

STA File 0569-EX-ST-2020 Technical Exhibit

Purpose Note

SRI is submitting this STA to support testing of an experimental transmitter. Testing will occur over a six-month period at the following locations: Menlo Park, California (37.45° N, 122.18° W) ; Boulder, Colorado (40.02° N, 105.27° W); Ann Arbor, Michigan (42.28° N, 83.74° W); St. Petersburg, Florida (27.76° N, 82.63° W); & Fort Story, VA (36.92° N, 76.02° W) operations will take place within 50km of the center of these locations. These areas of operations are shown below for reference in Figure 1 through Figure 6. We request the window of operations to be July 1st 2020 – December 31st 2020. Expected usage during this period is 2-6 hours a day approximately 3 days a week.

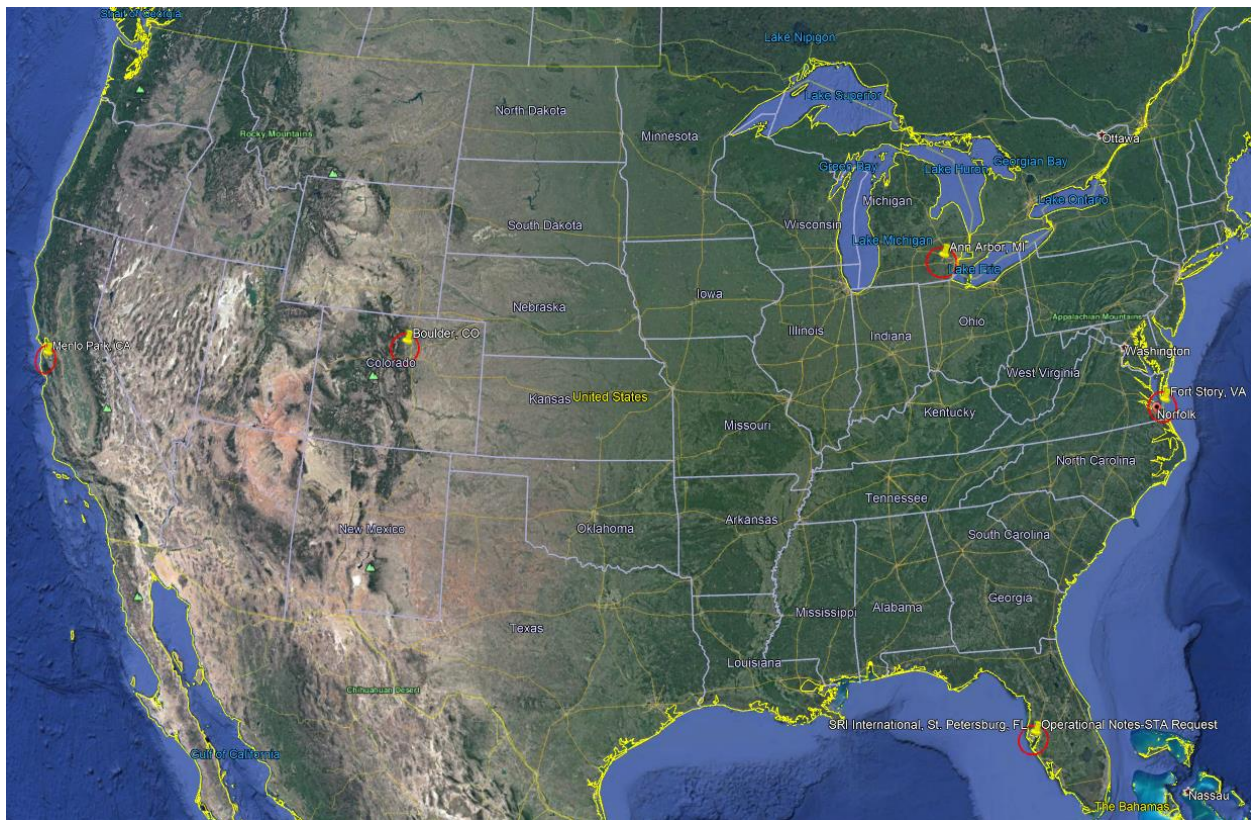


Figure 1

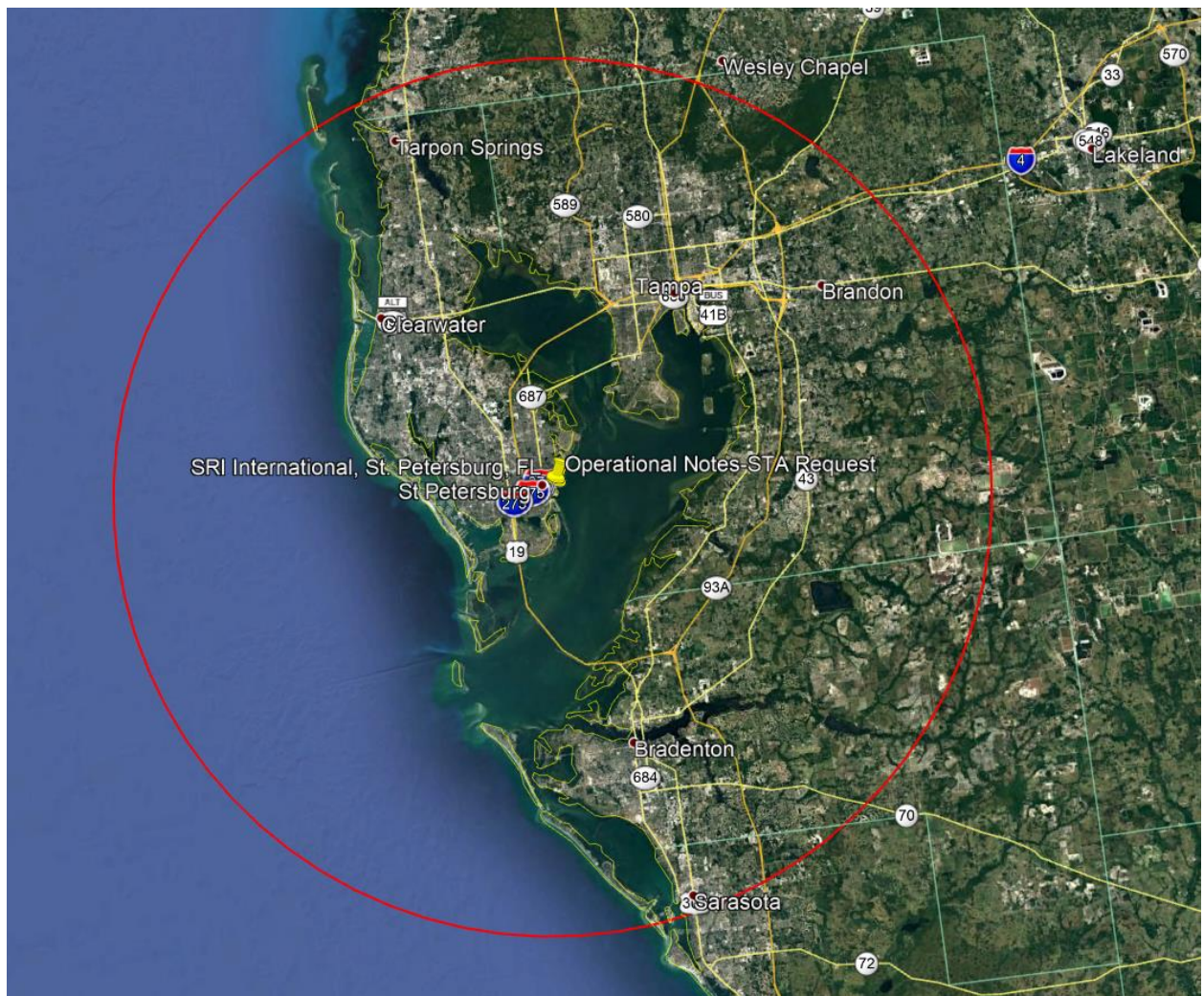


Figure 2

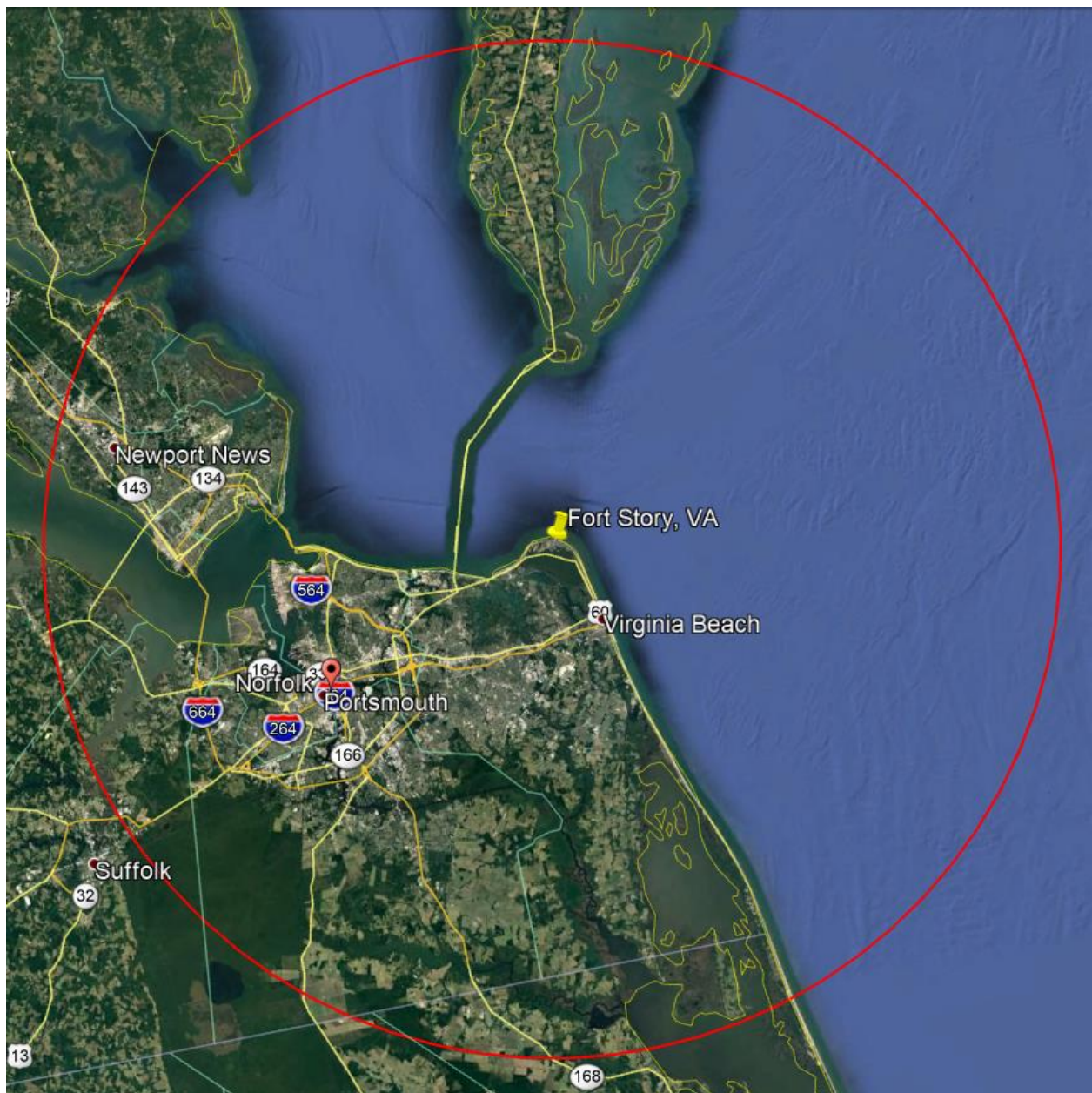


Figure 3

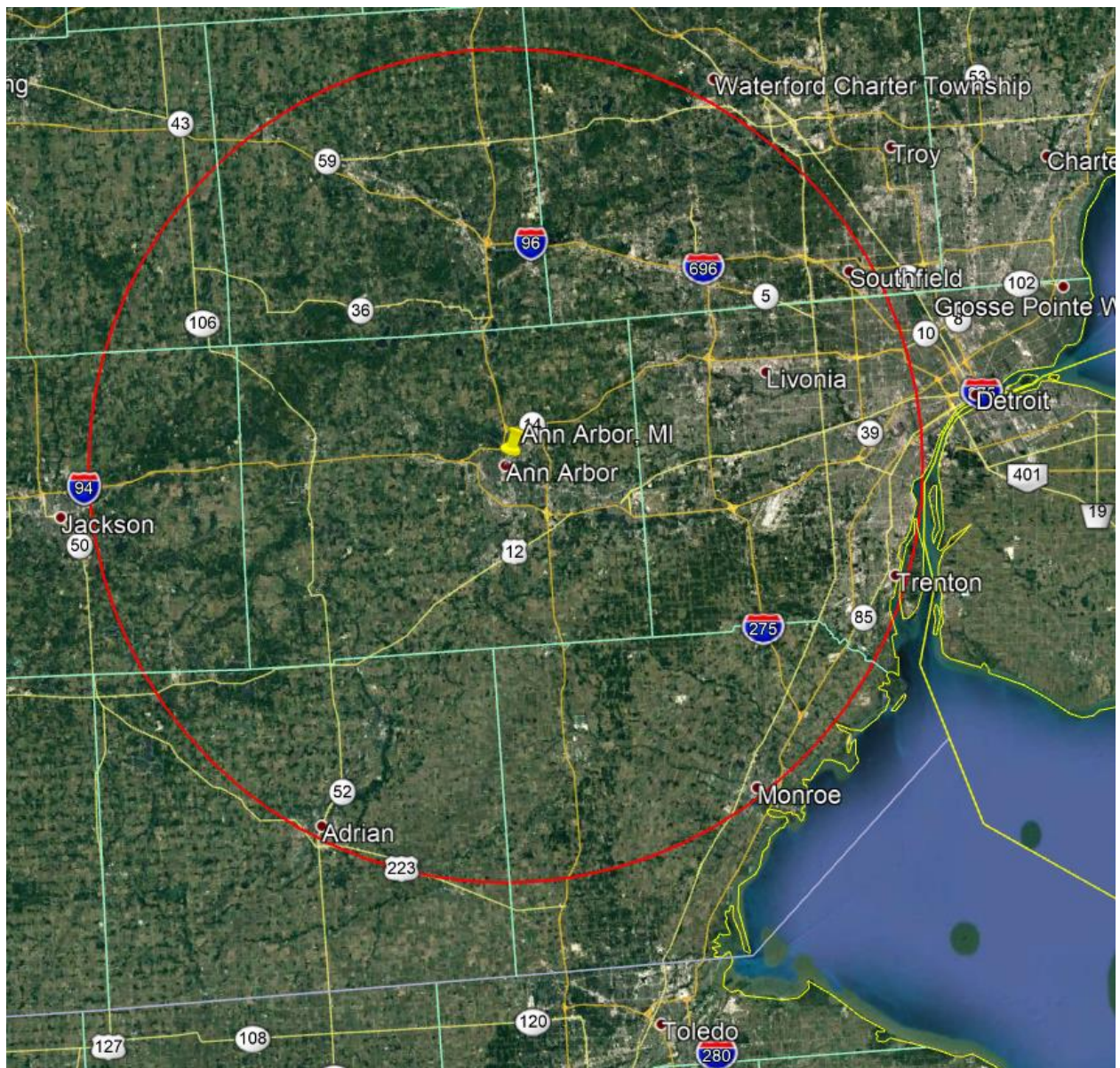
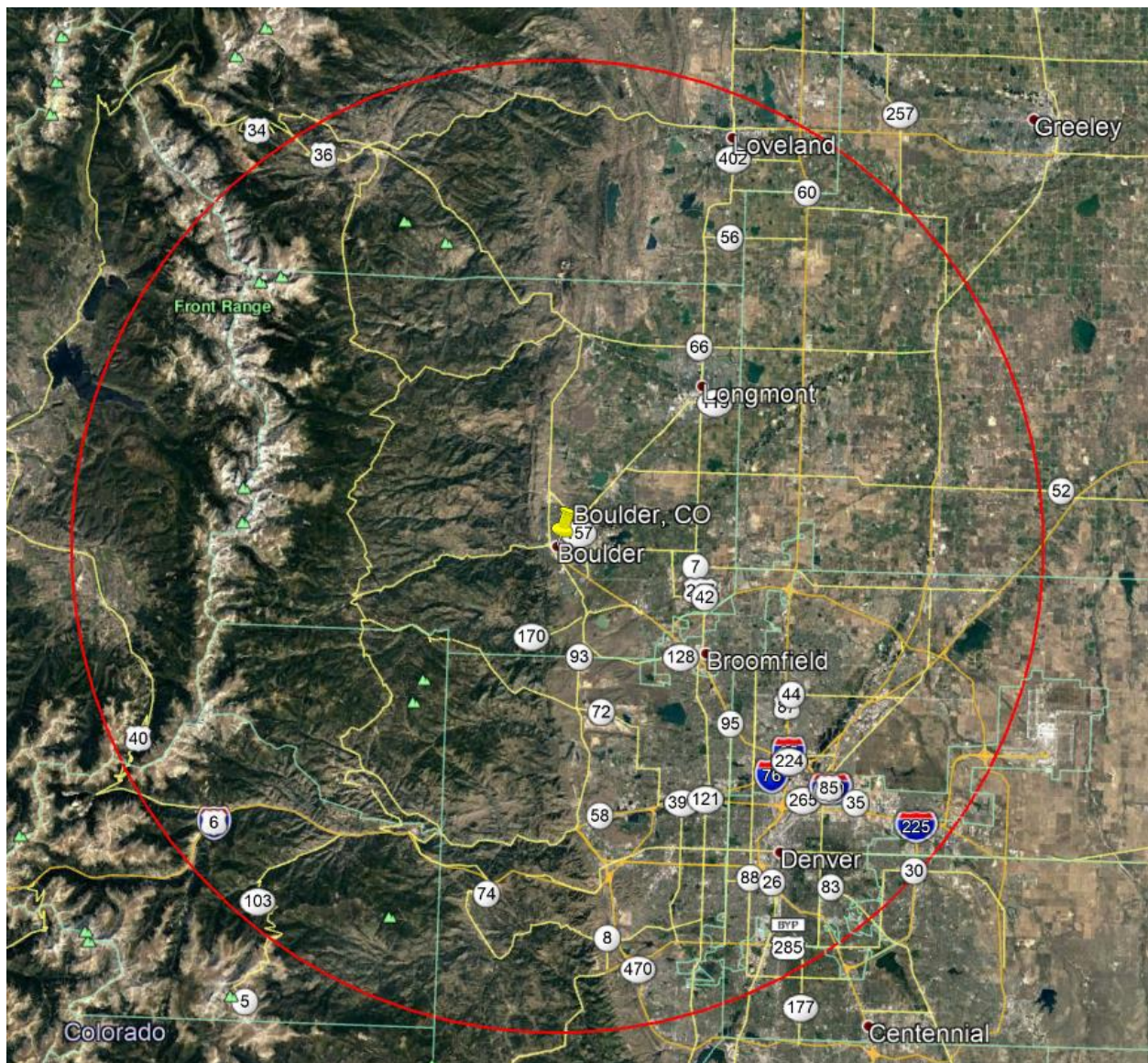


