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– ELS Attachments

Question 7: Experimentation Description

If all the answers to Items 4, 5, 6 are “NO”, include as an exhibit a narrative statement describing in detail the following items:

- a. The complete program of research and experimentation proposed including description of equipment and theory of operation,
- b. The specific objectives sought to be accomplished,
- c. How the program of experimentation has a reasonable promise of contribution to the development, extension, expansion or utilization of the radio art, or is along a line not already investigated.

The primary function of this SAIC office is the design and development of highly accurate GPS based guidance electronics systems for use in precision munitions as a part of official military contracts. To that end, specific location, timing and navigation tests must be performed on demonstration hardware as well as actual deliverable guidance hardware units to prove out their functionality and capabilities. In addition, the GPS receiving antennas and tracking algorithms of these guidance systems must be proven with live GPS data. Typically, such ‘live sky’ testing is only available to us by moving an enormous amount of hardware and test recording equipment to a nearby outdoor parking deck. Unfortunately, RF and environmental conditions are never ideal which inevitably leads to wasted time and potential damage to delicate systems. We seek to construct a consistent and reliable GPS repeater system within our controlled lab and testing/development space to remove that variability and provide far greater test control.

The GPS repeater system we propose has the following hardware:

- an active L1/L2 receiving antenna placed on the roof deck of our 24 floor building,
- an in-line RF amplifier approximately 25 feet from the receiving antenna,
- continuous cabling to the building’s vertical access trough, down to the third floor and into the SAIC suite,
- a passive RF splitter to provide two GPS feeds,
- two GPS Source, Inc. GPSRKL12-V-P110/5-NF Repeater Kits (L1/L2, Variable Gain 30dB). One will be located in our lab which is roughly at the center of the building within our suite. The other will be located in a small algorithm development room adjacent to the lab. One of the two Repeaters will also provide the DC power for the active antenna on the roof and the in-line amplifier.

Previous testing on the roof utilizing hand-held GPS devices has shown that the number of detectable satellites and the signal strength is greatly increased. We feel that having indoor controlled access to this increased GPS ‘view’ will facilitate expanded testing capability and allow us to detect and solve design anomalies that might not have been evident before. The results of this increased capability means a more robust and dependable product to support the military requirements and goals.