



Developing a Sustainable Spectrum Strategy for America's Future, National Telecommunications and Information Administration

Reference: 83 Fed. Reg. 65640, Docket No. 181130999–8999–01, RIN 0660-XC044 (Dec. 21, 2018)

Comments of the Small UAV Coalition

The Small UAV Coalition (“Coalition”)¹ files these comments in response to the Request for Comment (RFC) issued by the National Telecommunications and Information Administration (NTIA) regarding development of a comprehensive, long-term national spectrum strategy.² As set forth in the RFC, the NTIA seeks comments on six goals derived from the Presidential Memorandum on Developing a Sustainable Spectrum Strategy (“*Spectrum PM*”). Those goals include: (1) increased predictability of spectrum access; (2) flexible management (standards, incentives, and enforcement mechanisms, including flexible use); (3) use ongoing R&D to develop advanced technologies, innovative utilization mechanisms, tools and techniques that increase spectrum access, efficiency, and effectiveness; (4) build[ing] a secure, automated capability to facilitate assessments of spectrum use and expedite coordination of shared access among Federal and non-Federal spectrum stakeholders; and (5) improve global competitiveness of U.S. and space-related industries.³

At its core, a sustainable spectrum strategy must recognize that spectrum is a critical input to emerging technologies such as unmanned aircraft systems (UAS), requiring spectrum-intensive applications to realize their full economic potential.⁴ In order to meet the goals of the *Spectrum PM* and to ensure that spectrum is made available on a timely basis for emerging technologies, it is more critical than ever to develop a robust, transparent spectrum management framework founded on certain key concepts: a clear, well-coordinated pipeline of future spectrum availability; a mix of spectrum access regimes (licensed, unlicensed, shared, or hybrid); and rules for spectrum use that are future-proof to account current technologies as well as technologies under development.. The Coalition believes such an approach will fulfill the objective of the *Spectrum PM* to develop “a balanced, forward-looking, flexible, and sustainable approach to spectrum management.”⁵

¹ A full list of members can be found at <http://www.smalluavcoalition.org/members/>.

² *Developing a Sustainable Spectrum Strategy for America's Future*, National Telecommunications and Information Administration, Docket No. 181130999–8999–01, 83 Fed. Reg. 65640 (Dec. 21, 2018) (RFC).

³ *Id.* at 65641.

⁴ *Memorandum for the Heads of Executive Departments and Agencies, Developing a Sustainable Spectrum Strategy for America's Future*, 83 FR 54513 (Oct. 30, 2018), available at <https://www.federalregister.gov/documents/2018/10/30/2018-23839/developing-a-sustainable-spectrum-strategy-for-americas-future>. (*Spectrum PM*).

⁵ *Id.* At 245.



Spectrum Pipeline

The RFC seeks comment on how to ensure increased access to spectrum. The Coalition believes that spectrum access can best be enhanced through the adoption of a clear, well-coordinated spectrum pipeline. The connected economy is dependent on timely availability of sufficient spectrum for continued growth. Estimates of connected devices total 17 billion worldwide, of which IoT devices comprise 7 billion. One estimate of projected growth puts the number of connected devices at 34 billion by 2025, with IoT devices capturing a larger percentage at 21.5 billion of that total.⁶ Similarly, small commercial UAS growth is projected to accelerate over the coming 5 years from 110,604 in 2017 to a conservative estimated fleet of 451,800 by 2022.⁷ Such projected growth underscores the importance of developing the pipeline suggested above in order to fully capitalize on the economic benefits that UAS can bring and to ensure that America has the spectrum that will be demanded to remain a leader in the global race that emerging technologies are bringing about.

In order to promote continued innovation, it is vital that this clear vision of spectrum availability and clarity be the hallmark of policy today. In the past, spectrum allocations often relied on an “ad hoc, piecemeal process” that was focused on the demands of specific services or particular entities.⁸ Such an approach will not serve the nation well going forward. It is essential that the FCC, NTIA and other federal stakeholders coordinate to identify spectrum bands that can be brought to market and establish specific timeframes for doing so. Additionally, as spectrum bands have varying propagation characteristics, it is important that a spectrum pipeline promotes flexibility of opportunities across bands. Congress has taken steps to help federal agencies and the FCC enhance their coordination to fulfill the promise of transparency in spectrum access and band utilization.⁹ Specifically, policymakers have done great work to ensure access to low-band and millimeter wave spectrum, but they must focus on mid-band spectrum, which has the greater propagation capabilities of low-band, but higher bandwidth of high band. Both of those characteristics will be important in many UAS applications, such as search and rescue, real-time inspections, natural resource management,

⁶ *State of the IoT 2018: Number of IoT devices now at 7B – Market Accelerating*, IOT Analytics, available at <https://iot-analytics.com/state-of-the-iot-update-q1-q2-2018-number-of-iot-devices-now-7b/>.

⁷ *FAA Aerospace Forecast Fiscal Years (FY) 2018-2038*, Federal Aviation Administration, at 41, available at https://www.faa.gov/data_research/aviation/aerospace_forecasts/media/FY2018-38_FAAspace_Forecast.pdf (Mar. 15, 2018).

