Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of:	)	
	)	
Promoting the Development of Positioning, Navigation, and Timing Technologies and Solutions	)	WT Docket No. 25-110
	)	
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	)	

COMMENTS OF
THE NATIONAL ASSOCIATION OF BROADCASTERS

I. INTRODUCTION AND SUMMARY

The National Association of Broadcasters (NAB)[1] submits these comments in response to the above-captioned Notice of Inquiry.[2] We applaud the Commission for looking into ways to facilitate the development of complementary positioning, navigation, and timing (PNT) technologies. As the Notice observes, the security and resilience of PNT systems is critical for our national security and our economy. The FCC must take this national priority into account while exercising its spectrum management authority.

NAB has developed a system it refers to as the Broadcast Positioning System™ (BPS™), which leverages ATSC 3.0 (also called Next Gen TV) technology to provide accurate and precise timing information within a broadcast television signal. BPS time transfer has

[1] The National Association of Broadcasters (NAB) is the nonprofit trade association that advocates on behalf of free local radio and television stations and broadcast networks before Congress, the Federal Communications Commission and other federal agencies, and the courts.

[2] FCC Notice of Inquiry, *Promoting the Development of Positioning, Navigation, and Timing Technologies and Solutions* GN Docket No. 25-110, FCC 25-20 (Mar. 27, 2025) (Notice of Inquiry or Notice).

been declared "comparable to or better than GNSS" by time and frequency scientists at the National Institute of Standards and Technology (NIST), "making BPS a viable complementary PNT solution when GNSS is unavailable."[3] Using existing tower infrastructure and operating within the transmission standard to which broadcasters are already migrating, BPS can be rolled out quickly and at relatively low expense at any ATSC 3.0 broadcast site. Indeed, NAB members have already deployed BPS at ATSC 3.0 transmission sites in Washington DC, Baltimore, and Denver, and temporarily deployed BPS in Las Vegas, Nevada. The nature of broadcast transmissions – operating terrestrially at high power from high towers designed to reach substantially all of the population of the United States – makes it an ideal solution to address this problem.

Broadcasters began deploying ATSC 3.0 on a voluntary basis following the FCC's 2017 authorization of the standard.[4] To date, over 100 transmitters in 80 markets are broadcasting in ATSC 3.0, reaching over 75 percent of the households in the country. NAB has filed a petition asking the Commission to establish a timeline for a nationwide transition to Next Gen TV so that all of the nation's 1767 full-power and 383 class A television transmitters are using this innovative standard within the next three to five years.[5] Broadcasters are eager to complete this transition and begin delivering the full benefits of Next Gen TV to viewers nationwide – including vast improvements in video and audio quality, interactive features,

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[3] Mondal, T. , Sherman, J. and Howe, D. (2025), Time transfer performance of Broadcast Positioning System (BPS), Proceedings of the 56th Annual Precise Time and Time Interval Systems and Applications Meeting, Long Beach, CA, US, (Jan. 28, 2025), available at https://www.nab.org/bps/ITM25-0009.pdf (Time Transfer Performance Of BPS).

[4] Authorizing the "Next Generation Broadcast Television Standard, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 9930, (2017).

[5] See FCC, Broadcast Station Totals as of March 31, 2021, Public Notice, DA 25-296 (Apr. 4, 2025).

enhanced emergency information, and much more efficient use of spectrum. Broadcasters' ability to offer a robust PNT capability within this standard is yet another reason why the Commission should act swiftly to finalize this transition.

The Commission need not pick any specific PNT technology or set of technologies to favor. The development of multiple independent systems can strengthen PNT resilience and allow different use cases to choose the most appropriate system(s) for their needs. Developing solutions based on a combination of PNT technologies may also be desirable. For example, earlier this month in Las Vegas, Nevada, NAB demonstrated a combined BPS and eLoran system with UrsaNav.

We look forward to working with the Commission, among other government agencies and private sector entities, to deliver BPS as a robust complementary PNT solution.

II. THE BROADCAST POSITIONING SYSTEM LEVERAGES THE NEXT GENERATION TELEVISION STANDARD TO PROVIDE PRECISE AND ACCURATE PNT SERVICES

As the Notice observes, BPS uses features of ATSC 3.0, an international standard for broadcast television, to deliver precise timing information. As broadcasters complete this transition, the BPS service can be provided nationwide with a modest investment at each transmission site and no additional spectrum demands. Early testing at sites already broadcasting the BPS signal has shown extremely promising performance for all critical infrastructure timing needs. Below, we address the specific questions raised in the Notice.

Geography. Television broadcast signals operate throughout the United States and reach the vast majority of the populated areas of the country. Broadcasters note that in certain parts of the country, such as the mountain west, television signal reception can be somewhat limited. However, the BPS timing information is delivered in portions of the ATSC 3.0 signal that can be received and decoded in signal conditions substantially more

challenging than the main payload of the television signal.[6] Indeed, the BPS signaling is so robust that it can be decoded below the noise floor. As a result, the entire continental U.S. and Hawaii, including significant coverage into international waters, are predicted to be in range of BPS signals if BPS were deployed at each broadcast site as illustrated in Figure 1.

