

**U.S. AIR TRAFFIC CONTROL SYSTEMS,  
PERSONNEL AND SAFETY**

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**HEARING**

BEFORE THE

SUBCOMMITTEE ON AVIATION SAFETY,  
OPERATIONS, AND INNOVATION

OF THE

COMMITTEE ON COMMERCE,  
SCIENCE, AND TRANSPORTATION

UNITED STATES SENATE

ONE HUNDRED EIGHTEENTH CONGRESS

SECOND SESSION

DECEMBER 12, 2024

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED EIGHTEENTH CONGRESS

SECOND SESSION

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**U.S. AIR TRAFFIC CONTROL SYSTEMS,  
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**THURSDAY, DECEMBER 12, 2024**

U.S. SENATE,  
SUBCOMMITTEE ON AVIATION SAFETY, OPERATIONS, AND  
INNOVATION,  
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,  
*Washington, DC.*

The Subcommittee met, pursuant to notice, at 10:24 a.m. EST, in room SR-253, Russell Senate Office Building, Hon. Tammy Duckworth, Chairman of the Subcommittee, presiding.

Present: Senators Duckworth [presiding], Cantwell, Klobuchar, Rosen, Hickenlooper, Welch, Moran, Cruz, and Sullivan.

**OPENING STATEMENT OF HON. TAMMY DUCKWORTH,  
U.S. SENATOR FROM ILLINOIS**

Senator DUCKWORTH. Good morning. The Subcommittee on Aviation Safety, Operations, and Innovation will come to order. I want to welcome everyone to our hearing today, United States Air Traffic Control Systems, Personnel and Safety. This hearing is of vital importance to ensure the safety of our national airspace, and I want to thank our Chairwoman Cantwell, Ranking Member Cruz, and Ranking Member Moran for their help in making this hearing happen.

Too much of our Nation's air traffic control equipment, technology, and infrastructure is outdated. Today we will have an opportunity to hear from stakeholders about the challenges these aging systems create for our air traffic controllers and what needs to be done to keep our airspace safe.

We will be hearing from the Government Accountability Office of Information Technology and Cybersecurity Director, Kevin Walsh—thank you for being here; National Air Traffic Controller Association Chief of Staff, Dean Iacopelli—hopefully I said that correctly, thank you; Air Line Pilots Association President, Captain Jason Ambrosi—welcome; Professional Aviation Safety Specialists President, Dave Spero—thank you; and Reason Foundation Senior Transportation Policy Analyst Marc Scribner—thank you for being here.

Before I proceed to my opening statement I want to just make a comment that I am saddened to learn of FAA Administrator Whitaker's plan to resign next month. His leadership has been invaluable during this critical time in aviation safety. His oversight of Boeing production has been essential, and I hope the efforts he

spearheaded on that front will continue. Our aviation system is safer because of his service, and we are grateful to him for it.

I will recognize myself for the opening statement.

In the years immediately following the pandemic, we witnessed an alarming series of close calls in commercial aviation. Last year, we saw a terrifying image of a JetBlue flight attempting to land in Boston that came within 400 feet of a Learjet taking off. In Austin, we saw a FedEx cargo plane attempt to land on the same runway where a Southwest 737 was about to take off. The two aircraft came within less than 200 feet of each other.

Our Committee held hearings and worked in a bipartisan manner to pass an FAA Reauthorization Act to make our skies safer. The new law, which is still being implemented, makes important investments in air traffic controller staffing and surface detection technology.

But we cannot rest on our laurels. Safety requires constant vigilance, which leads me to today's hearing. The safety of the flying public depends upon well-equipped air traffic control systems. Our air traffic controllers work tirelessly to manage our national airspace, but they rely on increasingly outdated facilities and equipment. Following the January 2023 NOTAM system outage, which resulted in 1,300 flight cancellations, nearly 10,000 delays, and a shutdown of the national airspace, the FAA conducted an operational risk assessment to evaluate the sustainability of all aircraft, all air traffic control systems.

In September, drawing upon that work, the Government Accountability Office, the GAO, conducted its own analysis and issued a report warning, FAA actions are urgently needed to modernize aging systems. Fifty-one of our Nation's 138 air traffic control systems are unsustainable. That is more than one-third.

According to the GAO, 17 of these systems are critical for safety and efficiency, yet FAA will not be able to modernize some for 10 to 13 years, and as of May 2024, did not even have investments planned for four of them. Some ATC equipment is getting so old, service and replacement parts are no longer available. For example, replacement antennas are no longer available for beacons used to determine the location of some aircraft during the en route portion of their flight. Manufacturer support is no longer available for the most common types of equipment and instrument landing systems, which FAA maintains at our airports. Worse, when FAA replaces aging equipment, the process sometimes takes so long, the new equipment is outdated by the time it actually gets deployed.

To be clear, keeping FAA properly equipped is not an entirely new issue. It has challenged lawmakers and administrations from both parties for decades. What is new, however, is the context in which we find ourselves. Our air traffic control equipment and facilities are aging while our system is still under post-pandemic stress and contending with rising demand.

Close calls are still happening. A few notable examples from this year demonstrate the type of safety risks that we are seeing. In April, a JetBlue Embraer 190 had to abort takeoff at Reagan National Airport when a Southwest 737 was about to cross the same runway. In May, an American A319 had to abort takeoff at DCA after reaching about 100 miles per hour because a smaller plane

was on a final approach to an intersecting runway. In September, an Alaska Airline 737 aborted takeoff in Nashville to avoid a Southwest 737 that was about to cross the same runway. The Alaska plane braked so hard its tires blew out, reportedly.

There is a growing consensus across a wide range of aviation stakeholders that Congress needs to address this issue. We need modern, sustainable air traffic control systems to keep the flying public safe, and I look forward to hearing from our witnesses about how best we can achieve that.

And since Ranking Member Moran is not here for his statement, I will recognize our Chairwoman, Chairwoman Cantwell, for her opening statement. Oh, is he here? Oh, Senator Cruz.

**STATEMENT OF HON. TED CRUZ,  
U.S. SENATOR FROM TEXAS**

Senator CRUZ. Thank you, Madam Chair. Before I begin I want to comment on the announcement this morning that Michael Whitaker will resign on January 20. I want to thank him for his service. He was confirmed without a single no vote, a testament to his experience, his judgment, and his apolitical nature. When he took the job I asked him to focus on keeping the flying public safe and to stay out of politics, and he has ably led the agency during a challenging period, and I want to thank him for his public service.

On January 11, 2023, the Nation experienced its first nationwide ground stop of air travel since 9/11. This ground stop resulted in roughly 10,000 flights being canceled and days of delays for travelers. What could have prompted this grounding of air travel? It was not weather or some airline experiencing operational difficulties. It was because the FAA's NOTAM system, which delivers crucial safety information to pilots, experienced a technical glitch.

NOTAM has been used since 1947, and while the technology has evolved from the original telephone system, the current system has not been updated in over a decade. In fact, the most recent change to NOTAM was when the Biden administration changed Notice to Airmen to Notice to Air Missions. I think the American people would have preferred the Administration focus on modernizing the antiquated system over obsession on gendered language.

In response to this massive failure, the FAA conducted a review of more than 100 critical systems for air traffic in this country. Notably, of the systems the FAA evaluated, roughly a third of these systems were unsustainable. Even more concerning, the Government Accountability Office, the GAO, looked at the FAA's assessment and discovered that the FAA did not have plans to modernize 17 systems that were, quote, "most at risk." This is completely unacceptable.

Air traffic facilities and radars need improvement. Based on FAA data, the reliability of the FAA's radar fleet is declining. They are online less often, unscheduled and scheduled outages last longer, and it takes longer to restore service when radar does break down. The United States should be a leader in aviation technology. Sadly, this is often not the case.

Not only does the report deliver a harsh assessment of decades of sustainment efforts, it also presents a bleak picture when one

considers the funding wasted on doomed projects. For example, the GAO identified one ATC system that needed additional funding for modernization just two years after it was completed. Other projects took more than 10 years to complete, becoming obsolete almost as soon as they were deployed.

The FAA has long been plagued by difficulties in maintaining and modernizing ATC systems, especially the NextGen project. NextGen was first developed in the early 2000s, and has largely failed to deliver on the promised benefits. As projects finish, they quickly become outdated, underscoring the problem of such slow modernization. The FAA Reauthorization Act of 2024 addresses the problems with NextGen, requiring the FAA to finish development of NextGen and to sunset the office by the end of next year.

Before the FAA can embark on another wholesale modernization project, the law requires the FAA to present the business case for the project to Congress, ensuring that the FAA conducts the analyses necessary to identify feasible benchmarks for the NAS before starting the next big project. The breadth, scale, and sheer number of these challenges should cause us to question the fundamental structure and operations of the FAA. Is this the right model for air traffic control?

Experts across the political spectrum agree that there is a need for stakeholders to come together and discuss the path forward. In November 2023, the National Airspace System's Safety Review Team, appointed by the FAA, submitted an independent report to the FAA and to Congress focused on improving safety in the NAS, which included evaluating the reliability of the air traffic organization and the NAS.

Administrator Michael Whitaker has also said the aviation community should be evaluating alternatives to insulate the agency from political disruptions. I agree. Congress should discuss and consider creative alternatives to ensure that the national airspace system reliably works for all users, particularly as new aviation transportation technology enters the market.

The conclusions from the GAO report are numerous, but they all point to one clear conclusion: the status quo of how the FAA modernizes our ATC is unacceptable. Our nation should be the leader in the field, and instead we are stuck with technology that is outdated almost as soon as it is introduced into the airspace.

I applaud the thousands of air traffic controllers who safely manage thousands of flights, but broader conversations about how we modernize our air traffic system are desperately needed. The American people deserve an operation that uses its funding wisely, is innovative while ensuring safety, and is also world-leading in reliability. As Chairman next year, I intend to focus heavily on the status of the airspace and what changes may be necessary to enhance its efficiency and reliability. Thank you.

Senator DUCKWORTH. Thank you, Ranking Member Cruz. I now recognize Chairwoman Cantwell.

**STATEMENT OF HON. MARIA CANTWELL,  
U.S. SENATOR FROM WASHINGTON**

Chair CANTWELL. Thank you, Senator Duckworth, for having this important hearing this morning on aviation safety. Like you, I am

saddened and surprised to hear of Administrator Whitaker's decision to step down in January 2025.

I know this, that if you want to be the leader in aviation you have to be the leader in aviation safety. I think Administrator Whitaker was living by that motto. I hope that the next Administrator will live by it as well. The next Administrator needs to be ready on day one to continue the job of restoring the FAA's safety culture and providing real oversight of the aviation sector.

This Committee has done good work looking at not just what manufacturers must do, but making sure that the FAA does its oversight role and responsibility.

So we look forward to this opportunity to continue the work with Chairman-to-be Cruz in January, and with you, Senator Duckworth, on the very, very important technology challenges that we face in the FAA. And I will have more to say about Administrator Whitaker later today.

Last year's outage of the FAA NOTAM system underscored that the FAA, like airlines, must have a backup system and redundancy. We need to have the FAA meet the same standards.

So this hearing—and I want again to thank you for your leadership during the 118th Congress, Senator Duckworth, because serving as an aviator yourself, and certainly the intelligence that you bring to these technology issues, have helped us solve many issues.

Getting aviation infrastructure right, whether it is the air traffic controller system, sustainable aviation fuel, next generation, or important issues like thermal plastics and composites, all of these are about winning the next 100 years of aviation.

Our country has been blessed to be leaders in aviation, but we can see the competition coming, and we can see the challenges of implementing safety.

According to the Airports Council-North America, every dollar invested in aviation infrastructure yields \$2.5 dollars in aviation infrastructure growth, and importantly, it helps us stay on top of those aviation safety priorities.

We have been spurred to action obviously by the horrible crashes that we witnessed with both Ethiopian Airlines Flight 302 and the Lion Air Flight 610, which pushed us to pass ACSAA. And in the aftermath of that, the Alaska Airlines 1282 flight blow out renewed the focus even more on production quality.

On January 12, several days after the incident, the FAA Administrator chose to strengthen its oversight of manufacturing and initiated an audit. Four days later, Senator Duckworth and I made sure that we petitioned the 737 MAX-7's deicing system, and Boeing withdrew that and pledged to work on fixing that, and we are still seeing this play out.

Today's hearing marks the 12th hearing that our Committee has had, building on 7 hearings in the 117th Congress. So it is safe to say, with Senator Cruz's remarks, that we will continue to be laser focused on aviation safety and technology.

NTSB Chairman Homendy and others testified on the spike of near misses and close calls that we were seeing, and Chair Homendy has been before the Committee several times to discuss the continued investigation of the Alaska Airlines door plug blow-out.

We brought in airline CEOs, labor leaders and talked about the success that we have seen, and what we need to do to keep going past our COVID-19 pandemic considerations.

We put our money where our mouth is and set a table for a FAA reauthorization law, and all of the Committee worked very diligently to get that over the goal line. Again, I want to thank Senator Cruz for his work on that.

The FAA law reauthorized both the FAA and NTSB for an additional five years to help keep safe 3 million daily passengers in the United States. It gives the FAA the resources it needs and makes sure that the Nation's aviation safety regulator does set that gold standard.

The law provides NTSB, the Nation's safety watchdog, with the highest funding authorization it has received, to make sure that we hire the investigators needed to complete their mission. And the reauthorization invests in the well-being of our aviation workforce, giving them new tools, training, and platforms to thrive.

Senator Duckworth, again, thank you for holding this hearing this morning. I look forward to your continued leadership in this very important role of aviation technology advancement and meeting our safety standards. Thank you.

Senator DUCKWORTH. Thank you, Chair Cantwell. We will now proceed to witness testimony. First I would like to recognize Mr. Kevin Walsh from the Government Accountability Office for his statement.

**STATEMENT OF KEVIN WALSH, DIRECTOR,  
INFORMATION TECHNOLOGY AND CYBERSECURITY,  
UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE**

Mr. WALSH. Chair, Ranking Member, and members of the Subcommittee, thank you for inviting GAO to testify on this important issue.

The FAA's air traffic controllers rely on 138 systems that monitor weather, conduct navigation and surveillance, and manage communications. More than half of these systems are older than 20 years. Some are more than 60 years old. As a reminder, 20 years ago Facebook was launched, and 60-year-old systems may have been active when JFK was President.

Unsurprisingly, these FAA systems have long-standing issues with the availability of parts and the retirement of knowledgeable technicians. Generally, legacy systems contribute to unmet mission needs, staffing issues, and increased costs. That matches with what we are seeing at the FAA.

Further, their prior modernization efforts have been fraught with unrealistic baselines, cost and schedule overruns, unanticipated requirements, and poor oversight. The expected growth in air travel over the coming years will not help those issues.

As part of our recent report we reviewed selected efforts to modernize dozens of air traffic control systems and found that, on average, the FAA took more than four years to create a baseline, that is expected cost, schedule, and performance of a project. We also noted that such pre-baseline investments received limited oversight from FAA. After establishing a baseline, these modernizations plan to take a further 12.5 years to complete deployment, on average.

Prolonged timeframes like this will impact FAA's mission. For example, the En Route Automation Modernization was completed in 2015, after a 10-year effort, but it was deployed without data technology, which required a major refresh soon thereafter.

Back to the 138 air traffic control systems. To its credit, the FAA reviewed the systems to gauge how easy they are to maintain, as well as the operational impact of those systems. The FAA expects to use this assessment going forward to prioritize its modernization efforts. That assessment found that 33 of the air traffic control systems, 24 percent, had adequate funding and spare parts. The remaining 105 had differing degrees of shortages or potential shortages in spares and funding. Many of them also had limited staff expertise and did not meet mission needs.

Confirming those issues, Mr. Spero's organization kindly asked its members some questions on our behalf, and their top issues were also obsolete systems, difficulties finding parts, and staffing shortfalls.

Worryingly, FAA's assessment showed that 58 of the systems with shortages or shortfalls have a critical operational impact. Amongst them we identified 17 that we felt were especially concerning given their age, sustainability, and operational impact. Of those, the earliest of those 17 modernizations is planned to finish in six years. Some are planned to be completed in 10 to 13 years, and four do not have ongoing modernization efforts.

We also found that the FAA's Acquisition Oversight Council had not ensured that investments delivered functionality in smaller segments, and had not consistently monitored high risks. We also noted the Council made decisions based on incomplete data and documentation.

Despite this, flying is safe. But continuing to rely on these legacy systems diminishes the margin of safety and adds stress to the national airspace. To that end, FAA needs to break modernizations into smaller pieces, deliver functionality quicker, and improve accountability.

I hope that this hearing is a catalyst for action, but there is no easy answer or quick fix. A snap of Ironman's fingers cannot fix this. This will be the work of many years and billions of dollars.

This concludes my statement, and I look forward to your questions.

[The prepared statement of Mr. Walsh follows:]

PREPARED STATEMENT OF KEVIN WALSH, DIRECTOR, INFORMATION TECHNOLOGY AND CYBERSECURITY, UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE

**GAO Highlights**

Highlights of GAO-25-107917, a testimony before the Subcommittee on Aviation Safety, Operations, and Innovation, Committee on Commerce, Science, and Transportation, U.S. Senate

**Why GAO Did This Study**

The FAA, within the Department of Transportation, is responsible for the safety and efficiency of over 50,000 flights daily. Air traffic controllers use numerous systems to, among other things, monitor weather, conduct navigation and surveillance, and manage communications. However, over the past several decades, FAA has had challenges with aging ATC systems. These systems will face increased demand given that FAA forecasts air travel will increase, on average, by 6.2 percent annually.

GAO was asked to testify on its September 2024 report on aging ATC systems. This testimony (1) identifies unsustainable and potentially unsustainable ATC systems, (2) determines the extent to which FAA has ongoing investments to modernize these systems, and (3) determines the progress FAA has made in baselining and implementing selected modernization investments. GAO reviewed FAA's inventory of systems and the results of an FAA 2023 assessment of system sustainability. Additionally, GAO selected 20 modernization investments to assess baselining.

**What GAO Recommends**

GAO made seven recommendations to FAA. Transportation concurred with six of them and partially concurred with one, which GAO subsequently clarified. In December 2024, FAA officials stated that they do not have any updates on actions to address GAO's recommendations. They plan to provide an update in March 2025.

View GAO-25-107917. For more information, contact Kevin Walsh at (202) 512-6151 or walshk@gao.gov or Heather Krause at (202) 512-2834 or krauseh@gao.gov.

December 12, 2024

**AIR TRAFFIC CONTROL**

**Urgent FAA Actions Are Needed to Modernize Aging Systems**

**What GAO Found**

After a shutdown of the national airspace in 2023 due to an aging air traffic control (ATC) system outage, the Federal Aviation Administration (FAA) conducted an operational risk assessment to evaluate the sustainability of all ATC systems. The assessment determined that of FAA's 138 systems, 51 (37 percent) were unsustainable and 54 (39 percent) were potentially unsustainable. Of the 105 unsustainable and potentially unsustainable systems, 58 (29 unsustainable and 29 potentially unsustainable systems) have critical operational impacts on the safety and efficiency of the national airspace (see figure).

**Federal Aviation Administration (FAA) Air Traffic Control (ATC) System Safety and Efficiency Operational Impact Categories by Sustainability Rating**

Sustainability rating	Number of FAA systems by operational impact			
	Critical	Moderate	Low	Total
A Unsustainable due to shortages in spares and shortfalls in funding.	13	4	1	18
B Unsustainable due to shortfalls in funding or capability.	16	12	5	33
C Potentially unsustainable due to possible shortfalls in funding or capability.	29	9	16	54
<b>Total</b>	<b>58</b>	<b>25</b>	<b>22</b>	<b>105</b>

Sources: FAA 2023 operational risk assessment; ser72/stock.adobe.com (illustration) | GAO-25-107917

FAA had 64 ongoing investments aimed at modernizing 90 of the 105 unsustainable and potentially unsustainable systems; however, the agency has been slow to modernize the most critical and at-risk systems. Specifically, when considering age, sustainability ratings, operational impact level, and expected date of modernization for each system, as of May 2024, FAA had 17 systems that were especially concerning. The investments intended to modernize these systems were not planned to be completed for at least 6 years. In some cases, they were not to be completed for at least 10 years. In addition, FAA did not have ongoing investments associated with four of these critical systems.

Selected ATC modernization investments took years to baseline and progressed slowly. Specifically, as of May 2024, nine of the 11 applicable investments established baselines, and eight of them took over 4 years to do so. The other two investments were initiated over 6 years ago, but had not yet established their baselines. In addition, the nine investments plan to take on average 12 years and 8 months to complete all deployment activities—with some taking as many as 15 to 19 years. A contributing factor to the lengthy implementation schedules is that FAA does not always ensure that investments are organized in manageable segments. This is counter to the Office of Management and Budget and FAA policies that require this approach.

Until FAA takes urgent action to reduce the time frames to replace critical and at-risk ATC systems, it will continue to rely on a large percentage of unsustainable systems to perform critical functions for safe air travel. This reliance occurs at a time when air traffic is expected to increase each year.

United States Government Accountability Office

Chair Duckworth, Ranking Member Moran, and Members of the Subcommittee:

I am pleased to participate in today's hearing on the impact of the Federal Aviation Administration's (FAA) aging systems supporting the national airspace and air traffic control (ATC). As an agency of the Department of Transportation, FAA's mission is to promote the safe, orderly, and expeditious flow of air traffic in the national airspace. To ensure FAA's mission is met, air traffic controllers are to manage communications; monitor weather, navigation, and surveillance; and direct aircraft from takeoff to landing. Controllers manage up to 50,000 flights per day. FAA anticipates continued growth and congestion in the airspace, forecasting that air travel will increase annually on average by 6.2 percent.

Over the past several decades, FAA has been experiencing challenges with aging ATC systems. These challenges are due to, among other things, unavailability of

parts, reduced technical expertise in outdated technologies, and growth in airspace demand.

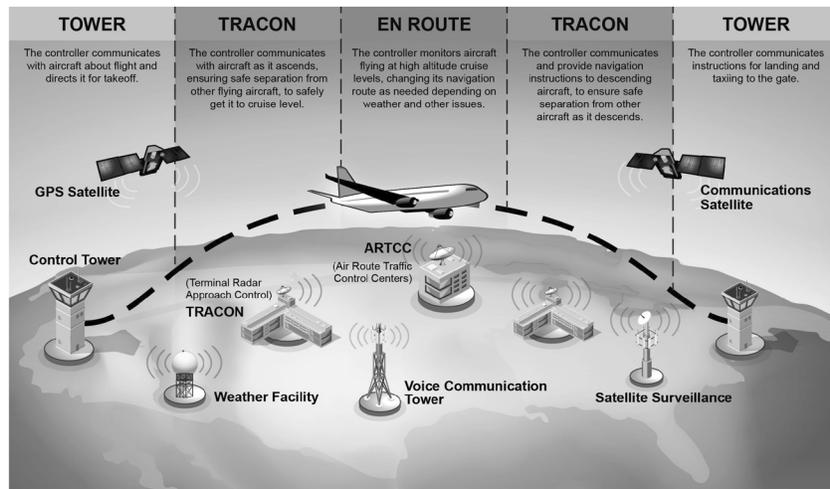
My statement today discusses the results of our recently issued report that, among other things, (1) identified FAA's unsustainable and potentially unsustainable ATC systems, (2) assessed the extent to which FAA has ongoing investments to modernize unsustainable and potentially unsustainable systems, and (3) examined the progress FAA has made in baselining and implementing selected modernization investments.<sup>1</sup> Detailed information on the objectives, scope, and methodology for that work can be found in the issued report. In addition, we followed up with Department of Transportation and FAA officials in December 2024 to determine what actions they had taken to implement our recommendations.

We conducted the work on which this statement is based in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

### Background

To ensure FAA's mission is met, air traffic controllers rely on numerous complex systems to monitor communications and weather and provide navigation and surveillance services during the various phases of flight. Figure 1 provides a simplified view of air traffic control within the national airspace.

Figure 1: Simplified Overview of Air Traffic Control within the National Airspace



Sources: GAO based on Federal Aviation Administration information; GAO (airplane, background); AlexZell/stock.adobe.com (buildings); TankVision/stock.adobe.com (towers). | GAO-25-107917

FAA has had longstanding challenges with maintaining aging ATC systems.<sup>2</sup> According to FAA officials, these challenges are due to the unavailability of parts and retirement of technicians with expertise in maintaining the aging systems. In addition, there has been dramatic growth in airspace demand since the older systems were initially implemented. This has adversely impacted the ability of those systems to continue to support mission needs.

These challenges can impact FAA's ability to meet its mission. For example, the Notice to Air Missions system, which enables air traffic controllers to provide real-time updates to aircraft crew about critical flying situations relating to issues such as weather, congestion, and safety, is over 30 years old. On January 11, 2023, the system became unavailable to users. To ensure safety, FAA grounded all departing aircraft for about 2 hours to fix the system. The outage caused cancellations of over

<sup>1</sup>GAO, *Air Traffic Control: FAA Actions Are Urgently Needed to Modernize Aging Systems*, GAO-24-107001 (Washington, D.C.: Sept. 23, 2024).

<sup>2</sup>ATC systems support a variety of air traffic control operations, including navigation, weather, surveillance, communications, and air traffic optimization.

1,300 flights and delayed almost 10,000 other flights throughout the day. Some airlines took several days to fully recover.

For over 4 decades we have reported on challenges facing FAA's modernization of its ATC systems.<sup>3</sup> In February 1982, FAA released its first comprehensive plan for improving ATC services. At that time, FAA estimated that implementation of this national airspace modernization plan would cost about \$10 billion with full benefits realized by the late 1990s.

As we subsequently reported in several products, FAA faced challenges with this modernization. Due to the many delays and overruns that FAA encountered, we designated FAA's ATC modernization as a new high-risk area in 1995.<sup>4</sup> In doing so, we noted that the estimated cost of the overall modernization had ballooned to \$36 billion, and the largest component had to be dramatically revamped. In continuing to identify FAA modernization as a high-risk area, in 2003 we reported that after 2 decades, FAA's ATC modernization was far from complete. Among the reasons for FAA's performance were that it did not (1) recognize the technical complexity of the effort, (2) realistically estimate the resources required, (3) adequately oversee its contractors' activities, and (4) effectively control system requirements.

In 2003, Congress created the Joint Planning and Development Office to plan for and coordinate a transformation from the current ATC system to the next generation air transportation system (NextGen). NextGen is a multidecade, multibillion-dollar program to increase the safety and efficiency of air travel by transitioning from a ground-based ATC system that uses radar, to a system of systems based on satellite navigation and digital communications.<sup>5</sup> FAA released its initial plan to implement NextGen in 2004.

We have reported that NextGen has had the following challenges: (1) software development complexity, (2) unanticipated system requirements, (3) insufficient stakeholder involvement during system development, and (4) unanticipated events, such as government shutdowns.<sup>6</sup> These challenges have contributed to significant schedule delays. Specifically, while NextGen was initially planned to be completed by 2025, as of November 2023, FAA did not anticipate completing NextGen until at least 2030.

Most recently, in November 2023, we reported that FAA had spent at least \$14 billion on NextGen from Fiscal Years 2007 through 2022 and expected to spend about \$22 billion in total through 2030.<sup>7</sup> We found that FAA had made mixed progress meeting milestones in its ongoing effort to modernize air traffic management through the NextGen initiative.

This mixed progress has slowed FAA's NextGen efforts to improve the safety and efficiency of air travel and address growing congestion in the national airspace. For example, FAA met its milestone for deploying more reliable digital communication services at ATC towers. However, it did not deploy initial modernized services to all 20 facilities serving en route flights by its September 2021 milestone.

We also reported that FAA officials and stakeholders stated that the COVID-19 pandemic was a major cause of schedule delays and cost increases, as it required FAA to redo work that had been completed prior to the pandemic. In March 2023, FAA officials estimated the financial impacts of COVID-19 to the NextGen program were \$225 million.

