

S. HRG. 118–653

ADDRESSING CLOSE CALLS TO IMPROVE AVIATION SAFETY

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

FIRST SESSION

NOVEMBER 9, 2023

Printed for the use of the Committee on Commerce, Science, and Transportation



Available online: <http://www.govinfo.gov>

U.S. GOVERNMENT PUBLISHING OFFICE

WASHINGTON : 2025

60–398 PDF

SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED EIGHTEENTH CONGRESS

FIRST SESSION

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THURSDAY, NOVEMBER 9, 2023

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 9:58 a.m., in room SR-253, Russell Senate Office Building, Hon. Tammy Duckworth, Chairman of the Subcommittee, presiding.

Present: Senators Duckworth [presiding], Cantwell, Klobuchar, Markey, Tester, Sinema, Rosen, Hickenlooper, Moran, Cruz, Thune, Wicker, Sullivan, and Young.

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

Senator DUCKWORTH. We are a couple of minutes early, but we will go ahead and get started. The Senate Subcommittee on Aviation Safety, Operations, and Innovation will come to order.

I want to welcome everyone to our hearing today, addressing close calls to improve aviation safety. This may be the most important hearing we have all year, and I want to thank Chair Cantwell, Ranking Member Cruz, and Ranking Member Moran for their help in making this hearing happen. The near misses we have been seeing recently are not normal.

They are a warning that our aviation system is under stress. And today we will have an opportunity to hear from several key stakeholders about why we are experiencing so many near misses and what we need to do to increase our safety margins.

We will hear from National Transportation Safety Chairwoman Jennifer Homendy, FAA Air Traffic Organization Chief Operating Officer Tim Arel, National Air Traffic Controller Association President Rich Santa, Airline Pilots Association President Jason—and Captain Jason Ambrosi, and former FAA Administrator Randy Babbitt.

While disagreements tend to garner more coverage than compromise, it is worth noting that I remain proud of the bipartisan FAA Reauthorization Act that we introduced together, and I remain committed to finding a path forward to passage. Since in my non-biased, purely objective opinion, the Cantwell, Cruz, Duckworth, Moran Senate bill is far superior to the House alternative.

Of course, safety must always come first and that is why I say this may be the most important aviation hearing we hold this year. Our nation is experiencing an aviation safety crisis. Near-misses are happening way too frequently, and I refuse to be complacent in waiting to act until the next runway incursion becomes a fatal collision.

A wave of retirements and buyouts drain valuable experience from the United States aviation system, and coupled with a surge in demand, created essentially a perfect storm that has eroded the system safety margins down to dangerously thin levels.

In far too many near misses, the difference between a close call and a deadly disaster has depended on a single individual taking emergency action, along with some good luck. According to *The New York Times*, in a recent 12 month period, there were 300 accounts of near collisions involving commercial carriers.

That is almost one near miss per day so far. And I think we have got some images behind us here. The darker image behind me is a still picture from a video recorded by an individual riding in the jump seat of a JetBlue Flight 206 while landing at Boston Logan Airport.

It shows a Hop-a-Jet charter flight crossing the runway they are about to land on and reveals how JetBlue 206 came within 400 feet of the charter flight crossing from left to right in front of them while taking off from an intersecting runway, despite that Hop-a-Jet charter flight received explicit instructions to line up and wait.

Fortunately, Logan Airport had installed a service detection equipment that notify air traffic control when the charter flight began its unauthorized takeoff roll, and this layer of safety was critical in empowering the controller to provide JetBlue 206 with the go around instructions that averted disaster.

Unfortunately, that very same month at Austin-Bergstrom International Airport, we witnessed how the lack of critical service detection equipment drastically increases the risk of a catastrophe. In that incident, a controller working on an overtime shift cleared FedEx 767 to land on a runway that Southwest—that a Southwest's 737 had been cleared to take off from.

It was foggy in the early hours and the controller could neither see the runway with their own eyes nor use ground radar to track the location of the 737, which was still on the runway as the large 767 descended through the clouds.

Words failed to adequately describe how close 131 souls came to dying that day. The following animation demonstrates what it looks like when a 767 comes within 100 feet of a landing 737. Here it comes. [video shown]

These two aircraft came within 100 feet of another. And ATC did not see how close those came and it was the pilot who called for the go around and—initiated his own go around and told the other aircraft that he—notified the other aircraft that he—that they almost came in contact with one another, and the air traffic controller never saw it.

But the air traffic controller also was on an overtime shift. Unfortunately, the near misses keep happening. Last month, an Alaska Airlines flight executive—an Alaska Airlines flight executing a

go round in Portland, Oregon, veered into the flight path of a SkyWest flight taking off from a parallel runway.

The FAA, Congress, and the aviation industry must treat these near misses as a precursor—as precursor events that left unchecked will eventually result in a deadly catastrophe. We have many layers of safety in our aviation system. The first layer is the pilot, controller read-back.