Figure 4



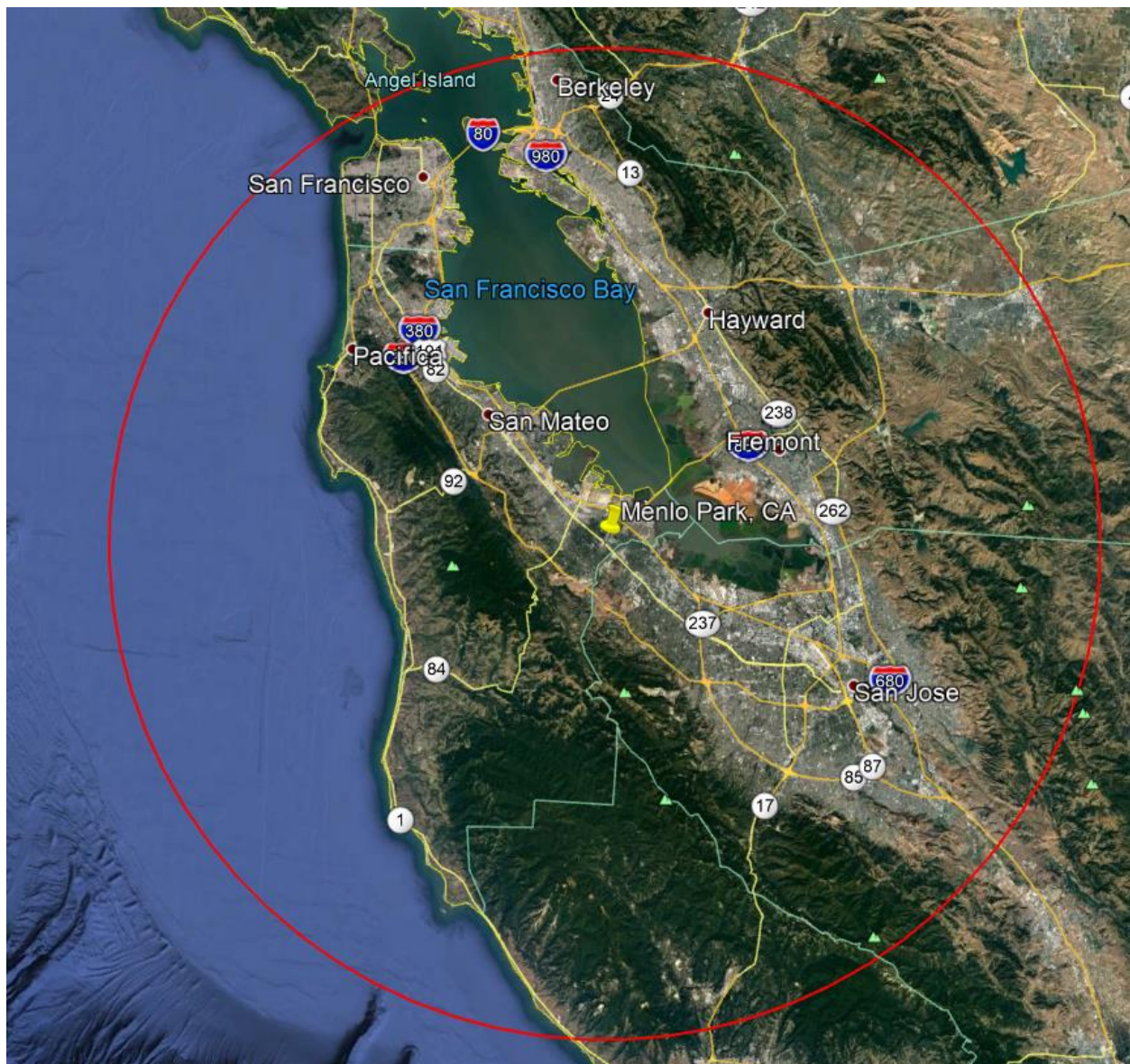


Figure 6

SRI engineers will be directly operating the transmitter, on site, and will have the ability to immediately turn off the transmitter.

Persons of Contact:

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Transmitter Description

The transmitter is a custom system developed by SRI International. It is comprised of a software defined radio, followed by an Intermediate Frequency (IF) to Radio Frequency (RF) frequency converter, followed by an active, electronically steered phased array (AESA). The AESA is custom hardware manufactured by Ball Aerospace. It will be statically mounted about 2 meters above ground on a tripod. The transmit beam is fixed in elevation and steerable in azimuth. In elevation, the beam will be directed between -2 and +8 degrees of the horizon, with a half-power, full-width of 11 degrees. Thus the half-ERP point may be up to 14 degrees above the horizon. The transmitter may be pointed in any azimuth direction, and the azimuth beamwidth is 4.2°. The transmitter output power envelope will be pulsed

with a duty factor not to exceed 30%, and pulse duration will not exceed 30 μ s. The interval between pulse-starts will vary between 20 μ s and 200 μ s. The mean ERP will not exceed 6kW, and the peak ERP will not exceed 20kW.

Signal Descriptions

As stated in the STA application, emissions will be confined to the 8500 – 9000 MHz and 9200 – 9500 MHz bands. SRI can control where the signal emission falls within those two bands, allowing SRI's transmitter system to be used in allowed frequency bands without interfering with nearby transmitters and receivers that may also operate in those