

Radio Physics Solutions
Experimental STA Request
File Number: 1531-EX-ST-2018

Explanation of Experiment and Need for STA

Radio Physics Solutions (RPS) is developing a radio-based threat detection system. The MiRTLE® patented technology fuses proprietary millimeter wave radar techniques with artificial intelligence to provide instant standoff threat detection of concealed person-borne threats. The system is being developed to detect a range of threats including hand guns, knives, assault weapons, and suicide bomb vests.

Need for an STA

RPS has been asked to demonstrate the MiRTLE technology to Vulcan Inc. in Seattle starting as soon after October 15, 2018 at possible, with the demonstration scheduled to last no more than 5 days from the start. The nature of the demonstration is short, and an STA is appropriate in this instance. Because of the uncertainty of the processing time, RPS is requesting an STA for a 60-day window. The operations will only last for five days, and then RPS will surrender the license.

Technical Synopsis

- Spectrum Needed: 77-110 GHz
- Location: Operations located at recessed building entrance
- Limited time of use: about 8 hours per day, intermittently
- Power level limited: 7 mW signal, with only 47 W ERP

Description of Operations

RPS has been asked to demonstrate its MiRTLE technology at the headquarters of Vulcan Inc. to illustrate its potential effectiveness in detecting threats, in particular to protect schools. The executives at Vulcan are interested in investment in RPS and this is part of their due diligence to examine the performance of the technology. The proposed operations will take place intermittently, to demonstrate the technology for evaluation by this potential corporate partner. RPS will use its MiRTLE technology to screen people on the plaza in front of the building where Vulcan's offices are. The screening results will be presented to Vulcan staff on a real-time basis, allowing them to determine the effectiveness of the technology, which will allow them to evaluate their investment.

The system works most effectively when it operates across 35 GHz, and RPS is seeking an authorization covering 33 GHz for this demonstration.

The MiRTLE technology operates from 77-110 GHz. The power level is low, only 5 milliwatts, with an ERP of 47 W. Because the millimeter waves are so short, they are easily absorbed or scattered by surrounding features such as trees and buildings. The signal propagation will be highly contained in the immediate area of the building. Further, for the MiRTLE detection system to

work, the technology needs to be directed toward the people to be screened. The system will be pointed at or below the horizon for this use.

RPS has undertaken other demonstrations under the authority of WM9XDS and WM9XHF. The proposed operations here are similar, with a slight adjustment to the spectrum selected to accommodate previous license conditions.

Location of Operations and Time of Use

The proposed operations will require installation of the RPS technology near the entrance to the building which houses Vulcan’s headquarters at 505 Fifth Avenue South, Seattle, Washington. The building entrance, as shown in *Figure 1* below, is recessed from the front of the building.

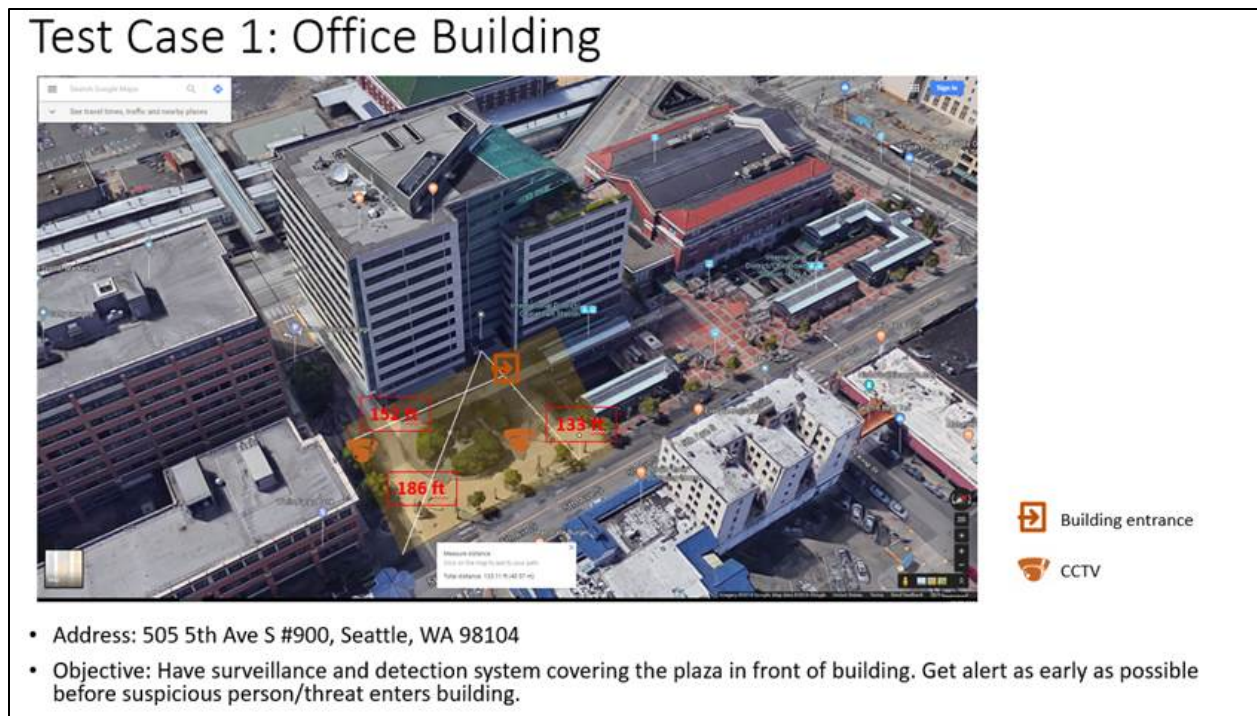


Figure 1: Entrance to building and plaza outside

The recessed entrance will provide shielding for the limited amount of side lobe energy, minimizing any prospect of interference.