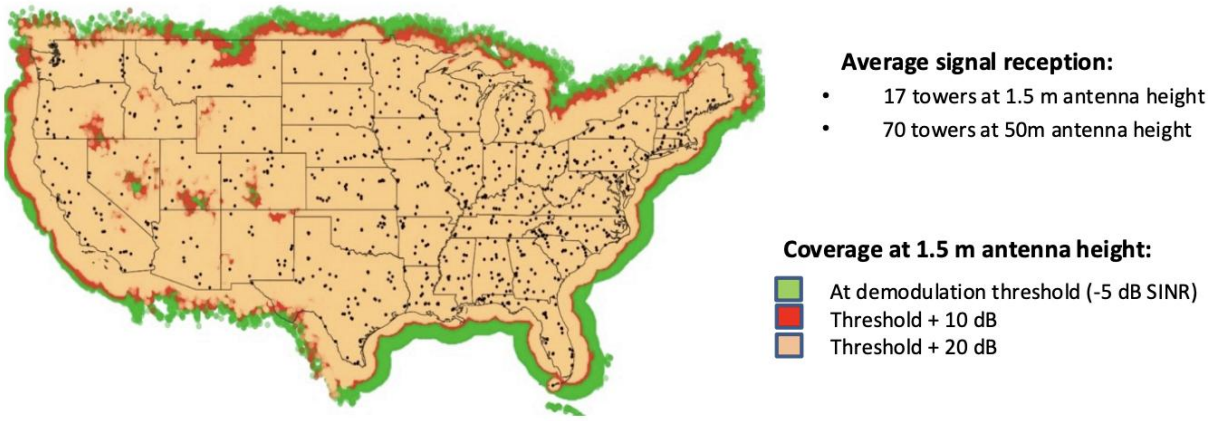

Figure 1: BPS coverage at full deployment.

Infrastructure & End-User Equipment. To transmit BPS signals, broadcasters must install a device called a "synchronizer" at their transmission site and receive time from a traceable source. There are multiple options for obtaining traceable time, including GPS satellites, a direct fiber feed or microwave feed from a government source, a leader-follower implementation in the BPS network, eLoran, and non-GPS satellite services. Current BPS deployments also use a local atomic clock for holdover. A new BPS transmission site can be configured and brought online within a matter of weeks, provided the site is already broadcasting in ATSC 3.0.

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[6] The timing reference used in BPS is the ATSC 3.0 "bootstrap," which is designed to be received at some 12 dB below the system noise floor, while other necessary parameters are transmitted in the "preamble" and in the most robust physical layer pipe (PLP) configuration, both of which are designed to be received at some 5 dB below the system noise floor.

NAB is working with vendors of GPS-based timing appliances used by power companies, telecommunications companies, data centers, and other similar critical infrastructure users to develop BPS receivers. At scale, the cost of such receivers should be comparable to commercial-grade GPS receivers.

Spectrum. BPS operates entirely within broadcasters' existing spectrum footprints. The provision of BPS uses a very small percentage of the capacity of the ATSC 3.0 broadcast signal, and as such no changes to broadcast licenses or allocations are contemplated.

Integration. BPS can operate as a complete solution, *i.e.*, providing both time transfer and time delivery. It can also operate as part of a system of systems. NAB demonstrated using eLoran as a timing source at the 2025 NAB Show in Las Vegas. Likewise, it would be possible for another time delivery system, such as PTP networks, to use BPS as a timing source. Having multiple PNT solutions confers many benefits and provides resiliency against different modes of attacks. Additionally, BPS as an independent network can be integrated into the larger PNT ecosystem to monitor GPS disruptions (jamming) and manipulations (spoofing) and satisfy a goal of President Trump's Space Policy Directive 7 (SPD-7).[7] NAB is already in discussion with relevant government agencies and commercial PNT manufacturers about this capability.

Resiliency. Broadcast television signals originate from terrestrial towers typically located at high elevation near population centers at up to a Megawatt of power. Each signal occupies 6 MHz of bandwidth, and at a typical location in the United States, there are over a dozen signals that could provide BPS service. While the television payload of broadcast signals can be susceptible to interference from a variety of sources, the BPS signal is

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[7] White House, Memorandum on Space Policy Directive 7 (Jan. 15, 2021), https://trumpwhitehouse.archives.gov/presidential-actions/memorandum-space-policy-directive-7/ (SPD-7).

transmitted within the bootstrap and other low-level portions of the ATSC 3.0 signal, which is receivable *below* the noise floor (-5 dB SINR). Because of the high power level and the fact that television stations operate on frequencies ranging from 54 to 608 MHz, jamming one BPS signal, let alone all available BPS signals would be a significant undertaking.