⁸ Doug Brake, *Keeping Up With Spectrum Policy: Mid-Band Opportunities*, Information Technology and Innovation Foundation, available at http://www2.itif.org/2018-spectrum-policy-mid-band.pdf?_ga=2.137074873.845561651.1547505381-882397413.1547505381, at 2 (Nov. 2018).

⁹ See Consolidated Appropriations Act, 2018, P.L. 115-141, Division P, the Repack Airwaves Yielding Better Access for Users of Modern Services (RAY BAUM’S) Act. Title VI of the RAY BAUM’S Act is the Making Opportunities for Broadband Investment and Limiting Excessive and Needless Obstacles to Wireless Act or MOBILE NOW Act (Act).



and more. Focusing on these mid-band opportunities will help maintain U.S. competitiveness and preparedness for what lies ahead.

The Coalition understands the NTIA and the FCC are working together to identify 255 MHz of spectrum for repurposing and we urge the federal stakeholders, including NTIA, FCC and other federal agencies, to closely coordinate with technology developers to ensure that the full range of spectrum opportunities are explored.¹⁰ A more aggressive approach with greater coordination will lead to the pipeline of the future and a world of new business opportunities and technologies to make consumers lives' better. As UAS and other emerging technologies scale operations, the amount of data generated, and therefore bandwidth required, is going to scale as well. Large blocks of contiguous spectrum best help to support the flood of devices that is already underway and will only increase, and are a critical input for the next generation network capabilities that emerging technologies will rely on. This clarity, coordination and vision will propel the United States in accomplishing its first goal of the *Spectrum PM* by ensuring increased predictability of spectrum access for all users.¹¹

Flexible Spectrum Access Regimes

The second and fourth elements of the spectrum strategy set out in the *Spectrum PM* direct NTIA and other federal agencies to consider how flexible models for spectrum management could promote efficient and effective spectrum use.¹² The Coalition encourages the promotion of a range of spectrum access regimes, including licensed, unlicensed, and sharing because flexibility in the rights structure will help ensure that regulatory determinations do not harm the path of technological advancement.

Over the last three decades the FCC has shifted from policies that granted spectrum licenses based on a comparative hearing process, to lotteries, to the current practice of allocating spectrum rights based on auctions.¹³ These exclusive use licensing auctions have promoted investment and innovation in spectrum that have led to its efficient use across many of the licensed bands. Licensees in these bands have been able to use their exclusivity to provide connectivity on a near ubiquitous basis throughout the United States and have pushed technological developments that have led to increased speed, lower latency, and resilient connectivity. This is in part due to the issuance of licenses under a flexible use policy, which stands in contrast to the FCC's past practice of licensing spectrum to meet the service needs of

¹⁰ *Id.*

¹¹ *Spectrum PM* at 65641.

¹² *Id.*

¹³ Dorothy Robyn, *Making Waves: Alternative Paths to Flexible Use Spectrum*, Aspen Institute Communications and Society Program, available at http://csreports.aspeninstitute.org/documents/Spectrum_Making_Waves.pdf (2015).



specific industries.¹⁴ The GSMA estimates that mobile technologies and services provide \$830 billion in economic value in North America.¹⁵

The FCC has also made spectrum available for use on an unlicensed basis. The opportunities to utilize spectrum for no cost other than the cost of the device has led to experimentation in the unlicensed spectrum bands that have produced a number of innovations. The rules for operation of devices in spectrum set aside for unlicensed use are straightforward – no harmful interference can be caused and interference must be accepted.¹⁶ The estimated economic value of unlicensed spectrum for the United States is over \$525 billion in 2017 and growing.¹⁷

Beginning in 2008, presidents of both parties have advocated for exploring sharing opportunities, particularly with regards to spectrum used by federal agencies.¹⁸ In 2013, the Obama Administration issued a Presidential Memorandum encouraging the use of spectrum sharing, and again reiterated a desire for it to be applied in the context of spectrum allocated exclusively for federal use.¹⁹ In 2018, Congress, as part of the passage of the RAY BAUMS Act, expressed its interest in having the FCC and NTIA explore opportunities for spectrum sharing.²⁰ And as noted above, the current *Spectrum PM* continues that policy interest forward, citing as one of the goals of a sustainable spectrum strategy the “expedite[d] coordination of shared access among Federal and non-Federal spectrum stakeholders.”²¹ Sharing opportunities will come with complex requirements as the incumbent user will maintain certain rights to the spectrum and will need to be afforded interference protections from all other users. The other users of the spectrum will be granted rights with varying levels of protections.²² With developments in software access systems (SAS), which will coordinate access in real time, and the development of dynamic spectrum sensing technologies, which will allow the devices using spectrum in shared bands to communicate critical information to facilitate coordination with the SAS, spectrum sharing opportunities have transitioned from concept to implementation.²³

¹⁴ *Supra* n. 8.

¹⁵ <https://www.gsmaintelligence.com/research/?file=1edb46b8f8d86187a7508bad348c3e87&download>

¹⁶ 47 C.F.R. 15.5.

