



ASRI submits that implementation of the NSS to preserve and protect the NAS framework (including supporting operations on the ground) should be based on five principles:

1. The timing and breadth of public and government participation in considering prospective changes that could impact any aeronautical spectrum bands,
2. Priority for protecting spectrum uses that preserve and protect safety-of-life allocations such as aviation safety,
3. Recommendations and decisions based on expert input and sound technical foundations,
4. A preference for spectrum sharing, where sharing is possible, providing that operational or technical performance of existing users is not degraded, and
5. Expectations in both shared and exclusively-licensed spectrum that users/industries will maximize their use of their existing frequencies to which they have access before gaining access to additional spectrum.<sup>4</sup>

These principles would support an NSS implementation that provides a known process for both new entrants and incumbent users while enabling a balanced process for all. In such an NSS implementation, seeking comprehensive input and addressing challenges early should be a core priority to ensure a successful outcome. Such a deliberate approach will require extra effort and may necessitate an accommodation of additional time to complete the early phases of studying a band, but it will be effort and time well spent to do this at the start and not risk saddling the final stages of any assessment with late challenges or new data that undermine the outcome. “Move fast and break things” is not a formula that should be applied in spectrum management, especially where public safety users such as aviation are involved or potentially affected.

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<https://www.whitehouse.gov/briefing-room/presidential-actions/2023/11/13/memorandum-on-modernizing-united-states-spectrum-policy-and-establishing-a-national-spectrum-strategy/>.

<sup>4</sup> ASRI submits that these five principles are universally relevant and applicable to all industries and users, with the second principle enlarged to encompass public safety generally.

## 1. NSS Implementation Should Be Characterized by Full Public and

**Government Participation.** The global leadership of American industries is advanced by a positive relationship between relevant Federal agencies and commercial industry participants. Accordingly, the implementation of the NSS should be informed by a similar public-private collaboration.

More specifically, strategic spectrum planning under the NSS, including spectrum studies and recommendation regarding access and/or coexistence frameworks (*if* sharing is even possible in any practicable manner) in particular bands, should be the result of vibrant Federal and non-Federal multi-stakeholder participation.<sup>5</sup> Participation should be solicited at the earliest opportunity to allow a robust multi-stakeholder process, supported by an early and full exchange of information (subject to any necessary protections for proprietary or otherwise sensitive data) by all interested parties. Accommodating these requirements will be essential to build and maintain trust in any spectrum planning and subsequent decision-making processes.

For each of the five bands identified in the NSS for study, broad participation of industry representatives should be actively fostered by the NTIA in conjunction with the Federal Communications Commission (“FCC”), including through an aggressive and timely set of invitations to industry sector representatives, *before* band-specific study methods are formulated, and should continue through the process of analysis, report writing, field testing, and recommendations. (All of this activity should precede statutorily necessary actions by the FCC that must be fulfilled before the spectrum can be accessed by new non-Federal users, such as a

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<sup>5</sup> See NSS at 10 (“The United States needs a process for bringing all stakeholders together for advanced planning, so they can generate recommendations earlier, based on the combined knowledge and perspectives of both the Federal Government and the private sector”).

notice of proposed rulemaking followed by a Report and Order and adopted rules.) Similarly, should additional bands be considered for study under the NSS in the future, ASRI strongly recommends that, as a first step, potential interested industry participants should be identified by the Government and their views solicited.<sup>6</sup> If the inquiry proceeds to new studies regarding such bands, the model for the studies of the NSS's five initial bands should be followed, supplemented by fine-tuning from lessons learned by prior NSS-related studies to improve the process and outcomes.<sup>7</sup>

In short, while the FCC must still, under the Administrative Procedures Act, openly solicit, receive, and consider public comments before rule changes are adopted affecting non-

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<sup>6</sup> To be clear, such proactive identification and solicitation should not be conducted in a manner that excludes any interested party from having its views received and considered.

