November 10, 2025

The Honorable Maria Cantwell
Chair
Committee on Commerce, Science, and Transportation
United States Senate
512 Dirksen Senate Office Building
Washington, DC 20510

The Honorable Ted Cruz
Ranking Member
Committee on Commerce, Science, and Transportation
United States Senate
512 Dirksen Senate Office Building
Washington, DC 20510

Re: Realizing a Modernized, Proactive National Airspace System (NAS)
Is Airspace Capacity Infinite?

Dear Chairman Graves and Ranking Member Larsen:

The Aviation-Impacted Communities Alliance (AICA) appreciates the leadership of the Senate Committee on Commerce, Science, and Transportation (the Senate Committee) in examining the future of the National Airspace System (NAS). With safety, staffing, and modernization at a crossroads, this moment calls for solutions that recognize both the opportunities and the limits of our shared airspace. **AICA encourages Congress to ensure that modernization efforts include a proactive system that links staffing, aircraft types, and operational volume to objective safety thresholds, making risk more visible, ensuring accountability, and supporting balanced outcomes for all stakeholders, including communities impacted by aviation operations, whose lived experience reflects conditions in the NAS.**

Background

Modernizing the NAS is essential for all, including the traveling public and communities impacted by aviation. Congress has already initiated the conversation, with the House Committee holding a March 4, 2025, hearing focused on safety, staffing, and modernization [1], and the Senate Committee convening a related hearing on May 14, 2025 [2]. The Senate leaders emphasized solutions that work across user groups and invited input to help shape the air traffic control system of the future.

AICA welcomes this inclusive intent and emphasizes that those residing under flight paths and near airports, whose lived experience reflects the real-world consequences of NAS decisions, provide essential context for modernization discussions. This perspective recognizes that 'stakeholders' include not only agencies and industry participants but also residents and regions directly influenced by aviation, whose lived experience offers critical insight into how the system actually performs. A recent example of how communities and industry can work

together constructively to inform policy and support balanced, data-driven modernization is the joint Federal Register comment submitted to FAA in September 2025 by AICA, the National Air Transportation Association (NATA), and the University Aviation Association (UAA) [3].

Senator Ted Cruz, Chairman of the Senate Committee stated, "Now is the time for Congress to determine whether or not changes need to be made, and what they look like." He asked pointedly, "In an era of AI and automation, is the current ATC system really the best we can do?" He further underscored that "the time of doing the same thing again and again and expecting different results is over" [4]. Senator Cruz's comments underscore the need for timely, comprehensive action, reflected in Congress's July 2025 approval of $12.5 billion to modernize the nation's air traffic control system and bolster staffing.

Notably, the FAA has taken two recent steps towards a modernized, proactive NAS:

- Announced that it has met its 2025 hiring goal to add 2,000 air traffic controllers, with plans to hire an additional 2,200 controllers in 2026 [5].
- Initiated an overhaul of the air traffic control system, beginning with replacement of the current Traffic Flow Management System (TFMS) with a new Flow Management Data and Services (FMDS) system [6].

These actions represent progress toward a modernized, proactive NAS and underscore the need for collaboration among all stakeholders. AICA, representing more than 90 local and national organizations advocating for bipartisan efforts to reduce noise and health impacts while ensuring safe management of the NAS, builds on this momentum with insight grounded in the lived experience of communities impacted by aviation operations. AICA encourages Congress to embed objective safety thresholds and transparent accountability within modernization initiatives, so progress leads to lasting safety and public confidence. AICA's perspective on airspace management is informed by two primary considerations: first, that airspace capacity is inherently limited, and second, that lived experience provides essential insight into how these limits affect safety, operations, and communities.

Is Airspace Capacity Infinite?

Airspace capacity is finite. In reality, capacity in the NAS is constrained by staffing, technology, operational complexity, and human limits. Ignoring these limits puts safety at risk. Today's NAS already manages a high number of operations, and increasing flights, new aircraft types, and escalating complexity are being added in an environment where staffing is not keeping pace and safeguards are unclear. Recognizing that capacity is finite, objective thresholds are essential, not only to identify risk but also to trigger timely action and ensure accountability before incidents occur.

Lived Experience: A Human and Data Perspective on NAS Capacity

"Lived experience" in airspace management reflects how NAS capacity is experienced by people, both in the air and on the ground. When airspace nears its limits, controllers manage higher workloads, pilots and uncrewed aircraft navigate crowded skies, and communities experience more concentrated overflights. These conditions can elevate safety risks and test system and human limits. A lived-experience approach connects these perspectives with operational data, including counting the number of aircraft and their relative separation in shared airspace to identify when the system is under stress and support proactive, safety-focused capacity management. This same

approach can also inform local environmental evaluation and land-use planning by ensuring analyses count the number of aviation noise events affecting a given area and reflect on-the-ground community experience.

Set forth below is a more comprehensive discussion of AICA's recommendations for successfully realizing a modernized, proactive NAS.