¹⁷ http://dynamicspectrumalliance.org/wp-content/uploads/2018/05/WiFi-Foward_Economic-Value_Shared-Spectrum_Report_05172018.pdf

¹⁸ *Memorandum for the Heads of Executive Departments and Agencies, Spectrum Policy for the 21st Century*, 69 Fed. Reg. 1569, available at <http://www.whitehouse.gov/news/releases/2003/06/20030605-4.html> (2004).

¹⁹ *Presidential Memorandum: Expanding America’s Leadership in Wireless Innovation*, available at <https://obamawhitehouse.archives.gov/the-press-office/2013/06/14/presidential-memorandum-expanding-americas-leadership-wireless-innovation> (2013).

²⁰ P.L. 115-141, Sec. 618 (c)(3).

²¹ *Spectrum PM* at 54515.

²² See e.g., *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rd. 3959 (2015).

²³ *Google Predicts CBRS Will Be Ready by Summer; Sees New Paradigm for Sharing*, Communications Daily, 39 Comm. Daily 11, available at <https://communicationsdaily.com/article/view?s=275724&id=565012> (Jan. 16, 2019).



Each of these regimes have their advantages and their disadvantages, but the Coalition views them as a group of opportunities that afford innovators the opportunity to experiment and explore their ideas across a range of spectrum opportunities. Spectrum access regimes have evolved over time advancing new capabilities that must be promoted, not stifled. As the Coalition members explore various approaches for their business models, there is an interest in each of these regimes. While some aspects of their business models may rely on licensed spectrum, other components may be equally well-served through shared spectrum or unlicensed spectrum. Promoting a diversified spectrum rights regime will ensure that the Coalition member companies can continue to pursue those opportunities based on their independent assessment of how to proceed. As the Coalition has noted in proceedings before the FCC, UAS technology is developing quickly and there is a need to adopt flexible allocation and, ultimately, flexible service rules that allow the market and advances in technology to dictate the best uses of the spectrum over time.²⁴

Flexible Spectrum Service Rules

Just as the spectrum access regimes should ensure a range of options to innovators, the Coalition supports spectrum policies and rules that ensure flexibility is built into the spectrum service rules. The Coalition support maximum flexibility in recognition of the fact that flexibility on the front-end will minimize the need to revisit rules and allocations in order to accommodate new technology demands. The *Spectrum PM* supports this approach as well, calling for recommendations on “flexible models for spectrum management (standards, incentives, and enforcement mechanisms, including flexible use).”²⁵

Rules for spectrum uses should be broadly defined based on technical requirements to prevent harmful interference, not application-specific services or offerings. In the past, the FCC made allocations of spectrum for specific services, such as paging services or taxi dispatch. When these services are surpassed by new technologies, the FCC must go through a protracted process under the Administrative Procedure Act to change the service rules to accommodate the needs of the new technology seeking access or worse, leave the allocation in place and underutilized.

Over the last two decades, the FCC has moved away from such a stringent “command-and-control” model of spectrum rules to a licensed regime that is focused on a more nimble “flexible use” model, allowing licensees to offer spectrum based on technical parameters, largely agnostic to the types of service that are seeking access. Similarly, the unlicensed spectrum rules allows for its use under fairly limited technical requirements focused on interference concerns, not the types of service or devices being offered. As new sharing regimes are established by the

²⁴ Comments of the Small UAV Coalition, ET Docket No. 15-99, at 9-10.

²⁵ *Spectrum PM* at 54514.



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FCC, like the one established for the 3.5 GHz band, the rules are largely agnostic to the types of uses the spectrum is put to, opting for technical parameters instead.²⁶

In addition to flexible service rules, policies should promote opportunities in the secondary market to gain access to spectrum through leasing. Streamlining the process for obtaining access in the secondary market for leasing spectrum will allow Coalition members [the UAS industry] the opportunity to assess whether their specific spectrum needs may be better addressed through holding spectrum. The FCC has adopted rules to promote secondary market opportunities in the context of the 3.5 GHz proceeding and the Coalition would encourage the FCC to look for other opportunities to streamline its secondary market rules.²⁷

Conclusion

The Coalition commends the NTIA for presenting it with the opportunity to provide support for a pathway forward that promotes a robust, transparent spectrum management regime focused on flexibility. As set forth above, transparency about future spectrum opportunities and flexibility in spectrum access regimes and service rules will best promote innovation, which is key to the United States' ongoing competitiveness in the global market.²⁸ In short, to realize the full potential of UASs (and autonomous vehicles, IoT devices, artificial intelligence, and smart cities) there will be a need for not only more spectrum capacity, but also the flexibility to allow for market innovation free of burdensome barriers and artificial boundaries. The investment and opportunities are upon us and the pathway before us will determine how fully we embrace the challenges and reap the tremendous benefits.

Respectfully submitted,

Small UAV Coalition

²⁶ *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, 31 FCC Rcd. 5011 (2016).

²⁷ 47 C.F.R. 1.9001-1.9080.

²⁸ *Spectrum PM* at 54515.