<sup>7</sup> Concerning prospective spectrum decisions that might affect aviation spectrum – whether Federal, non-Federal, or shared Federal/non-Federal spectrum and whether the changes directly affect an aviation band or frequencies adjacent or near-adjacent to such a band – it is essential that the Department of Transportation (“DoT”), the Federal Aviation Administration (“FAA”), and the FCC are all actively involved from the outset, as well as other potentially relevant agencies. ASRI submits that it would be best for the FAA to be in communication with the FCC directly at the working level (*e.g.*, among the engineers), along with NTIA involvement. Commercial aviation, both operators and manufacturers, must also be part of the multi-stakeholder process to ensure a comprehensive information exchange, even if the band currently is a Federal-only band. Artificial lines drawn to exclude commercial industry participants when spectrum is nominally Federal-only can stymie timely participation of the full complement of relevant government *and non-government stakeholders*, as Federal spectrum sometimes is still used by or directly affects non-Federal beneficiaries of the Federal spectrum operations, as the history of the aviation industry amply demonstrates. One example is the AWS-3 proceeding in which numerous direct, non-Federal users of NOAA satellite downlinks in the 1695-1710 MHz band, including many state and local agencies operating their own receive-only earth stations, did not have the means during pivotal spectrum planning discussions between the FCC and NTIA to have their perspectives considered. Depending on the specific band in question, different aviation stakeholders may have a heightened interest and degree of expertise to offer, whether ASRI, other civil organizations, the airlines, other operators, and/or aircraft or equipment manufacturers. NSS implementation should make sure there is the opportunity for these perspectives to be considered in a timely and collaborative fashion, *i.e.*, *before* tentative proposals to change access to and use in a particular band or a series of related bands (for example when some incumbent users may be relocated) are formulated and a notice of proposed rulemaking is issued.

Federal access and use of spectrum, multi-stakeholder processes occurring *prior* to the issuance of notice of proposed rulemaking by the FCC should be used to inform the proposals in any spectrum-related rulemaking that will consider such new access and uses.

Ideally, the FCC and NTIA should provisionally reach consensus among affected Federal agencies and incumbent and prospective future spectrum users (in all potentially affected bands) about the level of need and the technical and economic ability to repurpose the spectrum in question – whether to allow a new use on a shared basis or to make spectrum available for exclusive use. Spectrum decisions in today’s environment, especially with regard to aeronautical bands,<sup>8</sup> are more challenging than they have ever been, and the expertise to fashion effective solutions in the public interest resides co-equally with Federal users and members of the relevant industries.<sup>9</sup> Involvement in the early stages in the implementation process should not be limited to a select few participants, however, but should be open so as to foster transparency and trust

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<sup>8</sup> Virtually every band of spectrum allocated specifically for aeronautical use has unique characteristics making relocation without a degradation in performance extremely difficult, if not impossible. It cannot be assumed that existing aeronautical systems can or should be able to, without compromising the effectiveness of their operations, tolerate any and all permitted power levels or deployment configurations by contemplated neighboring radio systems or co-band sharing systems. If the performance of existing aeronautical systems must be modified to permit new entrants in the same or adjacent bands, adequate advance planning must take into account the costs associated with equipment upgrades or replacement, the funding mechanisms needed to recover such costs, and reasonable timeframes for upgrades taking into account equipment (or aircraft) lifecycles and any necessary certifications that may be needed. Multi-stakeholder planning in the early phase of implementing the NSS for any given band would be the best way to identify these potential issues early and develop practicable solutions with appropriate lead times, if such solutions are even available and achievable.

<sup>9</sup> Regulators have the authority, naturally, to adopt regulatory solutions and implement them, as they always have, but in these modern times, the role of potentially affected industries must be fully recognized and integrated in the process of reviewing and developing regulatory frameworks beyond submitting comments and reply comments to the regulators in response to a notice of proposed rulemaking and subsequent *ex parte* meetings.

and mitigate late arguments being submitted from those choosing not to become involved in the early stages when such proposals go to a formal public comment process.

Having a robust multi-stakeholder framework in place will also help government and industry, depending on any recommendations or decisions being made, to take into account as needed practical issues of the timing of any necessary transitions and reimbursement of the associated costs.<sup>10</sup> The costs of any disruptions caused by new or additional spectrum uses should not be externalized onto incumbent users.<sup>11</sup>

**2. NSS Implementation Should Prioritize Spectrum Uses That Preserve and Protect Safety of Life.** Protection of aeronautical spectrum allocations from interference and ensuring that adequate aeronautical spectrum is available directly translates into protection of life and property. Access to aeronautical spectrum, whether for voice or data communications by pilots and crews with the ground (and other aircraft), radiolocation, or radionavigation, is a key element in a safe and efficient NAS. Any proposed new or additional spectrum use that could impact aviation operations negatively, such as degrading the performance of existing aeronautical radio systems, decreasing the frequencies available for aviation use, or otherwise exposing aviation radio-based operations to potential harmful interference, must be closely scrutinized. The proponents of the new or additional uses should have the burden of clearly

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<sup>10</sup> In the case of aviation, equipment lifecycles are typically long in comparison to other industries, and most changes in on-board RF systems will require a recertification by the FAA not only of the upgraded equipment but also the affected aircraft themselves. Any transition involving aeronautical radio systems cannot run roughshod over the practical realities that incumbent users may face if they must upgrade or relocate incumbent systems.