We further reported that while FAA officials noted that another key contributor to the program's mixed progress was that NextGen had a flat budget for several

<sup>3</sup>GAO, *Examination of the Federal Aviation Administration's Plan for the National Airspace System—Interim Report*, AFMD-82-66 (Washington, D.C.: Apr. 20, 1982).

<sup>4</sup>GAO, *High-Risk Series: An Overview*, HR-95-1 (Washington, D.C.: Feb. 1, 1995). We updated our concerns in subsequent high-risk reports in 1997 through 2007. For example, see GAO, *High-Risk Series: An Overview*, HR-97-1 (Washington, D.C.: Feb. 1, 1997); and *High-Risk Series: An Update*, GAO-07-310 (Washington, D.C.: Jan. 31, 2007). In 2009, we noted that continued focus on ATC systems modernization was warranted as FAA began new modernization efforts. GAO, *High-Risk Series: An Update*, GAO-09-271 (Washington, D.C.: Jan. 22, 2009).

<sup>5</sup>In 2003, the Vision 100—Century of Aviation Reauthorization Act mandated that FAA create and carry out a plan for modernizing its ATC systems. *Vision 100—Century of Aviation Reauthorization Act*, Pub. L. No. 108-176, § 709, 117 Stat. 2490, 2582-2585 (2003).

<sup>6</sup>See examples of reports we have previously issued on NextGen: GAO, *Air Traffic Control Modernization: Progress and Challenges in Implementing NextGen*, GAO-17-450 (Washington, D.C.: Aug. 31, 2017); *Air Traffic Control Modernization: Management Challenges Associated with Program Costs Hinder NextGen Implementation*, GAO-12-223 (Washington, D.C.: Feb. 16, 2012); and *Next Generation Air Transportation System: Progress and Challenges Associated with the Transformation of the National Airspace System*, GAO-07-25 (Washington, D.C.: Nov. 13, 2006).

<sup>7</sup>GAO, *Air Traffic Control Modernization: Program Management Improvements Could Help FAA Address NextGen Delays and Challenges*, GAO-24-105254 (Washington, D.C.: Nov. 9, 2023).

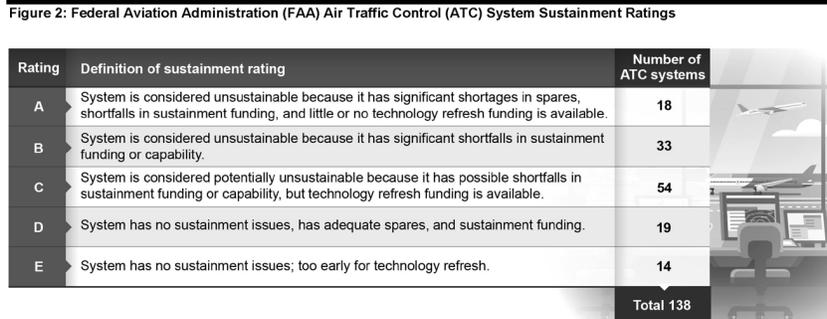
years, we found that the actual budget reported in FAA’s congressional budget justification generally aligned with the amounts in the President’s budget request. For example, as reflected in FAA’s congressional budget justifications for Fiscal Years 2012 through 2023, FAA’s budget requests and actual budget for NextGen—including system deployment—have remained relatively constant at about \$1 billion annually.<sup>8</sup>

*About One-Third of FAA ATC Systems Are Considered Unsustainable*

Lastly, we found that FAA’s efforts to implement NextGen met four leading practices in program management but fell short in fully meeting five other practices. We made four recommendations to address the five deficiencies to improve FAA’s management of NextGen. As of November 2024, FAA had not implemented three of the four recommendations.

During Fiscal Year 2023, FAA determined that of its 138 ATC systems, 51 (37 percent) were unsustainable and 54 (39 percent) were potentially unsustainable.<sup>9</sup> Specifically, after the January 2023 shutdown of the national airspace following the Notice to Air Missions outage, FAA officials conducted an operational risk assessment to evaluate the sustainability of all ATC systems.<sup>10</sup> In addition, the assessment was intended to inform where FAA should focus future investments, funding, and risk reduction activities associated with ATC systems.

The officials rated each of the 138 systems by their sustainability levels on a scale of A through E (rating A represented the least sustainable and rating E represented no sustainment issues). Systems with ratings A and B are unsustainable and C ratings are potentially unsustainable. Figure 2 summarizes the sustainability ratings of the ATC systems.



Sources: GAO analysis of FAA 2023 operational risk assessment; iconicbestary/stock.adobe.com (illustration). | GAO-25-107917

FAA categorizes its ATC systems by criticality. Of the 105 unsustainable or potentially unsustainable ATC systems,

- 29 unsustainable and 29 potentially unsustainable systems have a critical operational impact on the safety and efficiency of the national airspace,
- 16 unsustainable and 9 potentially unsustainable systems have a moderate operational impact on the safety and efficiency of the national airspace, and
- 6 unsustainable and 16 potentially unsustainable systems were mission support systems and were not considered critical.

See figure 3 for a summary of the 105 systems by criticality and sustainability.

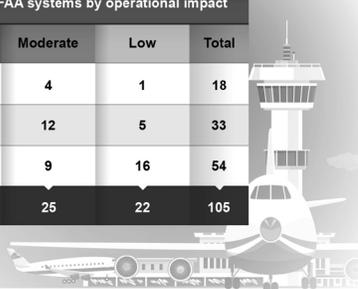
<sup>8</sup> We used the actual budget amount FAA reflected in its congressional budget justification for each Fiscal Year, but for Fiscal Year 2022 used the continuing resolution budget amount FAA reported because the actual budget was not yet available at the time the congressional budget justification was developed.

<sup>9</sup> The assessment identified 181 total systems. We excluded 43 of these systems that were classified as the responsibility of the Department of Defense or building facilities.

<sup>10</sup> FAA plans to continue conducting operational assessments of existing ATC systems on an annual basis. As of May 2024, FAA was developing a draft order to formalize this process.

Figure 3: Federal Aviation Administration (FAA) Air Traffic Control (ATC) System Criticality by Sustainment Rating

Sustainability rating		Number of FAA systems by operational impact			
		Critical	Moderate	Low	Total
A	Unsustainable due to shortages in spares and shortfalls in funding.	13	4	1	18
B	Unsustainable due to shortfalls in funding or capability.	16	12	5	33
C	Potentially unsustainable due to possible shortfalls in funding or capability.	29	9	16	54
<b>Total</b>		<b>58</b>	<b>25</b>	<b>22</b>	<b>105</b>



Sources: FAA 2023 operational risk assessment; serz72/stock.adobe.com (illustration). | GAO-25-107917

Moreover, the ages of the 105 systems vary significantly. Specifically,

- 73 were deployed over 20 years ago, with 40 being deployed over 30 years ago, and six of those deployed over 60 years ago.
- 32 systems were implemented within the past 20 years, with four as recently as 2020.

FAA also reported that of the 105 unsustainable and potentially unsustainable systems, 74 systems (70 percent) face one or more challenges that are historically problematic of aging systems. These challenges include no longer meeting mission needs, difficulty finding spare parts, and limited technical staff with expertise in repairing the aging system. Specifically, the agency reported that 11 systems no longer met FAA mission needs, 62 systems were difficult to maintain due to challenges in finding employees with the requisite knowledge and expertise, and 61 systems involved difficulty in finding spare or replacement parts.

*FAA Has Ongoing Investments to Modernize At-Risk Systems but Did Not Always Establish Near-Term Plans*

These challenges pose risks to the operations of key ATC systems. According to a February 2024 response from FAA technicians, the top issue facing the agency is system obsolescence and difficulty in finding replacement parts.<sup>11</sup> The response also indicated that inadequate staffing of FAA facilities posed a challenge to maintaining systems because some technicians were responsible for areas spanning hundreds of miles.

As of December 2023, the agency had 64 ongoing investments to modernize 90 of the 105 unsustainable and potentially unsustainable ATC systems. Collectively, the systems are intended to be modernized between 2023 through 2038. FAA did not have an associated modernization investment for the remaining 15 systems.

However, FAA has been slow to modernize some of the most critical and at-risk systems. Specifically, when considering age, sustainability ratings, operational impact level, and expected date of modernization or replacement for each system, as of May 2024, FAA had 17 systems that were especially concerning. The 17 systems range from as few as 2 years old to as many as 50 years old, are unsustainable, and are critical to the safety and efficiency of the national airspace. However, the investments intended to modernize or replace these 17 systems are not planned to be completed for at least 6 more years. In some cases, they were not to be completed for at least 10 years.

In addition, of the 15 systems that FAA does not have an associated ongoing modernization investment, four are critical systems and it is unknown when the associated systems will be modernized or replaced. (The remaining 11 systems were of moderate to low operational impact or only potentially unsustainable and not as much of an immediate concern.) Table 1 provides the key factors of the most critical and at-risk ATC systems.

<sup>11</sup>In response to discussions with us, the Professional Aviation Safety Specialists (a labor union that represents, among others, national airspace safety inspectors and technicians) used a survey tool to solicit responses to our questions from member FAA employees who maintain the national airspace.

**Table 1: Key Factors of Some of the Most Critical and At-Risk Federal Aviation Administration (FAA) Air Traffic Control Systems (ATC)**

System <sup>a</sup>	Age of system	Sustainability rating <sup>b</sup>	Safety and efficiency operational impact	Completion date for associated modernization investment
System A	30	A: unsustainable	Critical	2035
System B	21	B: unsustainable	Critical	2034
System C	6	B: unsustainable	Critical	2034
System D	30	B: unsustainable	Critical	2031
System E	50	B: unsustainable	Critical	2031
System F	36	B: unsustainable	Critical	2031
System G	25	B: unsustainable	Critical	2031
System H	46	A: unsustainable	Critical	2031
System I	21	A: unsustainable	Critical	2031
System J	28	A: unsustainable	Critical	2031
System K	30	B: unsustainable	Critical	2030
System L	20	B: unsustainable	Critical	2030
System M	7	B: unsustainable	Critical	2030
System N	33	A: unsustainable	Critical	No investment
System O	30	B: unsustainable	Critical	No investment
System P	2	A: unsustainable	Critical	No investment <sup>c</sup>
System Q	30	B: unsustainable	Critical	No investment

Source: GAO analysis of FAA documentation. | GAO-25-107917

<sup>a</sup>This table omits the official names of the 17 systems due to sensitivity concerns. We used generic designations instead.

<sup>b</sup>In 2023 FAA officials conducted an operational risk assessment to evaluate the sustainability of all ATC systems. The officials rated each of the 138 systems by their sustainability levels on a scale of A through E (rating A represented the least sustainable and rating E represented no sustainment issues). Systems with ratings A are considered unsustainable because they have significant sparing shortages, shortfalls in sustainment funding, and little or no technology refresh funding is available. System with ratings B are considered unsustainable because they have significant shortfalls in sustainment funding or capability.

<sup>c</sup>According to FAA officials in May 2024, the agency is taking steps to mitigate priority deficiencies for this system. These efforts are being addressed in operations, rather than through a technical refresh or sustainment investment.

In addition, the key goals of the 2023 operational risk assessment were to identify where FAA should focus future investments, funding, and risk reduction activities associated with ATC systems. FAA officials stated that they used the assessment to determine that the agency had sufficient backup systems and redundancies in place to enable it to avoid a catastrophic incident.

However, according to officials, FAA did not use the results of the 2023 operational risk assessment to prioritize or establish near-term plans to modernize all unsustainable and critical systems identified in its assessment. Specifically, as mentioned previously, FAA has four at-risk systems that do not have any near-term plans for modernization. Officials stated that they did not use the 2023 assessment to prioritize modernization investments because it was not completed in time to inform a 2024 enterprise architecture update.<sup>12</sup> Officials stated that they plan to use the results of the 2024 operational risk assessment to inform future budget decisions and plans for modernization.

Without near-term modernization plans for these systems, critical ATC operations that these systems support may continue to be at-risk for over a decade before being modernized or replaced. Specifically, FAA can take well over a decade to implement modernization investments once initiated. Of the nine investments that we reviewed that had established cost, schedule, and performance baselines, FAA plans to take an average of 12 years and 8 months to complete all deployment activities. In addition, four of these investments plan to take as long as 15 to 19 years to implement. For example, while the Terminal Flight Data Manager modernization investment was initiated in September 2010, as of May 2024, FAA estimated it will not be com-

<sup>12</sup>Each year, FAA updates the national airspace enterprise architecture roadmaps that highlight a 15-year view of modernization of the national airspace and a list of investments associated with each roadmap. The roadmaps include acquisition milestones as defined by the FAA acquisition management policy and any interdependencies between the investments. This helps to facilitate planning and scheduling for the approval, funding, acquisition, and deployment of related systems, equipment, or capabilities. Proposed capital investments must be presented to the JRC for review and approval before they begin. Once approved, an investment will be added to the national airspace enterprise architecture and be included in the President's budget submittal to Congress.

pleted until 19 years later, in February 2030.<sup>13</sup> Similarly, the Common Support Services-Weather system modernization investment was initiated in December 2010, but is not estimated to be completed until April 2026 (over 15 years later).<sup>14</sup>

The FAA Reauthorization Act of 2024 requires that by February 2026, FAA conduct an audit and report to Congress on the results to, among other things, determine the level of risk and impact associated with outdated, unsafe, or unstable legacy systems.<sup>15</sup> The act also requires that the report provide recommendations for system replacements or enhancements.

*Selected Modernization Investments Took Years to Baseline and Progressed Slowly*

However, in the interim, Congress may not have important information on how FAA is mitigating risks related to critical systems. Accordingly, we recommended that FAA report to Congress on how it is mitigating risks of all unsustainable and critical systems that are identified in the annual operational risk assessments. Transportation concurred with our recommendation.

According to the Office of Management and Budget (OMB), diligently tracking the execution of well-crafted plans can provide early warning of potential problems and enable timely and effective mitigation before problems spiral out of control.<sup>16</sup> Baselined plans act as a guide throughout the life of an investment to provide a basis for measuring performance.<sup>17</sup> In addition, according to FAA acquisition policy, once an investment establishes a baseline, the investment receives additional oversight from the Joint Resources Council (JRC)—FAA’s executive acquisition governance board.

Of the 20 selected investments we reviewed, 11 of the investments were required to establish an acquisition program baseline, and nine of them did so accordingly.<sup>18</sup> However, it often took several years after investment initiation to accomplish this. Specifically, eight of the 11 selected investments took longer than 4 years to establish a baseline. The Next Generation Very High Frequency and Ultra High Frequency Air-to-Ground Communications Phase 2 investment took the longest amount of time at 6 years and 8 months.<sup>19</sup> As another example, the Offshore Automation Phase 1 investment took 5 years and 6 months to establish a baseline.<sup>20</sup> In addition, while the Aeronautical Information Management Modernization Enhancement 1<sup>21</sup> and FAA Enterprise Network Services<sup>22</sup> investments were initiated over 6 years

<sup>13</sup>The Terminal Flight Data Manager modernization investment is intended to support new services that provide automation to current, manually intensive operations and replaces critical, outdated systems in the national airspace. It shares electronic data among controllers, air traffic managers, aircraft operators, and airports. It also enables stakeholders to more efficiently stage arrivals and departures and manage surface traffic flow. As of May 2024, this investment was in the process of rebaselining, which may impact planned time frames.

<sup>14</sup>The Common Support Services-Weather project is intended to offer weather products for integration into air traffic decision support systems, improving the quality of traffic management decisions and reducing controller workload during severe weather. Products will be provided via a set of common web services for weather, using internationally recognized data access and data format standards.

<sup>15</sup>Pub. L. No. 118–63, 138 Stat. 1025 (2024)

<sup>16</sup>OMB, *Information Technology Investment Baseline Management Policy*, M–10–27 (Washington, D.C.: Jun. 28, 2010).

<sup>17</sup>Baseline is defined as the approved costs, schedule, and performance goals for a given investment.

<sup>18</sup>We selected 20 of the 65 investments intended to replace unsustainable and potentially unsustainable ATC systems. Specifically, we selected the 20 investments based on, among other things, the operational impact on the safety and/or efficiency of the national airspace, acquisition type, and lifecycle cost. For each investment, we compiled cost, schedule, and descriptive information from investment planning and oversight documents, such as the acquisition program baselines, execution plans, and quarterly investment metrics from a centralized investment data repository. We performed reliability checks on the data against other data sources, such as the IT Dashboard.

<sup>19</sup>The Next Generation Very High Frequency and Ultra High Frequency Air-to-Ground Communications Phase 2 modernization investment is intended to replace and modernize aging and obsolete air-to-ground analog radios that allow direct voice communication with pilots. These radios are to support Voice Over Internet Protocol and meet modern requirements.

<sup>20</sup>The Offshore Automation Phase 1 investment aims to develop system enhancements to increase the productivity, capacity, flight efficiency, safety, and system availability of the offshore sites in Alaska, Hawaii, Guam, and Puerto Rico.

<sup>21</sup>The Aeronautical Information Management Modernization Enhancement 1 modernization investment is expected to consolidate redundant sources of aeronautical data (*i.e.*, navigational aids and notices to air missions) and systems and provide the foundation to expand aeronautical information exchange among existing applications, air traffic management automation systems, and national airspace stakeholders.

<sup>22</sup>FAA Enterprise Network Services modernization investment is intended to provide FAA with modern ethernet/internet protocol telecommunications infrastructure (*e.g.*, cabling) to,

ago, as of May 2024, neither had established an approved acquisition program baseline. FAA officials explained that some investments take a while to develop a baseline because of the complexity of the requirements or large number of affected stakeholders.

As a result, these pre-baselined investments receive limited oversight from the JRC for several years. Specifically, while FAA acquisition policy states that baselined investments are required to attend quarterly oversight meetings with the JRC, these oversight requirements do not exist for investments that have not been baselined.

In April 2024, FAA officials stated that they were in the initial phase of planning to establish greater accountability for investments prior to establishing a baseline. Specifically, officials stated that they are considering providing investments increased oversight when requesting additional resources for investment activities, beyond what was initially allocated, or when pre-baseline milestones are delayed. In May 2024, officials stated that FAA has not taken any further steps toward this goal.

To address the lack of accountability of pre-baselined investment, we made two recommendations:

- FAA should establish a time frame for developing and implementing guidance to increase JRC oversight of pre-baselined investments that require additional resources or time prior to establishing a baseline.
- FAA should ensure that ATC modernization investments establish baselines in an expeditious manner.

Transportation partially concurred with the first recommendation. To clarify our intention and address comments from Transportation, we added contextual language to this recommendation. The agency's planned actions should help meet the intent of our recommendation, if effectively implemented. Transportation concurred with the second recommendation. In December 2024, FAA officials stated that they do not have an update on actions they have taken to address these recommendations. They stated they would provide an update in March 2025.

In addition, we found that selected investments have progressed slowly. As discussed earlier, most of the selected modernization investments we reviewed plan to take many years before first deploying functionality and completing all deployment activities—with some taking as many as 15 to 19 years. Among other things, a key risk of slow system implementations is that the technology may be out of date by the time systems are implemented. For example, a November 2023 National Airspace System Safety Review Team report found that while En Route Automation Modernization was initiated in 2004, it was not delivered until 10 years later.<sup>23</sup> This process led to En Route Automation Modernization being deployed with outdated technology that needed a major technology refreshment within 5 years of implementation.

We have previously reported that segmenting large complex system development and implementation efforts into smaller and more manageable increments has the potential to reduce risk and deliver capabilities more quickly.<sup>24</sup> Since 2000, OMB has directed agencies to incorporate an incremental development approach into their policies and ensure that investments implement them.<sup>25</sup> Further, since 2012, OMB has required that functionality be delivered to users at least every 6 months.<sup>26</sup> Consistent with OMB's guidance, FAA's acquisition management policy states that the JRC is responsible for reviewing and approving investments that are organized as manageable segments.

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among other things, enable highly available and secure voice and data communications and networking capabilities needed to enable critical operations.

<sup>23</sup> National Airspace System Safety Review Team, *Discussion and Recommendations to Address Risk in the National Airspace System* (Washington, D.C.: Nov. 15, 2023).

<sup>24</sup> GAO, *Information Technology Reform: Agencies Need to Improve Certification of Incremental Development*, GAO-18-148 (Washington, D.C.: Nov. 7, 2017); and *High Risk Series: An Update*, GAO-15-290 (Washington, D.C.: Feb. 11, 2015).

<sup>25</sup> OMB, *Management of Federal Information Resources*, Circular No. A-130 Revised, Transmittal Memorandum No. 4. OMB's 2012 and 2013 guidance reaffirmed and strengthened these requirements. Executive Office of the President of the United States, OMB, *Analytical Perspectives, Budget of the U.S. Government, Fiscal Year 2014*, (Washington, D.C.: April 10, 2013), p. 354; and OMB, *Contracting Guidance to Support Modular Development* (Washington, D.C.: June 14, 2012).

<sup>26</sup> OMB, FY 2016 IT Budget—Capital Planning Guidance (Washington, D.C.: May 23, 2014); Guidance on Exhibits 53 and 300—Information Technology and E-Government (2013); Guidance on Exhibits 53 and 300—Information Technology and E-Government (2012).

However, the Council had not ensured that selected investments deliver functionality in manageable segments. For example, the JRC allowed two investments (*i.e.*, Enterprise Information Display System phase 1 and NextGen Weather Processor), to proceed even though neither was organized in manageable segments to deliver functionality incrementally.<sup>27</sup> Specifically, the Enterprise Information Display System phase 1 investment was initiated 8 years ago and had not delivered any functionality to users. Similarly, NextGen Weather Processor was initiated 14 years ago and had yet to deliver any functionality to users.

FAA officials acknowledged that they should do more to identify opportunities to segment investments and deliver functionality to users more rapidly across all ATC system modernization investments.

Specifically, in March 2024 the agency established a working group to develop guidance on segmenting investments. However, FAA officials did not provide specific time frames for developing and implementing this guidance.

Accordingly, we recommended that FAA establish a time frame for developing and implementing guidance that the JRC ensures that ATC system modernization investments are organized as manageable segments. Transportation concurred with our recommendation. Similar to the previously discussed recommendations, in December 2024, FAA officials stated that they do not have an update on actions they have taken to address the recommendation. They stated they would provide an update in March 2025.

In summary, FAA's reliance on a large percentage of aging and unsustainable or potentially unsustainable ATC systems introduces risks to FAA's ability to ensure the safe, orderly, and expeditious flow of up to 50,000 flights per day. In our September 2024 report, we emphasized that while FAA has ongoing investments aimed at modernizing aging ATC systems, the agency's progress to modernize some of the most critical and at-risk systems has been slow. As such, in our report we made seven recommendations to FAA aimed at, among other things, improving accountability of the replacement of these systems and reducing the amount of time the agency takes to modernize them. FAA officials were unable to demonstrate any actions they are taking to address our recommendations; however, expeditious implementation of our seven recommendations will be vitally important to help the agency manage risks while it addresses its unsustainable systems.

Chair Duckworth, Ranking Member Moran, and Members of the Subcommittee, this completes my prepared statement. I would be pleased to respond to any questions that you may have at this time.

Senator DUCKWORTH. Thank you, Mr. Walsh.

I now recognize Mr. Dean Iacopelli from the National Air Traffic Controllers Association.

**STATEMENT OF DEAN IACOPELLI, CHIEF OF STAFF,  
NATIONAL AIR TRAFFIC CONTROLLERS ASSOCIATION,  
AFL-CIO**

Mr. IACOPELLI. Good morning, Chair Duckworth, Chair Cantwell, and Ranking Member Cruz. Thank you for the opportunity to testify before you on this important subject.

My name is Dean Iacopelli. I am Chief of Staff for the National Air Traffic Controllers Association, NATCA. I am a retired air traffic controller with over 30 years of experience, having been assigned to a facility responsible for separating aircraft in and around the New York City area.

NATCA takes pride in our role as an aviation safety organization that stands shoulder-to-shoulder with Congress, the executive

<sup>27</sup>The Enterprise Information Display Systems is intended to replace information display systems that display aircraft, aeronautical, and other types of information that are currently in use at approximately 400 facilities (*e.g.*, air traffic control centers) with about 5,000 display systems. It was initiated in June 2016 and is estimated to be completed in December 2027. The NextGen Weather Processor is intended to replace FAA's aging weather processor systems and provide new capabilities, such as developing a common weather processing platform. This platform uses algorithms to create and display aviation-specific current and predicted weather. It was initiated in December 2010 and is estimated to be completed in April 2026.

branch, and industry stakeholders to ensure that the national airspace system remains the safest and most efficient in the world. The 20,000 air traffic controllers and other aviation safety professionals represented by NATCA throughout the FAA, Department of Defense, and the Federal Contract Tower Program, are vital to the U.S. economy, ensuring the safe and efficient movement of millions of passengers and tons of cargo every day. Our mission is to ensure the flying public arrives home to their vacation, their business destination, without delay and while maintaining the highest margins of safety.

I know that much of this hearing will be focused on safety and technology as well as funding for facilities and equipment, but I would be remiss if I did not first mention air traffic control staffing, which is the foundation of the air traffic control system. The national airspace system requires a sufficient number of trained air traffic controllers to meet the FAA's operational, statutory, and contractual requirements.

Certified air traffic controllers are also vital to participating in the modernization, equipment, and procedures. We would like to thank this Committee for passing the FAA Reauthorization Act of 2024 with overwhelming bipartisan support. That law includes many critical provisions on hiring, training, and staffing, including directing the FAA to conduct maximum hiring for controllers for its duration. Congress has consistently provided the FAA with the resources it requests through both authorization of top-line numbers and the annual appropriations process.

Currently one of the highest priorities for the FAA is to address the outdated FAA telecommunications infrastructure network, known as FTI. The FTI network affects radar displays that depict air traffic in real time and air-to-ground frequencies used to communicate with pilots. The network is largely comprised of copper wiring, which can no longer reliably meet the demand of the national airspace system. Recently, ground stops at airports in the New York City and Washington, D.C., areas highlight the consequences of a failure of the FTI network. The FAA must transition 4,600 sites away from copper wire and onto fiberoptic network to avoid extensive flight delays.

The FAA operates more than 300 air traffic control facilities. The FAA's 21 air route traffic control centers were built in the 1960s, and have an average age of 62 years old. Fort Worth, Seattle, Kansas City, Chicago, and Houston centers are each between 59 and 64 years old.

Our terminal facilities also require attention. The average FAA-operated tower is 36 years old. For example, Dallas-Fort Worth Airport has three air traffic control towers, which service one of the busiest airports in the country, the oldest of which is 50 years old.

Many FAA facilities have exceeded their expected lifecycles. Others require new roofs, windows, HVAC systems, plumbing, and elevators. When major systems fail or facilities have structural problems, it can lead to flight delays or temporary airspace shutdowns. It is implausible to build the air traffic control system of the future in outdated and inadequate buildings.

The national airspace system needs and deserves the best facilities and equipment to move this Nation's passengers and cargos.

To sustain many of our legacy systems as well as to enhance and deploy new safety and modernization programs, the FAA projects that it will need \$6 billion annually for its Facilities and Equipment account, which is a significant increase compared to recent years. Without this funding, along with continued focus on air traffic controller staffing, the FAA will struggle to maintain its capacity of the system, let alone modernize or expand it for new users and emerging technologies.

NATCA's continued involvement as a productive and collaborative partner will ensure the FAA continues to deliver these initiatives to industry stakeholders and the flying public on time and at cost savings to the American taxpayers. If NATCA's trained and experienced representatives were not involved, many modernization programs would be delayed and experience cost overruns because they would need to go through costly and time-consuming revisions following the development, testing, and even after implementation.

We look forward to working with this Committee, the Appropriations Committee, and the incoming administration to build on our successes and continue the safest period in aviation industry. Thank you.

