

Narrative Statement

IMPORTANT: This application seeks to reinstate WG2XYG, which expired on February 1, 2018. The application and the statement below are identical to those in the original application granted as of January 28, 2014, as modified. We have not updated references in the original Narrative Statement to the passage of time.

AKELA seeks to obtain an experimental license to conduct testing and demonstrations of a prototype ground surveillance radar that can be used for perimeter surveillance of fixed and mobile sites. The fundamental technology has been developed over a period of 9 years with U.S. government funding. Prior government interest in the radar technology has been for configurations optimized for through the wall and subsurface imaging to counter the use of building structures by insurgent forces as cover, and the use of improvised explosive devices as a force multiplier. Both of these applications are inherently short range because of the attenuation properties of building materials and the soil.

For the ground surveillance application there is no attenuation due to building materials or soil since the purpose is to monitor activity in an unobscured area. As a result, the range at which moving targets can be detected and tracked using the same fundamental technology changes from tens of meters to hundreds of meters and provides a good match to the requirements that are commonly articulated by the military and other government agencies for protection of these types of sites.

With approval of this application, AKELA will conduct experimental testing to help optimize radar operating parameters for site protection, and conduct field testing and evaluation of prototype configurations for government users.

Description of Device

The subject system will operate as a frequency-stepping radar device in a bistatic configuration. Because the targets of interest for site security applications vary from small motorized vehicles to crawling individuals, and the desire is to detect and locate them with sufficient time and accuracy to facilitate dispatch of response forces, the operating parameters of the subject radar can be bounded. We anticipate that the required radar bandwidth will be between 75 MHz and 150 MHz to achieve the range resolution desired. Selection of this amount of bandwidth within the frequency band of 2500 MHz to 3700 MHz would be based on investigation of the operating bands of other equipment currently in use by the military for fixed site security and the size of the antennas required to meet the target detection requirements. Frequency stepping intervals and frequency step size will vary in the course of experimentation. We expect that the frequency stepping intervals will vary between 65 μ sec and 22 μ sec and the frequency step sizes will vary between 75 kHz and 150 kHz. The above parameters will result in duty cycles between 0.05% and 0.1% and subsequent average powers per frequency point of 1 mW to 0.5 mW.

Description of Experimentation

The experiments will support the determination of the physical configuration of the bistatic radar system, its performance as a function of the frequency and timing parameters selected, and the requirements for algorithms to exploit the information being returned by the radar. The testing will be performed to verify that AKELA's radar technology is suitable for use for the protection of fixed and mobile sites, verify that it will meet the operational requirements of users, and identify possible improvements to radar system capability.