bands. Instantaneous bandwidth will not exceed 200 MHz. Overall pulse amplitude will be Tukey window shaped with sharpness varying between rectangular and raised-cosine. Within the windowed pulse, un-modulated, frequency modulated, and phase modulated emissions will be generated at different times. Since our system's waveform generator is a software defined radio, we can modify some parameters, including notching frequencies in some modes, if required. Below are further details on each emission defined in the application.

100KP1N, on/off modulation

- The signal within the pulse envelope will be CW. The bandwidth is stated as 100 kHz due to spreading from the not-to-exceed 50 kHz pulse rate.

200MQ1N, pulsed linear fm

- The signal within the pulse envelope will be a linear FM sweep, with a bandwidth of up to 200 MHz.

200MQ1N, pulsed frequency hop

- The signal within the pulse envelope will frequency hop in an unspecified order over a bandwidth of up to 200 MHz

200MQ1N, pulsed pseudo-random bpsk

- The signal within the pulse envelope will be a BPSK signal, modulated by pseudo-random bits at a chipping rate of up to ~~25~~ 200 M chip/sec, and filtered to limit bandwidth to 200 MHz.

Request for Detailed Problem Description if STA cannot be approved

If the FCC cannot approve this STA, SRI requests a description of the issues involved, so that we can efficiently modify the STA to make it acceptable. If operating bands, bandwidth, or power is unacceptable, we request feedback on parameters that would make these acceptable. Since SRI's system's waveform generator is a software defined radio, we can modify these parameters, including notching specific narrow frequency bands, if required.