[The prepared statement of Mr. Iacopelli follows:]

PREPARED STATEMENT OF DEAN IACOPELLI, CHIEF OF STAFF, NATIONAL AIR TRAFFIC CONTROLLERS ASSOCIATION, AFL-CIO

Thank you for the opportunity to testify on behalf of the National Air Traffic Controllers Association, AFL-CIO (NATCA) at today's hearing titled "U.S. Air Traffic Control Systems, Personnel, and Safety."

NATCA is the exclusive representative for nearly 20,000 employees, including the Federal Aviation Administration's (FAA) air traffic controllers, traffic management coordinators and specialists, flight service station air traffic controllers, staff support specialists, engineers and architects, and other aviation safety professionals, as well as Department of Defense (DOD) and Federal Contract Tower (FCT) air traffic controllers.

NATCA takes pride in its role as an aviation safety organization that stands shoulder-to-shoulder with government and industry stakeholders to ensure that our National Airspace System (NAS) remains the safest and most efficient in the world. The air traffic controllers and other aviation safety professionals who NATCA represents throughout the FAA, DOD, and the private sector are vital to the U.S. economy, ensuring the safe and efficient movement of millions of tons of cargo annually within the National Airspace System (NAS).

The NAS moves over 45,000 flights and 2.9 million passengers, and more than 59,000 tons of cargo every day across more than 29 million square miles of airspace. Although it is the safest, most efficient, and most complex system in the world, we should always strive to bolster safety, mitigate risk, and improve efficiency.

#### **Executive Summary**

The FAA's two primary accounts for running the U.S. air traffic control system are its Operations<sup>1</sup> (Ops) and Facilities and Equipment (F&E) budgets. Although

<sup>1</sup>NATCA supports the Department of Transportation's (DOT) Fiscal Year 2025 Operations budget request, which included an increase to \$13.6 billion from the 2024 Continuing Resolution level of \$12.729627 billion, in recognition that the FAA will experience several uncontrollable cost increases of over \$500 million, from personnel costs such as government-wide pay increases and annualized hiring from Fiscal Year 2024. The DOT's Fiscal Year 2025 budget request also accounts for a \$43 million increase to hire and train at least 2,000 new air traffic controllers to rebuild the controller staffing levels and meet current and projected traffic demands. This hiring target was established in accordance with the maximum hiring requirement in the FAA Reauthorization Act of 2024 and must increase in future years as the FAA Academy expands its capacity. In July 2024, the Senate Appropriations Committee approved this budget request in its Fiscal Year 2025 THUD appropriations bill, while the House THUD bill was slightly below that budget request amount.

the size of the F&E budget is roughly one-fourth of its Ops budget, F&E funding is critical for developing, testing, deploying, and enhancing the systems that air traffic controllers and other aviation safety professionals use every day to ensure that more than one billion passengers annually arrive safely at their destinations.

These safety-critical systems must be continuously monitored, maintained, upgraded, and enhanced even after they are fully deployed across the NAS, while many contain physical components that have lifecycle expiration dates. Software enhancements and cyber security upgrades are also necessary to meet the growing demands of the NAS. In addition to increased commercial passenger and cargo traffic, the rapid proliferation of space launches and unmanned aerial systems must be integrated safely into the system by the workforce that keeps it running.

F&E funding is also used to repair, update, and replace the FAA's rapidly aging physical infrastructure. Air traffic control facilities across the U.S. range from two to 82 years of age. Many controllers and other aviation safety professionals go to work every day in facilities that are plagued by leaking roofs, flooding basements that contain electronic systems, broken-down elevators and HVAC systems, and chronically backed-up bathroom toilets.

NATCA's written testimony will focus these issues including: (1) controller staffing challenges and how they negatively affect infrastructure and modernization initiatives; (2) the concerns with FAA's rapidly-aging physical infrastructure; (3) the FAA's F&E budget requests to Congress understated its needs in previous years; and (4) illustrate how we, as a nation, are falling behind in our efforts to maintain and modernize the system.

Importantly, this testimony will explain why NATCA must continue to be involved as a productive and collaborative partner across a wide range of safety, technology, and modernization programs to ensure that the FAA can deliver these initiatives to industry stakeholders and the flying public on-time and at a cost-savings to the American taxpayers.

#### I. CONTROLLER STAFFING CHALLENGES CONTINUE TO HINDER INFRASTRUCTURE AND MODERNIZATION ADVANCEMENTS

NATCA continues to be focused on improving the system-wide controller staffing shortage. A properly-staffed controller workforce is necessary in order to safely and efficiently meet all of its operational, statutory, and contractual requirements, while also having the personnel resources to research, develop, deploy, and then train the existing workforce on new processes, technology, and modernization initiatives. Without a sustainable hiring, training, and staffing model like the one outlined in the FAA Reauthorization Act of 2024, which passed both chambers with overwhelming bipartisan support, the FAA will struggle to maintain the current capacity of the system, let alone modernize or expand it for new users.

NATCA thanks the members of this subcommittee, as well as all Senators who championed the FAA Reauthorization Act of 2024. That law included many first-time provisions including directing the FAA to conduct maximum hiring for controllers for the duration of the bill and implementing expansion of the capacity of the FAA's Training Academy in Oklahoma City.

After reaching its hiring targets for air traffic controller trainees three consecutive years, including increased targets of 1,500 and 1,800 respectively the past two Fiscal Years, the FAA is finally starting to make some progress. After a decade of steady losses, in Fiscal Year 2023, the FAA added 15 additional Certified Professional Controllers and 15 additional trainees. In Fiscal Year 2024, the FAA added 140 CPCs and 189 trainees after accounting for attrition. Maximum hiring for the full duration of the bill will greatly assist the FAA achieve a staffing level required to meet all of its needs.

The law also requires the FAA to implement the Collaborative Resources Workgroup's (CRWG) new, more accurate operational staffing targets on an interim basis, until the Transportation Research Board—a part of the National Academies of Sciences, Engineering, and Medicine—completes a study to determine which staffing models and methodologies best account for the operational staffing needs necessary to meet facility operational, statutory, contractual and safety requirements of the air traffic control system. Proper and timely implementation of these provisions is essential to the safety, efficiency, and technological modernization of the NAS for the years to come.

Congress must make the necessary investments in the FAA's rapidly aging physical and technological infrastructure, which need significant attention and additional funding. But, staffing and infrastructure are inextricably linked, because it requires fully certified controllers to develop, test, deploy, and train new technology, while at the same time meeting the safety and efficiency requirements of the system.

## II. FAA'S PHYSICAL INFRASTRUCTURE IS RAPIDLY AGING AND MANY FACILITIES HAVE EXCEEDED THEIR EXPECTED LIFECYCLES

The FAA operates more than 300 air traffic control facilities of varying ages and conditions. The FAA's 21 Air Route Traffic Control Centers (ARTCCs) located in the continental United States were built in the 1960s and are more than 60 years old. The FAA's Terminal Radar Approach Control facilities (TRACONs) are on average more than 25 years old. In addition, the FAA has 132 combined TRACON/towers, which, on average, are approximately 35 years old. Finally, the FAA has another 131 stand-alone Towers which average more than 30 years old.

Many FAA facilities have exceeded their expected lifecycles. Others have major systems that have exceeded their expected functional lifecycle such as roofs, windows, HVAC systems, plumbing, and elevators, which no longer perform their necessary functions. Some of these issues have led to periodic airspace shutdowns and many others have led to safety concerns for the workforce. When these major systems fail, or facilities have integrity problems, it can lead to increasing delays, which negatively affect the flying public and our economy.

The FAA is addressing its aging infrastructure through a combination of realignments, sustaining and maintaining some facilities, and replacing a handful of others. However, that process has been slow and hampered by funding constraints. The FAA will need a substantially increased investment in its F&E budget to adequately maintain, let alone, replace its aging infrastructure.

## III. CONGRESS HAS ALWAYS MET FAA'S STATED BUDGETARY NEED FOR FACILITIES AND EQUIPMENT

The FAA, like much of the Federal government, has faced an unstable and unpredictable funding stream for the better part of two decades. Whether due to the risks of lapsed appropriations or authorizations, such interruptions have negatively affected all aspects of the FAA, making it increasingly difficult to maintain the safety and efficiency of the NAS. Even when the Agency is not facing the threat of a shutdown, multiple administrations from both parties have submitted insufficient FAA budget requests to Congress. FAA's requests have often fallen well-short of what it truly needs to adequately address the infrastructure needs of the NAS.

Congress has consistently provided the FAA with the resources it requests through both authorization of top-line numbers and the annual appropriations process. However, because FAA has consistently requested too little, there are significant backlogs of NAS system sustainment and ATC facility sustainment, in addition to mounting delays in the implementation of NAS modernization and system improvements as well as ATC tower and radar facility replacement.

The budgetary shortfalls also have not kept up with inflation over the past 15 years. For instance, the FAA has consistently requested only about \$3 billion in annual appropriations for F&E throughout that period, even though in Fiscal Year (FY) 2024 the Agency's internal budgetary estimates showed that it needed at least \$4.5 billion, with that need quickly approaching \$6 billion. This loss of spending and buying power for F&E programs forced FAA into a "fix-on-fail" model by requiring it to prioritize mandatory costs, leaving little to no money for modernization and infrastructure programs.

Currently, NATCA believes that the Department of Transportation's FY25 Budget Request (\$3.6 billion) for F&E is insufficient to meet the Agency's modernization and technological needs. To sustain many legacy systems, as well as to enhance and grow critical safety and modernization programs, the FAA projects that it will need \$6 billion. At minimum, the NATCA projects that the FAA will need at least \$4 billion to simply sustain these programs and the rest of the NAS. Investments that merely cover the costs to sustain current equipment will be insufficient to develop and implement new technologies and integrate new users into the system.

The FAA's FY 2025 budget request, for the first time in over a decade, acknowledges its true need, although not entirely through its F&E request. In addition to the \$3.6 billion F&E request, FAA cites the \$1 billion in funds authorized for 2025 through the Infrastructure Investment and Jobs Act as supplementing its facilities and infrastructure funding needs. It also proposes a new Facility Replacement and Radar Modernization fund that would dedicate \$8 billion over the next five years—beginning with \$1 billion in 2025—to replace or modernize aging air traffic control facilities. This includes modernizing 377 critical radar systems and more than 20 air traffic control facilities. We, along with a wide array of industry stakeholders, support this request.

Recently, the FAA publicly shared its facilities and systems sustainment backlog, ongoing needs for both, and facilities and systems replacement and improvement funding requirements looking forward 30 years into the future.



As a result, air traffic controllers throughout the U.S. are experiencing a steady increase in unexpected outages of air traffic systems. Recent ground stops at airports in the New York and Washington, D.C., areas highlight the risks and consequences of telecommunication network failures. To date, there are over 30,000 services at over 4,600 FAA sites that must transition away from copper wire and onto a fiber optic cable network in order to avoid severe service disruptions and extensive flight delays.

The FAA's Enterprise Network Services (FENS) program will replace existing copper wire infrastructure with a fiber optic network. As a result, FENS will be able to provide reliable and secure communications, information services, and networking capabilities to support NAS operations and agency administration functions. This will not only help to stabilize the telecommunications network but also pave the way for cloud-based services and reduce program development and sustainment costs. However, any discontinuation or disruption to the existing copper wire services without first transitioning to fiber optic services would lead to potential safety risks and/or significant delays in air traffic services.

Because this is both a time-sensitive and a safety-critical program, the FAA is currently moving money from other safety-critical programs in order to replace legacy copper wire on a case-by-case basis. The FAA is also spending an additional \$7 million per month just to maintain the legacy copper wire as they delay the fiber optic upgrades due to insufficient funding. Other FAA programs will continue to suffer funding cuts if this program is not adequately funded.

#### *B. The NOTAM Crisis Harbinger of Future Disruptions*

Even before the FAA's telecommunications crisis, the FAA was working to mitigate the risks associated with its faltering Notice to Airmen (NOTAM) system, which has been the source of significant disruptions throughout the NAS. The NOTAM system is vital for sharing and disseminating safety-critical flight information between both air traffic controllers and pilots.

However, in early 2023, a complete failure of the NOTAM system caused nationwide ground stop causing significant flight delays. Despite the known vulnerabilities and risks associated with the current system, the FAA will struggle to fund this program without increased F&E funding. At minimum, the FAA will need \$154 million just to conduct further *research* on a replacement NOTAM system, but will need \$354 million to replace the broken NOTAM system.

Much like the FAA's looming telecommunications crisis, the NOTAM crisis was not at the top of any F&E priority lists until after the 2023 collapse resulted in cascading nationwide delays and ground stops. We need to learn the lessons from similar events in the past and chart another course, rather than repeat the same mistakes.

#### *C. FAA Must Continue to Sustain and Enhance Automation Platforms*

Automation platforms such as ERAM and STARS deliver flight plan and surveillance information to air traffic controllers on a real-time basis. These platforms are the foundational systems that keep our NAS operating safely 24-hours a day, 7-days a week, 365-days a year.

Over the past four years, air traffic levels have continued to grow at a rate of 6.2 percent per year post-COVID, excluding new entrant operations. Air traffic automation systems have components reaching end-of-life that need to be replaced. Due to historically flat F&E funding, as a result of the FAA requesting less than it needs to maintain the system, air traffic automation has been unable to meet the growing needs of the NAS reducing the efficiency of the system.

In the near future, controllers will have to rely on this inadequate technology to maintain the safety and efficiency of the NAS. Without fully funding these programs, the FAA will need at least \$265 million just to maintain current functionality in FY25. However, at that level, the FAA would not be able to make additional enhancement upgrades for any of the current automation systems and some hardware replacements would be at risk. Because these platforms require continuous maintenance, it will cost the FAA \$400 million in FY25 to update the hardware for these systems and enhance functionality controllers desperately need.

#### *D. Surveillance Programs*

Air traffic surveillance systems encompass Radar, ADS-B, and GPS. Although ADS-B and GPS have been extremely beneficial for improving safety and efficiency, they do not replace the need to maintain legacy radar infrastructure. Modern radar technology is more cost-effective, requires less maintenance, and offers an increase in range visibility which will allow the deployment of fewer assets and maintain the same, if not improve, surveillance visibility throughout the system.

At minimum, the FAA will need \$212 million just to sustain current surveillance systems. Many components of legacy radars are past their end-of-life cycles and are no longer manufactured, while some other suppliers of ground radar equipment went out of business. Without replacing and upgrading these systems, the flying public is at risk of experiencing unexpected and significant flight delays and other disruptions to the system whenever these systems breakdown. The FAA requires \$1 billion to modernize radar technology throughout the system.

*E. NATCA Involvement Critical in Every Phase*

It is critical that NATCA remain a productive and collaborative partner throughout development, testing, training, and implementation across a wide range of safety, technology, and modernization programs. NATCA's continued involvement will ensure that the FAA continues to deliver these initiatives to industry stakeholders and the flying public on-time and at a cost-savings to the American taxpayers. If NATCA representatives were not involved throughout the entirety of the process, many modernization programs would be delayed and experience cost overruns, because they would need to go through extensive, costly, and time-consuming revisions following development, during testing, and even after implementation.

V. CONCLUSION

In order to enhance aviation safety, efficiency, and modernize FAA physical and technological infrastructure, Congress must prioritize investment in F&E funding. Meeting the FAA's F&E budgetary needs for Fiscal Year 2025 and beyond will finally allow the Agency to address its significant backlog of facility and equipment maintenance, repair, and replacement. This increased funding also will allow the FAA to fund critical modernization programs that enhance safety while continuing to expand the NAS to account for the development and rapid proliferation of commercial space operations, advanced air mobility, unmanned aerial systems (drones), and other new entrants that must be properly integrated into the existing system.

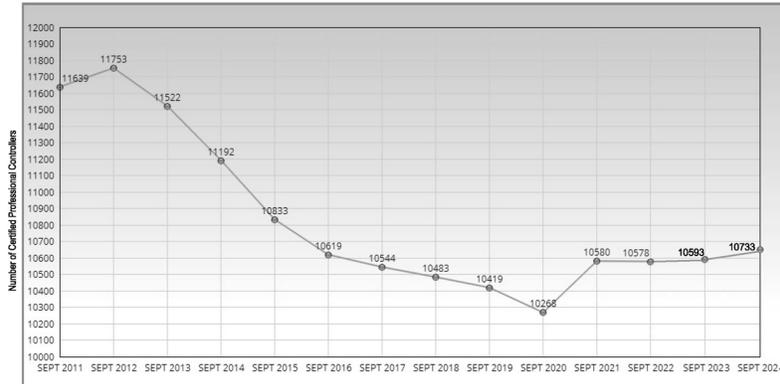
It is critical that NATCA remain directly involved throughout the safe and efficient integration of new technologies including research, development, testing, deployment, and training. NATCA's continued involvement will ensure that the FAA continues to deliver these initiatives to industry stakeholders and the flying public on-time and at a cost-savings to the American taxpayers.

Of course, none of this is possible without adequate staffing of the system. FAA must continue to hire and train the next generation of air traffic controllers. Congress' mandate to maximize controller hiring over the next five years can only be accomplished if FAA's Operations budget needs are also met.

NATCA looks forward to working members of this Subcommittee, the full Committee, the appropriators, as well as all other Members of Congress, aviation stakeholders, the incoming Administration, and the FAA to achieve these and many other mutually beneficial goals.

Thank you for holding this important hearing and providing the opportunity to testify.

### Air Traffic Controller Staffing: 2011-2024



FISCAL YEAR	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
On-Board	15,236	15,063	14,461	14,059	14,010	14,050	14,009	14,285	14,193	13,830	13,715	13,418	13,448	13,777
CPC	11,639	11,753	11,522	11,192	10,833	10,619	10,544	10,483	10,419	10,268	10,580	10,578	10,593	10,733
CPC-IT	965	1,143	1,187	1,200	1,218	1,259	1,205	1,320	1,414	1,309	1,031	943	985	953
DEV (Including AG)	2,632	2,167	1,741	1,667	1,959	2,172	2,260	2,482	2,360	2,253	2,104	1,897	1,870	2,091
AG	676	671	440	665	936	878	883	980	882	873	917	643	762	878
Retirement Eligible	3,064	3,224	3,077	2,982	3,355	2,915	2,410	1,842	1,004	1,143	=1,000	515	526	463
FAA Planned To Hire	829	981	1,315	1,286	1,772	1,619	1,781	1,701	1,431*	910	910**	1,020	1,500	1,800
FAA Actually Hired	824	925	554	1,112	1,345	1,680	1,880	1,786	1,010	920	510	1,026	1,514	1,811

Source: FAA Finance Staffing Data Snapshot

\*FAA reduced its FY 2019 hiring target from 1,431 to 907 following the 35-day government shutdown.

\*\*FAA reduced its FY 2021 hiring target from 910 to 500 due to the COVID-19 pandemic and increased its hiring targets for FY 2022-2024.

These data are prior to the Collaborative Resource Workgroup’s recommendation to establish new CPC staffing targets for FAA’s 313 air traffic control facilities.

CPC: Certified Professional Controller

CPC-IT: Certified Professional Controller in Training (fully certified elsewhere, transferred to a new facility and began training there)

DEV: Developmental (trainee)

AG: Graduate of the FAA Initial Classroom Training Academy in Oklahoma City, newly hired, and started at their first facility as a trainee

Senator DUCKWORTH. Thank you, Mr. Iacopelli.

I will now recognize Captain Ambrosi with the Air Line Pilots Association.

#### STATEMENT OF CAPTAIN JASON AMBROSI, PRESIDENT, AIR LINE PILOTS ASSOCIATION, INTERNATIONAL

Mr. AMBROSI. Chair Cantwell, Ranking Member Cruz, Chair Duckworth, and members of the Subcommittee, thank you for the opportunity to testify and to present the perspective of 79,000 commercial airline pilots of the Air Line Pilots Association International. My name is Jason Ambrosi. I am current and qualified 767 captain, and since January of last year I have been President

of ALPA, the largest pilot union and the largest nongovernmental safety organization in the world.

Our association's history of safety and security advocacy spans more than 90 years, and I am honored to continue that tradition by participating in today's discussion. Congress, as guided by this Committee, made important investments in the future of our aviation system when it passed a strong safety-focused, five-year FAA reauthorization bill. By furthering the Federal commitment to modernizing our system, enhancing the air traffic controller and aviation workforce, and investing in technology, we are positioned to remain the global aviation leader.

As operators in the system, pilots have a vested interest in the FAA sustaining legacy systems and advancing technological and infrastructure improvements to ensure the national airspace system remains safe and efficient. One of the biggest modernization initiatives in recent history is NextGen. The capabilities that have been implemented with NextGen have increased situational awareness and provided tools to help pilots make safe decisions through performance-based navigation, data communication, and ADS-B implementation.

However, the system's potential is not being fully realized, in part because many airliners are not properly equipped to take advantage of these updated capabilities. As a result, pilots and air traffic controllers are forced to use work-arounds that allow us to operate aircraft with outdated equipment in today's complex system, all of which runs counter to the anticipated benefits of NextGen. Implementing communications, navigation, and surveillance with air traffic management, data communication systems, and ATC automation systems will allow controllers to monitor aircraft, improve communication between pilots and controllers for clearance and reroutes, and ensure aircraft line up on the correct runway.

To the latter point, ALPA is pleased the FAA reauthorization addresses the need for terminal airspace automation display at small airports that have traditionally operated without these technologies.

As I have testified previously before this Committee, we have seen several near miss incidents, including a particularly close call, as you mentioned, in Austin in February of last year, in which pilots were the final line in defense in ensuring safety.

Time and time again, similar examples highlight that the presence of at least two highly trained and well-rested pilots on all commercial airline flight decks, at all times, is a major factor in why airline travel remains the safest form of transportation. The human element of pilots working together on the flight deck is irreplaceable. We are able to see, hear, feel, and react to issues in real time. As the Austin incident showed, we save lives.

To respond to these concerns and augment the critical role of pilots on the flight deck, the Committee has helped ensure that legacy systems, including ASD-X, remain fully operational to provide air traffic controllers with timely alerts that prevent accidents and near misses.

Similarly, the Committee has responded to these incidents with greater focus on runway incursions through the establishment of a

policy for not tolerance for near misses, which expands FAA's focus on improving the ground operation of aircraft at airports, establishing the Runway Safety Council, and supporting discretionary airport grant programs for runway safety projects.

Unfortunately, underinvestment, including for facilities and equipment account, is affecting the systems pilots and air traffic controllers use to ensure safe and efficient operations. While Congress has provided the funding requested each year by the FAA during the annual appropriations process, there remains a significant shortfall in numerous maintenance and modernization efforts. Resources have not kept up with inflation, and effectively require the agency to prioritize sustainment to the detriment of modernization and infrastructure needs. The FAA must ask Congress for its true needs in order to sustain the legacy systems and make greater headway on NextGen to improve the NAS for pilots and all users.

As a current and qualified airline captain with ongoing, firsthand experience in the National Airspace System, I can tell you that our commercial aviation system is safe, and I look forward to working with the Committee and the FAA to continue to improve aviation safety. Thank you.

[The prepared statement of Mr. Ambrosi follows:]

TESTIMONY OF CAPTAIN JASON AMBROSI, PRESIDENT,  
AIR LINE PILOTS ASSOCIATION, INTERNATIONAL

Chair Duckworth, Ranking Member Moran and Members of the Subcommittee, thank you for the opportunity to testify and present the perspective of the more than 79,000 commercial airline pilots of the Air Line Pilots Association, International. My name is Jason Ambrosi, and I am a current 767 Captain at Delta Air Lines and president of ALPA since 2023. ALPA is the largest pilot union in the world and the largest non-governmental aviation safety organization with a history of safety and security advocacy spanning more than 90 years. I am pleased to participate in today's discussion about air traffic systems, personnel, and aviation safety.

Let me affirm that as a current and qualified airline captain with a seat on the flight deck, our commercial aviation system is safe. However, while the U.S. aviation system remains the safest in the world, this outcome is not guaranteed. Safety is a matter of relentless vigilance, and our current success stems from decades of industry-wide efforts, and commitment to collaboration, data collection and analysis, hazard identification and mitigation, and congressional support. However, for the National Airspace System (NAS) to remain the safest and most efficient system, continuous improvements are needed to ensure that growth in traffic levels and new users do not threaten airline or system safety.

Technological and infrastructure improvements are required to efficiently manage current NAS operations, with emphasis on NextGen automation tools and airport infrastructure improvements to provide safe and efficient gate to gate operations, reduced airborne reroutes, ensure that on time arrivals proceed directly to their gate, and cargo is delivered on time. Modernization must continue to keep ahead of the demand from the wide variety of aviation users. The technologies and procedures that are needed must also contemplate new entrants into the NAS. The future of air transportation will bring a combination of commercial air carriers, unmanned aerial vehicles, general aviation, urban air mobility devices, and commercial space flight. The airspace system of the future will involve a wider and more complex variety of operations that our air traffic control infrastructure must manage safely and efficiently. Additionally, many FAA facilities exceed their lifecycles and have deficient systems that create airspace and carrier delays.

To the meet the challenges of an increasingly complex airspace, ALPA has worked with the FAA, our labor partners, airlines, and the industry to deploy air traffic control modernization. One of the biggest modernization initiatives in recent history is NextGen. The capabilities that have been implemented with NextGen have increased situational awareness and provided tools to help pilots make safe decisions through performance-based navigation, data communication, and ADS-B implemen-

tation. However, the system's potential isn't being fully realized—in part because many airliners aren't properly equipped to take advantage of its updated capabilities. As a result, pilots and air traffic controllers are forced to use “workarounds” that allow us to operate aircraft with outdated equipment in today's complex system.

Increasing safety and updating air traffic control systems requires increased resources, stable and reliable funding to ensure continuous FAA operations, and greater use of the Airport and Airways Trust Fund (AATF) to allow the FAA to more effectively leverage the Trust Fund's balance. This Committee did a phenomenal job with passage of five-year bipartisan FAA reauthorization bill that helps augment and develop advanced technologies, including new surface safety technologies, equally important so-called “low tech” safety technologies for runways, lighting and signage, as well as increasing air traffic controller hiring.

Underinvestment, including for the Facilities and Equipment (F&E) account, is affecting the systems pilots and air traffic controllers use to ensure safe and efficient operations. While Congress has generally provided the funding requested each year by the FAA during the annual appropriations process, there remains a significant shortfall of funding in numerous maintenance and modernization efforts. These shortfalls have not kept up with inflation and effectively required the agency to prioritize mandatory spending to the detriment of modernization and infrastructure needs. The FAA must ask Congress for its true needs and Congress should avoid unnecessary and damaging government shutdowns, threatened shutdowns, and lengthy Continuing Resolutions (CRs) that delay these critical efforts.

#### **Aircraft Equipage to Support NextGen Procedures**

The NextGen modernization initiative has resulted in the creation of new performance-based navigation departures, arrivals, and instrument approaches. These procedures safely reduce noise, aircraft greenhouse gas emissions, and airspace congestion. However, not all of the airline aircraft can fly these new procedures. In some circumstances there may be 15–20 percent of the airline aircraft that are unable to utilize the new procedures. Unfortunately, air traffic controllers are unable to maintain the integrity of these operations with such high levels of non-equipped aircraft.

For the NextGen procedures to become the standard, instead of the exception, the commercial airline aircraft fleet needs standardized equipage capabilities that meet the navigational requirements for flying the NextGen procedures. In recent years, there have been attempts to implement NextGen procedures with the assumption that pilots will utilize workarounds to offset the limited navigation capabilities on some of the aircraft. These workarounds often add complexity and workload, which is counter to the anticipated benefits from NextGen. In reality, pilots in lesser equipped aircraft are working harder to make the aircraft comply with the NextGen way of navigating. At times, instead of flying approaches with both precision lateral and vertical guidance that is automated with the assistance of an autopilot, pilots are also asked to hand-fly non-precision approaches on some of today's airline aircraft that lack the necessary NextGen navigation capability.

