Federal Register Notice: 89 FR 12871, https://www.federalregister.gov/documents/2024/02/20/2024-03400/request-for-information-on-the-national-spectrum-research-and-development-plan, February 20, 2023.

Request for Information on the National Spectrum Research and Development Plan

Shared Spectrum Company (SSC)

Shared Spectrum Company's Comments on Request for Information on the National Spectrum Research and Development Plan March 21, 2024

Background:

The National Spectrum Strategy (Strategy), November 13, 2023, Strategic Objective 3.2 directs the U.S. Government, through the White House Office of Science and Technology Policy and in coordination with the Federal agencies, to develop a National Spectrum Research and Development Plan (R&D Plan). The R&D Plan will act as an organizing national document, providing guidance for government investments in spectrum-related research and offering valuable insights. The plan will identify key innovation areas for spectrum research and development and will include a process to refine and enhance these areas on an ongoing basis. OSTP has tasked the NITRD Wireless Spectrum Research and Development Interagency Working Group (WSRD IWG) to draft and coordinate development of the National Spectrum R&D Plan. The R&D Plan is expected to be released in late 2024. Revisions will occur periodically. The NITRD WSRD IWG requests input from the public, including academia and industry, to assist in development of the National Spectrum R&D Plan.

Introduction:

There have been a large number of spectrum related research projects in the past twenty-five years that have created significant insights on spectrum sharing challenges, approaches, and technical capability. Most of this capability has not transitioned into use for two main reasons:

- Viable spectrum sharing solutions vary across spectrum bands due to requirement differences related to technical, business, operational, and policy factors. Adding technology solutions modifies these requirements. It takes significant research and effort to obtain the requirement knowledge, and this information is not widely available to the broader research community. Spectrum problems are usually quite complex with multiple subtle interactions between systems. As a result, most proposed solutions are incomplete and will not solve the problem.

- There has been minimal funding/projects to develop or field test spectrum sharing technologies. Thus, spectrum-related technologies are typically dismissed because they are perceived as unproven (i.e., too much risk) or don't meet all of the requirements (i.e., too expensive). To avoid this, the tests need to include operational legacy systems and consider all requirements. The field test needs to be of interest to the stakeholder, and not a generic test.

Despite these challenges, technology and system concept advances over the past 25 years have produced the essential building blocks to produce band-specific needs.

Shared Spectrum Company (SSC) Recommendations:

1. Recommendations on strategies for conducting spectrum research in a manner that minimizes unnecessary duplication, ensures that all essential spectrum research areas are sufficiently explored, and achieves measurable advancements in state-of-the-art spectrum science and engineering.

The National Spectrum R&D Plan should focus spectrum-related R&D on specific spectrum bands. System requirement studies that assume alternate solution approaches should be performed by contractors to establish what is needed in all dimensions (technical, business, existing spectrum eco-system compatibility, and policy factors).

The National Spectrum R&D Plan should fund development and test of solutions in specific spectrum bands. These projects should mature the spectrum-related technologies so that they meet most of the requirements. The projects should include an advisory board that contains representatives of all involved parties to validate the test plans and the test results. Multiple solution approaches should be funded in parallel so that critical technology-based decisions are based on experimental evidence and not solely untested proposed solutions.

The plan should also seek to understand what capabilities from the prior 25 years of research can be leveraged. This should include an assessment of what sharing problems they address, how they fit within effective operational architectures, how mature they are, and what investments are required to achieve an operational readiness.

The National Spectrum R&D Plan should address high priority ‘hard’ spectrum bands and ‘easy’ spectrum bands. Hard spectrum band examples include DoD sharing with commercial cellular providers, which has huge relocation costs and national security issues. Easy spectrum band examples include the 2025-2110 MHz ENG band and sharing within federal only bands. The Easy band solutions will be achieved at lower cost and more rapidly than the Hard spectrum bands. The Easy band solutions will provide lessons learned and experience.

2. Recommended priority areas for spectrum research and development, as well as productive directions for advancing the state-of-the-art in those areas.

As mentioned above, the National Spectrum R&D Plan needs to focus the majority of resources on development and test. In particular, the plan should establish a persistent test and evaluation capability in which solution providers can test, evaluate, and demonstrate their capabilities for assessment. This capability should allow for iterative testing and provide the Government with the ability to form collaborations among solution providers to achieve desired integrated capabilities.

3. Recommendations on grand challenge problems for spectrum R&D. Grand challenges are selected research problems that if attacked will help motivate and coalesce R&D efforts.

Grand challenges need to focus on specific band, comprehensive system solutions. It is unclear that a dramatic improvement in any one technology would make a significant improvement.

4. Recommendations on spectrum R&D accelerators.

The National Spectrum R&D Plan should assemble all stakeholders in specific spectrum bands into working groups. The groups should postulate alternate technical solutions and create requirements. Some system solutions might include combinations of technical approaches. Reallocation could be one potential approach. The goal is to understand and to document all concerns so that the research community and the stakeholders have a common understanding.

5. Recommendations on near-term Federal activities to make progress towards anything identified in responses 1–4.

6. Recommendations on a process to refine and enhance the R&D plan on an ongoing basis.