

SPECTRUM INNOVATION INITIATIVE (SII)

SII Funding			
(Dollars in Millions)			
	FY 2019	FY 2020	FY 2021
	Actual	(TBD)	Request
Stewardship Activities (MPS)	-	-	\$17.00

Overview

The electromagnetic spectrum plays a crucial role in many ways for the United States, including scientific investigation of the world around us, public safety and security, and the provision of a tremendous range of commercial services and products. The objective of the SII is to expand upon NSF's portfolio in this area to promote dynamic and agile electromagnetic spectrum utilization, while ensuring innovation and security for all users, including for both new active spectrum applications and for spectrum used for non-communication purposes. Reaching this objective will require basic research, infrastructure development, new collaborations, public outreach, education and workforce development.

Goals

As demands for spectrum availability have increased, the need to more efficiently and robustly use this limited natural resource to meet multiple goals has also increased. An increasing demand for broadband services, such as the coming 5G and beyond networks, and the need for a spectrum supply necessary for scientific research, such as atmospheric modeling, are two of the major sources of demand for spectrum availability, and innovation is required to solve the challenge of achieving the most efficient spectrum utilization for these and other purposes. While NSF has supported successful spectrum research activities for many years, the SII represents an increased and sustained commitment on a larger and more interdisciplinary scale. This initiative will result in increased industry, research, and societal capabilities through more efficient use of the electromagnetic frequency spectrum. Enhancing efficient spectrum utilization and access is vital to the national interest, including both the scientific enterprise and industries of the future.

The primary goals of the SII include the following:

1. Develop the concept and infrastructure for National Radio Dynamic Zones, which can be used for testing of dynamic spectrum utilization techniques while minimizing regulatory hurdles that slow innovation.
2. Establish and sustain an interdisciplinary National Center for Wireless Spectrum Research, which will bring teams of scientists, engineers, computer scientists, and social scientists together to innovate, developing new solutions that enable more efficient use of the electromagnetic spectrum.
3. Integrate the National Radio Dynamic Zones and the National Center for Wireless Spectrum Research with the frontier research currently being conducted through other NSF programs and facilities. Those programs include the NSF-industry partnership in Platforms for Advanced Wireless Research (PAWR), the Spectrum and Wireless Innovation enabled by Future Technologies (SWIFT) program, and NSF facilities performing cutting edge scientific research such as the Green Bank Observatory, the National Radio Astronomy Observatory, and the National Center for Atmospheric Research.
4. Develop the workforce needed to research and implement the dynamic and agile spectrum utilization techniques that will secure access to the spectrum for receive-only systems and enable the broadband applications of the future.
5. Develop increased public awareness of the scarcity of the electromagnetic spectrum resource, and the challenges associated with its scarcity and its efficient use.

FY 2021 Investments

Investments in FY 2021 include the following:

- *National Radio Dynamic Zones (\$9.40 million)*: This investment includes enhancements in active electromagnetic spectrum management efforts at NSF's major research facilities (\$1.40 million) as well as computing infrastructure and hardware research and development to support the National Radio Dynamic Zones (\$8.0 million).
- *National Center for Wireless Spectrum Research (\$5.0 million)*: This investment creates and sustains an interdisciplinary SII-Center that will bring together a diverse group of researchers that serve as a hub to develop, innovate and sustain new solutions that enable more efficient use of the electromagnetic spectrum.
- *Integration activities (\$1.60 million)*: This investment will integrate ongoing NSF activities, including SWIFT research and the support of national and international spectrum regulatory efforts, with the National Radio Dynamic Zones and the National Center for Wireless Spectrum Research.
- *Workforce development and public outreach (\$1.0 million)*: The investment in workforce development will include fellowships associated with the above efforts and research funded through SWIFT and PAWR, as well as Research Experiences for Undergraduates. The public outreach efforts will include supplements to existing awards that enable enhanced public awareness of the electromagnetic spectrum and the challenges associated with its scarcity and its efficient use.

These investments represent a new cross-disciplinary, NSF-wide focus on spectrum innovation.