While NextGen initiatives provide support for the NAS and augment pilot flying, a minimum of two pilots on the flight deck ensure redundancy that provides added awareness, expertise, and experience, factors that established and maintain today's safety standard. There is no technological or procedural pathway today or in the future that can overcome the risks introduced by reducing the flight deck complement, including technological failures or anomalies, incapacitation, and issues associated with the human-machine interface. ALPA views flight deck technology and automation as a human support tool, not a replacement. Given an FAA-Industry Working Group found that 20 percent of “normal” flights experience aircraft malfunctions that require human intervention, the premise of transport category aircraft operation—including FAA's scientific study of fatigue, sleep inertia, and related regulation and guidance—must be based on a minimum of two well-trained pilots on the flight deck.

#### **CNS/ATM Improvements Would Benefit All**

When Communications, Navigation, and Surveillance (CNS) capabilities are integrated with Air Traffic Management (ATM) systems, airspace management and air traffic operations become safer and more efficient. Surveillance technologies enable air traffic controllers to monitor aircraft and track their positions in real-time, increasing situational awareness and enabling proactive airspace management. Precise navigation systems enhance navigation accuracy and support optimized flight routing, attendant fuel savings, and reduced flight times. CNS/ATM contributes to

increased airspace capacity, reduced delays, improved safety, and enhanced operational efficiency.

Similarly, ADS-B, and ADS-C, as well as surface detection systems like Airport Surface Detection System Model X (ASDE-X) and Airport Surface Surveillance Capability (ASSC) are currently deployed runway safety systems that help prevent surface collisions and wrong surface landings. However, ASDE-X and ASSC are fully deployed at only 43 airports. Our air traffic controller workforce needs these capabilities to be fully functioning at all of the airports where ASDE-X and ASSC are installed. ALPA has called upon the FAA to install surface safety systems at all airports with airline services. ALPA is pleased the FAA's efforts to rapidly develop a new surface capability, the Surface Awareness Initiative (SAI), has made significant progress this year. After fielding a SAI system at four airports this summer to validate the system's readiness for expansion, the FAA has expanded deployment to 14 more airports by the end of 2024. ALPA continues to call on the FAA to have a surface safety system installed at all airports with an air traffic control tower and where there are airline operations, as quickly as possible.

ADS-B represents a major advance in efficient air traffic management and pilot situational awareness, with the potential to safely increase the capacity of the NAS. However, the use of ADS-B in oceanic airspace has lagged due to the severe difficulty of deploying ground stations on the water. Therefore, the FAA's original ADS-B program never planned for ADS-B in oceanic airspace. A solution currently available to the FAA is a service called space-based ADS-B. Simply put, the aircraft's ADS-B information is received by a satellite constellation instead of ground stations and relayed to air traffic controllers. Space-based ADS-B has the potential to provide surveillance information equivalent to en route radar surveillance over the ocean. In addition to surveillance, there is the safety benefit where the space-based ADS-B continuously tracks all aircraft. Should an aircraft be required to conduct a ditching into the ocean the precise location of the aircraft will be immediately known. Some have observed that with space-based ADS-B, there may no longer be the need for "search" in "search and rescue". ALPA would support an FAA investment into Space Based ADS-B capabilities, as a supplement to the ground-based ADS-B network. The safety benefits we foresee would provide significant value.

#### **ATC Automation**

There are many automation systems in the NAS that provide air traffic controllers with critical tools for the safe and efficient movement of aircraft, and they must continue to be updated. A recent update to the terminal airspace automation system has resulted in being able to track aircraft to ensure that they are lined up for the correct runway. This new capability is called the Approach Runway Verification (ARV) and is a significant safety advancement. ALPA was also pleased to see that the FAA reauthorization addresses the need for a terminal airspace automation display at small airports. Historically smaller airports have operated without any display of aircraft in the air traffic control tower, so that air traffic controllers can increase awareness of aircraft that are in the vicinity of the airport. The addition of a display in all air traffic control towers where there are airline operations is an important step in advancing safety across the NAS.

#### **Voice and Data Communications**

NextGen's Data Communications system (Data Comm) supplements radio-based voice conversations between pilots and air traffic controllers with digital, text-based messaging in the en route phase of flight. This often reduces the likelihood of missing or misunderstanding air traffic control clearances. Further, there is no need for the pilot to read back a message for accuracy. Data Comm also facilitates faster communications and can help increase operational efficiency in the national airspace. While the FAA has deployed Data Comm at air traffic control towers, the last shutdown cost taxpayers up to \$8 million to repeat training for controllers at several facilities and further delayed implementation by 18 months. Beyond fiscal support, the vicissitudes of shutdowns interfere and plague NextGen implementation.

#### **Future Demands on the NAS**

Higher fidelity CNS data and the ability to exchange this data in real time would allow better definition, geographically and temporally, of the protected airspace needed for space launch and reentry operations (both commercial and government-sponsored), and to disseminate this information to ATC and other airspace users.

ATC modernization is necessary to support the integration of UAS. Small UAS (sUAS) will operate in airspace at altitudes that are generally considered to be "below the NAS." The low altitude sUAS operations will need some form of assistance in ensuring safe separation to avoid collision with manned aircraft, other sUAS, terrain, and obstacles. The FAA's work in Unmanned Traffic Management is

just getting started, and certain foundational decisions need to be made about the role of the FAA in offering low-altitude separation services. ALPA recommends that the air navigation services at low altitude be provided by the same service provider of all other airspace in the NAS. In other words, the FAA should be providing separation and surveillance services. This ensures consistent application of safety risk mitigation policies and procedures.

#### **Funding Challenges**

Although Congress has authorized the FAA with funding for multiyear modernization projects, such as automation improvements or system upgrades, the FAA has underestimated its ongoing needs for facilities and equipment funding. This dynamic has built up over more than a decade, and it creates enormous challenges for the FAA to keep massively complicated projects on course and bring them to completion. Continuing resolutions, government shutdowns, authorization extensions, and other disruptions hinder the infrastructure modernization process. With all these issues at play, modernization of a critical system becomes a series of stop, replan, and restart. This is not a reliable or efficient approach to effectively plan and execute the modernization plan for our Nation's air traffic control infrastructure, which also is the world's largest and busiest airspace system. As called for in the 2024 FAA reauthorization legislation, the FAA has the opportunity and the requirement to now provide Congress with a more accurate picture of its budgetary needs for facilities and equipment. Providing the FAA the resources it needs to complete the mission, across multiple appropriation cycles, is a key area where Congress can assist in ensuring that our Nation's air traffic control system will meet the needs of the millions of Americans who depend on safe and reliable air transportation.

#### **Near Misses and Technology**

Last year I testified before this Committee on addressing near misses. First, I would like to commend the Committee for important provisions to improve safety and prevent near-miss incidents. The bill not only provides funding and stability for the FAA and FAA programs, but also for the latest safety technology on runways, for the hiring of more air traffic controllers, for workforce development, and a host of technological additives related to this hearing. Notable provisions of the legislation related to aviation safety, modernization, and expansion of additional capabilities for more airports, include:

- ALPA is pleased to see that the FAA authorization included guidance to the FAA to ensure that legacy surface safety systems including the ASDE-X system remain fully operational. When fully functional the ASDE-X system provides air traffic controllers with timely alerts that prevent accidents and near-misses.
- ALPA is also appreciative of the Committee's greater focus on runway incursions through the establishment of a policy for No Tolerance for Near Misses, which expands FAA focus on improving the ground operation of aircraft at airports, establishing the Runway Safety Council, and supporting discretionary airport grant programs for runway safety projects.

ALPA looks forward to continued collaboration with the Committee to sustain and enhance safety. Thank you for the invitation, your continued focus on safety, and the opportunity to testify.

Senator DUCKWORTH. Thank you, Captain Ambrosi.

I now recognize Mr. Dave Spero from the Professional Aviation Safety Specialists for his opening statement.

#### **STATEMENT OF DAVE SPERO, NATIONAL PRESIDENT, PROFESSIONAL AVIATION SAFETY SPECIALISTS, AFL-CIO (PASS)**

Mr. SPERO. Good morning. Chair Cantwell, Ranking Member Cruz, Subcommittee Chair Duckworth, thank you for inviting me to testify on behalf of PASS. PASS represents approximately 11,000 FAA and Department of Defense employees throughout the United States and abroad. These employees install, maintain, support, and certify air traffic control and national defense equipment, inspect and oversee the commercial and general aviation indus-

tries, develop flight procedures, and perform quality analyses of complex aviation systems used in air traffic control and national defense at home and abroad. Every day they work to ensure the safety and efficiency of an aviation system that transports over 2.9 million passengers across more than 29 million square miles of airspace. Their work is essential to the safe and effective operation of the aviation system.

Unfortunately, challenges unrelated to employee expertise are limiting that effectiveness. PASS appreciates the opportunity to share information and recommendations regarding air traffic control systems, personnel, and safety.

The largest PASS FAA bargaining unit is the Air Traffic Organization in the technical operations unit. There are approximately 4,000 technicians responsible for installing, operating, maintain, and repairing more than 74,000 radar, communication, automation, navigational aids, airport lighting, backup power, and HVAC systems at FAA facilities in support of the national airspace system. In February, PASS was asked to provide the Government Accountability Office with information regarding 135 FAA programs and services.

To provide accurate, current information, PASS shared that list with Tech Ops employees nationwide and asked them to complete a survey. Their feedback was extensive and concerning. The challenges our technicians face range from dealing with aging equipment, navigating through cumbersome procedures, and limited availability of parts. The complexity of the systems, compounded by staffing and training inadequacies further exacerbates the situation.

For instance, outdated technologies like Time Division Multiplexing hinder the swift implementation of new systems, while reliability concerns plague critical systems such as the advanced lighting systems for aircraft runways and fiberoptic transmission systems. The maintenance is increasingly challenging as systems become obsolete, necessitating specialized training and expertise. That being said, the technicians also interface with highly technical, state-of-the-art cloud-based solutions, which is often overlooked.

The most significant result of our survey was the clear indication that FAA employees, if adequately staffed, are capable and willing to perform the work to ensure successful implementation of new systems and equipment while also maintaining the aging systems as efficiently as possible.

The biggest challenge from our perspective is a lack of vision on behalf of the agency. Compounding this challenge is the lack of an appropriate technician staffing model. The FAA has been developing the Tech Ops staffing model for over a decade, yet they are fully aware that today they are short at least 800 technicians. While PASS does not agree that the model is factoring in all the necessary data to determine the optimum number of technicians, it clearly reveals an understaffed workforce.

The directives outlined in the FAA reauthorization bill are a roadmap for improvements. However, timely implementation is critical to their success. PASS thanks the lawmakers for including language in the 2024 reauthorization bill directing the agency to

install 15 instrument landing systems that are in storage in Missouri. PASS-represented technicians are ready and capable of doing this. While the language in the reauthorization directs FAA to install the ILS within 18 months of the law's passage, our attempts to coordinate with the agency have gone unreturned. As far as PASS knows, the equipment, paid for by taxpayers, is still not in service.

The FAA is simply not effectively using a key resource to address some of these challenges. The agency is ignoring the skill level and potential of more than 4,000 employees. The resources for the FAA to be effective are there. The FAA is not taking advantage of them.

PASS thanks the Subcommittee for holding this important hearing. As always, the union stands ready to assist lawmakers and the agency to ensure the safety of the American flying public.

[The prepared statement of Mr. Spero follows:]

PREPARED STATEMENT OF DAVID SPERO, NATIONAL PRESIDENT, PROFESSIONAL AVIATION SAFETY SPECIALISTS, AFL-CIO (PASS)

Chair Duckworth, Ranking Member Moran and members of the subcommittee, thank you for inviting me to testify on behalf of the Professional Aviation Safety Specialists, AFL-CIO (PASS).

PASS represents approximately 11,000 Federal Aviation Administration (FAA) and Department of Defense employees throughout the United States and abroad. PASS-represented employees in the FAA install, maintain, support and certify air traffic control and national defense equipment, inspect and oversee the commercial and general aviation industries, develop flight procedures, and perform quality analyses of complex aviation systems used in air traffic control and national defense in the United States and overseas. PASS members work to ensure the safety and efficiency of the aviation system that transports over 2.9 million airline passengers across more than 29 million square miles of airspace (domestic and U.S. airspace over oceans) at over 65,000 facilities every day. The diversity of the PASS-represented workforce provides insight into the safety of the system they maintain and the industry they oversee. PASS members are tasked with ensuring that the U.S. air traffic control system remains the gold standard of aviation safety. In fact, there has not been a major aircraft accident in the U.S. since the Colgan Air crash in 2009. That is a record for the FAA, its employees and the aviation community should be proud of this accomplishment.

The work PASS members do every day is essential to the safe and efficient operation of this country's aviation system. Unfortunately, challenges unrelated to employee talent and professionalism are limiting the agency's efficiency and effectiveness. These obstacles include the aging air traffic systems and facilities essential to air traffic control operations as well as related impacts on the technical workforce represented by PASS.

PASS appreciates the opportunity to share information and recommendations regarding air traffic control systems, personnel and safety.

**AIR TRAFFIC ORGANIZATION AND IMPACT OF AGING SYSTEMS**

The largest PASS bargaining unit at the FAA is the Air Traffic Organization (ATO) Technical Operations unit, consisting of technical employees who install, maintain, repair and certify the radar, navigation, communication and power equipment that comprises the U.S. National Airspace System (NAS).

Within Technical Operations, PASS represents FAA airway transportation systems specialists, more commonly referred to as technicians. Technicians ensure the functionality of communications, computers, navigational aids and power systems vital to safe air travel and the mission of pilots and air traffic controllers. Technicians maintain aging systems while simultaneously interfacing with highly technical, state of the art cloud-based solutions, and this is often overlooked. PASS-represented employees in Flight Program Operations (AJF), Mission Support Services (AJV) and Air Traffic (AJT) also provide critical support to the system by conducting flight inspections, developing instrument flight procedures, handling administrative tasks and other important work.

There are approximately 4,000 FAA technicians responsible for installing, operating, maintaining and repairing more than 74,000 radar, communications, automa-

tion, navigational aids, airport lighting, backup power, heating, ventilation and air conditioning (HVAC) at FAA facilities.<sup>1</sup>

*Technician Input Regarding Aging Systems*

In February, PASS was granted the opportunity to provide the Government Accountability Office (GAO) with information regarding 135 FAA programs and services. In order to provide the GAO with the most accurate and current information, PASS shared the list of programs and services with Technical Operations employees throughout the country and asked them to complete a survey. In addition to providing information on systems not on the GAO's list, the results of the survey indicate top concerns are related to aging equipment, cumbersome procedures, parts that are unreliable or unavailable, system complexity, and staffing and training of the workforce. At the rapid pace with which technology changes, the FAA is getting further behind in replacing aging systems.

However, the most significant result of the survey was the clear indication that FAA employees are capable and willing to perform the work to ensure successful implementation of new systems and equipment while also maintaining the aging system as efficiently as possible. The biggest challenge is a lack of vision on behalf of the agency.

The length of time it takes the FAA to implement new systems is directly related to the fact that current NAS systems and equipment are becoming obsolete. As stated by the GAO, "During Fiscal Year 2023, FAA determined that of its 138 ATC systems, 51 (37 percent) were unsustainable and 54 (39 percent) were potentially unsustainable."<sup>2</sup> According to PASS members who were surveyed, a key reason for ATC system sustainment issues is the inability to implement new systems quickly enough.

For instance, many facilities are still relying on an aging communications technology known as Time Division Multiplexing (TDM). TDM is a method of combining multiple data streams into a single communication channel by allocating specific time slots for each data stream. Use of this antiquated technology is not only inefficient, but it is unnecessarily costly. Telecommunication companies now use carrier ethernet and are not required by the Federal Communications Commission to support TDM technology. The FAA was aware of the change and that PASS-represented employees could assist in the transition. Unfortunately, the FAA is still relying on TDM and is being charged a premium by communications companies that no longer regularly use the technology. The agency has been informed by a communications company that maintaining the current technology is going to cost \$85 million a year. According to the FAA, it was an unanticipated expense that will come from operational funds. This will most certainly delay the implementation of the FAA Enterprise Network Services program (FENS) since the agency cannot progress on FENS until TDM is phased out and other infrastructure is upgraded as well.<sup>3</sup>

Another member who was surveyed cited key concerns with the High Intensity Approach Lighting System with Sequenced Flashing Lights (ALSF-2). The ALSF-2 is an approach lighting system (ALS), which provides the basic means to transition from instrument flight to visual flight for landing. This provides visual information on runway alignment, height perception, roll guidance and horizontal references for Category II/III instrument approaches.

ALSF is critical for an airport in low visibility weather situations. If it is not working, the airport is downgraded, which means some aircraft cannot land. An ALSF system failure would constitute significant delays to an airport and the NAS overall in instrument flight rules (IFR) conditions. However, due to the age of this system, light rebuild kits for ALSF are not reliable. Lighted navigational aids require regular parts replacement and fail often. If an outdated replacement part is either unreliable or unavailable, the impact on the system could be far-reaching.

PASS is also concerned with the FAA's Fiber Optic Transmission System (FOTS) and the associated complications with the system due to its age. FOTS is an electronics architecture for using fiber optic telecommunications equipment and systems at major airports. According to a PASS-represented employee at one of those airports, the system faces several challenges due to aging parts, which are not readily available. When a failure occurs, an airport loses access to the system until techni-

<sup>1</sup> Federal Aviation Administration, Airway Transportation Systems Specialists, updated October 6, 2022. Accessed December 10, 2024: [https://www.faa.gov/jobs/career\\_fields/aviation\\_careers/atss\\_join](https://www.faa.gov/jobs/career_fields/aviation_careers/atss_join). This number does not reflect the number of technicians that are fully certified.

<sup>2</sup> U.S. Government Accountability Office, *Air Traffic Control: FAA Actions Are Urgently Needed to Modernize Aging Systems*, GAO-24-107001, September 23, 2024, p. 15.

<sup>3</sup> Federal Aviation Administration, "FAA Enterprise Network Services Program," updated July 25, 2023. Accessed December 10, 2024: [https://www.faa.gov/air\\_traffic/technology/cinp/fens](https://www.faa.gov/air_traffic/technology/cinp/fens).

icians can travel to the sites and correct the issue. This is not something that will be resolved by the eventual implementation of FENS as it is considered 'inside the fence' (within the actual airport fence). Furthermore, due to the age of FOTS, no FAA training exists for the related equipment. The number of technicians who were trained are retired or approaching retirement.

#### *Technical Operations Staffing and Training*

It is impossible to discuss any issue related to the technician workforce at the FAA without highlighting the importance of staffing and training.

Insufficient technician staffing can result in increased restoration times and more air traffic delays during an outage. It can also make it difficult to ensure adequate shift coverage by technicians, another scenario that increases the risk of major air traffic issues. PASS has long called attention to not only the need for sufficient technical staffing but also the lack of a reliable staffing model on which to base staffing decisions and placement.

However, hiring and training new technicians is not a quick or easy process. FAA technicians must be skilled and proficient on multiple systems. It can take up to three years to fully train an FAA technician to perform all necessary duties related to the position. In addition, the FAA is still playing catch up after its training academy in Oklahoma City was shuttered during the COVID-19 pandemic. According to the Department of Transportation Inspector General (IG), "Most FAA systems require specific training and certification, and FAA does not typically train maintenance technicians on every equipment type. Therefore, individual maintenance technicians cannot work on all equipment, increasing the complexity of the technician workforce planning effort."<sup>4</sup> In addition, the FAA does not hire new technicians before experienced technicians retire. That training and expertise walks out the door without mentoring the next generation of employees. In 2024, 33 percent of the technicians PASS represents were age 55 or older.

In discussions with the FAA, staff have been developing the Technical Operations staffing model (TSM) for over a decade and are aware that the workforce is short at least 800 technicians. While PASS does not agree that the TSM is factoring in all the necessary data to determine the optimum number of technicians, it nonetheless reveals an understaffed workforce. PASS stands ready to assist the FAA with a staffing plan that will take into consideration all the elements of the position, including the responsibility of ensuring the safe and efficient operation of aging and new systems and equipment.

### **RECOMMENDATIONS**

PASS is extremely proud of the work our members do every day in Technical Operations. These dedicated public servants go above and beyond the usual call of duty to ensure the safety of the American flying public and should not be hampered by challenges because of outdated or aging systems and equipment.

Expediting new systems into the NAS is the obvious solution to the issue at hand. This has been the solution for years. Using resources outside the agency to upgrade aging systems has been neither efficient nor cost effective. By utilizing the workforce it already has, the FAA could repurpose funds being spent on costly contractors and bring the work in-house. Unfortunately, the FAA has lacked the motivation to do so.

PASS strongly emphasizes that the FAA technical workforce could be ready to assist the agency with updating and/or replacing its aging systems and equipment if the workforce was properly staffed around the country for such a task. They are uniquely qualified and have the expertise to accomplish this work if the workforce was augmented.

PASS thanks lawmakers for including language in the 2024 FAA reauthorization bill directing the agency to install 15 taxpayer-purchased instrument landing systems (ILS) that are in storage in Independence, Missouri. The technicians PASS represents are ready and capable of completing this task.<sup>5</sup> This is a prime example of the FAA taking steps toward identifying a solution but then failing to complete the work to implement it. While the language in the reauthorization law directs the FAA to install the ILS within 18 months of the law's passage (May 2024), PASS's attempts to coordinate with the agency to begin the project have gone unreturned.

<sup>4</sup>Department of Transportation Inspector General, *Opportunities Exist for FAA To Strengthen Its Workforce Planning and Training Processes for Maintenance Technicians*, Report No. AV2023027, May 2, 2023, p. 6.

<sup>5</sup>MCO NAV, "ORL Glideslope Shelter Replacement," July 12, 2021. Accessed December 10, 2024: [https://www.youtube.com/watch?v=UKP1o5Pl\\_w](https://www.youtube.com/watch?v=UKP1o5Pl_w).

As far as PASS knows, the equipment—paid for by the taxpayer—is still not in service.

PASS has additional concerns related to the agency’s procurement processes, some of which go back decades. However, pinpointing the FAA’s procurement and decommissioning strategy is not the responsibility of PASS. The union believes that the agency must conduct a full safety review and analysis before making any major changes to the operation of the NAS. As part of that process, the FAA should meet with PASS and other impacted labor unions.

Furthermore, the Airport and Airway Trust Fund is underutilized. Given projections by the Congressional Budget Office, the Fund is likely to triple over the next 10 years and have a balance of over \$17 billion that should be utilized for the modernization of the NAS.<sup>6</sup>

PASS-represented employees are the solution to the issues surrounding FAA aging systems and equipment. FAA technicians are the only individuals with the skill and knowledge to ensure the safe and efficient operation of this country’s air traffic control system. These employees are also able to assist the agency in updating the current system and addressing any challenges with aging systems and equipment if the workforce is properly staffed.

Quite simply, the FAA is not effectively using a key resource to address some of these challenges. The agency is ignoring the skill level and potential of more than 4,000 employees stationed across the country. The resources for the FAA to be more effective are there; the FAA is not taking advantage of the opportunity.

#### CONCLUSION

The FAA must address aging systems and equipment throughout the NAS based on careful analysis combined with efficient and effective action. Given the pace of technology, many systems and equipment are on the path to becoming outdated every day. The technician workforce can be instrumental in assisting the agency in ensuring successful implementation and updates throughout the NAS.

Congress must give FAA access to the Airport and Airway Trust Fund in order to fund the critical upgrades necessary to maintain the gold standard of the U.S. air traffic control system.

PASS thanks the subcommittee for holding this important hearing. As always, the union stands ready to assist lawmakers and the agency every step of the way to serve the needs and safety of the American flying public.

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#### ADDENDUM A

##### FAA TECHNICAL OPERATIONS WORKFORCE

The Technical Operations workforce at the Federal Aviation Administration (FAA) has diminished to a level that may lead to crises regarding the maintenance, repair, and certification of the National Airspace System (NAS). According to the FAA, in October 2014, there were approximately 5,810<sup>7</sup> technical employees (consisting of occupational series 2101, 856, and 802). Since then, the numbers have steadily declined, to approximately 5,360,<sup>8</sup> the COVID-19 pandemic slowed training for these highly skilled employees. The 2101 occupational series makes up the bulk of the Technical Operations workforce.

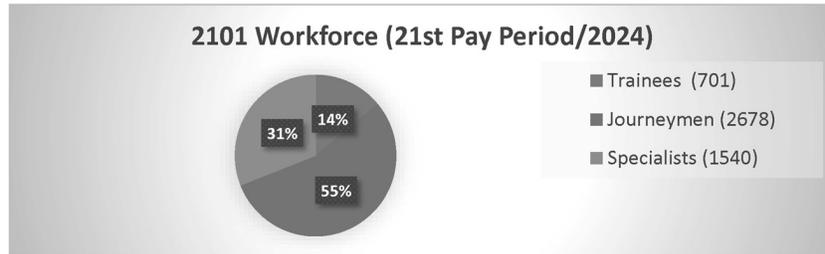
The current staffing of 2101 employees (21st pay period of 2024 sent to PASS from the agency) is as follows:

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<sup>6</sup> Congressional Budget Office, Airport and Airway Trust Fund Baseline Projections, June 2024.

<sup>7</sup> FAA collective bargaining contract data, 21st pay period of 2014.

<sup>8</sup> FAA collective bargaining contract data, 21st pay period of 2024.



The workforce can be broadly defined in three categories. Apprentices, also known as trainees, or developmental employees are auxiliary to the workforce because they are still officially in developmental training. Journeymen have been recently certified but will continue years of “on-the-job training” to then specialize in skills and do the bulk of certification and restoration work on the NAS. However, there is no clear definition of progression for a journeyman. Lastly, specialists have been working in their field for a significant time and are experts in their given skill or subject area.

The data suggests that the journeymen portion of the workforce has decreased substantially, by 960 employees, and represents the bulk of attrition of the 2101. Alternatively, the percentage of apprentices has almost tripled since 2014. These trainees should be certified at a higher rate and join the workforce as journeymen in a much timelier manner.

This potential crisis is exacerbated by the fact that training has slowed considerably due to the pandemic. As a result, the percentage of trainees has increased to a level that is unacceptable. Journeymen are left to handle the bulk of the work. This has led to a workforce that is understaffed, under-trained and overburdened.



The FAA needs to engage with PASS to create long-term staffing goals through a Workforce Plan. Simply developing a Technical Operations staffing model based on the current workforce does not take into consideration the growth of the NAS through Next Generation Air Transportation Systems (NextGen) technologies nor does it take advantage of the skills and abilities of this highly technical group of employees.

2101 Workforce				
AGE	> 55	> 60	> 62	> 65
NUMBER	1642	903	596	264
%	33%	18%	12%	5%

*Recommendation:* The FAA needs to engage with PASS to create long-term staffing goals through a Workforce Plan as it has for controller and safety inspectors. Simply developing a Technical Operations staffing model based on the current workforce does not take into consideration retirements or the growth of the NAS through Next Generation Air Transportation Systems (NextGen) technologies nor does it take advantage of the skills and abilities of this highly technical group of employees.

Senator DUCKWORTH. Thank you, Mr. Spero.

I now recognize Mr. Marc Scribner from the Reason Foundation for his opening statement.

**STATEMENT OF MARC SCRIBNER, SENIOR TRANSPORTATION POLICY ANALYST, REASON FOUNDATION**

Mr. SCRIBNER. Chair Duckworth, Chair Cantwell, Ranking Member Cruz, and members of the Subcommittee, good morning and thank you for the opportunity to testify before you today.

My name is Marc Scribner. I am a Senior Transportation Policy Analyst at Reason Foundation, a national 501(c)(3) public policy research and education organization with expertise across a range of policy areas, including aviation.