Executive Summary

AICA's Core Recommendation

All stakeholders, including communities impacted by aviation operations share the goal of ensuring a safer, more resilient NAS that benefits all. **AICA requests that Congress adopt policies, rules, regulations, and other actions to implement a modernized, proactive NAS framework defined by the three critical themes below. This links FAA staffing levels, aircraft types, operations volume, and airspace complexity to objective, predefined thresholds that make risk visible, trigger timely adjustments, and document who was notified, what actions were taken, and the basis for those actions.** This framework should also leverage existing FAA data systems, accommodate emerging low-altitude aircraft that will add operational volume and complexity, and explicitly acknowledge that airspace capacity is finite and must be managed proactively.

Three Critical Themes Supporting AICA's Core Recommendation

- **Safety improvements should be preventive rather than reactive,** guided by objective data before disruptions or accidents reveal system weaknesses.
- **Existing operational data must be used proactively** to establish objective thresholds that make risk visible, guide timely adjustments, and ensure accountability.
- **Airspace complexity is rapidly increasing** as commercial, General Aviation (GA), and Advanced Air Mobility (AAM, including drones) operations converge within overlapping altitude bands, underscoring that airspace capacity is finite and must be actively managed as depicted in Figure 7 below [7]. Managing this complexity requires input from all affected stakeholders, including those living in aviation-impacted communities.

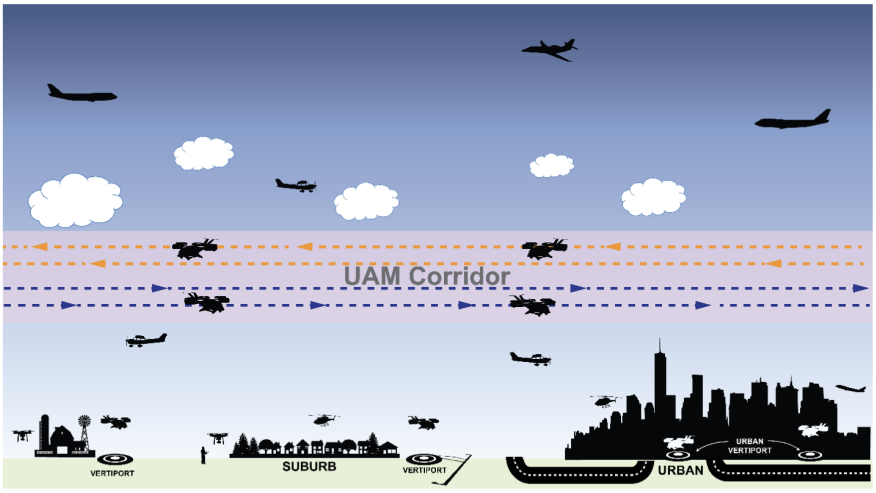

Figure 7: UAM Corridor with Multiple Tracks

FAA's *Urban Air Mobility ConOps 2.0* [7] serves as a foundational reference, depicting a notional "layer cake" of operations. This depiction of the NAS structure, as shown in Figure 7, provides important context for AICA's Core Recommendation. Although this graphic offers a static view of safe en route separation among aircraft types in the various altitude layers of the NAS, it does not indicate or explain the safety issues as flights converge across layers (see explanatory discussion in the Detailed Discussion and Considerations section below).

This illustration underscores why a modernized NAS must manage airspace capacity proactively to address safety risks as operations converge across altitude layers. It also indicates that the future NAS will be significantly more crowded than it is today, with numerous aircraft types flying at various altitude levels, including low-flying aircraft over cities, towns, and neighborhoods. Such conditions could create safety and operational challenges and increase adverse noise, health, and quality-of-life impacts on communities affected by aviation operations.

Evidence Supporting AICA's Core Recommendation

1. **Near-miss alerts at Ronald Reagan Washington National Airport (DCA) reveal long-standing risks.** The National Transportation Safety Board (NTSB) Chair testified that "between October 2021 and December 2024, there were over 15,200 near-miss events, including 85 cases where vertical separation was under 200 feet" [8].
2. **Air traffic warnings at DCA underscore ignored concerns.** At DCA, controllers asked for relief from the "feverish pace of arrivals," but their concerns "fell on deaf ears" [9]. They had recommended slowing arrivals as early as 2022, but "it was not acted on" [9]. Before the 2025 midair collision, one controller described the approach as a "squeeze play," where "everyone's just trying to constantly make it work, make it work, make it work [sic]" [9].
3. **Controller shortages heighten public awareness of safety risks.** Recent reporting has shown that air traffic control facilities in major metropolitan areas are operating at roughly 60 percent of target staffing levels, leaving some with fewer than two-thirds of the certified controllers needed**.** These shortages have drawn public attention to the growing strain on safety and efficiency across the NAS [10].

