

SPECTRUM WEEK 2024: DySPAN, SWIFT, NRDZ, SPECTRUMX, NSMA, WSRD

MONISHA GHOSH

Spectrum Week was organized by SpectrumX [1] and was held in Washington DC May 13–17, 2024 [2]. As the column title indicates, an alphabet soup of meetings were held with their respective stakeholder communities in attendance, from global attendees participating in the IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN) [3], to the workshop on the National Spectrum Strategy (NSS) R&D plan conducted by the Wireless Spectrum Research and Development (WSRD) Interagency Working Group of the Networking and Information Research and Development (NITRD) Program that coordinates networking research among all U.S. Federal agencies [4]. Spectrum technologies and policies in their various forms, with an emphasis on measurements, dynamic spectrum sharing and testbeds, were the principal focus of the gathering of representatives from academia, industry and government, with many joint panels and keynotes among the different meetings to encourage cross-collaborations. This column will present brief summaries of the principal discussions in these events, with a focus on future research directions.

IEEE SYMPOSIUM ON DYNAMIC SPECTRUM ACCESS NETWORKS

DySPAN is perhaps the only IEEE conference that brings together spectrum technology and policy researchers from academia, industry and government. The program has separate technology and policy tracks. The keynote addresses were delivered by members of industry and academia, as well as regulatory agencies, the Federal Communications Commission (FCC) from the U.S. and Ofcom from the U.K. The topic of future spectrum availability for cellular services was a common theme among most of the keynotes, with Ofcom's proposed hybrid sharing in the 6 GHz band being one of the more innovative approaches [5]. Testbeds are being planned to experiment with sharing between Wi-Fi, cellular and microwave incumbents in the band. The continuing evolution of sharing in 6 GHz, worldwide, was discussed in a prior column [6] where multiple research directions have been identified.

DySPAN also held 6 tutorials, 5 workshops and 3 panels, in addition to the regular paper sessions. The topics ranged from spectrum for 6G to sharing above 100 GHz and O-RAN. Testbeds and measurements to further research in spectrum coexistence and sharing were a prominent theme, not only in DySPAN, but many of the other Spectrum Week events as well.

NATIONAL SCIENCE FOUNDATION PRINCIPAL INVESTIGATOR MEETINGS

Principal Investigator (PI) meetings for the two National Science Foundation (NSF) programs focused on spectrum research were also held during Spectrum Week. These are described below:

- **Spectrum and Wireless Innovation enabled by Future Technologies (SWIFT):** This program [7] was started in 2020 and focuses on research specifically aimed at developing enabling technologies for improved spectrum utilization and management. The yearly PI meeting brings together all active grantees of the program in panel discussions, breakout sessions and poster sessions. The research projects cover a wide range of areas, from analog circuits that perform spectrum sensing to AI/ML and data platforms.
- **Spectrum Innovation Initiative: National Radio Dynamic**

Zone (SII-NRDZ): This program [8] focuses very specifically on the needs of passive users of spectrum such as radio-astronomy and geo-sensing satellites. With the increasing demands of commercial uses of spectrum, passive users are facing ever-rising levels of interference. The NRDZ is envisaged as a single zone in the U.S. where controlled experiments can be conducted to study dynamic spectrum management systems that will detect interference and take appropriate action. A number of projects have been funded since 2022 and the PI meeting offered an opportunity for grantees to present their research progress. The interference scenarios studied ranged from interference in the mmWave bands to the 3.55–3.7 GHz Citizens Broadband Radio Service (CBRS) in the U.S. The next stage of the NRDZ program will be the development of testbeds that will also be synergistic with the testbed plans of the National Spectrum Strategy Implementation Plan [9].

SPECTRUMX CENTER MEETING

SpectrumX, a collaborative center composed of 31 institutions, held its center meeting in conjunction with the other events during Spectrum Week. In addition to research overviews, SpectrumX also held collaboration discussions with their industry members, organized a panel discussing the broadband digital divide (joint with DySPAN) and held a poster session describing the research being conducted in the center. A highlight of the SpectrumX meeting was the Flagship Project discussions, especially Flagship Project 1 focusing on the 7.125–8.4 GHz band: this band has been highlighted in WRC-23 as well as the National Spectrum Strategy as one of the prime bands for future wireless networks, cellular and/or Wi-Fi, due to the desirable propagation characteristics. The project will engage all center members in measurements and development of coexistence schemes. Flagship Project 2 will be focused on research related to the scientific uses of spectrum.

NATIONAL SPECTRUM MANAGEMENT ASSOCIATION (NSMA) CONFERENCE

The NSMA is an international association of frequency regulators that serves as an interface between industry and spectrum regulators [10]. During Spectrum Week, the NSMA conference had a keynote speaker discussing current issues in spectrum regulation as well as a number of panels on 6 GHz, satellite mega-constellations and RF safety standards [11]. The NSMA discussions along with the DySPAN panel on industry views on spectrum sharing exposed the academics in the audience to real-world spectrum sharing concerns in 6 GHz, ultra wide-band (UWB) and satellites. For example, the proposed 7.125–8.4 GHz band, if allocated for high-power cellular, poses a concern to very low-power UWB systems that operate as an underlay over 500 MHz channels in the band.

WSRD WORKSHOP ON THE NATIONAL SPECTRUM STRATEGY R&D PLAN

Spectrum Week concluded with WSRD conducting a workshop on May 17 addressing the National Spectrum Strategy (NSS) R&D Plan [12]. The National Telecommunications and Information Administration (NTIA) had issued a Request For Information (RFI) on the plan, to which there were 31 responses from industry, academia and agencies [13]. There were a number of panels where respondents presented their views on

the plan followed by discussions. As described in a past column [9], the NSS focuses on five spectrum bands, however, most of the responses focused on the 3.1–3.45 GHz and 7.125–8.4 GHz bands since these, by virtue of their lower frequencies, are more desirable for wireless communication networks, both cellular and Wi-Fi. However, both these bands are Federal bands in the U.S. and hence reallocation or sharing pose unique challenges. The public safety respondents described their unique challenges when it comes to sharing: in an emergency immediate and priority access to spectrum is essential and measures of spectrum utilization are not good metrics to characterize public safety uses. Another topic of discussion was that of testbeds: what kinds of testbeds should be deployed, where, and how would the results be of use to the NSS?

CONCLUSIONS

Spectrum Week 2024 was much larger than the first time it was held in 2023. Co-locating with DySPAN allowed a wider community of international researchers, engaged in both spectrum technology and policy research, to gather and exchange ideas over a number of days via various events. For students in particular, the exposure to industry and policy viewpoints on spectrum sharing is especially valuable in identifying relevant research directions. DySPAN attendees could avail of most of the other events for a nominal extra charge. By broadening research horizons, such co-located events can be more beneficial to the academic researcher than regular academic conferences.

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