Throughout its 46-year history, Reason Foundation has conducted research on air traffic management, emerging aviation technologies, and their interactions with public policy. My testimony today focuses on institutional problems that are undermining efforts to modernize the infrastructure needed to support the continued air traffic volume growth in the national airspace system.

GAO's September report adds to the reams of studies documenting wide-ranging problems facing FAA's air traffic control modernization efforts, which have been plagued by delays and cost overruns for decades. I commend GAO for its excellent analysis and support its recommendations.

However, I believe the problems facing FAA run much deeper. A decade ago, my Reason Foundation colleague, Robert Poole, conducted an in-depth study on the relationship between innovation and the structure of and culture at FAA. He selected seven innovations in air traffic control and did brief case studies on each, observing how each innovation has been dealt with by FAA's Air Traffic Organization and its counterparts overseas.

He identified an agency culture resistant to innovation and then developed five explanations as to why ATO status quo bias exists, which were subsequently validated by a panel of more than dozen expert peer reviewers.

First, the ATO self-identifies as a safety agency rather than a technology service provider. Second, it faces a lack of or loss of technical expertise. Third, it faces a lack or loss of management expertise. Fourth, excessive agency bureaucracy is labeled as oversight. And fifth and finally, there is a lack of customer focus.

These cultural problems reflect an underlying flaw inherent in ATO's institutional design. It exists as a service provider within the national aviation regulator that is, in turn, housed within the

Department of Transportation. Its capital needs must compete with broader DOT and Executive Branch priorities and budget requests and then rely on inadequate annual appropriations.

The ATO's institutional design was historically the dominant model for air navigation service providers globally. This picture has changed dramatically since 1987, when New Zealand became the first country to separate air traffic control from its Transport Ministry. Since then, nearly all industrialized countries have adopted a public utility model for air traffic control, and separating the provision of air navigation services from the Civil Aviation Authority has been a globally recognized best practice by the International Civil Aviation Organization for more than two decades.

This organizational separation allows air traffic control to be regulated at arm's length, just like every other aviation player, and it resolves the fundamental conflict of interest of having a regulator also operate a service that it is tasked with regulating.

Under the public utility model, air navigation service providers assess cost-based user fees paid directly to the providers. Providers can then issue revenue bonds based on their projected revenue streams, just as airports do today in the United States. It is through predictable user-based revenue collection that air navigation service providers outside the U.S. have been able to successfully finance large-scale capital modernization efforts. Air navigation service providers that operate as public utilities, funded by user fees, now number 62, and serve 83 countries worldwide. In contrast, just 18 countries besides the United States, mostly developing countries, continue to operate air traffic control as part of legacy civil aeronautics authorities that also regulate aviation safety.

The modernization of existing air traffic management infrastructure in the United States continues to fall behind peer countries, and is straining from the continued operations and growth of conventional airspace users. The prospect of new airspace entrants raises even more questions about the ability of the U.S. to accommodate the future of aviation.

The bottom line is this. Successfully modernizing air traffic control technology and service provision in this country will require institutional modernization.

Thank you again for the opportunity to testify, and I welcome your questions.

[The prepared statement of Mr. Scribner follows:]

PREPARED STATEMENT OF MARC SCRIBNER, SENIOR TRANSPORTATION POLICY ANALYST, REASON FOUNDATION

Chair Duckworth, Ranking Member Moran, and Members of the Subcommittee, thank you for the opportunity to testify before you today. My name is Marc Scribner. I am a senior transportation policy analyst at Reason Foundation, a national 501(c)(3) public policy research and education organization with expertise across a range of policy areas, including aviation.<sup>1</sup> Throughout its 46-year history, Reason Foundation has conducted research on air traffic management, emerging aviation technologies, and their interactions with public policy. My testimony today focuses on institutional problems that are undermining efforts to modernize the in-

<sup>1</sup>My biography and writings are available at <https://reason.org/author/marc-scribner/>.

infrastructure needed to support the continued air traffic volume growth in the National Airspace System.

## I. INTRODUCTION

The United States was once the global leader in airspace management. However, in recent decades, we have fallen behind peer countries that have modernized their air traffic control practices and technologies. The Federal Aviation Administration's (FAA) modernization program, known as the Next Generation Air Transportation System (NextGen), has been plagued by cost overruns and delays. This bodes poorly for anticipated traffic growth from conventional airspace users and raises serious questions about long-term efforts to integrate emerging aviation technologies and operations—such as unmanned aircraft systems and advanced air mobility—into the National Airspace System (NAS).

Our increasingly obsolete air traffic control system is preventing airspace users from realizing benefits today while also threatening the future integration of emerging aviation technologies into the NAS. While there are many problems facing FAA's Air Traffic Organization (ATO) generally and NextGen specifically, they can be grouped into three categories:

- *Funding*: uncertain, unstable, and poorly suited to paying for large-scale capital modernization programs such as NextGen.
- *Governance*: a system with so many legislative branch and Executive Branch overseers that it focuses ATO management attention far more on overseers than on ATO's aviation customers.
- *Culture*: an organizational culture that is status-quo oriented.

These are all interrelated. The uncertain nature of the annual appropriations process makes it difficult for the ATO to complete major procurements in a timely fashion. As a governmental entity charged with regulating safety while providing air navigation services, unfortunately, FAA focuses on remaining accountable to its many political and administrative overseers rather than the users of its navigation services. FAA's dual regulator/service provider mission also presents a fundamental conflict of interest.

## II. PROBLEMS IDENTIFIED IN THE GAO REPORT AND RESPONSES

September's Government Accountability Office (GAO) report catalogued a lengthy list of problems plaguing FAA efforts to modernize aging, outdated air traffic control (ATC) systems.<sup>2</sup> GAO researchers identified 138 ATC systems, and its assessment found that 37 percent are unsustainable (*i.e.*, need to be replaced) and 39 percent are potentially unsustainable. And 58 of those systems “have critical operational impacts on the safety and efficiency of the national airspace.”

Even worse, GAO found that FAA has 64 ongoing efforts aimed at modernizing 90 of the unsustainable and potentially unsustainable systems. But current FAA plans show that many of these systems will still be in operation for between six and 13 more years before being either replaced or modernized. Table 3 in the report lists 17 of the “most critical and at-risk” ATC systems, all of which are “unsustainable” and shows that 13 of them are not projected to be replaced until the 2030s—and that four of them have no modernization investment underway at all. GAO notes that the reason four at-risk systems have no modernization plans is because the 2023 operational risk assessment was not completed in time for those four to be included.

GAO referenced the November 2023 report of the National Airspace System Safety Review Team,<sup>3</sup> which highlighted several aging systems as indicative of broader problems:

- Airport Surface Detection Equipment Model-X (ASDE-X), deployed in the early 2000s to track surface movements and alert controllers to potential conflicts, is no longer in production and “spare parts are extremely limited.”<sup>4</sup>
- Beacons used for en-route surveillance, with 20-year-old transponders and no available replacement antennas.

<sup>2</sup>Government Accountability Office, “Air Traffic Control: FAA Actions Are Urgently Needed to Modernize Aging Systems,” GAO-24-107001 (Sep. 23, 2024). Available at <https://www.gao.gov/products/gao-24-107001>.

<sup>3</sup>“Discussion and Recommendations to Address Risk in the National Airspace System,” National Airspace System Safety Review Team (Nov. 2023). Available at [https://www.faa.gov/NAS\\_safety\\_review\\_team\\_report.pdf](https://www.faa.gov/NAS_safety_review_team_report.pdf).

<sup>4</sup>Government Accountability Office, *supra* note 2, at 7.

- Instrument landing systems (ILSs), most of which are at least 25 years old and for which manufacturer support is no longer available.

GAO highlighted comments from the Safety Review Team and from both the National Air Traffic Controllers Association and Professional Aviation Safety Specialists that “should be timelier in identifying and addressing concerns with unsustainable systems given the length of time it takes to move through the acquisition process.”<sup>5</sup> Table 4 of GAO’s report shows that it can take between two and nearly nine years “to establish an acquisition program baseline” once a candidate system has been identified. This means that the time from the start of program planning to delivery of a modernized or replacement system can range from 5.5 years to as much as 19.5 years, by which time many selected technologies will be obsolete.

In response to GAO’s September report, numerous stakeholders contacted Reason Foundation to share their experiences with FAA’s ATC modernization efforts.<sup>6</sup> These responses offer insight into FAA’s particular failures. I highlight three below.

- A recently retired FAA engineer explained a general cultural problem within the agency:

Political overseers have made over FAA in their own image, putting people in charge of things for which they are not qualified: engineering programs run by non-engineers, operations run by non-operational people, logistics run by non-logisticians. The systems engineering that FAA once had has been destroyed. . . . I hope the GAO report elicits some positive action, but I wouldn’t bet on it. It’s an accident waiting to happen, but until it does, the current “leadership” is just making sure they don’t get blamed for it.

- A consultant who has worked within and external to FAA wrote in with disturbing details on specific aging ATC systems, including Mode-S:

Mode-S (secondary surveillance radar) is in such poor condition that it is operated in violation of FAA’s own commissioning orders for technician certification of its operational performance. As many as half of current Mode-S systems are operated in “IBI,” meaning they have zero Mode-S accuracy and capability. Accuracy of these radar systems drives the separation criteria of three and five miles near airports and in en-route airspace. The lack of this radar input makes the surveillance fusion with ADS-B less accurate and reliable. This data is what feeds the automation inputs of both en-route and terminal airspace.

- An engineering manager at a European aviation technology company compared FAA’s modernization efforts and procurement process to those of gold-standard ANSP Nav Canada:

Look at Nav Canada. How many primary radar types do they have for terminal surveillance? One. How many does FAA have? Three, dating back to the 1980s. The manufacturers of two of them are out of business. FAA has four types of secondary/beacon radars. Nav Canada does a wholesale replacement, launching a project at the end of life to replace them all at once. Nav Canada has one primary switch for all systems: tower, approach, and en-route. One backup switch for all. They just did a replacement tender for them all . . . FAA is never a single buy. All are indefinite quantity contracts. So suppliers deliver 10 to 20 systems a year. It is the [indefinite delivery/indefinite quantity] type of contract process, related to funding, that does not allow for a realistic replacement.

GAO also reports that FAA budget requests for facilities and equipment “have remained relatively constant at about \$1 billion annually.”<sup>7</sup> While NextGen’s flat budget is indeed a problem, GAO does not mention the two reasons why FAA has been unable to request adequate financial support for modernization. First, FAA’s budget request must be approved by the Secretary of Transportation. Second, the Office of Management and Budget has the last word on how much the Department of Transportation (and hence FAA) can request.

<sup>5</sup> *Id.* at 22

<sup>6</sup> Robert W. Poole, Jr., “Responses to GAO Report on Aging FAA Systems,” *Aviation Policy News*, No. 228, Reason Foundation (Nov. 2024). Available at <https://reason.org/aviation-policy-news/spirit-bankruptcy-space-launches-and-response-to-report-on-aging-faa-systems/#a>.

<sup>7</sup> Government Accountability Office, *supra* note 2, at 10

This is not how critically important public utilities operate, whether government-owned or investor-owned. Utilities plan their capital spending needs and obtain approval to set their rates to provide the needed revenue streams to pay off bonds used to finance large facility and equipment investments. That is true of Federal government utilities like the Tennessee Valley Authority, but nothing like that process exists for FAA's ATC system. It has no bonding authority, must compete against unrelated Department of Transportation and broader Executive Branch priorities, and then depend solely on inadequate annual appropriations from Congress.

### III. PROBLEMS WITH FAA ATO'S INSTITUTIONAL DESIGN

A decade ago, my Reason Foundation colleague Robert Poole conducted an in-depth study of the structure of and culture at FAA and their relationship to innovation.<sup>8</sup> He selected seven innovations in air traffic control and did brief case studies on each, observing how each innovation has been dealt with by the ATO and its counterparts overseas. In each of these, he found that ATO's approach was far more hesitant than that of air navigation service providers (ANSFs) in other countries that are structured as public utilities. He then developed five explanations of why this status-quo bias exists, which were subsequently validated by a panel of more than a dozen expert peer reviewers.

These five identified detrimental institutional deficiencies at FAA's ATO are as follows:

1. *Self-identity as a safety agency rather than as a technology provider.* This stems from the ATO being embedded within FAA, whose mission is safety. Nearly all the innovations relevant to NextGen come from the aerospace/avionics industry, which has a much more innovative, dynamic culture. Those companies are regulated at arm's length by FAA—but the ATO is embedded inside the regulator.
2. *Lack of, or loss of, technical expertise.* Partly due to its status-quo culture and partly due to civil service pay scales, the FAA has a chronic problem with not attracting or not being able to retain the best engineers and software professionals. This means that a lot of the detailed requirements for new air traffic control and aviation systems end up being defined by contractors, which can lead to costly additions that make the systems more complex and costly than necessary.
3. *Lack of, or loss of, management expertise.* For the same reasons that FAA has limited technical expertise, it also has trouble attracting and keeping top-notch program managers who are used to being held accountable for results.
4. *Excessive bureaucracy labeled as oversight.* Inherent in being a large government agency that is spending taxpayers' money, the FAA must be held accountable to all the normal government overseers. The ATO must respond to oversight by the FAA Administrator, the Secretary of Transportation, the Office of Inspector General, the Office of Management and Budget, the GAO, and up to 535 Members of Congress. While safety is the top priority, responding to the requests and whims of all these overseers takes up a large amount of senior management's time.
5. *Lack of customer focus.* Because the ATO gets its funding from Congress, it ends up—de facto—acting as if its customer is Congress rather than the aviation customers it is supposed to serve.

### IV. THE GLOBAL AIR NAVIGATION SERVICE PROVIDER LANDSCAPE

The status-quo ANSP model in the United States was historically the dominant model globally, whereby air traffic control was provided by a civil aviation authority within the transport ministry. That model has undergone major change since 1987 outside of the United States, starting when the government of New Zealand removed its air traffic control system from the transport ministry by restructuring it as Airways New Zealand, a self-supporting government corporation. Within 10 years, more than a dozen other countries had followed suit.

Separating the provision of air navigation services from the civil aviation authority and putting the ANSP at arm's length from its safety regulator, like all the other key players in aviation—airlines, business aviation, general aviation, airframe manufacturers, engine producers, pilots, mechanics, and so forth—is now the globally

<sup>8</sup>Robert W. Poole, Jr., "Organization and Innovation in Air Traffic Control," Reason Foundation Policy Study 431 (Jan. 2014). Available at [https://reason.org/wp-content/uploads/files/air\\_traffic\\_control\\_organization\\_innovation.pdf](https://reason.org/wp-content/uploads/files/air_traffic_control_organization_innovation.pdf).

recognized best practice. For more than two decades, this has been International Civil Aviation Organization (ICAO) policy.<sup>9</sup> The United States is among the last industrialized countries that have not taken this step to eliminate the fundamental conflict of interest of having an aviation regulator also operate a service it is tasked with regulating.

The revenue source for ANSPs operated as public utilities is globally accepted cost-based user fees in accordance with the airport and air traffic control charging principles promulgated by ICAO.<sup>10</sup> Prior to the conversion of these ANSPs to public utilities, those revenues were nearly always paid by airlines and other airspace users to the respective national governments. In most cases, once an ANSP has been converted to a utility, the user-fee revenue flows directly to the ANSP as its primary source of revenue. This makes it possible for the ANSPs to issue revenue bonds based on their projected revenue streams, just as airports do today in the United States and elsewhere. It is through their predictable streams of revenue that come directly from users that ANSPs outside the United States can successfully finance large-scale capital modernization efforts.

Globally, three ANSPs have been moved out of the government entirely under either an independent nonprofit user cooperative model or as partially privatized companies. Another 55 operate as wholly owned government corporations. Just 19—mostly developing countries, but also including the United States, Japan, and Singapore—operate as part of legacy civil aeronautics authorities that also regulate aviation safety. ANSPs that operate as public utilities funded by user fees now number 62 and serve 83 countries globally.<sup>11</sup> Appendix A lists ANSPs around the world by governance model.

## V. CONCLUSION

The modernization of existing air traffic management infrastructure in the United States continues to fall behind peer countries and is straining from the continued operations and growth of conventional airspace users. The prospect of new airspace entrants raises even more questions about the ability of the United States to accommodate the future of aviation, which would have significant negative impacts on the economy and safety. Evidence suggests that successfully modernizing the technology and service provision of air traffic management of the National Airspace System will require institutional modernization.

Thank you for the opportunity to testify before the Subcommittee, and I welcome your questions.

<sup>9</sup>International Civil Aviation Organization, *Safety Oversight Manual*, Doc. 9734, Part A, Paragraph 2.4.9 (2001).

<sup>10</sup>International Civil Aviation Organization, *ICAO's Policies on Charges for Airports and Air Navigation Services*, Doc. 9082 (9th Edition, 2012).

<sup>11</sup>Marc Scribner, "2024 Annual Privatization Report: Aviation," Reason Foundation (May 2024) at 26–29. Available at <https://reason.org/wp-content/uploads/annual-privatization-report-2024-aviation.pdf>.

Appendix A: Air Navigation Service Providers, by Type of Organization

Country	ANSP	Organization Type	Notes	
Canada	Nav Canada	Nonprofit corporation		
Italy	ENAV	Part investor-owned		
UK	NATS	Part investor-owned		
UK	Serco	Shareholder-owned		
Albania	ALBCONTROL	State-owned company	Also regulates	
Argentina	DGCTA	State-owned company		
Armenia	ARMATS	State-owned company		
Australia	Airservices Australia	State-owned company		
Austria	Austro Control	State-owned company		
Belgium	Skeyes	State-owned company		
Botswana	CAAB	State-owned company		
Bulgaria	BULATSA	State-owned company		
Cambodia	CATS	State-owned company		
Croatia	Croatia Control	State-owned company		
Curacao	DCANSP	State-owned company		
Czech Republic	ANS CR	State-owned company		
Denmark	Naviair	State-owned company		
Egypt	NANSC	State-owned company		
Estonia	EANS	State-owned company		
Fiji	Airports Fiji Ltd.	State-owned company		
Finland	Finavia Corp.	State-owned company		
Georgia	Sakaeronavigatsia	State-owned company		
Germany	DFS	State-owned company		
Hungary	HungaroControl	State-owned company		
Iceland	ISAVIA	State-owned company	Also regulates	
India	Airports Authority of India	State-owned company		
Indonesia	AirNav Indonesia	State-owned company		
Iran	Iran Airports Company	State-owned company		
Ireland	AirNav Ireland	State-owned company		
Israel	Israel Airports Authority	State-owned company		
Kazakhstan	Kazaeronavigatsia	State-owned company		
Latvia	LGS	State-owned company		
Lithuania	Oro Navigacija	State-owned company		
Macedonia	M-NAV	State-owned company		
Maldives	Maldives Airports Co.	State-owned company		
Malta	MATS	State-owned company		
Moldova	MoldATSA	State-owned company		
Mozambique	Aerportos de Moçambique	State-owned company		
New Zealand	Airways New Zealand	State-owned company		
Nigeria	NAMA	State-owned company		
Norway	Avinor	State-owned company		
Papua New Guinea	PNG Air Service	State-owned company		
Portugal	Nav Portugal	State-owned company		
Romania	ROMATSA	State-owned company		
Russia	State ATM Corporation	State-owned company		
Serbia & Montenegro	SMATSA	State-owned company	Also regulates	
Slovak Republic	LPS SR	State-owned company		
Slovenia	Slovenia Control	State-owned company		
South Africa	ATNS	State-owned company		
Spain	ENAIRES	State-owned company		
Sri Lanka	AASL	State-owned company		
Sweden	LFV	State-owned company		
Switzerland	Skyguide	State-owned company		
Thailand	AEROTHAI	State-owned company		
Turkey	DHMI	State-owned company		
Uganda	CAA Uganda	State-owned company		
Ukraine	UksATS	State-owned company		
Vietnam	VATMC	State-owned company		
Zambia	NACL	State-owned company		
Bangladesh	CAAB	Civil aviation authority		Financially autonomous
Cyprus	DCA Cyprus	Civil aviation authority		
Dominican Republic	IDAC	Civil aviation authority		Financially autonomous
Ghana	Ghana CAA	Civil aviation authority		
Greece	HCAA	Civil aviation authority		
Japan	JCAB	Civil aviation authority		
Jordan	CARC	Civil aviation authority		
Kenya	Kenya CAA	Civil aviation authority		

Appendix A: Air Navigation Service Providers, by Type of Organization—Continued

Country	ANSP	Organization Type	Notes
Mongolia	CAA of Mongolia	Civil aviation authority	
Myanmar	DCA Myanmar	Civil aviation authority	
Nepal	CAA Nepal	Civil aviation authority	
Saudi Arabia	GACA	Civil aviation authority	
Singapore	CAAS	Civil aviation authority	
Swaziland	SWACAA	Civil aviation authority	
Taipei FIR	ANWS	Civil aviation authority	
Tanzania	TCAA	Civil aviation authority	
Trinidad & Tobago	Trinidad & Tobago CAA	Civil aviation authority	
Tunisia	OACA	Civil aviation authority	
United States	FAA	Civil aviation authority	
Azerbaijan	AZANS	Government department	
Brazil	DECEA	Government department	
France	DSNA	Government department	
Mexico	SENEAM	Government department	
Netherlands	LVNL	Government department	Financially autonomous
Poland	PANSA	Government department	
United States	DOD Policy Board, Aviation	Government department	Military
Belgium	MUAC	Intergovernmental	Upper airspace
Honduras	COCESNA	Intergovernmental	6 countries
Senegal	ASECNA	Intergovernmental	17 countries
Angola	ENANA-EP	uncategorized	
Haiti	OFNAC	uncategorized	
Luxembourg	ANA	uncategorized	
Sudan	Sudan ANS	uncategorized	
Dubai	DANS	uncategorized	

Senator DUCKWORTH. Thank you, Mr. Scribner. I will now recognize myself for five minutes of questions.

GAO found 17 of the 51 unsustainable air traffic control systems are critical, yet investments to modernize some of these will not be completed for more than a decade. Worse, as of May 2024, there was not even any modernization investment underway for four of these systems.

Mr. Walsh, how worried should we be about these four critical and unsustainable systems for which there were not any modernization investments underway?

Mr. WALSH. So as myself and the other witnesses have said, the national airspace is safe. It is safe to fly. But this is stressing the system, and the longer we wait, the worse it will get. So I am worried, but again, it is still safe to fly.

Senator DUCKWORTH. Thank you. Mr. Iacopelli, how worried are air traffic controllers about unsustainable critical air traffic control systems for which there are no modernization investments underway?

Mr. IACOPELLI. I will reiterate what has been said. The national airspace system is safe. We represent 15,000 professional, trained, dedicated air traffic controllers who will do everything they can to maintain the safety of the system. They are the failsafe, along with the pilots and the technicians to oversee it. So very similar to Mr. Walsh, we believe the system is safe. We are obviously concerned about a number of these issues, not the least of which is the FTI network. But as far as the systems go, we would like to work with the FAA. We have talked to the FAA about working with them in addressing those issues, and we will continue to do so.

Senator DUCKWORTH. I feel that it is the personnel, the air traffic controllers and the pilots, who are keeping us safe, despite systems and technology that keeps going further and further behind, and you are having to adjust more and more in order to keep the flying public safe. Would that be an accurate statement?

Mr. IACOPELLI. That is an accurate statement.

Senator DUCKWORTH. Thank you. I see you nodding, Captain Ambrosi. Would you like to comment on this? And how do pilots feel about these aging systems and systems that do not have plans to be updated?

Mr. AMBROSI. Well, as my colleagues have said, the system is safe. We have never been happy with current safe. If we said in the 1980s that we are safe but we are safe enough, think of how many accidents we would be enduring today. So you can never say we are safe enough. We always need to push forward. As Dean said, we do a lot of work-arounds to make sure that the system is working as intended, and we keep the traffic, the passengers and cargo, moving.

There needs to be that next step forward in safety where we get the technology that supports the human element—the air traffic controllers, the pilots. We absolutely need that next investment and that push forward to the next level for all of us, to continue the safe operation and make it safer.

Senator DUCKWORTH. Can you speak a little bit about how having the two pilots helped with the reaction time to some of the near misses, and why it was critical to have two pilots as opposed to one?

Mr. AMBROSI. I mean, as we talked about the Austin incident. If there was only one pilot there, the first officer would not have identified the Southwest jet on the runway. Let's take the Alaska incident. While there is still an investigation underway, can you imagine having a door panel come off an airplane in flight, with only one person in the flight deck at that time to manage that situation.

Let's take ground operations, surface operations, where you have two people, at least—some of our international operations more. Somebody needs to have their eyes outside at all times—you are a pilot and you understand that—eyes outside while somebody else may be looking down at a chart, you know, how do we get from A to B. We do not work at the same airport every day, so we will go to an airport and it may be our first time there. Somebody's head is down and another pilot needs to be heads-up, looking out and seeing where we are going and monitoring the technology. You know, there is technology right around the corner that will give us more situational awareness on the ground. But if someone is looking at that situational awareness display to see where other airplanes are, that means somebody else needs to be looking out the window.

Senator DUCKWORTH. And in the Alaska Airline door plug incidents, one of the pilot's headsets was actually ripped off in the middle of that incident, from the wind gusts.

Mr. Spero, if we are stuck relying on these unsustainable, critical air traffic control systems for many more years, how much harder will it be for your personnel to maintain them? And are you con-

fidient we will have enough parts and a workforce with enough experience to do so?

Mr. SPERO. Senator, thank you for the question. So I will start out by saying I like the way Captain Ambrosi talked about work-arounds. That is essentially what our folks do every day when they do not have spare parts. They find ways to make these systems work. They look for the spare parts. They have to dig into the FAA system to see if they can get them refurbished.

It will become more difficult as times goes on. Moving forward, they have to have the ability and the training, and the staffing, as well. We have had incidents in various places where we have the equipment, we have the spare parts, yet we do not have the right people in the right place at the right time to restore systems. In Chicago earlier this year we had a ground stop because we did not have a trained technician available on shift to be able to exclude a software problem that effectively caused the controllers to not know where the aircraft were. Once that person came in, they fixed it in two minutes.

But all of these things fall together. It is going to become more difficult as time goes on. We have to have the personnel. We have to have the parts. We have to have the training. It breaks our members' hearts to not be able to sustain the air traffic control system the way they want.

Senator DUCKWORTH. Thank you. I now recognize Ranking Member and incoming Chairman Cruz for his question line.

Senator CRUZ. Thank you, Madam Chair, and thank you to each of the witnesses for being here today on this very important topic. Mr. Walsh, let me start with you. The GAO report paints a grim picture of the FAA's sustainment plans for the air traffic system. More than 100 ATC systems, meaning radar, software, and hardware, were unsustainable or potentially unsustainable. With air travel expected to continue to grow, breakdowns and disruptions will only get worse.

Mr. Walsh, your expertise is in procurement and modernization of legacy systems. How would you summarize the current state of air traffic control?

Mr. WALSH. The easy summary is this is what happens if you take the "if it isn't broke, don't fix it" or perhaps if it's still somewhat working, don't fix it, just sustain it, over many, many years. So we are seeing the ramifications of that. We need to invest more money and more funds to get us back on track.

Senator CRUZ. How do you fix it? And I suspect the answer is not going to be just more money, because that answer has often failed to solve the problem.

Mr. WALSH. You are correct. Throwing money at the problem won't fix it. You need adequate oversight. You need the right people in the right place. You need training. You need to have more of the good people that are keeping things running with bandaids and patches.

So as I said in my opening statement, this is not a quick fix. There is no silver bullet. This is going to be the work of years and billions of dollars and thousands of people.

Senator CRUZ. All right. Mr. Scribner, in your testimony you mentioned that former FAA employees responded to your analysis

of the GAO report. One stakeholder wrote that the ongoing reliability of existing surveillance technology like radar and ADS-B is in jeopardy, and the replacement for these existing technologies likely will not be deployed for 15 years.