4. **Helicopter crash in congested urban airspace underscores oversight gaps.** The helicopter crash in a major city underscores the growing safety risks in congested urban airspace. Even with existing rules, complex low-altitude environments demand stronger oversight, coordination, and real-time accountability to prevent tragedies as new aircraft such as eVTOLs and drones enter the same airspace [11].

5. **United cuts flights before FAA caps at Newark (EWR).** United's CEO stated, "over half a million customers … were delayed because of air traffic control shortfalls in Newark alone" [12]. United canceled 35 daily roundtrips "to protect our customers" [12], subsequently FAA imposed a cap on operations "as a result of a persistent number of flights above capacity at EWR" [13].

6. **Airlines emphasize substantial ATC strain.** Airlines for America testified to the House Committee that the ATC system is "woefully obsolescent, unreliable and inefficient due to a multitude of well-documented critical staffing, facility, technology, equipment, funding and investment deficiencies" [1].

7. **NATCA testimony underscores controller fatigue.** In House testimony, the National Air Traffic Controllers Association stated that controllers "continue to work short-staffed, often six days-a-week, ten hours-a-day for years at a time," highlighting long-term safety risks from sustained understaffing [1].

8. **eVTOL test flight shows NAS coordination challenges.** The trip included a "five-minute hold pattern at Monterey to allow spacing for another airliner" [14], demonstrating added complexity and safety implications of new entrants in shared airspace.

9. **Proposed BVLOS rule raises low-altitude safety concerns.** FAA's draft Beyond Visual Line of Sight (BVLOS) rule would allow drones to operate below 400 feet AGL unless crewed aircraft are broadcasting their position electronically, shifting right-of-way responsibility based on signal visibility. Many low-altitude aircraft, including helicopters and seaplanes, do not routinely use ADS-B Out, creating situations where drones could legally operate near pilots unaware of their presence and increasing collision risk in mixed-use airspace [15].

10. **Prototype flying car trials point to growing airspace complexity.** Trials at two airports "will test operations in common air traffic with other aircraft" [16], underscoring increased complexity and the need for robust air-traffic protocols.

Thank you for your leadership in addressing these urgent concerns. Communities share with government, industry, and labor the common goals of ensuring safety and strengthening the National Airspace System for the benefit of all. We appreciate the opportunity to contribute to this discussion and look forward to continued engagement as Congress advances this critical work.

Below are the Detailed Discussion and Considerations sections that supports AICA's Core Recommendation.

Respectfully submitted,

Darlene Yaplee
President and Co-founder, Aviation-Impacted Communities Alliance (AICA)

cc:
Members, Committee on Commerce, Science, and Transportation, U.S. Senate
Members, Quiet Skies Caucus
Members, Aviation-Impacted Communities Alliance

Supporting Organizations

National Organizations
aiREFORM
Aviation-Impacted Communities Alliance (AICA)
Citizens for Quiet Skies
National Quiet Skies Coalition
NextGenNoise.Org
Quiet Communities, Inc.
Sky Justice National Network

State/Local Organizations
Advocates for Viable Airport Solutions, CA
Airport Concerned Citizens (ACC) of Georgetown, TX
Airport Impact Relief Incorporated (AIR Inc.), MA
Alliance for a Regional Solution to Airport Congestion (ARSAC), CA
Arlington County Quiet Skies Coalition (ACQSC), VA
ATL Neighbors Needing Quiet Skies, GA
Bay Area Jet Noise, CA
Brooklyn Quiet Skies, NY
Bucks Residents for Responsible Airport Management (BRRAM), PA
Citizens Advocating Safe Aviation, CA
Citizens Against Airport Noise and Pollution (CAANP), CA
Citizens Against Gillespie Expansion and Low Flying Aircraft (C.A.G.E.L.F.A), CA
Citizens for Airpark Safety, MD
Claremont Town Council, San Diego, CA
Clow.NoNoise.CleanAir, IL
Coalition to Transform East Hampton Airport, NY
Concerned Residents of Palo Alto, CA
DC Metroplex BWI Community Roundtable, MD
FAiR Chicago, IL
FumeFighters United VNY, CA
GrotonAyerBuzz of Ayer, MA
GRRift (Gilpin Residents Refuse Increased Flight Traffic), CO
H.A.R.N.E.S.S. (Helping Aviation Respect Neighbors, Environments, Sustainability, and Silence), OR
Hawthorne Quiet Skies, CA
HICoP (Hawaii Island Coalition Malama Pono), HI
Hull Neighbors for Quiet Skies, MA
Keep It Down Up There, CA
Logan Aircraft Noise Working Group, MA
Long Beach SANER (Small Aircraft NoisE Reduction Group), CA
Los Angeles Area Helicopter Noise Coalition (LAAHNC), CA
Lower Makefield Township Trenton-Mercer Airport Review Panel, PA
Melrose Place Against Nuisance, Baton Rouge, LA