The second layer is all the airport designs and markings. Next is the runway safety lights that turn red when the runway is active, alerting a crossing pilot to not cross. In ideal situations, the fourth layer is a ground radar tool. And of course, the last line of defense lies with the flight crew, especially the captain and first officer.

Despite multiple layers of safety, far too many near misses have come down to the last line of defense. And bottom line, a system that repeatedly forces pilots into taking emergency evasive actions to save lives is either a broken system or one that is overwhelmed by new risks.

Such new risk could be the result of aggregate loss of experience and has forced the industry to confront a workforce that overall is less experienced, from pilots, to controllers, to technicians, and other personnel.

It appears that we have been fortunate to have experienced pilot—to have experienced pilots in many of these instances who prevented a close call from becoming a disaster. But continuing to count on such good fortune is neither sustainable nor responsible.

I hope we will hear more about this from our witnesses, but one thing we already know, now is not the time to weaken or water down the post Colgan era of safety—post Colgan era safety system. Now is the time to strengthen it.

This includes prioritizing one of the most vital pillars of our aviation safety system, air traffic control. Look, every air traffic controller has the privilege and pressure of working in a road that is inherently stressful, even on a good day.

But that reality is no excuse for our current status quo, which forces controllers to regularly work 60 hour weeks because an estimated 99 percent of airports are understaffed, in addition to many airports lacking important runway safety technology. As both a pilot and a passenger, I refuse to accept a status quo that places the lives of our constituents in the hands of civil servants who are overworked and utterly exhausted.

More than a decade ago, the FAA established new pilot rest and crew rest rules—established a new pilot rest and crew rest rule. This action aligned with a growing body of knowledge demonstrating that optimizing human performance requires optimizing rest and recovery.

And when it comes to optimizing performance, the stakes could not be higher for ATC. FAA prioritizes the problem of fatigue controllers, and Congress must invest in these critical American workers to ensure that ATC staffing levels are sufficient to end once and for all the era of forcing controllers to regularly work 60 hours per week and often without the benefit of vital safety technology and tools.

I look forward to hearing from our witnesses today about how we can work together to enhance safety and get our margins back to where they need to be. I now recognize Ranking Member Moran for his opening statement.

**STATEMENT OF HON. JERRY MORAN,
U.S. SENATOR FROM KANSAS**

Senator MORAN. Chair Duckworth, thank you very much. Thank you for convening this hearing. Thank you for your cooperation in working with me and others to see that this subcommittee and this full committee accomplishes its task in regard to aviation.

The FAA manages one of the world's most complex aviation systems, in fact the most complex aviation system, and oversees more than 45,000 flights a day and almost 3 million airline passengers.

Safety is so important, but it is an evolving process, and we must continually reevaluate our system to make sure we have the most safe possible in play. We must determine how to prevent serious incidents like runway incursions and near misses, so I am pleased to join you in having this hearing.

We also need to ensure that these incidents are not indicative of a larger underlying issue. We know that demand for commercial aviation is expected to grow, and we have new entrants into our airspace.

FAA is directly involved, impacts a 1.5 million jobs and \$1.5 trillion in GDP in the world's economy. Our job is to determine the pressure points on our system now so that we can be ready to meet the demands not only today, but in the future.

Dangerous incidents also further highlight the need for Congress to pass FAA reauthorization. I was pleased and certainly agree with you that we have a bill that is worthy of action by the full committee and consideration by the U.S. Senate. So, I am anxiously awaiting that to occur and look forward to working to see that it does.

Earlier, we were successful in confirming a new FAA Administrator, one—in my view, one of the most important tasks that we could do, and certainly one of the basic roles of the U.S. Senate.

And so, I am pleased the Administration nominated and the U.S. Senate confirmed a new FAA Administrator that we look forward to working with and have faith that he will perform his task well.

I do hope that we get out of the series of reauthorizations that we have had in years past, and I look forward to a long-term reauthorization of the FAA. The FAA, in my view, is at a critical juncture.

Perhaps that can be said at many times in our country's history. But we face many challenges, and the FAA is front and center. We ought to do everything in our power to ensure the United States remains a leader in aerospace and innovation, and everything that we do, we do it safely. Thank you, Chairman.

Senator DUCKWORTH. Thank you, Senator Moran. I will now turn it over to main Committee Chairwoman Cantwell for her opening remarks.

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

The CHAIR. Thank you, Chair Duckworth, and thank you to Senator Moran for this important hearing. I can't think of two people better prepared to lead the safety charge and aviation charge on our committee than the two of you. So, thank you for doing this hearing.

And I so agree with both of your comments. I think you outlined exactly why we are here this morning, that it is a constant task to be on top of innovation and safety and competitiveness.

And I want to thank the witnesses for being here, too, because I think that they are very illuminating of the challenges we faced in the past, and how we met them, and what we need to do today. So, I thank all of them for that. The Aircraft Certification, Safety and Accountability Act outlines some new ways in which we can improve safety.

One of those was to basically say that we should have a trend report every year to better listen to some of the safety trends. This hearing this morning is really a reflection of that. It is about what trend we are seeing now and why we want to do more to fix it. So, I want to applaud the NTSB for their leadership on this particular issue of near misses.