<sup>11</sup> Whether there are suitable alternative spectrum sources for incumbent operations that may be disrupted in whole or in part, as the RFC recognized, must be a central part of any planning process that considers relocating incumbent users as part of repurposing spectrum. *See* RFC, Pillar #1, ¶ 4, 88 Fed. Reg. at 15246.

demonstrating, through factually-supported analyses and coexistence and interference studies, as appropriate, that are subject to review by the FAA and the aviation industry, that the safety and efficiency of aviation operations would not be compromised. This demonstration should be completed as early as possible in the NSS implementation process involving any particular band.<sup>12</sup>

**3. NSS Implementation Should Have a Sound Technical Basis.** It is essential that spectrum management decisions to consider new and additional spectrum uses have a grounding in sound technical analysis that considers the tolerance for harmful interference among potentially affected spectrum uses. That tolerance can vary widely among various spectrum uses. In the case of aeronautical spectrum applications affecting safety-of-life, the FAA certification processes form the prime focal point for certification of all avionics equipment by that agency. FAA-adopted performance standards must be met through a wide range of possible operational configurations including those that go well beyond what is “reasonably likely” to be encountered on most flights or missions. By contrast, many other radio systems, including those used for commercial fixed and mobile services and for utility operations, have, by comparison,

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<sup>12</sup> In a similar manner, some spectrum bands may be studied under NSS for new aviation spectrum uses that theoretically may lead to a more congested physical NAS. One clear example is the 5030-5091 MHz band, one of the five initial bands identified for study in the NSS document. Consideration of how to make that spectrum available for uncrewed aircraft systems (“UAS”), must in tandem consider not only questions of radiofrequency compatibility within that band and with uses in adjacent bands, such as AeroMACS and aircraft flight test operations in adjacent bands, but also consider whether adequate spectrum will be available to support large UAS operations that might present a certain increased risk of physical dangers with manned aircraft operations in the NAS. In other words, NSS implementation for this frequency band must address, among other things, whether the band’s capacity is sufficient for the stated purposes – supporting command and control of large UAS accessing controlled airspace – so as to not increase risks to safety of life and property due to increased use of the NAS.

have much less strict operational integrity requirements. Such industries can operate very differently, and NSS implementation should reflect this.

To ensure that the implementation of the NSS is grounded properly, ASRI submits that some of the early work by the multi-stakeholder process regarding any given band or set of bands (*e.g.*, a band to introduce new or additional uses, and any bands that may be considered as a new home for incumbents if relocation of some or all of the incumbents in the initial band proves necessary because of coexistence challenges) is to develop by consensus the analysis and testing methodologies to address coexistence and compatibility questions. This process should also account for any necessary equipment testing, as incumbent systems may have been designed before new commercial wireless technologies existed that are being studied for possible introduction into the same or neighboring frequency ranges.<sup>13</sup> Government oversight on the multi-stakeholder process, for example by the NTIA and the FCC, should be focused on trying to drive consensus, which would give the results more credibility. Whether consensus on the approach to such analysis and testing is achieved or not, the multi-stakeholder process should lead to a schedule with reasonable deadlines to fully accommodate the completion of such testing and technical analysis.

**4. NSS Implementation Should Reflect a Preference for Spectrum Sharing by All Spectrum Users but *without* Compromising Essential Missions.** Spectrum sharing, *where it can be achieved*, inherently leads to more intense spectrum usage. The NSS implementation

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<sup>13</sup> Manufacturers of incumbent systems may not have the necessary information on interference tolerances for these systems relative to the new technology waveforms, nor the necessary signal waveform parameters needed to appropriately assess a system's reaction to the presence of nearby radios employing certain modulation schemes. This is essential for more sensitive receivers such as radars which may show significant variation in system response to interference from different signal modulation types.

plan should put a priority on exploring opportunities for maximizing spectrum sharing, as that puts less pressure on repurposing spectrum or the need for exclusive licensing. Nevertheless, implementation of the NSS should proceed in a manner that requires the multi-stakeholder participants representing both incumbent uses and new or additional applications to engage in a good faith process to examine sharing possibilities, even if the possibility is ultimately discarded and the band is considered unavailable for a new or additional use.