Montgomery County Quiet Skies Coalition, MD
North Bayside Civic Association, NY
Oregon Aviation Watch, OR
Portland International Jetport (PWM) Noise Advisory Committee – South Portland Representative, ME
Plane Sense 4 Long Island, NY
Quiet Florida, FL
Quiet Skies, AL
Quiet Skies Boulder County, CO
Quiet Skies Coalition, WA
Quiet Skies Hawaii, HI
Quiet Skies Jefferson County, CO
Quiet Skies LA, CA
Quiet Skies La Jolla/San Diego, CA
Quiet Skies Lake Arrowhead, CA
Quiet Skies Maui, HI
Quiet Skies Northeast Miami-Dade County, FL
Quiet Skies Over Arapahoe County, CO
QuietskiesPacifica94044, CA
Quiet Skies Puget Sound, WA
Quiet Skies Santa Monica Mountains, CA
Quiet Skies Woodland Hills, CA
Reduce Jet Noise Naples, FL
San Francisco's Concerned Residents Experiencing Annoying Aircraft Maneuvers (S.C.R.E.A.A.M.), CA
Save Our Skies Alliance, CO
Save Our Skies LA (SOSLA), CA
Save Our Skies Santa Cruz, CA
SCANA (Scottsdale Coalition for Airplane Noise Abatement), AZ
Serra Mesa Community Council, CA
Sherman Oaks & Encino for Quiet Skies, CA
Sky Posse Los Altos, CA
South Flow Alliance, VA
Stop OAK Expansion Coalition, CA
STOP Jet Noise NOW! SFOAK North S.F. Bay Area, CA
Still Protecting Our Newport (SPON), CA
Stop the Chop, NY/NJ
Studio City for Quiet Skies, CA
Sunnyvale / Cupertino Airplane Noise Group, CA
Teachers and Students Supporting Quiet Skies – San Diego, CA
Trenton Threatened Skies, NJ
Truckee Communities for a Better Airport, CA
Twin Cities Metro Airport Neighbors for Change, MN
UproarLA, CA
Vashon Island Fair Skies, WA
West Adams for Quiet Skies, CA

Detailed Discussion and Considerations

The following sections provide context, evidence, and recommendations that expand on the Executive Summary of AICA's letter, offering a framework to inform the design of a modernized, proactive NAS.

Part 1: Shared Understanding Among Stakeholders, Including Communities Impacted by Aircraft Operations

As Congress and stakeholders consider the path forward on airspace modernization, there is broad agreement that the system must be safer, more resilient, and better prepared for the future. In this context, AICA interprets "stakeholders" to include not only aviation entities but also communities impacted by aviation operations, whose lived experience provides essential insight into system performance. Several themes illustrate this shared understanding.

Priority Among Stakeholders
As Chairman of the Senate Committee, Ted Cruz emphasized, "Everyone has a role in preventing the next accident" [4]. Communities impacted by aviation operations also share this responsibility by offering input and recommendations that, together with those of other stakeholders, support efforts to prevent the next accident.

The bipartisan passage of the FAA Reauthorization Act of 2024 reflected a broad consensus that modernizing the nation's airspace is a shared priority. As Pete Bunce, President and CEO of the General Aviation Manufacturers Association (GAMA), testified at the House Aviation Subcommittee, "this Committee, as it did with the FAA Reauthorization Act of 2024, will respond with true leadership and a focus on consensus and bipartisan support" [1]. AICA notes that achieving this consensus requires continued collaboration among all stakeholders, including those living near airports and under flight paths.

Urgency of Action
Nicholas Calio, President and CEO for Airlines for America (A4A), testified before the House Committee that the U.S. air traffic control system is "woefully obsolescent, unreliable and inefficient due to a multitude of well-documented critical staffing, facility, technology, equipment, funding, and investment deficiencies" [1]. His statement reflects the view of many stakeholders that the current system is struggling to meet today's demands. People experiencing heavy air traffic and overflights encounter these same strains through more frequent routes, increasing local exposure to safety risks and noise impacts.

Modernization: Address Today, Prepare for Tomorrow
In the Senate Committee testimony, Jodi Baker, FAA Deputy Associate Administrator for Aviation Safety, noted the need to "enhance the safety of the national airspace system (NAS) for current users" while also preparing to accommodate new entrants such as Advanced Air Mobility (AAM) [2]. These new entrants are already emerging, and modernization must account for their impacts on safety, staffing, and the coordination of different types of operations within the NAS with community considerations addressed alongside operational and economic priorities.

Doing Things Differently
As Chairman Ted Cruz stated, "Now is the time for Congress to determine whether or not changes need to be made, and what they look like" and asked, "In an era of AI and automation, is the current ATC system really the

best we can do?" He further underscored that "the time of doing the same thing again and again and expecting different results is over" [4]. Dave Spero, Professional Aviation Safety Specialists (PASS), reinforced this same theme from a labor perspective, testifying at a House hearing that FAA needs to be willing to "take a different approach if we want different outcomes" [1]. AICA concurs that achieving different outcomes will require new approaches that engage all stakeholders in shaping modernization policy.