Why do you think FAA employees reacted so powerfully to the GAO report and your analysis, and what does it say about the FAA's acquisition strategy that it takes 15 years to deploy a new surveillance system?

Mr. SCRIBNER. Well, thank you for those questions, Senator Cruz. On the first, I think the reaction that Reason Foundation received from FAA stakeholders on the GAO report, it was not really anything new. A lot of these types of complaints we have heard for many years. I think they saw the thorough, and I think the excellent analysis, in the GAO report as an opportunity for Congress, for FAA, for Department of Transportation leadership to really take another close look at some of these issues that, again, are not new.

When it comes to the delays that they are specifically complaining about, again, those are not new, and as documented by GAO quite thoroughly, this is quite common. I think especially stakeholders who have contractors who have worked abroad with air navigation service providers outside the country, and then they come back and work with ATO, can see the night-and-day situation when it comes to technology procurement and technology development. Some of the larger ANSP's globally are able to develop their own technology effectively in-house and then market it globally. That is something that the FAA used to specialize in developing technology in-house, but increasingly it is relying too much on outside contractors without adequate internal controls, and that is helping add to the delays and cost overruns for a variety of systems.

Senator CRUZ. My understanding is that the FAA has concurred with the majority of the GAO's recommendations, ranging from better reporting requirements and budget baseline practices to more regular reviews from the Joint Resources Council. Are those recommendations, in your judgment, sufficient, or should Congress consider more creative solutions to ensure that the U.S. air traffic control system is the best in the world?

Mr. SCRIBNER. As I said in my opening statement and as I detail in my written testimony, I think the problems run much deeper. It is structural. It is institutional design that is ultimately the root cause here. There is a reason why the vast majority of countries, of air navigation service providers globally, have moved toward the public utility model, the self-supporting public utility model, to avoid some of the political problems that the FAA continues to experience. And we have seen a lot more success outside the U.S. in modernizing air traffic control technologies and practice than we have here. And again, I think it is institutional.

Senator CRUZ. And finally, Mr. Iacopelli, in your judgment, what is the biggest challenge outside of funding facing the FAA's air traffic control system?

Mr. IACOPELLI. Thank you, Senator. I would say, you know, we have recently—I will answer it this way—we have recently met with the COO of the ATO, and we talked about this equipment.

Right now the way it is set up is, unfortunately, that there is a program office that goes out and looks for and acquires new technologies. And they take that equipment idea and bring it over to the ATO, and say, hey, we have acquired this. How do you want to use it?

It does not make a whole lot of sense to us. We would rather, as the experts in running the air traffic control system, and the COO, Tim Arel, has agreed, we should get together, talk about what do we need, look at all of the systems that are out there, prioritize what we need, prioritize what would make it better, go through that, and move forward together and saying this is what the ATO needs. This is what air traffic control needs to maintain the safety of the NAS and improve and increase the efficiency of the NAS.

Senator CRUZ. So what you are saying makes a lot of sense. Is there anything that prevents the FAA from doing that now?

Mr. IACOPELLI. There is not, and it is a goal that we are going to start doing in the coming weeks and month, certainly in 2025, to move—and this is not a NATCA issue. It is an FAA issue—moving those pieces around to put the office that goes out and acquires technology for air traffic control under the ATO so that we are acquiring systems that make sense to air traffic control.

Senator CRUZ. Very good. Thank you.

Senator DUCKWORTH. Chairwoman Cantwell.

Chair CANTWELL. Thank you, Madam Chair. And following on Senator Cruz's line of questioning, because I think the issue here is we want to know what modernization takes, and we, obviously, have seen a lot of events. So the workforce training and hours also matter to us, and the experience of those air traffic controllers. If you listen to the Alaska flight audio, it was really critical that the communication between the pilot and the air traffic control system had the best you could possibly have in that situation.

So Captain Ambrosi, let's just say you are the most active user of the air traffic controller system. So you said something in your statement, at the very end. I do not see it in your written statement. But you were referring to the FAA's tendency to do what is required within their budgeting but not come to the table with the right amount of technology investment. Am I making sense there, when you were talking about your resources? I do not know if you have that line and you could re-read it again.

Mr. AMBROSI. If you like.

Chair CANTWELL. Yes, please.

Mr. AMBROSI. Sure.

Chair CANTWELL. Because I thought it was a very telling statement about this dilemma.

Mr. AMBROSI. Let's see. While Congress has provided the funding requested each year by the FAA during the annual appropriations process, there remains a significant shortfall in the numerous maintenance and modernization efforts. Resources have not kept up with inflation and effectively require the agency to prioritize sustainment to the detriment of modernization and infrastructure needs. The FAA must ask Congress for its true needs in order to sustain legacy systems, and make greater headway on NextGen and improve the NAS for all users.

Chair CANTWELL. Sustainment to the detriment of—

Mr. AMBROSI. Modernization.

Chair CANTWELL.—modernization. OK. That is what I wanted you to focus on.

So how do we deal with this dilemma? Because sustainment, you know, there was much debate between, I think, NATCA and others about what they thought the FAA should do. But if the FAA is sitting over here looking at sustainment instead of modernization, and modernization is absolutely capable, as the NTSB Chairwoman has said, on near-miss technology at the airports or these systems, how can we be better informed that that is no tradeoff when safety is concerned? Trading off sustainment for modernization is no tradeoff when safety is concerned. How do we better understand this?

Mr. AMBROSI. Well, I will use this second to do a shout-out for Administrator Whitaker and thank him for his leadership. It will be sad to see him go. We obviously need an FAA Administrator that is going to be a leader, and we need long-term, stable leadership at the top of the FAA to tackle this exact challenge. It was under his leadership that the FAA did request a significant increase in budget last year to address the facilities and equipment and improvement. But yes, they need to ask for what they need, absolutely.

Chair CANTWELL. OK. I am not sure I quite got the—here is how we are dealing with it. We, in the ACSAA, said, we want a Top 10 trend list. We want to know what the top safety trend concerns are, so that you are elevating that to us. We also, obviously, had the Chair testify here, and then Acting Administrator heard her, and a few days later ended up finally putting out an order on near-miss technology deployment for most large airports in the United States.

But you are asking us to do our oversight role, but it is a lot of times way deep down that there is this disagreement. Now you have captured it—sustainability versus modernization. But what else can we do to crystalize that that modernization equals safety, and that Congress needs to understand where dollars go when they are prioritizing safety?

Mr. AMBROSI. All I can answer is by working together and highlighting the problems that may be there. I believe that the people at the FAA want to modernize. They believe they have a path forward. It is just a case of saying, “All right. We have got to really ask for what we need and go out and do it.”

They have the data. There have been miraculous things over the last two decades—

Chair CANTWELL. Not—I have to interrupt—no, no, no, not if people are sitting there arguing over formula models for staffing. That is what we argued over. I see everybody nodding—formula models for staffing. That is what we argued over. Nobody argued over you need this technology modernization now, so that you can prevent X, Y, and Z from happening, or the risk of whatever that risk was, 30 percent change. I don’t know. Some percent chance of that happening.

Instead it came down to this is a disagreement over staffing models, and I do not really think that is what it was about. I think it

was about sustainability of an organization versus modernization, just as you crystallized it.

So anyway, I will stop there, Madam Chair. But I do think this is—we here are—I am really proud of what our Committee has done on oversight, and by that I mean the whole Committee has really taken a more aggressive role and position and input in really understanding these.

But you guys all have to help us. You have to help us crystallize these opportunities in ways that Congress can fully see the trade-offs without, you know, having to spend hours and hours and hours digesting the nuance here of staffing models. And I do not know, Mr. Iacopelli, if anybody else has any thoughts about that. But the way we have dealt with it so far is to use the NTSB, and to say you be the watchdog whistle here and tell us, and be louder about it.

But look, these technology shifts are major in innovation and they are also critical to our competitiveness. So we want to get it right, and we want to understand it. So I don't know. If I could have one more minute, if anybody else has a comment on that.

Mr. IACOPELLI. So if I may, thank you, Senator. So it is an interesting perspective that the staffing question was sustainment versus modernization. On one side was we have a model that barely keeps the system alive and runs it as inexpensively as we can. On the other side you had the air traffic experts who looked at it and said, "If we are building the air traffic control system for the future, and we want it to be safe, we need to do these things."

And when we talk about sustainment and modernization I think Mr. Walsh said it. There is not an easy fix. There is not an easy solution. And I would liken it to any—you know, when I talked about the buildings, when I talked about anything that we are trying to improve, if we are installing high-definition TVs in a building that is run on an electric generator, powered by gasoline, it is not sustainable.

So we have to have the equipment that is out there work while we modernize, and modernization, in a lot of instances, is improving efficiency. And I know your focus, and I think it is an excellent question, what are the modernization tools that we need that focus on safety. We have to deal with efficiency and capacity, but we need to focus first and foremost on safety.

And I think that in our conversations with the FAA, and I will also follow up with what Captain Ambrosi said, thank Mike Whitaker for his leadership because he has been, much as I heard from all of you say, hey, he has been focused on safety. It has been an important part of his charge. And we have worked together to try to identify those systems we need to make the system safe, but we have to figure out a way to do both, because we cannot let go of the things we have until we have the replacement, and those things take time.

But the safety issues in the modernization do need to be separated out from the capacity and efficiency issues.

Chair CANTWELL. Well, I see many of my colleagues here who probably want to jump in on these things. But I would say this Committee has the capacity. I think it has demonstrated it has the capacity. So I think we just have to get this debate elevated. It was

not a staffing model discussion. It was about what do you need to do. And again, Captain Ambrosi being the end user of all of this, you know, I am sure they were the loudest in saying this is what we need, because they are the ones every day who have to get up there and rely on this.

Mr. AMBROSI. And with your leadership and the leadership of this Committee saying to them, "Is this really what you need? Does this budget have what you need to modernize?" and put them on the spot. So I thank this Committee—

Chair CANTWELL. Well, I think air traffic controllers were saying yes, but a larger FAA discussion was saying no, and then we are in the middle, trying to digest and help. But anyway, we got what we needed, which was important, but more to do. More to do because technology and modernization are going to continue.

Again, thank you, Chair Duckworth, for this very important hearing, and thank you for your leadership on aviation, in general.

Senator DUCKWORTH. Senator Rosen very patiently joining us remotely.

**STATEMENT OF HON. JACKY ROSEN,  
U.S. SENATOR FROM NEVADA**

Senator ROSEN. Thank you, Chair Duckworth. I appreciate you and Ranking Member Moran. Today's hearing is critically important to all of us, and I appreciate all the witnesses for being here and for your work.

You know, safe and efficient travel, I do not have to tell you. I was Chair of the Tourism, Trade, and Export Promotion Subcommittee on Commerce, and safe and efficient travel is key to Nevada's tourism economy, and it begins with our Nation's air traffic controllers. And we do have the safest skies in the world.

And I want to build a little bit on what Senator Cantwell is talking about with staffing issues and a lot of these systemic issues that we have with modernization, because today air traffic controllers are working longer hours, longer than ever before, fewer breaks, for more consecutive days. And we do agree, every one of us, this is not sustainable, and it must be addressed.

In May, the FAA sent a letter on the controller shortage that argued its own staffing targets would produce the same hiring levels for the next 3 years, as what the recommended targets from the Collaborative Resource Working Group.

So Mr. Iacopelli, has the FAA sufficiently taken into consideration the Collaborative Resource Working Group's staffing model, which NAFDA helped inform, when crafting its own workforce plan? Because we cannot burn out the workforce we have, and we have to grow folks faster than we are doing.

Mr. IACOPELLI. Thank you, Senator. Those are all true and very accurate points. The men and women, the professionals that we represent, are working longer, and they are working harder, and they are handling more aircraft than they have, likely in most of their careers because we do have a relative new turnover in our workforce.

As far as the CRWG goes, the Collaborative Resource Work Group, the ATO, the Air Traffic Organization, has fully embraced it. They were partnered with NATCA in the creation of those cer-

tified professional staffing targets, because we partnered and worked through it collaboratively with the ATO.

When you get to the FAA—and again, we do thank Mike Whitaker for his service and his commitment to safety—but it has been a challenge convincing the FAA as a whole that the CRWG numbers are the correct number that we need to adequately and safely staff the air traffic control facilities in the country, that allow them to take sufficient breaks, that allow us to participate in the modernization efforts and moving the air traffic control system into the future.

We are expecting that part of the FAA Reauthorization Act of 2024—again, thank you all for passing that—requires a study of the two different models. In the meantime—

Senator ROSEN. We need more than a study. We need to take some action. I think we have studied an awful lot, and somebody's safety is on the line.

I have just a little over a minute. I will take some more of your answer off the record because I just want to pair this with modernizing our aging technology, as it is going to alleviate some of the strain on the air traffic controllers because they are working oftentimes with older equipment or things that are not as technically good as they could be. And it also will help expedite and increase air traffic controller graduation rates.

And one of these pieces of technology that will help us, help the air traffic controllers and their workload are the Terminal Flight Data Manager and the FAA's Surface Safety Portfolio. So I am going to ask you—like I said, I just have about a minute left—what impact, Mr. Iacopelli, you think the TFDM or Surface Safety Portfolio systems had on airports that have installed this equipment, particularly when it comes to controllers' morale and retention. You know, workers, we partner with technology to be better at our job, so it is really important, right, it's a partnership between humans and technology that gives us a safe space, a safe airspace in this regard.

Mr. IACOPELLI. Well, thank you again, Senator. So we did deploy the Surface Awareness Initiative, and I know several times Austin was brought up. That was the first location that we worked with the FAA, and we collaboratively developed this new tool that, again, we call it the Surface Awareness Initiative. And we deployed it at Austin first, and we put it in seven other locations.

It is overwhelmingly, positively received. In fact, the leadership of the FAA, including Administrator Whitaker, from the ATO and NATCA, went to Austin, talked to the folks there, and they are very appreciative, and it has made a difference. And we are continuing to try—well, not try, we are continuing with our deployment schedule to get that out. It is in eight facilities now. We are going to another nine facilities in the coming months. So it has made a difference.

And this is an interesting point between those things that are modernization that are for safety and those things that are modernization for capacity. The TFDM is more a capacity tool. All things that we modernize have some effect on safety. But the Surface Awareness Initiative is a direct tool that directly affects safety.

Senator ROSEN. And if it is a very short answer, how can we help you speed up the deployment of some of these tools that we know help, because we need to speed up the deployment. It is going to really help us all across this Nation. If you want just like a 10-second answer, I could take it off the record, but what do you need to help speed up your deployment schedule?

Mr. IACOPELLI. What we need to do is be adequately funded so that the FAA does not have to choose between deploying this and something else and make this a prioritization issue.

Senator ROSEN. Thank you very much, and I yield back, Madam Chair.

Senator DUCKWORTH. Senator Klobuchar.

**STATEMENT OF HON. AMY KLOBUCHAR,  
U.S. SENATOR FROM MINNESOTA**

Senator KLOBUCHAR. Thank you. Thank you very much, Madam Chair. Mr. Walsh, it is critical, as you have talked about in this hearing, that our safety and security, for our safety and security that we upgrade our aviation system. The NOTAM system outage, way back, as you know, caused a delay, major delay, and in July the FAA confirmed that there is now a backup system in place, but there is still more work to do.

Could you talk about the challenges that airports and air traffic controllers face when trying to transition away from their old legacy systems?

Mr. WALSH. So I think the National Airspace System Safety Review Team did a great job in their recent report on the topic, and I would highlight some of the things that they said. In particular, it is very difficult right now to turn off the legacy systems once you have built the new system that is intended to replace it. We have a lot of users. In particular, if you read between the lines, the military, that does not easily transition over to newer technology, and FAA is then left holding the bag with two systems rather than one. And then they have to sustain both of those systems rather than focusing entirely on their new system, which again, takes up an increasingly large piece of the not growing pie.

So I think as our air traffic controllers, our pilots, and our technicians work with these older systems it makes their life harder, and again, it makes it more upon them to catch things when they go wrong or when these systems have outages.

Senator KLOBUCHAR. OK. Very good. Thank you.

Mr. Iacopelli, thank you for being here. As you know, we have a shortage of air traffic controllers. We have a major hub in Minnesota. I know how important the air traffic controllers' work is, and we have seen flight disruptions and the like. The bill that we passed back in May, with Senator Cantwell's leadership, the FAA Air Traffic Controller's Hiring Act, focused on boosting FAA training capacity.

Do you believe that we should focus on training and hiring? How is it going? What is the latest?

Mr. IACOPELLI. Well, thank you for the question, Senator, and absolutely, yes, we need to continue to focus on hiring. We know that the FAA has just met their hiring goal for the Fiscal Year, so we are in a new Fiscal Year. And based on the FAA Reauthoriza-

tion Act that they are required to do max hiring. And we have partnered with the FAA and our Public Affairs Department to go out and promote that.

If you ever scroll through Facebook you see hundreds of air traffic controllers promoting this profession and how great it is and how much they want people to get in it, for two reasons. One, it is a great profession, and two, we need more air traffic controllers.

We do need to focus on the training. We have recently agreed to some new initiatives within the FAA to focus on training, increase the success rate, the TSS provision in the FAA Reauthorization Act, the training simulator. Again, it is a funding issue. It has been authorized. We need the appropriations part, and hopefully the FAA is going to ask for the right amount of money so, again, we are not choosing between which thing is more important. We need all of it.

Senator KLOBUCHAR. Right. You know, the air traffic control tower up in Duluth is 70 years old, in northern Minnesota. The weather is rather harsh there. We also have an incredible Guard base there, and Cirrus is right near there. So there is a lot of it, a great synergy of air travel and air manufacturing. It is one of the three oldest towers in the country. It does not make the line-of-sight requirements. It is in need of significant repairs. It actually gets under water somehow, even though it is on a hill, quite a bit. We got some funding for it but not enough to get it going.

So is the biggest obstacle here infrastructure, and just talk about the rural communities. And this is not even that rural, right. It is quite a big city, Duluth, Minnesota, where Bob Dylan came from. The biopic is coming out, so I want to get it on everyone's mind.

Mr. IACOPELLI. We have been working, using the Bipartisan Infrastructure Law as the base, to go through and look at a lot of our facilities. And, I mean, we have our folks sending us pictures of flooded basements, mold, decay. When I mentioned plumbing, just upgrading the plumbing in the facility, so that the restrooms and the water work, so that our folks who are air traffic controllers can do that.

I know up in Alaska they have space heaters. We have gone through where the air conditioning this past summer in several locations around the country just stopped working. And we have had our folks in the elevators stopped and it was 90-plus degrees in the tower, and they had to go to remote sites.

So all of those little things, in those rural communities, where you do not hear about it, it does not necessarily make the news. We certainly hear about it. I am assuming you hear about it from your constituents.

So it is an enormous task to go out and upgrade the entire infrastructure of the national airspace system. And I think Mr. Walsh said it—it is not a quick fix. It is not something that happened over the past 3 years. It is something that has been building for 50 years of, if it's not broke—and I forget how you said it—but if it's not broke, we don't need to fix it. If it is working, that is good. Let's keep going.

And I do not want to take up too much time, but we have radar sites right now that the FAA is going around trying to decommission because they do not have the means by which they can main-

tain it. That is not improving safety. That is simply a matter of taking down a radar site so you can use those parts someplace else, because they do not have the means by which to maintain those radar sites, and that is another big issue we are going through.

Senator KLOBUCHAR. OK. Very good. Anything else, Captain, that you would like to add?

Mr. AMBROSI. I think Dean covered it pretty well there. But it is an all-of-the-above strategy. We need to keep it working so we can keep moving passengers and cargo. But it is time to make that next leap and finally put the people, resources, the money in place to move our—it is the safest aviation system in the world, but we need to keep it that way and move it forward. So I would agree with everything he said.

Senator KLOBUCHAR. OK. Thank you. I will send questions in writing. There are many things going on today around here, so thank you. Thanks.

Senator DUCKWORTH. Thank you. I hear they are tough in Alaska about those space heaters there, Senator Sullivan.

**STATEMENT OF HON. DAN SULLIVAN,  
U.S. SENATOR FROM ALASKA**

Senator SULLIVAN. Well, thank you, Madam Chair, and it is always good to follow my friend from Minnesota, who has similar issues, cold, rural—

Senator KLOBUCHAR. Space heaters.

Senator SULLIVAN.—space heaters needing upgrades. We do not have—was it Bob Dylan? We do not have him, but we have a lot of other famous people.

So I want to thank the Chair for holding this really important hearing, and Mr. Iacopelli, I want to begin with you, first doing a shout-out to all the air traffic controllers across the country, in Alaska in particular. These are really heroes, in my view. They keep us safe. We have a lot of aviation challenges in Alaska. You guys do such a great job. I am a giant fan of your workers and members.

You know, even the whole issue, a lot of Americans do not know if you are flying to Asia, you know, even from Chicago or somewhere, you come over the Alaska airspace. Our air traffic control kind of gets them safely to Tokyo or Seoul. So I really just want to do a great shout-out to them.

And I want talk to you. You know, as we were developing the FAA Reauth I supported the Air Traffic Control Hiring Act to require the FAA to set a minimum of hiring targets for new air traffic controllers. We got a lot of this in the bill, but is there more Congress can be doing on this really important issue?

Mr. IACOPELLI. Well, thank you, Senator, and I appreciate the compliment to our brothers and sisters who work up in Alaska.

You know, the Reauthorization Act and the requirement to conduct max hiring, the success of that depends on having it sufficiently funded. So we are hopeful that the FAA requests the money that they need to continue the hiring. We are working with the FAA, and I am sure you are aware, sir, that we have expanded the enhanced CTI program, the College Training Initiative. So we are working on that.

We are working on a number of initiatives in-house, if you will, to enhance and improve the training, to enhance and improve the success rate, most importantly, of that training. Because any time we take someone, we know if we hire 2,000 people, we are not getting 2,000 through our training course out in Oklahoma. Then once they hit the field, again, there is more attrition.

But to maintain that focus and not lose sight of the importance, and again, we have all Priority 1A things here. Everything is a 1, 1, 1 priority. But to continue to focus and ensure we have the funding to stay with it. Because it is not a one-year task. It is a multiyear, long-term commitment.

Senator SULLIVAN. Well, thank you on that, and I again, we will continue to stay very focused on this Committee on those issues.

Captain Ambrosi, it is good to see you again, sir, and I want to do a shout-out to your members too. They are great Americans. A lot of them live in Alaska. We have more pilots per capita than any state in the country, as you probably know, more veterans per capita too—I know our Chair cares a lot about that—per capita.

But we also have challenges with regard to having enough pilots, particularly for regional airlines, because they get recruited up to the major airlines so quickly. So one of the things that I worked on with you and others, that had bipartisan support, and both labor union support and industry support, was focusing on education for our pilots. And one thing that just kind of—I just do not understand why it still exists—that we have this kind of unequal treatment for, loan treatment between traditional college students and students seeking a professional airline pilot, who shoulder very costly loans for training.

So I am trying to fix that. As you know, we had a bill that unfortunately did not make it in the FAA Reauth that I thought was kind of a no-brainer to get in there, to help our pilot situation. Can you explain the barriers a prospective pilot faces for assessing flight education and training and what you think Congress should be doing to right-size the existing programs?

And oh, by the way, on Federal loan payback, you know, the pilots who go through this kind of training, they get Federal loans. They will have a great record of paying back those loans, unlike some of the others who do not, because they will go get an aviation job or a pilot job, and those are good-paying jobs.

So what more can we do to level that playing field?

Mr. AMBROSI. Senator, good to see you. Thank you again, as you did with the shout-out for our members. They work hard every day.

Senator SULLIVAN. Yes, we have a lot in Alaska, as you know.

Mr. AMBROSI. Keep our people safe. Thank you for your leadership on this issue. As I may have said in former testimony that I would not be able to be a pilot today with what it costs.

Senator SULLIVAN. Yes.

Mr. AMBROSI. It has gotten out of hand. It is a wonderful profession. I am proud to be an airline pilot. And we need to do more to open the doors.

We have a robust pipeline. The schools are full. But there are the best and brightest still out there that do not have the resources that enable them to do this.

Senator SULLIVAN. Yes. Do you think that limits the number of pilots in America, just because it is so expensive?

Mr. AMBROSI. It certainly limits—it takes away the ability for a lot of people that would like to get into this profession, if they do not have the ability to get the resources, the Federal loans, that could help. It does not make sense that if you can get those loans for other professions, that we cannot do it for ours.

Senator SULLIVAN. To get a philosophy degree, you can get a Federal loan, but pilot training, you cannot. That seems backward.

Mr. AMBROSI. Yes. Well again, thank you for your leadership on it. I believe that opening the doors of opportunity for all those that would like to get into this profession, it is an important step in the right direction.

Senator SULLIVAN. Great. And Madam Chair, I want to work with you on that too. I know you care a lot about this issue.

I see my time has expired, so I will submit additional questions for the record. But the one that I am going to submit, just to make a very quick comment on, is this idea of air traffic control privatization. I know we have differing views on the panel, but I am going to submit that.

I do not support that. I think that the small, rural airports, that my state has an enormous number of, they are going to kind of lose out on any kind of, you know, privatization that would be run by a private entity. I think in this case the government is best equipped to make sure smaller airports, smaller populations, who need infrastructure, do not get missed out. So I will submit that for the record, Madam Chair. I appreciate the hearing. Thanks again.

Senator DUCKWORTH. Without objection. Senator Welch.

**STATEMENT OF HON. PETER WELCH,  
U.S. SENATOR FROM VERMONT**

Senator WELCH. Thank you very much, Madam Chair, and I share the concern about small airports that Senator Sullivan just mentioned.

I want to start by thanking Mr. Whitaker. He had a short time but a big impact. And it is extraordinary to hear from everyone, from Senator Cruz to folks who are on the panel paying tribute to the excellent job he did as the FAA Administrator. And I am very sorry to lose him. We are proud of him, he is a Vermonter, but primarily because of the extraordinary job that he did in creating confidence among all of the folks who are keeping our skies safe.

I have a few questions, Mr. Iacopelli, I want to ask you. On these shortages that we are trying to deal with, I know the FAA is really hard at work at implementing changes to deal with the air traffic controller shortage. And it takes time, especially 3,000 ATC staffers overnight cannot be hired.

But the ongoing shortage is really hurting us in Burlington, Vermont, at the Leahy International Airport in Burlington, and it has resulted—we understand in the slot waivers for the New York area airports, that has been really detrimental to us but also to other small airports around the country.

Last year, JetBlue terminated service routes from Leahy Burlington International Airport to JFK. That is a real problem for us.

We had a lot of folks that wanted to come from JFK to Burlington and from Burlington to JFK.

So I want to just ask, what is your confidence about the capacity for swift implementation of the ATC workforce provisions included in the FAA Reauthorization Act, and will the FAA be able to lift the New York City slot waivers by the end of the waiver period, which is slated for October 2025?

Mr. IACOPELLI. Thank you, Senator. To start with the slot question, we do not know. I do not know that they will be able to do that. I do not know if it is based solely on staffing or through some commitment with the airlines. NATCA is not involved in the—

Senator WELCH. But we are sort of in it now. Do you have any assessment of the progress that is being made that gives you any capacity to be confident that the target will be met?

Mr. IACOPELLI. So the training and hiring of air traffic controllers is an ongoing effort. It is going to take years of sustained focus to ensure that we continue to hire. Now, the FAA Reauthorization bill requires max hiring for 5 years, because that is the length of the bill. And honestly, if it was a 10-year bill it would have to be 10 years. Because as we hire, and we lose through attrition, as we hire we lose, for retirement and those who are unsuccessful.

But to your question, Senator, we are focused along with the ATO and the FAA in ensuring that those who do get hired receive the best quality training we can, to ensure the most success that we can, to address those issues that you are talking about.

Senator WELCH. Well, I will just implore you to stay on it, because you were not able, obviously, and I respect that, to give us confidence that those slot waivers will be dealt with so that we can get service back to New York City. So it is really, really important to us in Vermont.

