



## Testimony

Before the Subcommittee on  
Communications, Media, and Broadband,  
Committee on Commerce, Science, and  
Transportation, U.S. Senate

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# SPECTRUM MANAGEMENT

## Improved Planning and Interagency Collaboration Could Strengthen Spectrum Reallocation Efforts

Statement of Andrew Von Ah, Director,  
Physical Infrastructure

# GAO Highlights

Highlights of GAO-22-106170, a testimony before the Subcommittee on Communications, Media, and Broadband, Committee on Commerce, Science, and Transportation, U.S. Senate

## Why GAO Did This Study

Almost all spectrum has been allocated for federal government, commercial sector, or other nonfederal use. However, the demand for spectrum continues to grow. This is especially the case with the commercial sector as it seeks to deploy and improve 5G mobile service. In the U.S., NTIA and FCC regulate and manage federal and nonfederal spectrum use, respectively. With FCC and other federal agencies, NTIA helps to reallocate federal spectrum for commercial use.

This statement is based on two GAO spectrum management reports issued in June 2021 (GAO-21-474) and January 2022 (GAO-22-104537). Specifically, it discusses the extent to which (1) NTIA has developed a planning process to guide its spectrum reallocation efforts, and (2) the cognizant federal agencies follow leading practices in collaborating on potential spectrum interference issues. Among other things, GAO compared the agencies' spectrum reallocation and coordination efforts with applicable leading practices.

## What GAO Recommends

In the June 2021 and January 2022 reports, GAO made a total of 14 recommendations. These include that NTIA develop plans for executing spectrum reallocations and that FCC and NTIA update documents and processes related to spectrum-management coordination. The agencies generally agreed to implement the recommendations, but have not yet done so.

View GAO-22-106170. For more information, contact Andrew Von Ah at (202) 512-2834 or [vonaha@gao.gov](mailto:vonaha@gao.gov).

August 2, 2022

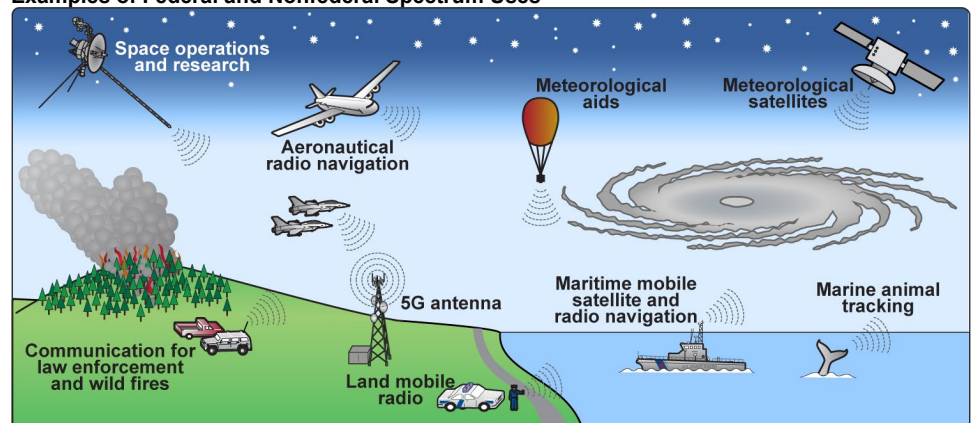
## SPECTRUM MANAGEMENT

### Improved Planning and Interagency Collaboration Could Strengthen Spectrum Reallocation Efforts

## What GAO Found

Spectrum is a natural resource that enables wireless communications and critical government operations, such as shown in the figure below. A key spectrum management activity of the National Telecommunications and Information Administration (NTIA) is to work with other agencies, such as the Federal Communications Commission (FCC), to execute spectrum reallocations, so that FCC can auction the spectrum for commercial use. However, GAO found that NTIA lacks a comprehensive planning process for doing so. Reallocating spectrum, which involves transferring spectrum used by the federal government to nonfederal users, is a complex, often lengthy undertaking involving many stakeholders and steps. For reallocations, NTIA typically collects input from those agencies whose use of spectrum would be affected by a proposed reallocation. NTIA may also help agencies evaluate the potential effects that a proposed reallocation could have on the agencies' spectrum-dependent operations. While NTIA follows some usual steps in conducting reallocations, NTIA lacks plans with objectives and targets, integrated master schedules, and risk assessments. By following these leading practices in program management, NTIA may be able to more effectively implement reallocations.