Resourcing alone may address current shortfalls but will not prepare the NAS for future complexity. AAM, and rising GA traffic that will result from regulatory changes such as the FAA's Modernization of Special Airworthiness Certification (MOSAIC) rule and, add both volume and operational variety.

Part 2: Resourcing and Safety in a Shared Airspace

Ensuring safety in the NAS requires more than addressing current staffing gaps. This section illustrates how under-resourcing and growing airspace complexity highlight the need for a proactive system that addresses risks early, before they require reactive measures.

FAA Caps at Newark (EWR) Follow United's Cuts
At Newark, major operational disruptions occurred when, as United Airlines CEO Scott Kirby noted for the month of November, "over half a million customers … were delayed because of air traffic control shortfalls in Newark alone" [12]. In response, Kirby announced that United would cancel 35 daily round-trip flights, stating, "we feel like there is no other choice in order to protect our customers" [12].

FAA subsequently took the unusual step of explicitly citing staffing-related safety concerns in reducing the number of scheduled flights at a major airport. On May 23, 2025, the agency issued an Interim Order capping Newark operations after persistent demand exceeded capacity and delays cascaded across the NAS [17]. The order cited staffing shortfalls at the Philadelphia TRACON (PHL) and construction-related disruptions as contributing factors. According to the order, "PHL's targeted staffing number is 114 Certified Professional Controllers (CPCs); the current onboard number at PHL is 82, representing 71.9% staffed. Area C, overseeing the Newark area, has a targeted staffing number of 38 CPCs, with its current staff of 24 CPCs representing 63% staffed" [17]. The cap was later formalized as a limit of 77 operations per hour through December 31, 2025, under a June 10 order [18]. Subsequently, in August 2025, FAA published a Notice of Request for Comment proposing to continue operational limits, lowering the cap to 72 operations per hour and extending restrictions through October 24, 2026 [19].

Breadth of Resourcing Gaps
The Government Accountability Office **(**GAO) recently warned that the number of meteorologists working with FAA air traffic controllers is "critically low," with only 69 currently on staff compared to the agreed-upon 81 and the 90 originally stipulated, despite a staffing model calling for four per Air Route Traffic Control Center. This shortage has led to "burnout, fatigue, and low morale" among the remaining meteorologists [20].

Collision Highlights Challenges of Mixed Airspace.
A commercial airliner struck a weather balloon near a major airport, underscoring the growing challenge of maintaining safe separation among diverse airspace users. As commercial, GA, and non-traditional vehicles share the same controlled airspace, the incident illustrates the need to modernize detection, tracking, and communication systems to prevent similar events [21].

Emerging Entrant Operational Complexity
In one certification-related test flight between two airports, an eVTOL was required to spend "five minutes in a holding pattern to allow an airliner to land," demonstrating how these aircraft must cooperate with commercial traffic flying into congested airports. This reaffirmed the operational complexity of shared airspace and the potential safety challenges of integrating new entrants [14].

Flying-Car Trials Highlight Airspace Growth and Coordination Challenges
Prototypes are already underway and have received approval to begin flying-car test trials at Half Moon Bay and Hollister airports, where they "will test integration into common air traffic alongside other aircraft" [16], underscoring operational complexity and the need for stricter air-traffic protocols. The testing "will include driving, vertical takeoff, forward flight, vertical landing, and maneuvering both on the ground and in the air" [16]. The prototype "is expected to cost around $300,000" and the company "has already received more than 3,200 pre-orders" [16].

Additional Safety Risks in Controlled and Uncontrolled Low-Altitude Environments
As operations expand across controlled and uncontrolled low-altitude environments, significant safety challenges are emerging in areas where oversight varies, traffic is increasing, and traditional and new entrants now share the same airspace. Many of these risks occur near airports, in approach corridors, and in other transitional zones where aircraft with differing operational characteristics interact in close proximity. The following examples highlight existing risks and challenges that must be addressed in any modernized, proactive NAS framework.

- **Urban helicopter crash highlights risks in dense, mixed-use corridors.** A fatal helicopter crash in a major city illustrates how dense, low-altitude airspace can outpace current oversight and coordination. In complex urban environments, multiple operators share constrained corridors near people and infrastructure. Stronger real-time coordination, clear responsibility for deconfliction, and transparent accountability are needed, especially as eVTOLs and drones expand operations in the same airspace [11].

- **Drone near-miss reports reveal growing hazards.** The NASA Aviation Safety Reporting System (ASRS) received 50 drone-related reports in July 2025, including 13 near-midair collisions involving commercial flights, GA aircraft, helicopters, or air ambulances. Because reporting is voluntary, these figures likely underrepresent the true scale of safety risks [22].

- **AIM data point to low-altitude collision risk.** The Aeronautical Information Manual (AIM) states that "a high percentage of near midair collisions occur below 8,000 feet AGL and within 30 miles of an airport" [23]. Low-altitude operations, including helicopters and AAM, share this congested airspace with uncrewed aircraft that often lack ATC communication or visibility, heightening conflict potential.