There is also, you know, with the smaller airports, the need for upgrades of equipment and facilities. At our airport in Burlington the tower was built in the 1980s, and it is considered to be relatively new for a small airport. But we have had significant expansions at the airport, and at the tower you cannot see the entire airport. We have got \$17.8 billion in the FAA Reauthorization Act to fund the modernization of key technologies.

My question to you is, as we continue to implement the FAA Reauthorization Act, how can the FAA better coordinate with smaller regional airports to ensure its technology and facilities are being consistently maintained and upgraded?

Mr. IACOPELLI. Well, thank you for that, Senator. I think the best way for us to do it is continuing to stay involved with the FAA and having our experts work with the FAA, whether it be in the ATO or any other line of business that oversees the deployment of new technologies.

We do have a good number of professionals out there working with the FAA now, and their counterparts who are either in the engineering or the other modernization departments. And we do make sure we are focused on where does it need to be deployed and are we getting it to where it needs to be, as quickly as we can. But there are limitations to how much we can get accomplished, as was previously discussed.

Senator WELCH. OK. Thank you. I yield back.

Senator DUCKWORTH. Thank you to our witnesses for your participation today. They have called a vote so we are going to end the hearing.

The hearing record will remain open until January 13, 2025. Any Senators that would like to submit questions for the record should do so by December 20, 2024. I again thank the panel for being here. I thought this was a very good discussion. We ask that responses be returned to the Committee by January 13.

And that concludes today's hearing. Thank you.

[Whereupon, at 11:56 a.m., the hearing was adjourned.]

# A P P E N D I X

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JERRY MORAN TO  
KEVIN WALSH

## 1. FAA Budgetary Processes

Over the course of the last decade, Congress has consistently provided funding in excess of that requested by the FAA to support its modernization and sustainment needs, particularly for legacy systems. The GAO report implies this level of investment is inadequate to support the safety and capacity of the airspace.

- What recommendations do you have that would enable the level of investment that is more in line with the needs and short comings identified in your report?

Answer. We previously reported that the amount Congress has invested in NextGen generally aligned with the amounts in the President's budget request.<sup>1</sup> For example, as reflected in the Federal Aviation Administration's (FAA) congressional budget justifications for Fiscal Year 2012 through 2023, FAA's budget requests and actual budget for NextGen—including system deployment—remained relatively constant at about \$1 billion annually. We did not assess FAA's budget requests in relation to NextGen priorities.

Nonetheless, representatives from an association representing air traffic controllers told us that FAA's budget requests for implementing NextGen have not kept up with the growing costs of materials and labor over time. We also reported that FAA has not updated its full NextGen life cycle cost estimate since 2017. Updating this estimate could help better inform and justify budget requests. Accordingly, we recommended that FAA develop an updated life cycle cost estimate for NextGen, measure FAA's performance against it, and create a schedule for updating the life cycle cost estimate regularly.

Finally, we recently initiated a new audit looking at, among other things, the reliability of FAA cost and schedule estimation practices for air traffic control (ATC) system modernization investments. This new audit, coupled with our prior recommendation, may help to improve the accuracy, reliability, and justification of the budget requests submitted by FAA.

- Are there added revenues, such as the Airport and Airway Trust Fund, for Congress to explore for FAA to better leverage investment in its infrastructure modernization programs?

Answer. FAA's funding for these investments generally comes from the Facilities and Equipment account. We have not done work on other possible revenue sources.

## 2. DOD Systems

The GAO report excluded 43 systems that were classified as the responsibility of the Department of Defense or building facilities.

- Can you speak at all to the sustainability of those DOD systems? Are there lessons to be learned in how those systems are sustained?

Answer. We have not done work on how the 43 systems and building facilities are sustained. Of the 43, 16 were classified as systems supporting national defense, and the remaining 27 were classified as building facilities. FAA officials rated each of the 16 national defense systems by their sustainability and criticality. The table below is a summary of the 16 systems based on FAA's 2023 operational risk assessment.<sup>2</sup>

<sup>1</sup>GAO, *Air Traffic Control Modernization: Program Management Improvements Could Help FAA Address NextGen Delays and Challenges*, GAO-24-105254 (Washington, D.C.: Nov. 9, 2023).

<sup>2</sup>These numbers were derived from the 2023 National Airspace System operational risk assessment. FAA intended to perform the assessment annually.

Systems by Operational Impact	Sustainability rating		
	Critical	Moderate	Low
A: Unsustainable due to shortages in spares and shortfalls in funding	0	0	0
B: Unsustainable due to shortfalls in funding or capability	0	0	0
C: Potentially unsustainable due to possible shortfalls in funding or capability	15	0	1
<i>Total</i>	<i>15</i>	<i>0</i>	<i>1</i>

One of the four critical systems for which FAA does not have an associated modernization investment underway is used by the Departments of Defense and Homeland Security, as well as FAA.

- How would you suggest these three agencies initiate discussions regarding procurement of a replacement system?

Answer. While we have not done work on how these three agencies might initiate discussions for the procurement of a replacement system,<sup>3</sup> we have developed best practices to be used by Federal agencies to enhance Federal interagency collaboration.<sup>4</sup> Specifically, in May 2023 we issued a report that highlights eight leading collaboration practices, including bridging organizational cultures, identifying and sustaining leadership, clarifying roles and responsibilities, and developing written guidance and agreements.

In addition, in March 2024 FAA provided us a few additional details on the system that is used by FAA and the Departments of Defense and Homeland Security. Specifically, FAA officials stated that the three agencies intend to modernize the system, but no program is currently underway. In March 2024, FAA officials stated that the Office of the Secretary of Defense was working on an analysis of alternatives for a new replacement investment, and that analysis was nearing completion. FAA officials also stated that the National Airspace System (NAS) Defense Program plans to begin tri-agency discussions to procure a replacement system that meets the modern requirements of all three agencies. Lastly, the officials stated that while it is unlikely that they will be able to start the program in 2025, once they are able to start, it will take at least nine years before the legacy system is decommissioned.

Following the interagency collaboration best practices from our May 2023 report could be helpful to FAA, and the Departments of Defense and Homeland Security in ensuring effective collaboration as they embark on their future work.

### 3. Limiting Factors

Pages 37 and 38 of the report call attention to the limitations of FAA’s acquisition management oversight council, stating “[it] is not ensuring that the investments deliver functionality in manageable segments to address the extended periods of time it takes FAA to develop and deploy new systems.”

- Has your investigation into these aging systems offered any insight into why FAA is less agile in its procurement and development of new systems than other Federal agencies—like DOD?

Answer. While we did not perform an in-depth analysis of whether FAA is less agile in its procurement and development than other Federal agencies, in April 2024, we asked about reasons for FAA’s lack of agility. FAA officials did not give specific reasons for its lack of agility but stated that in some instances it is not appropriate to segment a system development effort. Specifically, officials stated that when a system is providing functionality that is only useful when it is deployed throughout the NAS, it is not appropriate for the system to be segmented. The officials highlighted two examples of these types of systems: the En Route Automation Modernization (ERAM) system and the Standard Terminal Automation Replacement System (STARS). The officials stated that they could not realistically provide only a portion of the full functionality to safely separate aircraft in the en route or terminal airspace; nor could the FAA provide that functionality to half of the country when the systems need to be able to communicate with each other.

<sup>3</sup>We omitted the official name of the system due to sensitivity concerns. We used a generic designation instead.

<sup>4</sup>GAO, *Government Performance Management: Leading Practices to Enhance Interagency Collaboration and Address Crosscutting Challenges*, GAO-23-105520 (Washington, D.C.: May 24, 2023).

In April 2024, FAA officials acknowledged that they should do more to identify opportunities to segment investments and deliver functionality to users more rapidly across all ATC system modernization investments. Specifically, in March 2024 the agency established a working group to develop guidance on segmenting investments, where feasible. Officials noted that the working group will be addressing the types of investments that should apply this strategy. FAA anticipates the working group will result in improved guidance and training opportunities for segmentation. However, FAA officials did not provide specific time frames for developing and implementing this guidance. Accordingly, we recommended that FAA establish a time frame for developing and implementing guidance that the Joint Resources Council ensures that ATC system modernization investments are organized as manageable segments.

#### 4. Modernization Difficulties

The report shows a clear picture of the pressing needs of modernization.

- What are the primary difficulties the FAA has found to execute the modernization programs?

Answer. In our September 2024 report, we identified individual reasons why specific investments were delayed, but these reasons varied by investment.<sup>5</sup> In addition, we reported that segmenting large complex system development and implementation efforts into smaller and more manageable increments has the potential to reduce risk and deliver capabilities more quickly. We also highlighted that the Office of Management and Budget requires agencies to deliver functionality to users at least every 6 months.

However, we found that FAA's acquisition oversight body—the Joint Resources Council—does not ensure that investments deliver functionality in manageable segments. For example, while the Enterprise Information Display System (E-IDS) was initiated 8 years ago, it has not delivered any functionality to users. Similarly, the NextGen Weather Processor (NWP) system was initiated 14 years ago and had yet to deliver any functionality to users.

As a result, we concluded that this lack of segmentation, at least partially, contributes to the extended development time frames. Accordingly, we recommended that FAA establish a time frame for developing and implementing guidance that the Joint Resources Council ensures that ATC system modernization investments are organized as manageable segments.

In November 2023 we reported that closer adherence to five program management practices could better position the agency's ongoing effort to modernize air traffic management.<sup>6</sup> Collectively, the gaps in program management mean FAA has less assurance that it has taken steps to avoid major course corrections in the future, contributing to continued delays in deployment. We made four recommendations to improve FAA program management operations.

In addition to these program management challenges, FAA and stakeholders cited varying levels of aircraft equipage, the changing national airspace, and unanticipated events as challenges to implementing its modernization efforts. More specifically, achieving the level of equipage on aircraft needed to ensure that operators can realize NextGen benefits has continued to be a barrier. While foundational systems—such as ERAM and STARS—do not require aircraft operators to install avionics, other NextGen systems do, and aircraft operators have achieved different levels of aircraft equipage. Also, cybersecurity risks posed by a more connected NAS, integration of new entrants into the NAS (such as drones and commercial spacecraft), and potential spectrum interference were cited as additional challenges. Lastly, unanticipated events, such as the COVID-19 pandemic, have affected modernization timelines. Although the COVID-19 public health emergency ended in May 2023, FAA was continuing to modify plans and schedules resulting from restricted access to facilities, testing delays, and difficulties obtaining system components, as of November 2023.

Finally, we recently initiated a new audit, which will assess the extent to which FAA follows leading practices for planning, selecting, managing, and evaluating ATC modernization investments. We will also assess the reliability of FAA's cost and schedule estimation practices of ATC system modernization investments. This new audit is intended to provide additional insights into the execution of FAA's ATC modernization investment practices.

<sup>5</sup> GAO, *Air Traffic Control: FAA Actions Are Urgently Needed to Modernize Aging Systems*, GAO-24-107001 (Washington, D.C.: Sept. 23, 2024).

<sup>6</sup> GAO-24-105254.

### 5. Federal Contract Tower Program

Kansas is home to the Kansas City Air Traffic Control Center and eight (8) participants in the FAA's Federal Contract Tower program.

- Can you provide the Subcommittee your perspective of the FAA Contract Tower program, which continues to provide critical ATC safety benefits to the 264 airports in the program?

Answer. We have not done work on this topic.

### 6. NOTAM Improvement Act

Following the January 2023 Notice to Air Missions (NOTAM) outage, I was pleased to introduce with my colleagues, Sens. Klobuchar and Capito, a bill to require FAA establish a task force to strengthen the resiliency and cybersecurity of the NOTAM system.

The bill was signed into law in 2023, and the task force's report is expected early next year.

- Are there particular themes you expect to find in the report?

Answer. We have not examined the NOTAM outage or the work of the taskforce, which would be needed to comment on this topic.

- How do you anticipate the findings and recommendations from this report to complement GAO's findings to help bolster safety of the NAS ecosystem?

While we cannot speculate on the taskforce's future report, it will be important for FAA to closely review their findings and recommendations and work to implement ours and others' recommendations aimed at strengthening the safety of the NAS.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. DAN SULLIVAN TO  
KEVIN WALSH

With the persistent challenges faced by Congress and the FAA to budget for air traffic control modernization, there have periodically been suggestions to spin off the air traffic control systems into a private or quasi-private entity.

I have deep reservations about any proposal to transfer the FAA's air traffic facilities to a quasi-private corporation and allow it, rather than Congress, to make decisions on where funding should be spent and how much tax general aviators should pay. This threatens to leave rural communities largely ignored.

The 582 airports out of 600 in Alaska that do not have air traffic control would receive little if any funding for upgrades and new technology, and it is unclear what would happen to the 400 navigation aids that Alaskans depend on. The largest hubs would receive the lion's share of the funding leaving states like Alaska with no recourse.

*Question 1.* Do you agree that congress is in the best position to allocate resources between the few dozen airports serving larger cities and the thousands of general aviation airports and facilities serving rural America?

Answer. Congress has the authority to determine how to allocate resources or whether to separate ATC operations from FAA. In October 2016, we identified key transition issues associated with such a change, including changes in user fees and their impacts on certain users such as general aviation.<sup>7</sup>

Similarly, I have concerns over a non-public entity making decisions regarding the allocation of airspace. In Anchorage for example, airspace is shared among Ted Stevens International, Merrill Field, one of the largest general aviation airports in the country, Lake Hood, the world's largest floatplane airport, and major military airfields which conduct air training activities.

With more licensed pilots per capita than any state in the union we have (9,428 active pilots), we have an extremely active General Aviation community in Alaska. Allocating air space among these diverse users should be determined by a government entity, not a private organization.

*Question 2.* Do you agree that airspace should be available to all users, including those serving small towns and villages as well as individuals as it is currently?

Answer. FAA regulations currently identify various classes of airspace and requirements for those classes, which are, in part, based on proximities to airports. While we have not done recent work on how separating ATC operations between a government entity and private organizations might specifically impact airspace

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<sup>7</sup> GAO, *Air Traffic Control: Experts' and Stakeholders' Views on Key Issues to Consider in a Potential Restructuring*, GAO-17-131 (Washington, D.C.: Oct. 13, 2016).

users, as mentioned in the prior question, our October 2016 report explores various issues that are associated with separating ATC operations from FAA.<sup>8</sup>

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARIA CANTWELL TO  
KEVIN WALSH

Planning for Safe Transition Away from Aging Systems: In a 2019 report, GAO looked at legacy systems across the Federal government, identifying the 10 most critical systems in need of replacement. The report observed that three agencies, including the Federal Aviation Administration (FAA), had “no documented plans to modernize” the critical systems identified.

Five years later, Government Accountability Office’s (GAO’s) 2024 report found that FAA still did not have near-term modernization plans in place for certain at-risk systems.

This is exactly why section 622 in the FAA Reauthorization law mandates an outside audit of all FAA legacy systems in to determine the level of risk and impact associated with operating outdated, unsafe, or unstable older systems.

After the audit is complete, FAA must then implement a plan to prioritize the drawdown, replacement, or enhancement of legacy systems based on the risks such systems pose to aviation safety.

*Question 1.* Having multiple redundancies in systems can help delay or even prevent air traffic control (ATC) system failures and operational disruptions in the aviation system. To what extent has GAO seen the FAA comprehensively incorporate redundancies in legacy ATC systems?

Answer. We have not done in-depth work on this topic. However, when we asked FAA about systems that are considered a single point of failure or have associated redundancies, FAA stated that depending upon the system, if there are not any direct or associated redundancies, there are procedural contingencies in place to mitigate operational risk. FAA officials explained that if one system goes down, another one takes over, or the air traffic controller uses an alternative piece of equipment or changes operational procedures to monitor air traffic.

*Question 2.* GAO’s recent report points out that planning for ATC systems should focus not just on upgrading legacy systems and installing new technologies, but also on determining which aging systems to decommission. In your view, is FAA taking a constructive approach to phasing out the systems that have outlasted their useful life?

Answer. The FAA Acquisition Management System includes a sustainment phase referred to as In-Service Management, which entails revalidating the need to sustain deployed assets or taking other action to improve service delivery. During this phase, the service organization or program office responsible for sustaining a system is expected to periodically revalidate the need to sustain fielded assets or recommend other action such as upgrade, replacement, or decommissioning and removal.

The Acquisition Management System also includes a Service Analysis phase which is intended to determine what capabilities must be in place now and in the future to meet agency goals and the service needs of customers. During this phase, the organization is intended to identify differences between future service need and current capability. A service shortfall is expected to be addressed by a sustainment action for existing assets or a new service delivery idea.

We have not done in-depth work on FAA’s decommissioning and disposition processes. However, to the extent that FAA can expeditiously complete its NextGen modernization efforts, the agency will likely be in a better position to decommission aging systems. In November 2023, we reported that closer FAA adherence to program management practices was needed.<sup>1</sup> Since that report was issued, the FAA Reauthorization Act of 2024 requires FAA to operationalize the programs under NextGen by the end of 2025 and then sunset its Office of NextGen. The act also requires FAA to establish an office within FAA responsible for the modernization of NAS, including the development of an information-centric NAS, improving the interoperability of NAS systems, and developing an integrated plan for the future of NAS. As FAA moves in this direction, we believe that full implementation of our recommendations, related both to aging systems and NextGen program manage-

<sup>8</sup> GAO-17-131.

<sup>1</sup> GAO-24-105254.

ment, will target critical improvements needed for the new office to begin meeting the expectations of Congress in this vital area.<sup>2</sup>

*Question 3.* I understand that in some cases, FAA will need to operate legacy ATC systems until it can safely transition to newer technologies. Based on the GAO report, is FAA undergoing effective analysis and planning to determine when it is safe to transition away from operating older ATC systems?

Answer. We have not done in-depth work on the decommissioning and disposition processes or the transition from one operational asset to another. However, FAA completed the 2023 operational risk assessment to assist in identifying systems that present a risk to the NAS and may be considered for decommissioning as part of the Acquisition Management System processes described earlier. Nonetheless, as reflected in our September 2024 report, FAA did not prioritize or establish near-term plans to modernize unsustainable and critical systems based on its operational assessment as originally intended.<sup>3</sup> Officials stated that they plan to use the results of the 2024 operational risk assessment to inform future budget decisions and plans for modernization.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JERRY MORAN TO  
DEAN IACOPELLI

### 1. NOTAM Improvement Act

Following the January 2023 Notice to Air Missions (NOTAM) outage, I was pleased to introduce with my colleagues, Sens. Klobuchar and Capito, a bill to require FAA establish a task force to strengthen the resiliency and cybersecurity of the NOTAM system.

The bill was signed into law in 2023, and the task force’s report is expected early next year.

- Are there particular themes you expect to find in the report?

Answer. NATCA is a participant in the NOTAM task force. We expect themes to include acknowledgement of known vulnerabilities and risks associated with the current system, including the need to reduce the number of NOTAMs in the system, the need to prioritize the importance of NOTAMs in terms of the safety of flight, and the need for more stringent requirements for a replacement NOTAM system. Despite these themes, the FAA will have a difficult time funding this program without increased F&E appropriations. At minimum, the FAA will need \$154 million just to conduct further *research* on a replacement NOTAM system. It will need \$354 million to replace the broken NOTAM system.

- How do you anticipate the findings and recommendations from this report to complement GAO’s findings to help bolster safety of the NAS ecosystem?

Answer. NATCA anticipates both reports will complement each other in defining core issues that exist in the NOTAM program and throughout the majority of FAA systems and programs.

Congress has consistently provided the FAA with the resources it requests through both authorization of top-line numbers and the annual appropriations process. However, because FAA has historically requested too little, there are significant backlogs of NAS system sustainment and ATC facility sustainment, in addition to mounting delays in the implementation of NAS modernization and system improvements as well as ATC tower and radar facility replacement.

The FAA’s FY 2025 budget request, for the first time in over a decade, acknowledges its true need, although not entirely through its F&E request. In addition to the \$3.6 billion F&E request, FAA cites the \$1 billion in funds authorized for 2025 through the Infrastructure Investment and Jobs Act as supplementing its facilities and infrastructure funding needs. It also proposes a new Facility Replacement and Radar Modernization fund that would dedicate \$8 billion over the next five years—beginning with \$1 billion in 2025—to replace or modernize aging air traffic control facilities. This includes modernizing 377 critical radar systems and more than 20 air traffic control facilities. We, along with a wide array of industry stakeholders, strongly support this request.

The FAA must continue to be transparent with its need for increased F&E funding so that it can meet its own equipment sustainment, replacement, and modernization needs. If not, it will continue to exacerbate the FAA’s significant sustainment and replacement backlog. Failing to maintain and replace critical safety equipment that has exceeded its expected life introduces unnecessary risk into

<sup>2</sup> GAO-24-105254 and GAO-24-107001.

<sup>3</sup> GAO-24-107001.

the system. These funding limitations also have prevented the FAA from designing and implementing new technologies that will improve safety.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. DAN SULLIVAN TO  
DEAN IACOPELLI

With the persistent challenges faced by Congress and the FAA to budget for air traffic control modernization, there have periodically been suggestions to spin off the air traffic control systems into a private or quasi-private entity.

I have deep reservations about any proposal to transfer the FAA's air traffic facilities to a quasi-private corporation and allow it, rather than Congress, to make decisions on where funding should be spent and how much tax general aviators should pay. This threatens to leave rural communities largely ignored.

The 582 airports out of 600 in Alaska that do not have air traffic control would receive little if any funding for upgrades and new technology, and it is unclear what would happen to the 400 navigation aids that Alaskans depend on. The largest hubs would receive the lion's share of the funding leaving states like Alaska with no recourse.

*Question 1.* Do you agree that congress is in the best position to allocate resources between the few dozen airports serving larger cities and the thousands of general aviation airports and facilities serving rural America?

Answer. Congress has consistently provided the FAA with the resources it requests through both authorization of top-line numbers and the annual appropriations process. However, because FAA has consistently requested too little, there are significant backlogs of NAS system sustainment and ATC facility sustainment, in addition to mounting delays in the implementation of NAS modernization and system improvements as well as ATC tower and radar facility replacement.

The budgetary shortfalls also have not kept up with inflation over the past 15 years. For instance, the FAA has consistently requested only about \$3 billion in annual appropriations for F&E throughout that period, even though in Fiscal Year (FY) 2024 the Agency's internal budgetary estimates showed that it needed at least \$4.5 billion, with that need quickly approaching \$6 billion. This loss of spending and buying power for F&E programs forced FAA into a "fix-on-fail" model by requiring it to prioritize mandatory costs, leaving little to no money for modernization and infrastructure programs.

To sustain many legacy systems, as well as to enhance and grow critical safety and modernization programs, the FAA projects that it will need \$6 billion. At bare minimum, the NATCA projects that the FAA will need at least \$4 billion to simply sustain these programs and the rest of the NAS. Investments that merely cover the costs to sustain current equipment will be insufficient to develop and implement new technologies and integrate new users into the system.

The FAA's FY 2025 budget request, for the first time in over a decade, acknowledges its true need, although not entirely through its F&E request. In addition to the \$3.6 billion F&E request, FAA cites the \$1 billion in funds authorized for 2025 through the Infrastructure Investment and Jobs Act as supplementing its facilities and infrastructure funding needs. It also proposes a new Facility Replacement and Radar Modernization fund that would dedicate \$8 billion over the next five years—beginning with \$1 billion in 2025—to replace or modernize aging air traffic control facilities. This includes modernizing 377 critical radar systems and more than 20 air traffic control facilities. We, along with a wide array of industry stakeholders, support this request.

NATCA is not advocating to reform FAA or the Air Traffic Organization's (ATO) structure.

NATCA will oppose any reform proposal that would transfer management or operation of the air traffic control system to a for-profit entity or to one that is co-owned, operated, and/or controlled by for-profit entities. Moreover, any FAA reform proposal must adhere to NATCA's core principles before we would consider endorsing it:

1. Ensure the frontline workforce is protected in their employment relationship, including their pay, rights, retirement, health care and other benefits, negotiated collective bargaining agreements, and indemnification for acts within the scope of their employment;
2. Ensure safety and efficiency remain the top priorities;
3. Provide for a stable, predictable funding stream that adequately supports air traffic control services, staffing, hiring and training, long-term modernization, preventative maintenance, and ongoing modernization to infrastructure; and

4. Maintain a dynamic aviation system that continues to provide services to all users, areas, and segments of the existing aviation community as well as integrating new users.

NATCA will meticulously review the details of any reform proposal before taking a position.

Similarly, I have concerns over a non-public entity making decisions regarding the allocation of airspace. In Anchorage for example, airspace is shared among Ted Stevens International, Merrill Field, one of the largest general aviation airports in the country, Lake Hood, the world's largest floatplane airport, and major military airfields which conduct air training activities.

With more licensed pilots per capita than any state in the union we have (9,428 active pilots), we have an extremely active General Aviation community in Alaska. Allocating air space among these diverse users should be determined by a government entity, not a private organization.

*Question 2.* Do you agree that airspace should be available to all users, including those serving small towns and villages as well as individuals as it is currently?

Answer. NATCA is focused on the safety and efficiency of the system for all users. NATCA takes pride in its role as an aviation safety organization that stands shoulder-to-shoulder with government and industry stakeholders to ensure that the NAS remains the safest and most efficient in the world. The air traffic controllers, including in Alaska Flight Service Stations, and other aviation safety professionals that NATCA represents throughout the Federal Aviation Administration (FAA), Department of Defense (DOD), and the FAA's Federal Contract Tower (FCT) program ensure the safe and efficient movement of GA aircraft and millions of tons of cargo annually, while simultaneously ensuring that more than one billion commercial passengers annually arrive at their destinations safely. In its role as a safety organization, NATCA does not take a position on how access to airspace is allocated or prioritized among existing users.

NATCA believes the National Airspace System must continue to be a dynamic aviation system that continues to provide services to all users, areas, and segments of the existing aviation community as well as integrating new users.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARIA CANTWELL TO  
DEAN IACOPELLI

*FAA Facilities and Equipment Funding*

The President's FY 2025 Budget included the establishment of a \$8 billion Facility Replacement and Radar Modernization program to make further investments in addressing FAA's aging infrastructure through FY 2029. Building upon the Bipartisan Infrastructure Law \$5 billion investment in air traffic facilities, the Administration proposal would provide dedicated supplemental appropriations to modernize 377 radar systems and more than 20 aging air traffic facilities nationwide.

In July 2024, NATCA joined a coalition of aviation industry leaders advocating for the establishment of a separate annual funding stream from the Airport and Airway Trust Fund (AATF), dedicated solely for upgrading and replacing FAA air traffic facilities, systems, and equipment.

While the Administration and industry coalition proposals are different, both emphasize using additional AATF funding to upgrade air traffic control system infrastructure in light of growing air travel demand.

*Question 1.* How would air traffic controllers, air traffic support specialists, and other ATC professionals represented by NATCA benefit from additional funding to upgrade FAA systems, facilities, and equipment in performing their job duties?

Answer. The FAA's FY 2025 budget request, for the first time in over a decade, acknowledges its true need, although not entirely through its F&E request. In addition to the \$3.6 billion F&E request, FAA cites the \$1 billion in funds authorized for 2025 through the Infrastructure Investment and Jobs Act as supplementing its facilities and infrastructure funding needs. It also proposes a new Facility Replacement and Radar Modernization fund that would dedicate \$8 billion over the next five years—beginning with \$1 billion in 2025—to replace or modernize aging air traffic control facilities. This includes modernizing 377 critical radar systems and more than 20 air traffic control facilities. We, along with a wide array of industry stakeholders, strongly support this request.

Disruptions to FAA funding and significant budgetary shortfalls create a more stressful, less productive work environment for all aviation safety professionals. Many controllers and other aviation safety professionals go to work every day in facilities that are plagued by leaking roofs, flooding basements that contain electronic

systems, broken-down elevators and HVAC systems, and chronically backed-up bathroom toilets. Without sufficient funding the FAA will continue to experience delays implementing vital modernization technology, sustaining and repairing of existing safety-critical equipment, and the hiring and training of new controllers and other aviation safety professionals.

