

ESTABLISH A NATIONAL RADIO DYNAMIC ZONE AND SPECTRUM INNOVATION CENTER

Background

Expanded reliance on communications and connectivity are creating a greater need to manage the electromagnetic spectrum much better. With the expanded deployment of the Internet of Things (IoT) and the launch of more communications satellites, technologies and techniques are needed for additional spectrum flexibility and sharing, spectrum awareness, and increased spectrum efficiency. If effective broadband monitoring is available, and automated coordination and optimal decision making between, say, transmitters and receiving users is enabled, then sharing of spectrum dynamically may be possible, opening up significant commercial opportunities. Similarly, an enhanced understanding of the distribution of transmitters and propagation effects may enable a more efficient implementation of spectrum allocations than currently available.

Proposal

Establish one or more National Radio Dynamic Zones (NRDZs), or large test beds,

to allow industry and researchers to test and demonstrate new technologies and techniques aimed at more efficient use of the spectrum. Further, one or more Spectrum Innovation Centers could focus on the technologies needed for scaling up, deploying, and evaluating the innovative technologies and concepts. Combined, the NRDZ and Spectrum Innovation Centers would enable testing on a physical scale applicable to real-world deployment. The location of the NRDZ(s) would be selected to minimize any signal interference with surrounding regional activities.

The effort would be funded by the National Science Foundation (NSF). Other agencies, including the Department of Defense, would be stakeholders in the Center. Efforts have started under the NSF but providing funding in a stimulus package would allow the establishment and operations of the effort to proceed, and make sure we are well positioned to monitor and manage the EM spectrum world-wide.

R&D Priorities for American Leadership in Wireless Communications included spectrum flexibility and sharing, spectrum awareness, and increased spectrum efficiency as key areas for technical advancement. The NSF through its Spectrum Innovation Initiative (SII) is interested in promoting dynamic utilization of the spectrum while enhancing communication innovation and security. An NRDZ would be a key enabling step, and with a set of major

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challenges, such as developing monitoring equipment to characterize the baseline spectrum noise and produce a real-time measurement of radio emissions that span the frequency bands of interest. An NRDZ and innovation center would also enable additional international collaboration on spectrum management and sharing.

Proposed Funding

The funding estimate is \$30-50M/yr for 5 years to support the management and operations of an NRDZ, as well as initial development of technologies for monitoring and measuring of innovations that would be proposed and funded by commercial entities or through other federal government programs.