- **NTSB data show higher accident rates for GA and helicopters.** Helicopters have an accident rate 26 times higher than commercial airliners (3.92 vs. 0.15 per 100,000 flight hours) and a fatal accident rate 230 times higher (0.690 vs. 0.003) [24]. Privately owned aircraft have an accident rate 35 times higher and a fatal rate 317 times higher [24]. Over 2012–2021, GA averaged 1,237 accidents annually, with 227 fatal accidents (18%) and 382 fatalities per year [24]. Given their short-haul, low-altitude operations, AAM accident rates are likely to align more closely with GA than with commercial aviation.

- **GA operations, including private jets, already strain ATC capacity.** GA accounts for a significant share of controlled operations, with private jets representing about one out of six flights managed by FAA air traffic control [25]. As AAM operations are added, the burden on both staffing and capacity will continue to rise.

- **Midair collision highlights ongoing GA safety risks.** Two general aviation aircraft collided in Colorado in August 2025, resulting in one fatality and causing both planes to catch fire after impact**,** illustrating risks that exist before adding new vehicle types to shared airspace [26].

- **Ultralight eVTOL operations reveal regulatory gaps.** The introduction of ultralight eVTOLs like the BlackFly operating in uncontrolled airspace, with no pilot license, medical certificate, or aircraft registration required, reveals a major gap in airspace oversight and safety accountability [27].

- **Delivery drone crash exposes oversight and safety risks.** A delivery drone struck power lines and caused a fire, demonstrating that even isolated, uncrewed operations can pose significant safety and infrastructure hazards that require stronger oversight and real-time coordination [28].

- **Paraglider and drone collision illustrates recreational airspace risk.** A drone collided with a paraglider in uncontrolled airspace near a gliderport, forcing the paraglider to make an emergency landing and revealing growing risks in recreational environments [29].

- **Widespread Uncrewed Aircraft System (UAS) incursions disrupt wildfire response.** During the Palisades Fire, unauthorized drone activity overwhelmed restricted airspace, with approximately 500 drones detected inside the Temporary Flight Restriction zone. A total of 732 flights were recorded, involving 419 unique drone IDs; 223 exceeded 400 feet AGL, and 90 occurred at night. These incursions forced multiple firefighting aircraft to alter flight paths to avoid and exposed systemic risks from uncoordinated UAS in emergency airspace [30].

- **Firefighting aircraft collision underscores coordination failures.** In the same wildfire response, a privately operated drone violated restricted airspace and struck a firefighting aircraft, puncturing its wing and forcing it out of service during active suppression efforts. The incident shows that even with Temporary Flight Restrictions in place, current detection and enforcement systems remain inadequate to prevent unauthorized UAS activity [31].

Part 3: The Need for Objective Thresholds Linking Staffing and Safety

Without objective thresholds linking staffing and safety, the NAS tends to be more reactive and dependent on interpretation. Unheeded warnings, expert findings, and oversight reports all point to the need for clear, predefined thresholds that make risk visible, enable timely adjustments, and strengthen accountability.

Warnings Not Acted On

At the Senate Committee hearing on March 27, 2025, NTSB Chair Jennifer Homendy testified that “between October 2021 and December 2024, there were over 15,200 near-miss events, including 85 cases where vertical separation was under 200 feet” [8]. Her remarks highlight a systemic issue: signals of risk are reported, yet they

remain subject to interpretation and discretionary judgment instead of being tied to objective thresholds that would signal when operational risk has reached a critical level and trigger cautionary adjustments.

Independent Expert Recommendations
The Transportation Research Board's (TRB) Special Report 357 recommended that FAA "validate its facility models using risk indicators" [32]. The Board further concluded that unfinished work to understand the relationship between staffing levels and safety leaves current staffing approaches without a safety-integrated foundation. It also noted that the Office of Finance and Management (AFN) staffing model "does not sufficiently take into account the unique operating conditions at particular local facilities" [31], underscoring the risks of applying one-size-fits-all standards to very different airspace environments.

Data Inputs for Uncrewed Systems: Turning Data into Actionable Thresholds
FAA has proposed new data reporting requirements for drones, including flight hours, reliability, altitude, speed, location, and incident data. A future system should ensure that these inputs are collected, analyzed, and translated into objective thresholds that can guide staffing or operational adjustments, making the data actionable for safety and accountability [15].

Unheeded Warnings at DCA
At Reagan National Airport, controllers asked for relief from what one described as the "feverish pace of arrivals," but their concerns "fell on deaf ears" [9], an FAA manager testified that controllers had recommended slowing arrivals as early as 2022, but "it was not acted on." [9] When asked at the NTSB inquest whether more operations were still being applied than what controllers had recommended in 2022 and 2023, he answered, "Yes. It needs to be addressed and we didn't address it" [9]. Before the 2025 midair, one controller described the approach as a "squeeze play," where "everyone's just trying to constantly make it work, make it work, make it work [sic]" [9].