#### Examples of Federal and Nonfederal Spectrum Uses



Source: GAO analysis of National Telecommunications and Information Administration information. | GAO-22-106170

To address potential interference among proposed uses of spectrum, NTIA and FCC employ various coordination mechanisms. For domestic matters, the agencies coordinate through an NTIA-led committee that provides input to FCC's spectrum proceedings. However, GAO found these mechanisms do not fully reflect leading collaboration practices. For example, while the documents that guide coordination between FCC and NTIA emphasize reaching consensus whenever possible, there are no clearly defined and agreed-upon processes for resolving matters when agencies cannot do so. GAO's review found that these issues affected the United States' participation in international conferences regarding the regulation of the global use of spectrum. For example, disputes among the agencies and the inability to reach agreement on U.S. technical contributions challenged the U.S.'s ability to present an agreed-upon basis for decisions or a unified position.

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Chair Luján, Ranking Member Thune, and Members of the Subcommittee:

I am pleased to be here today to discuss our work on spectrum management issues. Regulating and managing the diverse uses of spectrum are complex and challenging tasks. Considerations include accommodating the growing needs of emerging spectrum-dependent technologies, protecting existing uses from harmful interference, and balancing the concerns of various spectrum users to promote the most efficient and effective use of the spectrum resource in the public interest.

Within the U.S., two agencies share responsibilities for regulating and managing spectrum. The Federal Communications Commission (FCC) has responsibility for nonfederal public and private uses, such as wireless services provided over commercial mobile networks. The Department of Commerce's (Commerce) National Telecommunications and Information Administration (NTIA) has responsibility for federal users, including agencies that use it for diverse purposes, such as national defense and meteorological satellites.

Recent domestic and international spectrum-management activities have focused on making spectrum available for fifth-generation (5G) mobile communications. Since almost all spectrum is currently allocated, to make spectrum available for 5G and other commercial services, spectrum might need to be reallocated. Accordingly, a key spectrum management activity for NTIA is examining the suitability of spectrum bands to be reallocated from federal to nonfederal use, such as for 5G.<sup>1</sup> Reallocations may require existing users in or adjacent to bands to end or modify their spectrum use, move their affected services to other bands, or accommodate ongoing sharing through coordination with other users. As part of its reallocation efforts, NTIA coordinates with FCC and affected agencies to examine the potential impact of a proposed reallocation on federal use. Once the spectrum is reallocated from federal to nonfederal use, FCC primarily uses spectrum auctions to assign spectrum licenses

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<sup>1</sup>NTIA assigns spectrum to federal users, and assigning spectrum involves providing federal agencies with an authorization to use specific frequencies. Reallocation is the process by which one or more frequency bands—which are specific ranges of frequencies—are redesignated for new types of users. Spectrum is allocated, or designated, for federal, nonfederal, or shared use.

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to the entities that submit the highest bid for specific bands of spectrum. FCC's auction authority is scheduled to expire on September 30, 2022.<sup>2</sup>

My statement is based on two of our recently issued spectrum management reports, one issued in June 2021 and the other in January 2022.<sup>3</sup> This statement addresses the extent to which (1) NTIA has developed a planning process to guide its spectrum reallocation efforts, and (2) cognizant federal agencies follow leading practices in collaborating on potential spectrum interference issues. In preparing the reports, we compared NTIA's spectrum-reallocation-planning documents and policies to leading practices for program management we previously developed based on the Project Management Institute's (PMI) established standards.<sup>4</sup> Additionally, we reviewed documentation and interviewed officials from FCC, NTIA, and other agencies that use spectrum; analyzed how various agency mechanisms and processes were implemented during recent domestic and international spectrum-management activities; and compared agencies' efforts to leading collaboration practices as well as applicable federal internal-control standards and key elements of a sound research process.<sup>5</sup>

More detailed information on our objectives, scope, and methodology for that work can be found in the issued reports. We conducted the work on which this statement is based in accordance with generally accepted government auditing standards. Those standards require that we plan

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<sup>2</sup>Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, § 6405, 126 Stat. 156, 230 (2012). Exceptions exist that set later expiration dates for certain uses of FCC's auction authority. See 47 U.S.C. § 309(j)(11).

