depicted below in Figure 2.

The radios will be tested to see how far the radio links will reach while delivering reliable information, and the radios will be tested to determine the speed of the data transmissions that can be achieved across various distances. This testing will give World View better information about how to configure its technology to deliver performance to its customers.

Data link: After the launch, the data link will be in use during the desired transmission periods. The downlink will be used to transmit high-resolution imagery and other telemetry data from the balloon to the ground station. The downlink will use the 2200-2500 MHz, excluding 2305-2360 MHz, radio to transmit at 8 watts, with an ERP of 15.4 watts. Given the altitude of the balloon, which will be 10 miles or more from earth, the signal at ground level will be very low. Data uplink will also use the 2200-2500 MHz radio to transmit at 8 watts, with an ERP of 1225.3 W confined to a 7 deg beamwidth cone centered in the direction of the aerial vehicle.



Figure 1. World View Stratospheric Balloon

Area of Operation: see *Figure 2* below:

Portions of Arizona and Portions
of Western New Mexico

The oval shaded area below is where these operations will take place. The Stratollite movement is controlled by upper atmosphere wind patterns, so each flight will be somewhat different. The estimated flight will be 300 miles or so, which is about twice the length of the green line stretching from Tucson east into New Mexico. The oval area is needed to accommodate the variability of the winds.



Figure 2. Proposed area of operations
(The blue outline above is illustrative).

To optimize the functioning of the radio systems, World View has built a mobile command center that uses a directional antenna to track and receive telemetry information from the transmitter on the Stratollite.

Minimization of risk of interference:

To minimize any potential interference, World View has worked to design a system that puts the most gain into the receive antenna rather than adding power to the transmitter. The uplink design is highly directional (7 deg beamwidth dish antenna) and is used only for handshake and occasional configuration control purposes. This is expected to minimize the prospect of any interference. Further, because the radios use a MIMO technology, they use spectrum very efficiently, which helps to minimize interference.

While the Stratollite will operate at a very high elevation, because it is below orbit, its footprint will be far more limited than satellites operating on the same spectrum. With the directional antenna employed, the signal is not expected to cover a large footprint.

Further, the signal level proposed should attenuate significantly due to free space pathloss before the signal reaches the ground. This will also minimize any potential for the signal to cause harmful interference to any licensed operators.

Stop Buzzer Point of Contact:

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Conclusion:

World View continues to develop its stratospheric balloon platform for a range of government and an emerging sector of commercial customers. As part of the development of the balloon, World View needs to test a new radio system to determine what can be achieved over distances and varying altitudes. The proposed testing will allow World View to expand its experimentation to cover much greater distances, allowing more adaptations for weather and allowing study of the effects of distance on radio throughput and transmit speeds.

If there are any questions about this application, please contact Anne Cortez, WFS, 520-360-0925 or alc@conspecinternational.com.