

## Explanation of Experiment

### **Background:**

Raytheon Technical Services Company is a DoD contractor that develops radar and radio systems that are incorporated into a variety of defense technologies. As a result, it needs to experiment with and develop new radios and to test the radio systems to make advances needed by Raytheon's customers.

The current application is for extended development and testing of a Ground Vehicle demonstration of an FLIR radar system with a ground vehicle. Early testing under STA WG9XTI proved very productive, and Raytheon needs to continue its research and development on this project.

### **Synopsis:**

- Spectrum required: 9.3-9.5 GHz
- Time of use: limited to two minute tests, with only intermittent spectrum use
- Power level: limited to ERP of 680 W, signal propagation limited to Raytheon property

### **Radar System Under Development:**

The radar is used to sense ground targets, vehicles and personnel on Raytheon property, per the FLIR Ranger RR20SS design parameters. The radar is operated using the power and modulation settings required for the short range mode for safety, reduced interference, and effective operation. The short range mode will be used to sense ground targets within 2.5 km of the radar as shown in the diagram below. The long range mode of the radar will not be used.

#### Test Time:

During testing, the time required to create and display multiple targets is less than two minutes. The transmitter use will be intermittent during that period. During the remainder of the testing, the FLIR radar will not be transmitting. For the ongoing testing and development, the radar system is expected to be in use only 120 minutes per day, and only intermittently across those minutes. The duty cycle of the system is less than 10%.

#### Directional Antenna Information:

- Beamwidth at half-power point: 1.6° azimuth, 1.7° elevation
- Elevation orientation in horizontal plane: +/- 45°
- Orientation in vertical plane: +/- 3°
- Orientation limited via software-defined radiation control zones

**RF Safety Compliance:**

Raytheon will use its established RF safety Plan from the previous STA for ground vehicle demonstration testing to ensure that no personnel are subjected to RF power density levels exceeding the Maximum Permissible Exposure limits (MPE) set forth in 47 C.F.R. § 1.1310 and the guidelines in FCC OET Bulletin Number 65. The existing RF safety plan limits the time that the radar system can be tested, it cordons off the test area at a distance of 1.6 meters from the transmitter, which is the only area where the signal strength could exceed the maximum exposure limit, and there are signs posted alerting other Raytheon personnel to the testing. The Raytheon plant is a secure facility and it is not accessible to the general public. All RF exposure levels will be below the limits set forth in the Commission's Rules, therefore the proposed operations are in compliance with 47 C.F.R. 1.1307(b) of the Commission's Rules.

**Stop Buzzer Point of Contact:**

The Stop Buzzer Point of Contact for the proposed operations is:

Anthony Vicich, Lead Test Engineer, RTSC  
317.306.7745 (office)  
317.417.0483 (cell)

**Conclusion:**

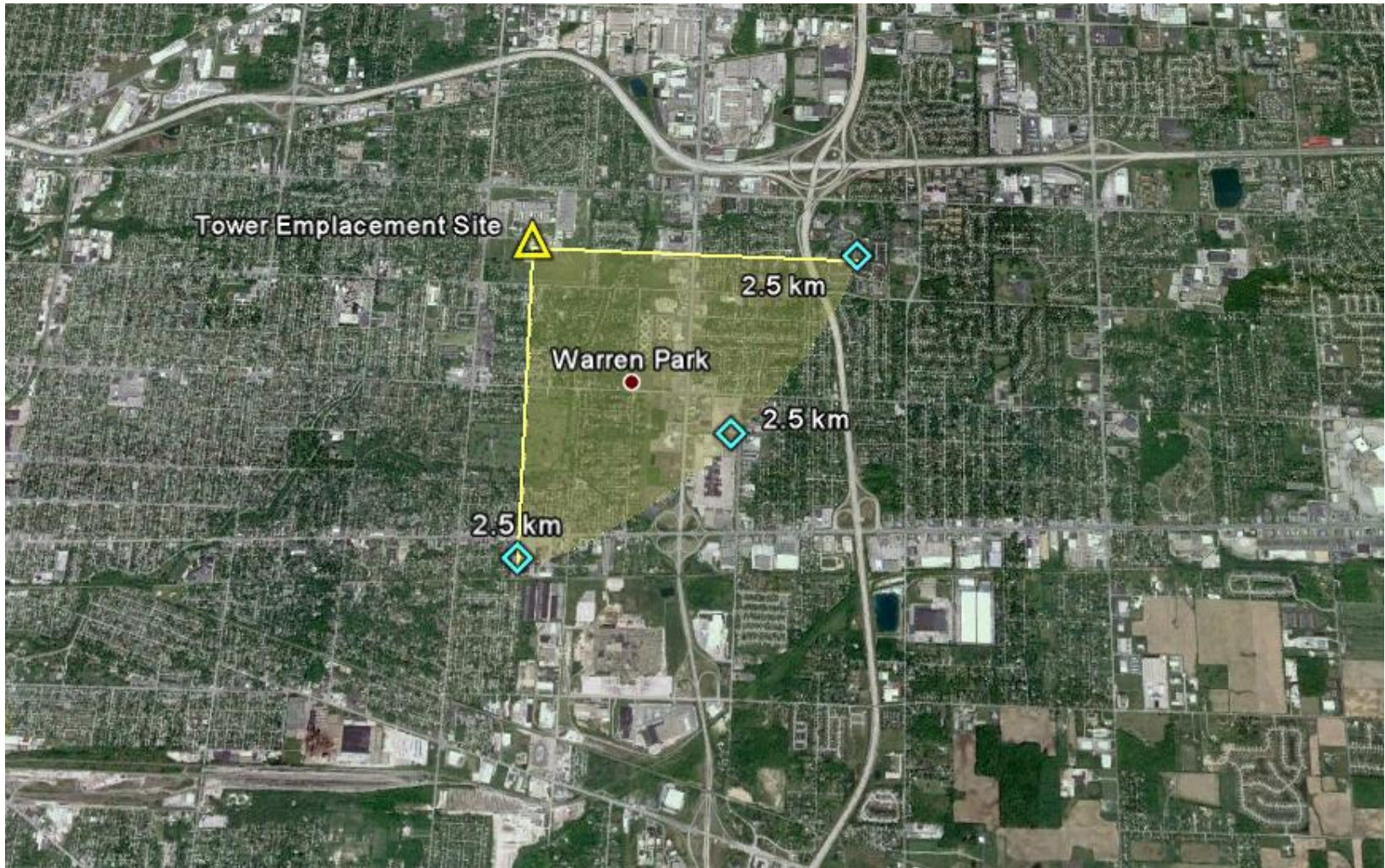
This experimental license application is being filed to continue Raytheon's experimentation with the FLIR Ranger R20SS radar system to allow for advanced development of radar systems. The testing is expected to continue for an additional two years, at least. For questions about this experimentation, please contact Brian Kavalari, Spectrum Manager, RTSC, [brian\\_r\\_kavalari@raytheon.com](mailto:brian_r_kavalari@raytheon.com) or 317-306-7793, or Anne Cortez, WFS, [alc@conspecinternational.com](mailto:alc@conspecinternational.com) or 520-360-0925.

# Raytheon Indianapolis Test Site – FAA Antenna Sketch



Test site is fenced, antenna is 9 meters above ground with 90 degree horizontal and 8 degree vertical scanning angles

# Maximum Range of Radar Test



Range will be limited to 2.5 km during the short durations the radar is operational