<sup>3</sup>GAO, *Spectrum Management: Agencies Should Strengthen Collaborative Mechanisms and Processes to Address Potential Interference*, [GAO-21-474](#) (Washington, D.C.: June 29, 2021); and *Spectrum Management: NTIA Should Improve Spectrum Reallocation Planning and Assess Its Workforce*, [GAO-22-104537](#) (Washington, D.C.: Jan. 27, 2022).

<sup>4</sup>PMI is a not-for-profit organization that has established standards for program and project management that are generally recognized as leading practices for most programs and projects. These standards are used worldwide and provide guidance on how to manage various aspects of projects, programs, and portfolios. *The Standard for Program Management*®, Fourth Edition (Newtown Square, PA: 2018).

<sup>5</sup>GAO, *Managing For Results: Key Considerations for Implementing Interagency Collaborative Mechanisms*, [GAO-12-1022](#) (Washington, D.C.: Sept. 27, 2012); *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014); and *Employment and Training Administration: More Actions Needed to Improve Transparency and Accountability of Its Research Program*, [GAO-11-285](#) (Washington, D.C.: Mar. 15, 2011).

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## NTIA Spectrum Reallocation

and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

At the time of our review, we found that NTIA did not have a comprehensive documented process in place to plan its reallocation efforts from start to finish, even though reallocations are complex and can take many years to complete. For example, a recent spectrum reallocation in the 3.5 GHz band (referred to as the Citizen's Broadband Radio Service or CBRS) took 10 years to complete.<sup>6</sup>

In conducting reallocations, NTIA and advisory groups first work to evaluate the potential impact that such a reallocation would have on the agencies operating in or near those bands. Subsequently, agencies may conduct technical studies, one band at a time, to consider the feasibility, cost, and length of time to move existing systems off the bands under consideration or develop sharing procedures. Following these steps, to fully complete and implement reallocation changes, agencies may need to transition their systems off the band(s) or otherwise modify their operations.

When programs involve many steps and stakeholders—such as NTIA's spectrum reallocation efforts—the potential risks increase. We identified three leading practices for program management that are relevant to NTIA's spectrum reallocation efforts. In comparing NTIA's approach to reallocations with these best practices, we found that NTIA's efforts could have benefited from following such practices, as follows:

- **Having a program management plan that is updated regularly.** Without maintaining a complete plan and regularly updating it, NTIA and other stakeholders, including agencies, may not have assurance that NTIA is anticipating and preparing for the many steps involved in reallocating spectrum.

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<sup>6</sup>This reallocation and transition effort involved complex technical challenges related to sharing spectrum between the U.S. Navy and the private sector, which were only addressed through the development of new technologies. The CBRS reallocation effort largely concluded in 2020 with auctions of 150 megahertz of spectrum for commercial wireless communications.

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- **Having a reliable, integrated master schedule that is updated on a regular basis.**<sup>7</sup> Without an integrated master schedule to guide reallocation efforts, there is no baseline for NTIA or others to measure NTIA's actual overall spectrum reallocation timeline against, meaning there is no basis to judge whether work could have been performed faster. Further, an integrated master schedule would enhance NTIA's ability to manage tradeoffs among cost, schedule, and scope.
  - **Conducting program risk management throughout the life of the program.** Without full consideration of reallocation risks, NTIA may not be able to respond effectively to them as they arise or to help or represent agencies in dealing with them.

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## Collaboration among Agencies

With respect to collaboration, at the time of our review, we found that the collaborative mechanisms used by FCC, NTIA, and other relevant agencies to address potential interference among proposed uses of spectrum did not fully reflect leading collaboration practices. Leading collaboration practices include, for example, clarifying roles and responsibilities and developing written guidance and agreements, and we have found that these practices are useful for addressing complex issues, such as spectrum management.

The agencies use various collaborative mechanisms. For instance, by statute, FCC and NTIA are required to meet, at least twice a year, to conduct joint spectrum planning with respect to various enumerated issues.<sup>8</sup> The two agencies also maintain a memorandum of understanding that serves as the main mechanism that guides their overall coordination on spectrum management. For domestic matters, the agencies coordinate through an NTIA-led committee that provides input to FCC's spectrum proceedings. For U.S. participation in international conferences regarding the regulation of the global use of spectrum—known as World Radiocommunication Conferences (WRC)—agencies coordinate via a preparatory committee that provides input used to develop U.S. positions that the Department of State (State) submits to a

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<sup>7</sup>A program's integrated master schedule is the top-level program document that defines the individual component schedules and dependencies between program components (individual project, site, and program level activities) required to achieve the program goal.