Additional funding, such as the Facility Replacement and Radar Modernization proposed in the President's FY 2025 Budget, would not only allow for an improvement in physical infrastructure and working conditions, but it would also provide for desperately needed modernization and technology updates to aviation systems and air traffic control automation platforms that are used by controllers 24 hours a day, 7 days a week.

The FAA must continue to be transparent with its need for increased F&E funding so that it can meet its own equipment sustainment, replacement, and modernization needs. Failing to maintain and replace critical safety equipment that has exceeded its expected life introduces unnecessary risk into the system, such as the complete failure of the NOTAM system in 2023 and the current unexpected outages of the FAA's Telecommunications Infrastructure (FTI) program that are plaguing air traffic facilities across the country.

*Question 2.* Given NATCA's support for the industry proposal, and if more AATF funds are made available annually, what system upgrades would you like to see FAA prioritize first in its modernization of air traffic control systems?

Answer. NATCA has identified several automation platforms and modernization programs that are the most critical to maintaining and upgrading the National Airspace System (NAS) based on their relationship and necessity to the continued safe and efficient operation of the NAS. At the top of that list is maintaining, repairing, and replacing RADAR systems, some of which date back to 1964. NATCA anticipates that RADAR failures are likely to occur in 2025, which could cause gaps in surveillance coverage throughout the country. NATCA also believes that additional funding is needed for air traffic automation platforms such as ERAM, STARS, and ATOP enhancements to support new entrants, such as space launches and UAS/UAM/UTM operations. The Agency and NATCA have been able to fast-track a surface surveillance situational awareness tool that will help controllers mitigate the risks associated with wrong-surface landings and runway incursions. It needs to be deployed across all airports that do not currently have an existing surface tool.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. TAMMY DUCKWORTH TO  
DEAN IACOPELLI

*Question 1.* Safety is the most important concern, but equipment failures can also cause flight delays and disruptions. In June, a feed from a long-range radar to the Chicago TRACON malfunctioned. Air traffic controllers reported seeing multiple targets on their displays. They saw two aircraft representing just one aircraft on their screen. Worse, this was at a time when there was no qualified technician on duty to fix the equipment. This resulted in a ground stop at O'Hare, while they called in an off-duty technician. In August, air traffic was halted in Newark due to a technology outage in Philadelphia. Ground stops can have ripple effects.

When equipment failures result in ground stops—what does that mean for air traffic controllers and what is the impact on air traffic across the country?

Answer. As you rightfully noted, equipment failures that cause ground stops are a tremendous burden and cause unnecessary stress for air traffic controllers. For controllers and other aviation safety professionals, an equipment failure is often treated as an emergency and swift action is needed to ensure safety for all aircraft and the flying public.

In recent years, these unexpected outages have occurred far more frequently, placing an even higher workload and stress level on the air traffic workforce. Depending on the outage, the effects are often felt throughout the National Airspace System. In addition to the examples at the Chicago TRACON and in Philadelphia, the complete failure of the NOTAM system in 2023 and the anticipated outages of the FAA's Telecommunications Infrastructure (FTI) program going forward are recent examples of a long-standing problem.

*Topic: Air Traffic Control Infrastructure*

*Question 2.* While recently describing the need for FAA to upgrade its facilities to keep up with technology, FAA Administrator Michael Whitaker called some of the current efforts “band-aid” solutions with “a lot of duct tape”.

Do you agree with Administrator Whitaker's characterization, and if so, can you describe how this “band-aid” approach is impacting air traffic controllers?

Answer. NATCA concurs with the statement from Administrator Whitaker. Controllers are working in rapidly-aging facilities, using outdated and unstable technology that lacks modern automation. These issues can lead to significant delays and a tremendous increase in workload.

Although the FAA has begun the process of upgrading its rapidly aging infrastructure to improve technology, that process has been slow and hampered by the Agency not requesting its full need for F&E funding throughout the last 15 years. This loss of spending and buying power forced FAA into a “fix-on-fail” model by requiring it to prioritize mandatory costs, leaving little to no money for modernization and infrastructure programs. The FAA’s “fix-on-fail” philosophy has also been applied to maintenance and repair projects, as the Agency stopped stockpiling critical parts for essential operational equipment resulting in a backlog of maintenance projects at facilities around the country.

Congress has consistently provided the FAA with the resources it requests through both authorization of top-line numbers and the annual appropriations process. However, because FAA has consistently requested inadequate resources, there are significant backlogs of NAS system sustainment and ATC facility sustainment, in addition to mounting delays in the implementation of NAS modernization and system improvements as well as ATC tower and radar facility replacement.

Furthermore, the F&E budget has not kept up with inflation over the past 15 years. For instance, the FAA has consistently requested only about \$3 billion in annual appropriations for F&E throughout that period, even though in Fiscal Year (FY) 2024 the Agency’s internal budgetary estimates showed that it needed at least \$4.5 billion, with that need quickly approaching \$6 billion. This loss of spending and buying power for F&E programs forced FAA into a “fix-on-fail” model by requiring it to prioritize mandatory costs, leaving little to no money for modernization and infrastructure programs.

The FAA’s FY 2025 budget request, for the first time in over a decade, acknowledges its true need, although not entirely through its F&E request. In addition to the \$3.6 billion F&E request, FAA cites the \$1 billion in funds authorized for 2025 through the Infrastructure Investment and Jobs Act as supplementing its facilities and infrastructure funding needs. It also proposes a new Facility Replacement and Radar Modernization fund that would dedicate \$8 billion over the next five years—beginning with \$1 billion in 2025—to replace or modernize aging air traffic control facilities. This includes modernizing 377 critical radar systems and more than 20 air traffic control facilities. We, along with a wide array of industry stakeholders, strongly support this request.

*Topic: Close Calls and Near Misses*

*Question 3.* Coming out of the pandemic, we saw an alarming rise in close calls in commercial aviation. Last year, FAA convened a safety summit to bring stakeholders together to address it. We’ve done a lot of work since then to help restore our margins of safety—including passing an FAA reauthorization law with many safety enhancements. But the new law is just starting to be implemented, and in the meantime, our aviation system remains stressed.

Do you think modernizing our aging air traffic control systems would improve our safety margins and if so, how?

Answer. Although it is the safest, most efficient, and most complex airspace system in the world, we should always strive to bolster safety, mitigate risk, and improve efficiency. NATCA believes that investing in modernization and technology programs will improve the margins of safety in addition to enhancing system efficiencies.

The FAA’s aging radar surveillance infrastructure is in dire need of modernization. NATCA anticipates in the near future, RADARs throughout the U.S. will start to fail causing gaps in surveillance coverage. Likewise, new RADAR technology could also allow for surveillance coverage in areas where coverage does not currently exist. In addition, emerging technologies and new entrant activity such as UAS, UAM, and increased space launches will require updated automation technology so controllers can continue to ensure as the system improves safety margins rather than degrade.

The Agency and NATCA have been able to fast-track a surface surveillance situational awareness tool that will help controllers mitigate the risks associated with wrong-surface landings and runway incursions. It needs to be deployed at facilities that do not have an existing surface surveillance tool.

*Topic: Fiber Optic Cables*

*Question 4.* You noted in your testimony that FAA needs to upgrade its telecommunications from copper wire to fiber optic cable but since FAA only has enough

funding to proceed on a case-by-case basis, FAA is stuck spending \$7 million per month just to maintain the old copper wire that ultimately needs to be replaced. That's \$85 million a year.

How important is this transition from copper to fiber optic cable and is this something we should be accomplishing more swiftly?

Answer. FAA telecommunications are the backbone of the air traffic control system, which makes the transition from copper wire to fiber optic cable absolutely critical to the operation of the National Airspace System (NAS). This network provides data to air traffic control information and automation platforms in addition to air-to-ground communications and facility-to-facility communications.

Presently, there are over 30,000 services at over 4,600 FAA sites that must transition away from copper wire and onto a fiber optic cable network in order to avoid severe service disruptions and extensive flight delays. NATCA believes the current timeline to complete the transition is insufficient when compared to the rate of copper wire discontinuances.

One of FAA's three main service providers has advised the Agency that it will be discontinuing copper wire services two years earlier than originally planned. This requires the FAA to reallocate resources to ensure that none of the affected facilities lose services during 2025 before the discontinuance occurs.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. AMY KLOBUCHAR TO  
DEAN IACOPELLI

*Air Traffic Controllers Hiring*

*Question 1.* Our nation is facing a shortage of air traffic controllers, causing flight disruptions and safety risks across the country and seriously straining our air traffic controller workforce, and putting travelers at risk. The Federal Aviation Administration Reauthorization passed in May included my bill with Senator Braun, the *Air Traffic Controllers Hiring Act*, to boost Federal Aviation Administration training capacity and increase the Federal Aviation Administration's use of its expedited hiring authority.

In your view, how should the Federal Aviation Administration focus on training and hiring more controllers?

Answer. NATCA thanks Sen. Klobuchar and Sen. Braun for their leadership in passing the Air Traffic Controllers Hiring Act as part of the FAA Reauthorization Act of 2024. The FAA must take a holistic, collaborative approach to resolving its staffing and training challenges. The first step is implementing the Collaborative Resource Workgroup's (CRWG) jointly-developed operational CPC staffing targets for each facility as the basis for its annual Controller Workforce Plan (CWP) as required by the FAA Reauthorization Act of 2024, while continuing maximum controller hiring for at least the duration of the Act.

The FAA also must continue to submit annual budget requests for its Operations account that account for the increased cost to hire and train at least 2,000 new air traffic controllers annually, in order to rebuild controller staffing levels and meet current and projected traffic demands.

NATCA supports the Department of Transportation's (DOT) Fiscal Year (FY) 2025 Operations budget request, which included an increase to \$13.6 billion from the 2024 Continuing Resolution level of \$12.72 billion, in recognition that the FAA will experience several uncontrollable cost increases in addition to maximum controller hiring. In July 2024, the Senate Appropriations Committee approved this budget request in its FY 2025 THUD appropriations bill.

We were pleased the negotiators from the House and Senate agreed to an anomaly in the December-passed Continuing Resolution to ensure the FAA can maintain its hiring, training, and staffing plans until a full-year appropriations bill can be passed.

*Air Traffic Control Infrastructure*

*Question 2.* Smaller regional airports provide a vital link to the rest of the world for many rural communities, particularly for both residents and businesses in my state that rely on them to connect to the Twin Cities and beyond. At the Duluth International Airport, the current air traffic tower is 70 years old, making it one of the oldest towers in the country. It does not meet current Federal Aviation Administration line-of-sight requirements, and it needs significant repairs. I've been fighting to get them the funding to build a new one.

What do you see as the biggest obstacles for building out infrastructure to support air traffic controllers?

Answer. The FAA operates more than 300 ATC facilities of varying ages and conditions. NATCA has been and continues to advocate for additional funding to repair and replace the FAA's physical infrastructure. Although the FAA has begun the process of addressing its rapidly aging infrastructure through a combination of realignments, sustaining and maintaining some facilities, and replacing a handful of others, that process has been slow and hampered by funding disruptions and limitations. The landmark, bipartisan Infrastructure Investment and Jobs Act (IIJA) was a huge step in the right direction in addressing these issues, but it will not be enough on its own.

Some of the biggest hurdles, beyond funding limitations, include significantly-high vendor costs, flawed FAA/vendor contracts, and vendor inability to provide product that meets FAA's needs and standards.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JERRY MORAN TO  
DAVE SPERO

### 1. Pace of Modernization

The GAO report has highlighted that many of the safety critical systems currently operating are well past their planned service life. It is, though, clear to me the endurance of these systems is a testament to the quality of the Kansas workforce that has been manufacturing these systems for decades.

Congress has allocated \$5 billion over 5 years for airspace system infrastructure modernization, though the pace of deploying new technologies, also produced in Kansas, could take years.

- As an expert in the operations and maintenance of these systems, is this a sustainable path forward?

Answer. The largest PASS bargaining unit at the FAA is the Air Traffic Organization (ATO) Technical Operations unit, consisting of technical employees who install, maintain, repair and certify the radar, navigation, communication and power equipment that comprises the U.S. National Airspace System (NAS).

Within Technical Operations, PASS represents FAA airway transportation systems specialists, more commonly referred to as technicians. Technicians ensure the functionality of communications, computers, navigational aids and power systems vital to safe air travel and the mission of pilots and air traffic controllers. Technicians maintain aging systems while simultaneously interfacing with highly technical, state of the art cloud-based solutions, and this is often overlooked.

As emphasized in PASS's testimony, PASS-represented technicians in the field have many concerns regarding issues with aging equipment and the pace at which the equipment is being upgraded. Of utmost importance, the correct number of technicians must be in place to maintain the current equipment and assist in the implementation of new equipment and technology. The amount of time it takes to upgrade one system at hundreds of locations across the country can be considerable. Without the right number of technicians in place to install the new systems and equipment while also maintaining operations around the country, the time to upgrade the system can take even longer.

While PASS appreciates the funding allocated by Congress for airspace system infrastructure modernization, it is also essential to recruit and retain the right number of employees to ensure a successful modernization. For the FAA to do that, it needs to develop, in collaboration with PASS, a workforce staffing model and implement it as soon as possible. Once the staffing is appropriate a paradigm shift to have our workforce install equipment across the NAS quicker and more efficiently so it is not obsolete before it is completely installed would accelerate aviation modernization.

### 2. NOTAM Improvement Act

Following the January 2023 Notice to Air Missions (NOTAM) outage, I was pleased to introduce with my colleagues, Sens. Klobuchar and Capito, a bill to require FAA establish a task force to strengthen the resiliency and cybersecurity of the NOTAM system. The bill was signed into law in 2023, and the task force's report is expected early next year.

- Are there particular themes you expect to find in the report?
- How do you anticipate the findings and recommendations from this report to complement GAO's findings to help bolster the safety of the NAS ecosystem?

Answer. PASS expects the report to include themes that address but are not limited to the following issues: ensuring NOTAMs are accurate, timely, relevant, and contain pertinent information; best practices to improve the accuracy and under-

standability of NOTAMs; how to educate and work with air carriers, other airspace users and aviation service providers; NOTAM cybersecurity, stability, and resiliency; and training.

It is also likely that the report will determine if its recommendations satisfy the National Transportation Safety Board's safety recommendation A-18-024, which asks the FAA to "establish a group of human factors experts to review existing methods for presenting flight operations information to pilots . . . to optimize pilot review."<sup>1</sup> By emphasizing human factors design, information prioritization, stakeholder collaboration, and modernization of the NOTAM system, these actions align with the NTSB's goal to enhance how pilots receive and retain flight operations information, particularly in critical situations such as what happened in the Air Canada 759 incident it references in the recommendation.

### 3. Limiting Factors

Page 7 of the GAO report highlights that a lack of spare parts for certain systems is point of concern to maintaining these systems.

- What are some of the limiting factors for part production?

Answer. In February, PASS was granted the opportunity to provide the Government Accountability Office (GAO) with information regarding 135 FAA programs and services. In order to provide the GAO with the most accurate and current information, PASS shared the list of programs and services with Technical Operations employees throughout the country and asked them to complete a survey. In addition to providing information on systems not on the GAO's list, the results of the survey indicate top concerns are related to aging equipment, cumbersome procedures, parts that are unreliable or unavailable, system complexity, and staffing and training of the workforce. At the rapid pace with which technology changes, the FAA is getting further behind in replacing aging systems.

For instance, a PASS member who was surveyed cited key concerns with the High Intensity Approach Lighting System with Sequenced Flashing Lights (ALSF-2). The ALSF-2 is an approach lighting system (ALS), which provides the basic means to transition from instrument flight to visual flight for landing. This provides visual information on runway alignment, height perception, roll guidance and horizontal references for Category II/III instrument approaches.

ALSF is critical for an airport in low visibility weather situations. If it is not working, the airport is downgraded, which means some aircraft cannot land. An ALSF system failure would constitute significant delays to an airport and the NAS overall in instrument flight rules (IFR) conditions. However, due to the age of this system, light rebuild kits for ALSF are not reliable. Lighted navigational aids require regular parts replacement and fail often. If an outdated replacement part is either unreliable or unavailable, the impact on the system could be far-reaching.

While PASS is not involved with the production of parts, the union concurs that the lack of spare parts is concerning. PASS stands ready to assist with a further review of issues related to the availability of parts.

### 4. Workforce

The GAO report highlighted challenges not new to the FAA: workforce—and difficulties recruiting technicians with the skills required to maintain some of these older systems.

In your testimony, you indicated it can take up to three years to fully train a technician to perform necessary duties related to a position. As noted in the report, the systems your workforce is responsible for maintaining are outdated and technologies no longer commonly taught at technical schools.

- To what degree does this situation exacerbate the training challenge?

As indicated in PASS's testimony, hiring and training new technicians is not a quick or easy process. FAA technicians must be skilled and proficient on multiple systems. It can take up to three years to fully train an FAA technician to perform all necessary duties related to the position. Furthermore, the FAA is still playing catch up after its training academy in Oklahoma City was shuttered during the COVID-19 pandemic.

Exacerbating the issue is the fact that the FAA training for many aging systems and equipment is not offered very often. This is another reason the current workforce is essential. The knowledge and skills these employees have are vital to the continued operation of the system. We must utilize the technicians' knowledge work-

<sup>1</sup>National Transportation Safety Board, "Taxiway Overflight Air Canada Flight 759 Airbus A20-211, C-FKCK, San Francisco, California, July 7, 2017." Report Number AIR-18-01. Adopted on September 25, 2018. Published on October 11, 2018. <https://www.ntsb.gov/safety/safety-recs/reletters/A-18-023-029.pdf>

ing these programs to provide on the job training to a new generation of technicians before they retire. We cannot let this knowledge walk out the door when they retire. FAA employees must be trained to maintain and certify all systems and equipment in the aviation system—both current and those newly introduced.

- Are there ways industry and Congress can work together to provide technical programs to better equip current and future technicians for their jobs, with the systems-wide modernization and replacement in mind?

Answer. The FAA must address aging systems and equipment throughout the National Airspace System (NAS) based on careful analysis combined with efficient and effective action. Given the pace of technology, many systems and equipment are on the path to becoming outdated every day. The technician workforce can be instrumental in assisting the agency in ensuring successful implementation and updates throughout the NAS.

PASS believes there are many ways industry and Congress can collaborate to better equip current and future technicians. Congressional inquiry and legislation is essential to securing both attention and funding for many aspects of the aviation system. But without the FAA's commitment to action, little can be accomplished.

For example, PASS thanks lawmakers for including language in the 2024 FAA reauthorization bill directing the agency to install 15 taxpayer-purchased instrument landing systems (ILS) that are in storage in Independence, Missouri. The technicians PASS represents are ready and capable of completing this task when fully staffed. This pilot program can be an example of how we can save time and taxpayer dollars by utilizing the Federal workforce. This is a prime example of the FAA taking steps toward identifying a solution but then failing to complete the work to implement it. While the language in the reauthorization law directs the FAA to install the ILS within 18 months of the law's passage (May 2024), PASS's attempts to coordinate with the agency to begin the project have gone unreturned. As far as PASS knows, the equipment—paid for by the taxpayer—is still not in service.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. DAN SULLIVAN TO  
DAVE SPERO

With the persistent challenges faced by Congress and the FAA to budget for air traffic control modernization, there have periodically been suggestions to spin off the air traffic control systems into a private or quasi-private entity.

I have deep reservations about any proposal to transfer the FAA's air traffic facilities to a quasi-private corporation and allow it, rather than Congress, to make decisions on where funding should be spent and how much tax general aviators should pay. This threatens to leave rural communities largely ignored.

The 582 airports out of 600 in Alaska that do not have air traffic control would receive little if any funding for upgrades and new technology, and it is unclear what would happen to the 400 navigation aids that Alaskans depend on. The largest hubs would receive the lion's share of the funding leaving states like Alaska with no recourse.

*Question 1.* Do you agree that Congress is in the best position to allocate resources between the few dozen airports serving larger cities and the thousands of general aviation airports and facilities serving rural America?

Answer. PASS has been opposed to any attempt to privatize the aviation system. We have consistently maintained that the U.S. government is the only entity that should be responsible for the safe and efficient operation of this country's aviation system. This country's aviation system is clearly valuable both in terms of economic impact and services provided. It is obvious that such an asset should be properly funded and overseen. Privatizing the air traffic control system would do neither.

In fact, congressional oversight would be severely curtailed and that congressional oversight ensures that the flying public has a voice when it comes to aviation-related issues. This is even more essential in Alaska and other rural or smaller environments. Many smaller airports across the country are dependent on congressional involvement and support in order to continue to operate. Under a private model, local cities and towns could be increasingly saddled with the costs of keeping their airports open and maintained properly.

PASS agrees that Congress should continue to allocate aviation resources throughout the country.

Similarly, I have concerns over a non-public entity making decisions regarding the allocation of airspace. In Anchorage for example, airspace is shared among Ted Stevens International, Merrill Field, one of the largest general aviation airports in the

country, Lake Hood, the world's largest floatplane airport, and major military airfields which conduct air training activities.

With more licensed pilots per capita than any state in the union we have (9,428 active pilots), we have an extremely active General Aviation community in Alaska. Allocating air space among these diverse users should be determined by a government entity, not a private organization.

*Question 2.* Do you agree that airspace should be available to all users, including those serving small towns and villages as well as individuals as it is currently?

Answer. PASS firmly believes that airspace should be available to all licensed and certified users throughout the system. Our air traffic control system is a national public asset and PASS strongly believes it should remain in the public trust.

Allowing any entity other than the U.S. government to allocate airspace would place such decisions in the hands of a private entity not focused on what is best for the country overall. Furthermore, Americans in rural areas rely on their local, smaller airports for employment, commerce and transportation. Many of these smaller airports will not have a congressional advocate under a private model and it is possible that a nongovernmental entity would do away with Essential Air Service program. It is feasible that a corporation would not focus on maintaining these facilities if they are not profitable, essentially shrinking this country's airspace.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARIA CANTWELL TO  
DAVE SPERO

Safety Risk Analysis of FAA's Technician Workforce: In addition to aviation safety inspectors, Professional Aviation Safety Specialists (PASS) represents FAA employees who play an integral role in operating, maintaining, and certifying air traffic control systems. This includes FAA's technical operations workforce made up of airway transportation systems specialists, commonly referred to as technicians. However, as air traffic systems age, so does the workforce that has the knowledge and expertise to operate and maintain these systems.

*Question 1.* Has FAA's Air Traffic Organization (ATO) conducted a safety risk management (SRM) analysis with respect to the technician workforce to evaluate staffing challenges associated with operating aging systems?

Answer. The Professional Aviation Safety Specialists, AFL-CIO (PASS) appreciates the opportunity to address these questions and concerns. As indicated in the question submitted by Hon. Maria Cantwell, the FAA's Technical Operations workforce is responsible for maintaining and certifying this country's aviation system and, as the system ages, so too does the workforce.

While the FAA has a process in place for conducting safety risk management (SRM) analyses, the primary objective of SRM is to provide information regarding hazards, safety risk and safety risk mitigations to agency decision-makers. The target of such analyses is usually safety risks outside of the makeup of the workforce. This means that while the SRM is able to identify certain risks and hazards, PASS is not aware of the agency using this method to examine its staffing challenges. The FAA should apply SRM to workforce and staffing issues.

*Question 2.* Has ATO done such an analysis to determine the number of technicians it needs per FAA facility to ensure the safe and reliable operation of ATC systems in the National Airspace System? If so, what has been the level of coordination between ATO and PASS in assessing and developing solutions to this staffing issue?

Answer. PASS has long called attention to not only the need for sufficient technical staffing but also the lack of a reliable staffing model on which to base staffing decisions and placement. As stated in PASS's written testimony, the FAA has been developing the Technical Operations staffing model (TSM) for over a decade and the agency is aware that the workforce is short at least 800 technicians.

PASS has concerns that the FAA's current strategy is not taking into consideration all the necessary data to determine the optimum number of technicians. PASS has provided input and assisted the FAA on attempts to establish an adequate workforce plan, but the union feels as if the agency is not fully cooperating with PASS to develop such a plan. As always, the union stands ready to assist the FAA with a staffing plan that will take into consideration all the elements of the position, including the responsibility of ensuring the safe and efficient operation of aging and new systems and equipment.

Air Traffic Specialist and Technician Workforce Shortages: Due to severe FAA technician staffing shortages in some areas of the air traffic control system, the responsibility of keeping some systems running falls on one FAA employee. At the San Antonio System Support Center,

for instance, at the hearing date there was just one full-time certified technician responsible for servicing three long-range radar sites within hundreds of miles from San Antonio. He has since been promoted and there is not a certified technician in this area to maintain the three long-range radars. And overall, the FAA is short at least 800 technicians throughout the National Airspace System.

*Question 3.* While we are grateful to dedicated FAA employees who make it possible to maintain aging systems that still perform key safety functions, do you believe these technician workforce shortages insert operational safety risks into the National Airspace System? Would you agree short-staffed FAA facilities expose single points of failure in how FAA operates air traffic systems?

Answer. PASS is extremely concerned that the technician staffing shortages introduce additional risk into the National Airspace System (NAS). Insufficient technician staffing can result in increased restoration times and more air traffic delays during an outage. It can also make it difficult to ensure adequate shift coverage by technicians, another scenario that increases the risk of major air traffic issues.

For example, as PASS discussed in testimony presented in July to the House Transportation and Infrastructure Committee Aviation Subcommittee, an incident over the summer with a radar system caused a ground stop when no technician was on site with the requisite skills to fix the issue. Just a few weeks later at the same airport, a power supply failure led to another ground stop. The failure was resolved quickly yet required an off-duty technician to intervene to restore it to service. Again, there was no technician with that skillset on duty. Even brief ground stops have a ripple effect across the NAS. These two problems would have been resolved immediately if the agency had the right number of people with the right training in place.

While the FAA acknowledges that it is short at least 800 technicians, PASS and the employees we represent have serious concerns that this number is far higher. The FAA is not taking into consideration many factors that go into a fully trained and capable technician who is able to perform all duties required of the position. PASS again emphasizes that we are prepared to assist the agency in determining the right path forward to ensure adequate staffing at facilities throughout the country.

*Question 4.* What is PASS doing in its own capacity to recruit more FAA technicians, share knowledge about aging systems, and ensure they receive proper training to enable them to respond in the event of a system issue or outage?

Answer. FAA technicians must be skilled and proficient on multiple systems. It can take up to three years to fully train an FAA technician to perform all necessary duties related to the position. Unfortunately, the FAA is still playing catch up after its training academy in Oklahoma City was shuttered during the COVID-19 pandemic. In addition, the FAA does not hire new technicians before experienced technicians retire. That training and expertise walks out the door without mentoring the next generation of employees. We encourage proactive staffing so this expertise is taught to the next generation of technicians.

PASS consistently expresses concern with the training of the technician workforce and the ability of the FAA to keep current with hiring and training new technicians. It is a long process because these employees are tasked with such an important responsibility. However, in order for the agency to function safely and efficiently, it is a process that must be made a priority.

Furthermore, the membership of PASS is a diverse group of men and women from across the country. PASS is focused on increasing efforts to recruit new employees and retain the current workforce. Our members serve on committees, organizations and boards tasked with building interest and involvement in aviation. PASS members also participate in tradeshow and events at schools specifically aimed at attracting youth to a career in aviation. In addition, PASS worked closely with the FAA to develop the Gateways Internship<sup>1</sup> program to hire college and even high school students as trainee technicians to receive practical, on-the-job experience while still in school. But comprehensive training for all technicians must remain paramount.



<sup>1</sup>Federal Aviation Administration, *Gateways Program*, <https://www.faa.gov/jobs/students/gateways>, (accessed January 17, 2025).