

**Before the
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION
WASHINGTON, DC 20230**

In the Matter of)	
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Implementation of a National Spectrum Strategy)	Document No. 2023-26810
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COMMENTS OF THE GPS INNOVATION ALLIANCE

GPSIA^{1/} applauds the National Telecommunications and Information Administration’s (“NTIA”) efforts to develop and implement a National Spectrum Strategy (“*National Spectrum Strategy*”).^{2/} Spectrum is a limited, high-demand national resource and its management is critical to ensuring that there is appropriate access to that resource for all spectrum users, across all access models. Among other goals, the *National Spectrum Strategy* appropriately seeks to balance the expanding spectrum needs of non-Federal users with the requirement that Federal agencies are also provided with the spectrum access needed to fulfill their critical missions. That balance is particularly important with respect to GPS, a Federally-operated satellite network on which billions of government *and* non-government devices rely. Accordingly, the *National Spectrum Strategy* implementation plan should be particularly cautious in managing spectrum

^{1/} GPSIA is an industry association that was formed to protect, promote, and enhance the use of global positioning system (“GPS”) and global navigation satellite system (“GNSS”) technologies. GPSIA includes organizations in the manufacturing, aviation, agriculture, construction, transportation, emergency response, surveying, mapping, and defense industries and organizations. GPSIA strives to inform policymakers and GPS users about the centrality of GPS in our nation's economy.

^{2/} See *Implementation of the National Spectrum Strategy*, Notice of Opportunity for Public Input, NTIA, 88 Fed. Reg. 85266 (Dec. 7, 2023); see also *National Spectrum Strategy*, THE WHITE HOUSE (Nov. 13, 2023), https://www.ntia.gov/sites/default/files/publications/national_spectrum_strategy_final.pdf (“*National Spectrum Strategy*”).

used for, and adjacent to, GPS to protect the spectrum environment in which GPS has historically operated.

I. A SPECTRUM PIPELINE SHOULD RESPECT AND EXPAND CURRENT SPECTRUM USES

Implementation of Strategic Objective 1.1 of the *National Spectrum Strategy* should be about more than just ensuring that “sufficient spectrum” is made available to support federal use cases.^{3/} While sufficiency is important – there must be *enough* spectrum to support the intended use-cases – it is equally imperative that spectrum be made available under the right conditions so that it may be used effectively for its planned purposes. Spectrum that will be made available in the future through the *National Spectrum Strategy’s* spectrum pipeline and currently assigned spectrum to be preserved for existing operations must be appropriate for the purpose it is expected to serve, both with respect to the technical characteristics of the frequencies and the spectrum environment in and adjacent to those frequencies.

For GPS, that means that the GNSS spectrum that supports billions of devices today must be adequately preserved and protected. The stability of the quiet spectrum environment in which GPS devices operate must be maintained to ensure the continued success of GPS in delivering reliable service. To preserve the spectrum assets that support GPS, NTIA, in cooperation with the Federal Communications Commission (“FCC”), should ensure that incompatible operations are not authorized in the GNSS bands or adjacent spectrum bands.

^{3/} See *National Spectrum Strategy* at 3.

As GPSIA has often highlighted, there are critical differences between navigation systems like GPS and communications systems.^{4/} Navigation systems receive very faint signals from space and operate below the noise floor. In-band and adjacent-band operations that raise the noise floor even a small amount can therefore imperil GPS operations. That is why a quiet spectrum neighborhood – populated only by similarly sensitive systems – has allowed GPS to flourish. This environment must continue to be preserved.

NTIA also observes, in addressing how Federal spectrum may be made available for commercial use, that “Federal operations often do not fully occupy their spectrum assignments at all times; however, the nature of an agency’s mission may require constant *availability* of a spectrum assignment for immediate use.”^{5/} That assumption alone is not always sufficient for GPS. How and where GPS devices are used should also inform how spectrum in bands designated for, and adjacent to GNSS, are managed. GPS is used all the time, everywhere to support the use cases that receivers enable for consumers and businesses. GPS receivers are used in a wide variety of government, military, commercial, public safety, and critical and other infrastructure applications. For example:

- GPS is used in precision agriculture for applications like field mapping, soil sampling, tractor guidance, crop scouting, and yield mapping;^{6/}

^{4/} See, e.g., Comments of GPSIA on the Development of a National Spectrum Strategy, Docket No. 230308-0068 at 12 (filed Apr. 17, 2023) (“*GPSIA NSS Development Comments*”); Comments of GPSIA, WT Docket No. 23-232 at 5-6 (filed Oct. 3, 2023) (“*GPSIA Spectrum Usage Comments*”).

