**Array Processing for Interference Suppression in GPS Receivers**

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Project Summary:

The project considers signal processing techniques for anti-jam GPS. The jammer mitigation may be performed in time, frequency, time-frequency, and space-time domains. Existing techniques assume knowledge of satellite positions or/and code synchronization. Both assumptions become invalid at the "cold" start or at persistent jamming. In the proposed technique, suppression of the interference is performed blindly in the sense that it is neither based on satellite positions nor does it incorporate the synchronization between the received code and the reference code. The proposed technique is based on the GPS C/ A signal structure. It utilizes the fact that the C/A repeats 20 times per GPS symbol. This periodic feature can be used to discriminate between desired and undesired signals. Jammer suppression is performed by maximizing a cross correlation function between the incoming signal and its delayed version. The delay is equal to a multiple integer of the code length. Constrained maximization is performed to reduce array sensitivity towards signals arriving from the horizon leading to combined jammer and multipath mitigations.

In addition to devising arrays for interference mitigations, the research, over the first quarter, has considered the impact of impulsive noise on the GPS receiver's delay lock loop (DLL). Initial results show that, unlike the Gaussian noise, the impulsive noise can have a significant impeding effect on the GPS receiver performance. Further studies on the subject will be conducted over the second quarter of this project.