Contractor Warning on Unhealthy Staffing Levels at DCA
At FAA's request, a contractor, who conducted compliance verifications at Reagan National from 2017 to 2023, observed tower operations two years before the collision and testified that staffing levels were "not necessarily healthy." He recommended additional staff support but was told to "quit bringing it up" [9].

Objective Thresholds Already Guide Aviation Safety
Other parts of aviation already operate with clear, objective thresholds. Flight attendants and pilots are subject to duty and rest limits: once they exceed a set number of hours, they cannot continue flying, regardless of circumstances. Passengers are familiar with the consequences, such as delays or cancellations when a new crew is required, and they also recognize these limits as safeguards for fatigue and safety. In the same way, objective thresholds for controllers could establish caution zones that make staffing and fatigue risks visible before errors occur and provide a stronger link between staffing conditions and safety outcomes.

Oversight and Research Point to Systemic Safety Risks
The GAO warned of "compounding effects… on the safety and efficiency of the NAS" [20], citing controller shortages and system failures. The DOT Office of Inspector General (OIG) adds that FAA "continues to face staffing challenges and lacks a plan to address them, which in turn poses a risk to the continuity of air traffic

operations" [33], NASA human factors research supports this conclusion: workload thresholds are "critical" for evaluating system design, and studies caution that complex systems can "drift into safety margins" over time if risks are not systematically tracked and addressed [34].

Labor Testimony Confirms On-the-Ground Staffing Shortfalls

Testimony to the House Committee hearing reinforced this reality: Nick Daniels, President of National Air Traffic Controllers Association (NATCA), stated that controllers "continue to work short-staffed, often six days-a-week, ten hours-a-day for years at a time" [1], while Dave Spero, President of Professional Aviation Safety Specialists (PASS), testified that staffing models reveal "a significant shortfall of at least 800 airway transportation systems specialists in the workforce" [1].

Part 4: Considerations for a 21st Century NAS

Designing a Proactive and Data-Driven NAS Framework

Part 3 highlighted that while today's NAS has processes to manage staffing and safety, they rely heavily on interpretation and tend to be reactive. A future modernized, proactive NAS should build on what exists to create a framework that links FAA staffing levels, aircraft types, operations volume, and airspace complexity to objective, predefined thresholds. These thresholds would make risk levels visible, trigger timely adjustments, and document who was notified, what actions were taken, and the basis for those actions. The system must also account for the expected growth in operations and the introduction of new types of aircraft, including AAM and future supersonic services, recognizing that airspace capacity is finite. The following considerations are not prescriptive directions but recommendations to inform the design of a system that is proactive, data-driven, and accountable.

Building on this precedent, the NAS could adopt a system that provides automated or procedural alerts when thresholds are reached and creates a clear record of those events. This would reduce reliance on whether a complaint is made or heard and instead assign responsibility for addressing identified risks. It would also allow a more consistent assessment of risk using historical data, an approach recommended by the TRB and essential to strengthening accountability.

Identifying Overlaps Across Altitude Bands

Altitude is a key factor in assessing shared-airspace risks. FAA's Urban Air Mobility ConOps 2.0 [7] is a foundational starting point, illustrating a notional 'layer cake' of operations. Figure 7, shown earlier, is included again here for reference to show how altitude overlaps create shared-airspace risks that affect NAS capacity and safety. The figure demonstrates why a proactive NAS must address convergence across altitude layers before safety margins erode. The depiction, taken from ConOps 2.0, shows a UAM corridor with multiple tracks. However, the ConOps remains conceptual and does not explain in sufficient detail how overlaps across altitude bands will be managed in practice.

A future modernized, proactive NAS should therefore establish a consolidated, data-driven depiction of how different categories of aircraft actually operate within and across altitude bands, what the dependencies and potential risks are for each band, and who is responsible for managing safety within those bands. Linking operational data to objective thresholds can clarify when airspace congestion approaches defined safety limits and when mitigation is required. The resulting information should be published in a transparent and accessible form so stakeholders, including those living in aviation-impacted communities, can understand both how the operations are expected to work and who holds accountability.