<sup>8</sup>47 U.S.C. § 922.

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regional body or directly to the WRC.<sup>9</sup> A *General Guidance Document* establishes the expectations and process by which the preparatory committee operates.

In examining these and other related coordination activities, we found that while the documents that guide coordination between FCC and NTIA and the preparatory committee emphasized reaching consensus whenever possible, there were no clearly defined and agreed-upon processes for resolving matters when agencies cannot do so. Additionally, neither the memorandum of understanding nor the *General Guidance Document* had been updated in almost 20 years, though agency officials said conditions regarding spectrum management activities have changed in that time. Our review of U.S. participation in the 2019 WRC showed that these issues affected collaboration. For example, disputes among the agencies and the inability to reach agreement on U.S. technical contributions challenged the U.S.'s ability to present an agreed-upon basis for decisions or a unified position.

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## Conclusions

Effective spectrum management is critical given the importance of spectrum's role in ensuring the nation's security and communications. NTIA has recently facilitated a complex, multi-stakeholder spectrum reallocation to free up spectrum critical for mobile services. However, by following program management leading practices related to planning, particularly for creating a plan, developing an integrated master schedule, and anticipating risks, NTIA could better ensure that reallocations are executed in a timely fashion and that potential challenges and risks are addressed before they arise. Furthermore, while mechanisms exist that facilitate collaboration between FCC and NTIA—the U.S. spectrum managers—and federal users, gaps also exist. We have found that these gaps may have contributed to challenges experienced during some recent efforts to allocate additional spectrum for mobile use and that, in the future, these gaps could contribute to challenges in managing spectrum for other uses. In our reports, we made several recommendations to FCC and NTIA related to the reallocation process and collaboration. Among others, we recommended that:

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<sup>9</sup>Internationally, the International Telecommunication Union—a United Nations specialized agency responsible for matters related to information and communication technologies—regulates the global use of spectrum and hosts international conferences, known as World Radiocommunication Conferences, to update the global treaty establishing the international regulations.

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- NTIA align its spectrum reallocation-planning efforts with leading practices for program management by developing a plan, analyzing risks, and creating and updating a schedule for NTIA's ongoing and future reallocation efforts;
  - FCC and NTIA establish clearly defined and agreed-upon processes for making decisions on spectrum-management activities that involve other agencies, particularly when consensus cannot be reached (in consultation with each other and—as appropriate—State);
  - FCC and NTIA clarify and further identify shared goals or outcomes for spectrum-management activities that involve collaboration and ways to monitor and track progress (in consultation with each other and—as appropriate—State);
  - FCC and NTIA update the FCC-NTIA memorandum of understanding to address identified gaps (such as the lack of clearly defined goals and agreed-upon processes for making decisions) and develop a means to continually monitor and update this agreement (in consultation with each other);
  - FCC and NTIA request that State initiate a review of the *General Guidance Document* (a document that guides U.S. preparation for WRCs)—in consultation with each other and other relevant participants—and update and develop a means to continually monitor and update this document; and
  - FCC and NTIA establish procedures to help guide the design (including selection of acceptable assumptions and methodologies) of spectrum-sharing and potential-interference studies intended as U.S. contributions to WRC technical meetings (in consultation with each other, State, and other federal participants of the U.S. technical preparatory process).

FCC broadly agreed to work collaboratively with NTIA and State to respond to our recommendations. Commerce agreed with our recommendations to NTIA. In January 2022, FCC affirmed its commitment to implement the recommendations from our June 2021 report and said that it had started to take steps to address them. In February 2022, NTIA also indicated that it was working on addressing the recommendations from our June 2021 report in coordination with FCC and State, as applicable. The agencies have not yet implemented our recommendations, and we continue to monitor their progress in doing so.



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Chair Luján, Ranking Member Thune, and Members of the Subcommittee, this completes my prepared statement. I would be pleased to respond to any questions that you may have at this time.

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## GAO Contact and Staff Acknowledgments

If you or your staff have any questions about this testimony, please contact Andrew Von Ah at (202) 512-2834 or [vonaha@gao.gov](mailto:vonaha@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. GAO staff who made key contributions to this testimony are Andrew Huddleston, Assistant Director; Sally Moino, Assistant Director; and Nalylee Padilla, Analyst-in-Charge. Other staff who made contributions to the reports cited in this testimony are identified in the source products.

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