It is notable that, of the five bands that were identified for study, the NTIA contemplates sharing or potential sharing in each of them.<sup>14</sup> This indicates that, at this time, there likely is no “low hanging fruit” for exclusive licensing that dispenses with the need for sharing.

**5. NSS Implementation Should Be Predicated on A Clear Expectation That Intensity of Use in Existing Spectrum Should Be Maximized as a Prerequisite to Accessing Additional Spectrum for Similar Uses.** Related to the principle of prioritizing the examination of candidate sharing regimes, implementation of the NSS should require proponents of access to new spectrum bands to demonstrate that they are making intensive use of any existing spectrum

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<sup>14</sup> See NSS at 6. The NSS declares the intention to study the Federal 3.1-3.45 GHz band further to supplement Department of Defense determinations “that sharing is feasible if certain advanced interference-mitigation features and a coordination framework to facilitate spectrum sharing are put in place” by “explor[ing] dynamic spectrum sharing and other opportunities for private-sector access in the band, while ensuring DoD and other Federal mission capabilities are preserved . . .” *Id.* The NSS will also study whether to augment “expected . . . near-term action to facilitate limited deployment of UAS” in the 5030-5091 MHz band by facilitating “UAS spectrum access across the band while avoiding harmful interference to other protected in-band and adjacent-band operations.” *Id.* In addition, implementation of the NSS will study the 7125-8400 MHz band “for wireless broadband use (on a licensed and/or unlicensed basis)” in some sub-bands and “for other uses,” eventually, in other sub-bands, recognizing that mission-critical incumbent Federal operations in this band “will make it challenging to repurpose portions of the band while protecting incumbent users from harmful interference.” *Id.* Further, the NSS calls for the study of “expanded Federal and non-Federal satellite operations” in 18.1-18.6 GHz by adding “space-to-space allocations to this band” along with existing Fixed Satellite Service space-to-Earth operations and non-Federal Fixed Service operations in all or some of the band. *Id.* at 7. Finally, the 37.0-37.6 GHz band “will be further studied to implement a co-equal, shared-use framework allowing Federal and non-Federal users.” *Id.*

to which they have access. Incumbent spectrum users in a band typically will be asked to explain and justify their existing spectrum usage as part of studies to introduce new or additional uses into their spectrum, and there should be no reason why prospective new entrants from different industries should not be asked to do the same for their own existing spectrum holdings to ensure maximum spectrum efficiency. This would not constitute the imposition of a *de facto* spectrum cap, but a commonsense requirement for sound spectrum management in a world of increasing congestion and a safeguard against effective spectrum warehousing. Individualized examination of the demand for new access must be predicated on a demonstration, not a presumption, that access to new spectrum is necessary.

The NSS should be implemented in a clear and open manner that creates expectations that all industries using spectrum will work to prioritize and maximize existing spectrum use, including frequency reuse, and to conduct periodic examination of their existing spectrum allocations for prospects to implement new technologies and services. This examination should be done by industry players before urging regulators to adopt new spectrum allocations.

This sequence of effort by a proponent for access to spectrum for new or additional uses should be an essential part of implementing the NSS because the spectrum, in all frequency ranges, is increasingly congested and adding new layers to sharing regimes is becoming increasingly difficult. A demonstration that existing spectrum is being heavily used, and whether that usage is uniformly heavy, or is localized in a finite number of areas will be of significance in considering what form potential new or additional access might take.

## CONCLUSION

ASRI appreciates this opportunity to comment on the implementation of the NSS. It is well known that the aviation industry plays a vital role in our nation's life and economy, especially safe and efficient air transport that is heavily reliant on adequate spectrum access. This access is essential to enable the advanced plethora of aviation communications, radiolocation, and radionavigation technologies of today, which continue to grow with the demand for air travel. Spectrum access to support a myriad of wireless functions will be even more critical for the more sophisticated aircraft of tomorrow in an increasingly heavily used NAS. ASRI looks forward to working with Federal Government agencies and spectrum users, as well as industry participants, in supporting implementation of the NSS with respect to aeronautical spectrum bands.

Respectfully submitted,

**AVIATION SPECTRUM RESOURCES, INC.**

/s/ Andrew C. Roy

Andrew C. Roy, Director of Engineering Services  
180 Admiral Cochrane Drive  
Suite 300  
Annapolis, MD 21401  
443-951-0340

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