Performance. NAB, along with Nexstar, has entered into a Collaborative Research and Development Agreement (CRADA) with the National Institutes of Standards and Technology (NIST) to assess the performance of BPS. Under this agreement, scientists at NIST have performed their own tests of BPS, comparing it against the performance of single-band and dual-band GPS. In a peer-reviewed paper, the scientists found that the time deviation of BPS is "superior to the single-band GPS receiver" and that "ns-level timing of BPS can support PNT services comparable to GPS or other GNSS" as illustrated in Figure 2.[8]

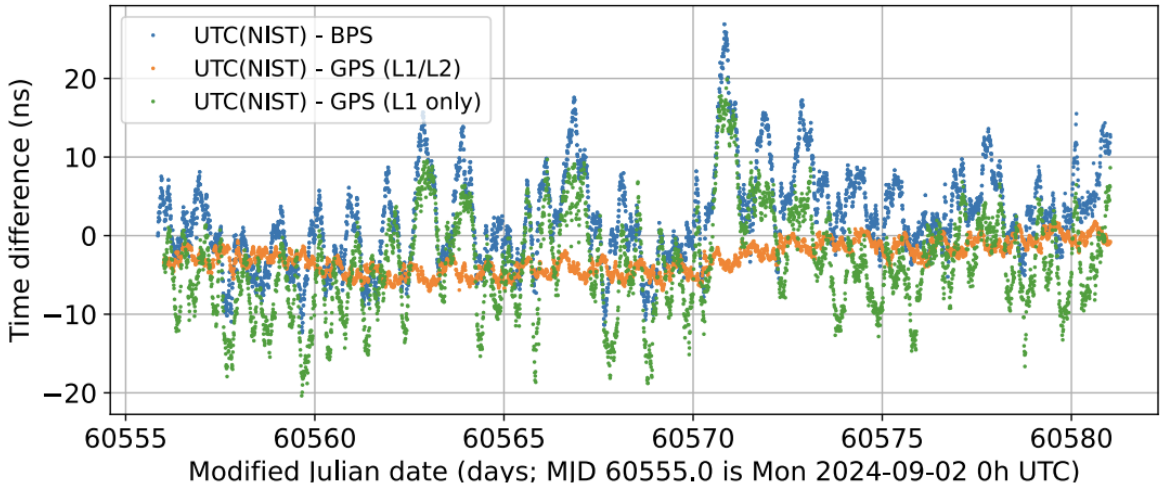

Figure 2: Comparison of UTC(NIST) vs BPS measurements, with a single-band and dual-band measurement of UTC(NIST) – GPS.

International. BPS can be deployed anywhere ATSC 3.0 is deployed. ATSC 3.0 is an international standard – currently deployed in South Korea and Jamaica. Trinidad and Tobago

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[8] Time Transfer Performance of BPS at 6.

is preparing to launch ATSC 3.0 service this year. Brazil has adopted significant portions of the ATSC 3.0 standard for its TV 3.0 service and broadcasters there have shown strong interest in BPS. India is exploring ATSC 3.0 technologies for direct-to-mobile services and has chipset manufacturers implementing BPS. Humber College in Canada runs an ATSC 3.0 testbed and has been actively doing work to test BPS in Toronto since 2023. South Korea's Electronics Technology Research Institute (ETRI) is also investing in BPS research and development with the support of their Ministry of Information and Communications Technology.

Economic considerations. As a one-to-many service, with no incremental cost associated with adding additional viewers, broadcasters have typically provided services at no cost to the public. There is no reason to expect that the provision of BPS would deviate from this model. Nevertheless, there is an expense to deploying, operating, and maintaining this service. The U.S. Government appropriates funds each year to maintain GPS, which also operates at no charge to end users.[9] NAB believes it would be appropriate for the government to consider funding the build-out and deployment of appropriate complementary PNT services, which would then be offered for free to end-users.

While the FCC clearly has a key role in PNT solutions as they impact spectrum management decisions, choices about whether, which, and how many terrestrial PNT services should be funded or otherwise promoted by the federal government require input from other agencies. As the Notice observes, SPD-7 established a National Space-Based Positioning, Navigation, and Timing Executive Committee, with leadership shared between the Department of Defense and the Department of Transportation.[10] The FCC serves an advisory role in that

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[9] See GPS.gov, Fiscal Year 2023 Program Funding (updated Apr. 27, 2022), https://www.gps.gov/policy/funding/2023/.

[10] See https://www.gps.gov/governance/agencies/.

committee. The FCC need not make decisions about which technology or technologies to preference in a vacuum. NAB is confident that BPS can play a vital role in strengthening our nation's PNT resiliency, regardless of the parallel development of other solutions.

III. CONCLUSION.

BPS is an exciting and viable complementary PNT technology that could be ready to serve most of the nation's critical infrastructure PNT needs within the next three years or less, with full CONUS coverage within five years. We look forward to continuing to work with the Commission and with other agencies to enhance the nation's PNT resiliency alongside the nationwide deployment of Next Generation Television services.

Respectfully submitted,

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