

Suggested R&D Areas for Radar-Communication Co-existence and Co-design

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In response to current and anticipated spectral congestion at radio-frequencies (RF) and the associated interference issues caused by the proliferation of cellular systems, suggestions for requisite research and development (R&D) to achieve spectral harmony (co-existence and co-design) among radar and communication users will be provided. These R&D suggestions will be informed by the outputs and open questions of recent and current mitigation efforts: the DARPA program on Shared Spectrum Access for Radar and Communications (SSPARC) for achieving harmonious co-existence and co-design between these modalities; the recently completed Task Groups (SET-179 “Dynamic Waveform Diversity and Design” and SET-182 “Radar Spectrum Engineering and Management”) and Specialists’ Meetings (SET-204 “Waveform Diversity” and SET-SCI-230 “Reconfigurable and Scalable Multi-Function RF Systems in a Congested EM Spectrum”) of the NATO Sensors and Electronic Technology (SET) Panel.

Research areas include:

- jointly optimizing spatio-temporal energy distribution (radar) and channel capacity (communications);
- coding signals at RF;
- designing innovative antennas/arrays that are conducive to radar-communication co-design and that include platform structure and near-field scatterers;
- accurately integrating EM theory and modeling (especially antenna design and proper characterizations of propagation media) and signal processing in system design;
- designing innovative analog receivers that mitigate interference to other RF users.

In addition, roadmaps for individual nations and international organizations and consortia are suggested to enable facts-based decisions on ways for improving legacy radar systems and for determining critical requirements for future systems. Such documents will provide guidance for industry and academia in developing improved standards and approaches for future commercial products and should foster intra-national and international spectral harmony.

This talk serves as a follow-on companion to the talk, “Summary of Recent Radar Spectrum Activities.”

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