

Explanation of Experiment

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.

RPS was asked to demonstrate the MiRTLE technology to potential users and investors in the Seattle area. The first demonstrations in November 2018. RPS has been asked to continue its testing and demonstration for further review at the same location, based on the interest generated by the operations that took place under the initial STA, WN9XNZ. RPS continues to negotiate with potential investors who are requesting on-going demonstrations as part of their fundraising and technology evaluation efforts. For that reason, RPS is seeking to renew its authorization.

Technical Synopsis

- Spectrum Needed: 77-86 GHz
- Location: Operations located at recessed building entrance
- Limited time of use: about 8 hours per day, intermittently
- Power level limited: 5 mW signal, with only 47 W ERP

Description of Operations

RPS has been asked to extend its demonstrations of the MiRTLE technology to illustrate its potential effectiveness in detecting threats, in particular to protect schools. The executives are interested 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. The screening results will be presented to staff on a real-time basis, allowing them to determine the effectiveness of the technology, which will allow them to evaluate their investment.

Since the original STA request was submitted in September, RPS has been working to reduce the amount of spectrum needed for its system to perform at the high level that interests potential users. Now, RPS is seeking an authorization covering only 9 GHz for this demonstration.

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.

Location of Operations and Time of Use

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

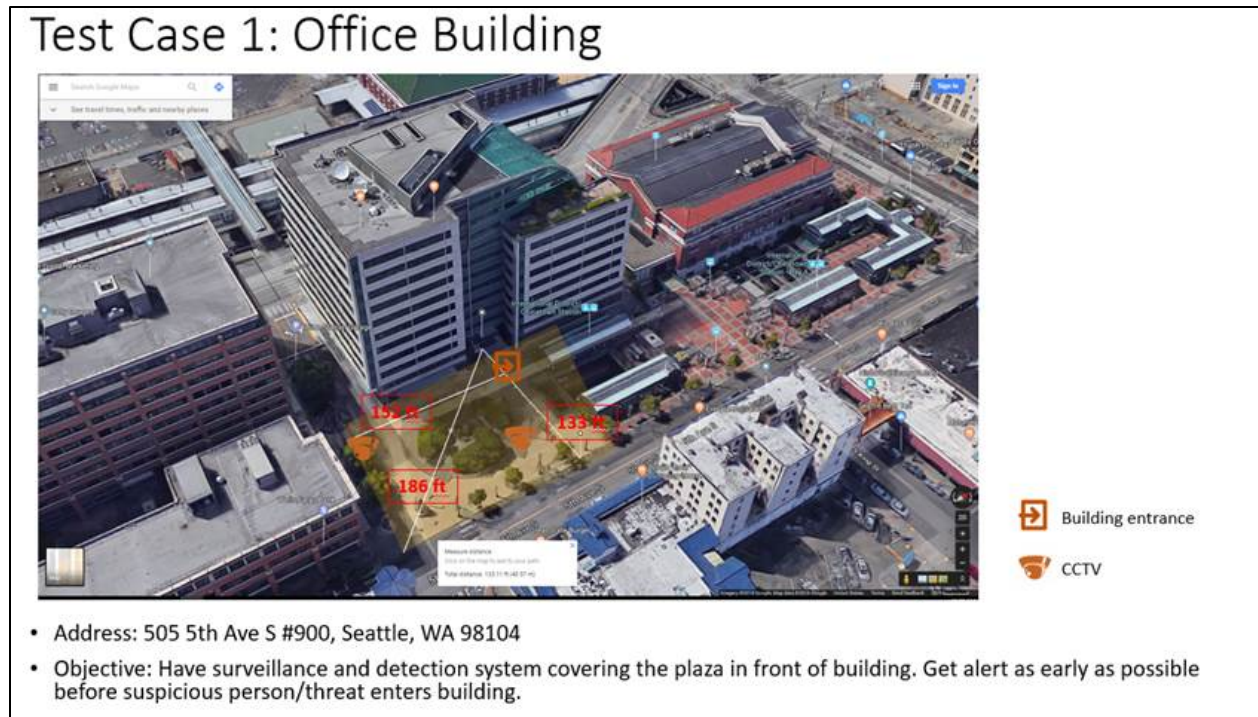


Figure 1: Entrance to building and plaza outside

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

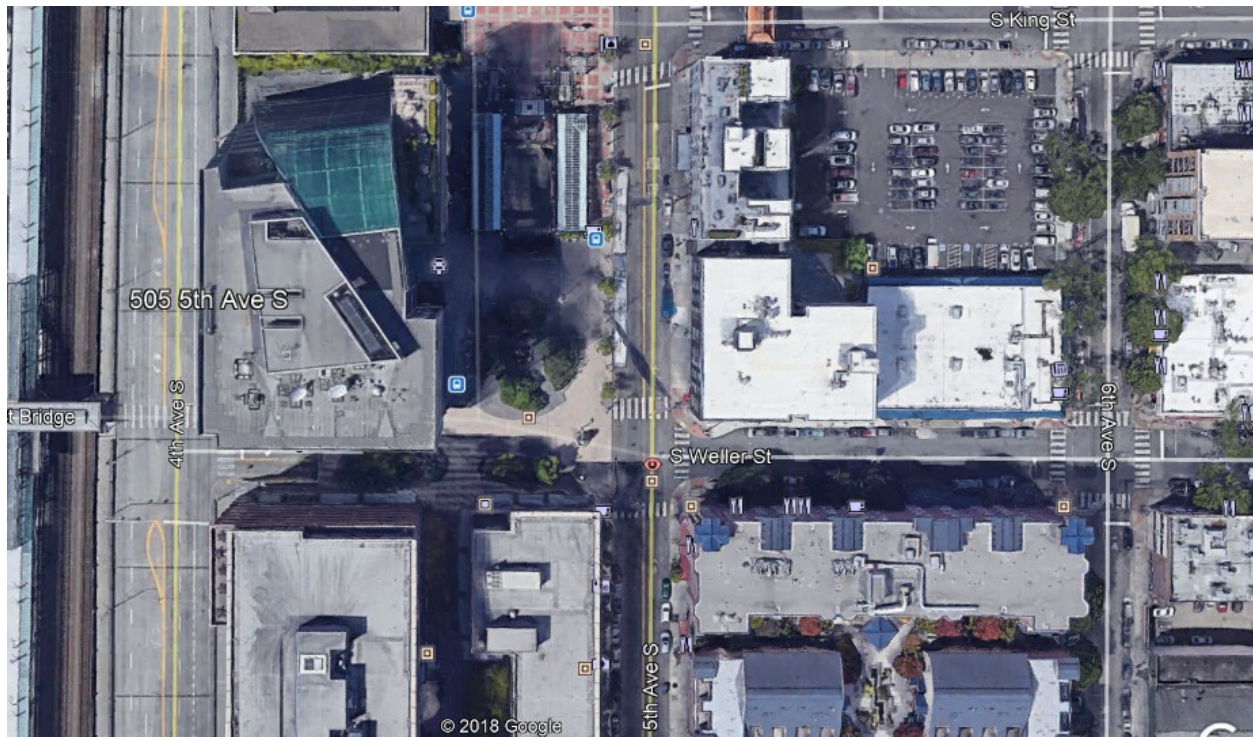
The demonstrations are expected to take place during the workday. The MiRTLE system sweeps through the frequencies, with a sweep taking approximately 0.31 milliseconds. There are approximately 3000 sweeps per second. The time on any frequency per sweep is very brief. When the time of use is divided across the 9 GHz of spectrum requested, RPS determined that the system is in use a very brief period. The system sweeps in channels of 50 MHz, so most of the spectrum is not in use at any given period of time. 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 microseconds per sweep.

The other millimeter wave 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 propagates very far, because the wavelengths are so short. Since this demonstration period started, there have been no instances of any interference to other operations.¹



Stop Buzzer Point of Contact

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Conclusion

RPS is seeking to renew its experimental license to allow it to continue demonstrating its MiRTLE standoff threat detection system for additional evaluation of this technology for purposes of determining whether to invest in RPS.

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.

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.