^{5/} *National Spectrum Strategy* at 4 (emphasis in original).

^{6/} See *Agriculture*, GPS.GOV, <https://www.gps.gov/applications/agriculture/> (last visited Dec. 18, 2023).

- GPS is used for aviation applications to offer navigation services that enable three-dimensional position determination for all phases of flight;^{7/}
- GPS is used to gather accurate and timely information about the natural environment, including migratory patterns of endangered species and earthquake detection;^{8/}
- GPS plays a critical role in emergency response efforts after global disasters like tsunamis, hurricanes, and earthquakes, and can also be used to enable aircraft equipped with infrared scanners for the early detection of wildfires;^{9/}
- GPS makes outdoor recreation activities safer by providing accurate, real-time location data to ensure that hikers, bicyclists, and outdoor adventurers remain on the right path;^{10/}
- GPS has transportation safety uses, like enabling Intelligent Transportation Systems, traffic monitoring, and navigation;^{11/}
- GPS is used by the Department of Defense to support a broad array of military operations, including force tracking, search and rescue, and remote piloting of unmanned aerial vehicles;^{12/} and

^{7/} *Aviation*, GPS.GOV, <https://www.gps.gov/applications/aviation/> (last visited Dec. 18, 2023).

^{8/} *Environment*, GPS.GOV, <https://www.gps.gov/applications/environment/> (last visited Dec. 18, 2023).

^{9/} *Public Safety & Disaster Relief*, GPS.GOV, <https://www.gps.gov/applications/safety/> (last visited Dec. 18, 2023).

^{10/} *Recreation*, GPS.GOV, <https://www.gps.gov/applications/recreation/> (last visited Dec. 18, 2023).

^{11/} *Roads & Highways*, GPS.GOV, <https://www.gps.gov/applications/roads/> (last visited Dec. 18, 2023).

^{12/} *Department of Defense*, GPS.GOV, <https://www.gps.gov/governance/agencies/defense/> (last visited Dec. 19, 2023).

- the financial sector relies on GPS for precise timing services to create financial transaction timestamps and improve operational efficiency.^{13/}

Many GPS receivers that support these services, and those that, for example, are used to monitor and warn first responders and the public of earthquakes, are always “listening” for signals so that they may relay life-saving information at unpredictable time intervals.^{14/} This ubiquity heightens the need to ensure that GPS operations are protected everywhere, all the time. Other GPS receivers, like those embedded within emergency handsets, may be used intermittently or even seasonally. However, these intermittent use cases are often time sensitive, safety-of-life scenarios and the inability to receive clear signals whenever necessary because of harmful interference could result in catastrophic harm.

While, as highlighted above, spectrum characteristics are important in considering the current and future sufficiency of spectrum for Federal operations, NTIA should also ensure that satellite systems in general, and those that support navigation operations in particular, have ample capacity. It has become apparent that satellite technology will be able to address an increasing variety of communications and navigation requirements.^{15/} There must be a sufficient quantity of spectrum (and in the appropriate spectral position) to support these applications.

^{13/} *Timing*, GPS.GOV, <https://www.gps.gov/applications/timing/> (last visited Dec. 18, 2023).

^{14/} Earthquake detection relies on data from seismometers combined with GPS locational data.

^{15/} The growth in satellite applications like those used for weather data, broadcast TV, imagery, defense industry applications, GPS, remote sensing, human space flight, and many other uses are expected to drive a more than fourfold increase in the overall satellite market by 2030. *See See Satellite Internet: The Next Big Wave June 2023 Market Study Report*, EY PARTHENON (June 2023) at 8, https://assets.ey.com/content/dam/ey-sites/ey-com/en_in/topics/technology/2023/06/ey-satellite-internet-the-next-big-wave-market-study-report.pdf?download (predicting growth in the satellite market from \$3.99 billion in 2021 to \$17.43 billion by 2030). In recognition of the growing importance of the satellite industry’s impact on the national economy and national security, the U.S. government has launched new space-facing initiatives in recent years, including the Space Force, which is first new branch of the U.S. armed services in more than 70 years. *See About the Space Force*, United States Space Force,

II. ADDITIONAL COLLABORATIVE EFFORTS ARE IMPORTANT TO SPECTRUM MANAGEMENT

GPSIA appreciates that the *National Spectrum Strategy* highlights existing and planned efforts by Federal entities to collaborate on future spectrum use.^{16/} Particularly where Federal operations are implicated by future in-band or adjacent band spectrum use, it is important that collaboration occur early in any process that may result in changed spectrum use. But recognizing when collaboration should occur must be based on a mutual understanding of when existing spectrum use may be affected. That requires an appreciation of when protection may be required and a recognition that, among other things, as noted above, navigation systems have different protection requirements than communications systems. Recognizing those differences, which will lead to coordination early in the spectrum planning process, will avoid unintended and unanticipated interference that degrades GPS functionality, preventing life-threatening outcomes.