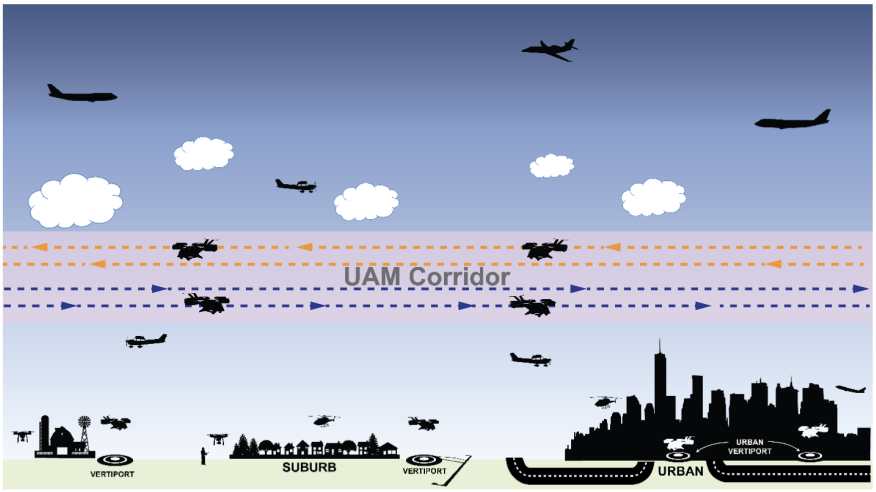

Figure 7: UAM Corridor with Multiple Tracks

Leveraging Existing FAA Systems for Thresholds and Accountability

FAA already operates systems that could support the development of data-driven thresholds. The System Wide Information Management (SWIM) platform provides the operational data backbone, and the Aviation Safety Information Analysis and Sharing (ASIAS) system offers a safety analysis environment. In addition, onboard safety systems such as the Traffic Alert and Collision Avoidance System (TCAS) monitor aircraft separation and provide alerts and advisories when safety margins are at risk. While these sources contain valuable data and proven safeguards, they are not currently integrated or used to establish cautionary thresholds, track when safety margins begin to degrade, or create visible accountability for who reviewed the data, what actions were taken, and when. A modernized, proactive NAS should build on these capabilities and expand participation to include GA, AAM, and supersonic operations.

Oversight and Sufficient Staffing for Non-FAA Service Providers

As the NAS incorporates AAM, FAA will increasingly rely on third-party UAS/UAM Service Suppliers (USS) and other non-FAA providers to manage corridors and related operations. Any future NAS Capacity and Safety System must account for this shift by ensuring that FAA has sufficient staffing to oversee these providers and that each provider demonstrates adequate staffing to manage operations safely. Governance mechanisms will also be needed to adjudicate demand when multiple operators request the same slots, using neutral rules that ensure fairness and prevent conflicts of interest. In addition, a system of caution tiers could help reveal when safety risks are increasing or persisting within corridor operations, providing clear triggers to guide both oversight and accountability.

Incorporating Fatigue and Scheduling Safeguards

TRB Special Report 357 emphasized the need for robust Fatigue Risk Management Systems (FRMS) combined with prescriptive fatigue rules, efficient shift-scheduling tools, and structured staffing input so that facility-level realities are incorporated consistently [32]. These measures ensure that thresholds account not only for the number of operations but also for human capacity to manage them.

Human-Centered Design and Cognitive Limits

A 21st century system should recognize human limits in managing complexity. Research shows that people can effectively manage only a small number of variables at one time [35], and that exceeding this capacity erodes safety margins. These variables represent categories of factors such as traffic volume, vehicle types, weather conditions, coordination demands, and equipment issues, each of which could include multiple interactions that must be tracked and balanced in real time. Fatigue further constrains human performance, reducing the capacity to manage these interactions safely and consistently.

Detection, Identification, and Accountability in Congested Airspace

Low altitude environments present unique risks as the airspace becomes increasingly congested and traditional surveillance is less reliable. ADS-B performance can degrade in dense drone operations and detect-and-avoid technologies must be robust for drones and AAM. FAA's proposed BVLOS rule [15] would allow drones to operate below 400 feet AGL unless crewed aircraft are broadcasting their position electronically, shifting right-of-way responsibility based on signal visibility. Many low-altitude aircraft, including helicopters and seaplanes, do not routinely use ADS-B Out, creating situations where drones could legally operate near pilots unaware of their presence and increasing collision risk in mixed-use airspace. Clear mechanisms for detection, identification, and tracking must encompass all aviation vehicles, including crewed, uncrewed, and emerging AAM operations, to ensure accountability and maintain safety across shared airspace.

Community Engagement, Transparency and Safety Concerns

A future NAS system should ensure early and transparent community engagement by notifying communities and involving them in the planning and introduction of new aircraft, vertiports, corridors, and procedures so that engagement informs decision making before implementations begin. This should include a structured process to gather community input through comments and responses, conduct post-implementation analyses, and take appropriate actions or remedies in which the community participates. Integrating the lived experience of affected communities into these steps will help ensure that modernization reflects real-world impacts and strengthens trust, accountability, and shared responsibility across the system.

Conclusion

Modernization must move from reactive responses to a proactive framework that uses objective thresholds to manage staffing, technology, and complexity. Recognizing that airspace capacity is finite, a data-driven and proactive approach will strengthen safety, transparency, and resilience across the NAS for all, while ensuring that communities impacted by aviation operations are meaningfully included as stakeholders in shaping and monitoring outcomes. Congress should codify these thresholds and accountability measures to institutionalize a proactive, systemwide approach to safety.

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