



Cognitive Foliage Penetration Radar (FPR)

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Available

Project description:

A foliage penetration (FOPEN) radar detects, tracks and images targets such as human intruders in a dense forest environment. The radar transmission should be able to penetrate the foliage without significant signal attenuation and the received signal should have sufficient backscatter from targets (vehicles and humans) to achieve good detection performance. In order to meet these criteria, often VHF and UHF frequencies are considered suitable candidates.

The objective of this project is to improve detection of low Doppler targets in the ground-based Foliage Penetration Radar. The native radar system transmits a train of pulses and suffers from interference in the UHF band. We propose cognitive transmission to mitigate the radio-frequency interference and sub-Nyquist sampling to enhance the Doppler resolution to detect slowly moving targets. We focus on the transmission of sparse stepped-frequency continuous waveform (s-SFW) to enable the cognition and then develop sub-Nyquist processing for such a waveform.



Required background

Signal and systems (essential), Mavlas (essential), Random signals (desirable)

Development platform

MATLAB