NTIA can and should leverage existing mechanisms to promote collaboration between various interested Federal agencies and between Federal agencies and commercial entities.^{17/} The *National Spectrum Strategy* notes, for example, the work of the Department of Defense (“DoD”) in leading, to date, the Emerging Mid-Band Radar Spectrum Sharing (“EMBRSS”) Feasibility Assessment that brought together representatives from military services, other

<https://www.spaceforce.mil/About-Us/About-Space-Force/#:~:text=The%20U.S.%20Space%20Force%20was,is%20a%20national%20security%20imperative> . (last visited Dec. 18, 2023); Press Release, *Chairwoman Rosenworcel Announces Plan To Modernize The FCC By Establishing A Space Bureau And Office Of International Affairs*, FCC (rel. Nov. 3, 2022) <https://docs.fcc.gov/public/attachments/DOC-388826A1.pdf> (The satellite industry is growing at a record pace[.]”). The launch of the FCC’s Space Bureau reflects the tremendous growth in spacefaring activities.

^{16/} See *National Spectrum Strategy* at 9.

^{17/} See *National Spectrum Strategy* at 9-10.

defense stakeholders, interagency partners, industry and academia to study the lower 3 GHz band.^{18/} The *National Spectrum Strategy* states that follow-on studies will be co-lead by DoD and the Department of Commerce.

III. SPECTRUM SHARING MAY NOT ALWAYS BE APPROPRIATE

The *National Spectrum Strategy* emphasizes the importance of shared spectrum, stating that “U.S. spectrum regulating agencies, Federal agencies, U.S. commercial industry, academia, and technology developers will work collaboratively to encourage dynamic spectrum sharing that employs spectrum management technologies and techniques.”^{19/} While GPSIA recognizes the benefits of spectrum sharing, its use is not appropriate in all instances. Specifically, sharing may be appropriate when (i) incumbent services cannot be relocated from a particular spectrum band, *and* (ii) incumbent services are capable of coexisting with new entrants. GNSS spectrum does not meet those criteria. The L-band, which supports much of today’s U.S. GPS traffic, is internationally harmonized to support GNSS operations; it would be impractical to consider requiring the use of GNSS operation in other spectrum bands. And, there is no time or place where GNSS spectrum can be shared with another service. As noted above, GPS devices are ubiquitous and use GNSS spectrum everywhere, all the time. This intensive use of GNSS spectrum would be disrupted by even a small increase in the noise floor. GNSS spectrum must, therefore, remain designated exclusively for GNSS operations.

^{18/} See *National Spectrum Strategy* at 6; see also Press Release, *Joint Statement from Department of Defense Chief Information Officer John Sherman and Assistant Secretary of Commerce Alan Davidson on the Emerging Mid-Band Radar Spectrum Sharing (EMBRSS) Feasibility Assessment* (Sept. 28, 2023) <https://www.defense.gov/News/Releases/Release/Article/3541300/joint-statement-from-department-of-defense-chief-information-officer-john-sherm/> (announcing the completion of the EMBRS Feasibility Assessment).

^{19/} *National Spectrum Strategy* at 14.

Similarly, NTIA must consider the impact of proposed sharing of spectrum adjacent to or in bands nearby those in which GPS operates. Spurious emissions from adjacent bands, even those subject to relatively low out-of-band emission limits, would be likely to cause harmful interference and could disrupt the provision of GPS service. It is critical that any consideration of sharing recognizes that receive-only GPS signals have technical characteristics and use cases that are different and more sensitive to harmful interference than communications-centric services. As a result, the implementation plan should recognize that GNSS spectrum *and* spectrum in bands adjacent to GNSS use are *not* candidates for sharing.

IV. CONCLUSION

GPSIA appreciates NTIA's efforts to develop and implement a *National Spectrum Strategy* to ensure that the spectrum needs of both Federal and non-Federal users are met now and in the future. In implementing the *National Spectrum Strategy*, NTIA should acknowledge, in general, that not all spectrum uses are the same, and in particular, that there are critical differences between communications systems and navigation systems. The implementation plan should not disrupt the spectrum environment that has allowed GPS to thrive. It should promote coordination early among all interested stakeholders. And any implementation plan should recognize that sharing solutions that work well for some bands and some users will not work for others.

Respectfully submitted,

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