The demonstrations are expected to take place across a 5-day period, during the workday. The MiRTLE system sweeps through the frequencies, with a sweep taking approximately 0.31 milliseconds. There are approximately 3000 sweeps per second. The time on any frequency per sweep is very brief. When the time of use is divided across the 35 GHz of spectrum requested, RPS determined that the system is in use for only 0.0088 milliseconds per gigahertz (88 μ s/GHz). The speed of the sweep will mitigate any potential for interference to other operations using this spectrum, since most radios do not detect signals that are so brief in duration. A review of typical 70/80/90 GHz data links shows that the typical emission designator for those operations near this

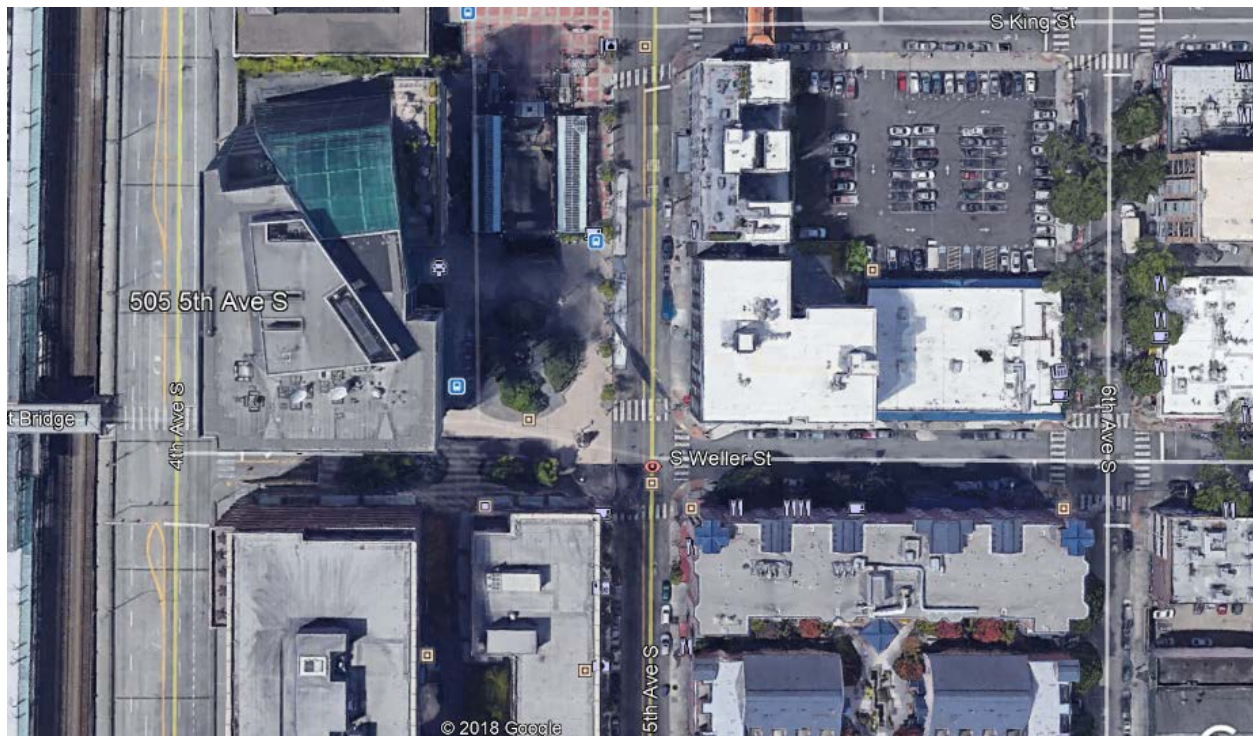
proposed demonstration ranges from 0.5 to 2.0 GHz wide, which means that a sweep of this system will overlap any nearby operation for just 44 to 136 microseconds per sweep.

The other operations are all mounted on rooftops, with highly directional antennas, and this operation will be ground based.

If a screening demonstration shows something interesting, the MiRTLE system will be turned off for the participants to discuss what they are seeing and how the system is working.

No likelihood of interference to other operations

RPS is working with spectrum that is very effective in this technological application. However, it is not spectrum that will propagate very far, because the wavelengths are so short. As a result, the signal should be harmless to other operations.¹



Previous applications submitted by RPS have been approved, and RPS is hoping this application will also be approved. To best demonstrate the technology, it is best to operate it as designed. With that goal in mind, RPS has taken the time to determine the closest radio astronomy telescopes, none of which is anywhere within 500 miles of the proposed demonstration area. Further, there are buildings and mountain ranges between the test area in Seattle and any of the observatories.

¹ The majority of Amateur Radio Astronomy observations are usually performed at less than 12GHz. Higher frequencies are deemed to be very exotic requiring very specialist construction and measurement techniques. British Astronomical Association, <https://www.britastro.org/radio/spectrum.html>. Website viewed, and quotation downloaded, on Sept 18, 2018.

Stop Buzzer Point of Contact

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Conclusion

RPS is seeking an STA to allow it to demonstrate its MiRTLE standoff threat detection system at the headquarters of Vulcan Inc. to allow Vulcan executives the opportunity to evaluate the technology for purposes of determining whether to invest in RPS.

Should there be any questions about this application, please contact Anne E. Cortez, Esq. of Washington Federal Strategies, 520-360-0925 or alc@conspecinternational.com.