I think that they have sounded the alarm, and I think you are sounding it again today. And it is one of the reasons why, as Senator Moran said, we need to get an FAA authorization bill because it has some tools in that bill that will help us meet this challenge.

First and foremost, NTSB Director Homendy basically is saying in her testimony, "for controllers, we have cited staffing shortages which lead to scheduling issues, fatigue, lack of or deficient supervisory oversight, distraction, ineffective scanning, and the need for value added training."

That is a—a summation of her—that is right. That is why we need the additional FAA air traffic controllers that are in the FAA bill of over 3,000 people to help us meet this balance. We cannot have people working 6 days a week.

We need people who have the ample amount of rest and capability to deal with, as my colleague, Senator Duckworth, said, probably one of the most stressful and challenging jobs there is.

Second, I think Ms. Homendy also outlines correctly the important attributes of the air surface detection equipment program, ASDE-X, which is a ground radar and electronic technology that allows controllers to track surface movement of aircraft and vehicles. And in the airports where we have this technology, guess what?

Things have worked well. The areas where we haven't, this is why we need this legislation, because we are authorizing \$18.2 billion to make sure that all of our large and midsize airports have this technology and have this technology deployed. So, I am sure we are going to hear other comments this morning and other answers, but two of them lie right in front of us.

And I am with Senator Moran, we should get this job done and continue to move forward. I am a believer, as he is, that aviation is going to continue to grow, and we want it to, and that the international competition is also going to be there. So, we have to lead, get it right, and demonstrate that we have the capacity to grow in

the future and to get it to be the safest system in the world. So, with that, thank you, Madam Chair, again for this important hearing.

Senator DUCKWORTH. Thank you. Senator Cruz is not currently here. He is the Ranking Member of the main committee.

We will reserve time for him to give his opening remarks when he does attend. In the meantime, we will go ahead with witness testimonies.

I would like to go ahead and recognize Ms. Jennifer Homendy, Chairwoman of the National Transportation Safety Board, for your comments. Thank you.

**STATEMENT OF JENNIFER L. HOMENDY, CHAIR, NATIONAL
TRANSPORTATION SAFETY BOARD**

Ms. HOMENDY. Thank you—thank you so much, Chair Duckworth. And thank you, Senator Moran and Senator Cantwell, for leading on this issue and for having me here today. I want to start by emphasizing our incredible safety record.

We have the safest airspace in the world, period. The critical efforts of everyone in this room have contributed to our reputation as the world's gold standard for aviation safety. We have a lot to be proud of, but we can make aviation safer. As you can see from this chart, there were 23 serious runway incursions in Fiscal Year 2023, up from 16 in Fiscal Year 2022, and 11 a decade ago.

Runway incursions are also happening at a faster rate over the last decade. That is all runway incursions and the most serious. While these events are incredibly rare, our safety system is showing clear signs of strain that we cannot ignore. The NTSB has opened investigations into seven runway incursions this year alone.

In over half, the aircraft got within several hundred feet of each other. We also opened an investigation into a runway collision between two business jets that occurred two weeks ago in Houston. Combined, these events put more than 1,300 lives at risk. That is on top of three wrong surface landings that we investigated.

Thankfully, no one was hurt or seriously injured in any of these incidents, but they could have been. It only takes one. It only takes one missed warning to become a tragedy. One incorrect response to destroy public confidence in a system that has been built over decades.

These incidents must serve as a wakeup call before something more catastrophic occurs. This isn't the first time we have seen this. We issued this same warning in 2007 and we issued the same warning after the 2017 incident at SFO, where an A320 came close to colliding with an A340 and three other airliners on a taxiway.

The incident aircraft flew over the A340 at an altitude of 60 feet before it began climbing, which resulted in only 10 to 20 feet of vertical separation. All told, more than 1,000 people on the taxiway that day were at imminent risk of serious injury or death. I know you are going to want to talk about our open investigations and get details on those.

The NTSB is incredibly careful to gather all the facts and evidence around an incident before drawing conclusions or making safety recommendations. While I cannot discuss the details of our

open investigations, I can share a few things—a few of what we are seeing.

In the wake of the pandemic, we are experiencing a massive resurgence of air traffic, but we are also seeing significant ATC shortages, resulting in mandatory overtime, fatigue, distraction, and less opportunity for meaningful value added training.

On the flight deck, fatigue and distraction are leading to deviations from Federal aviation regulations. Across the entire industry, we have a newer workforce who need training and mentorship, and we are seeing people that are struggling with significant mental health challenges. All of this is compounded by a lack of technology to ensure redundancy and protect against human error. Redundancy is the foundation of our stellar aviation safety record.

It has served as the models for preventing accidents and crashes in all other modes of transportation. All that is to say, the current strain on our aviation system and its workforce cannot be underestimated. Before I close, I want to thank all of you for being staunch supporters of the NTSB, but now I need your help.

The NTSB needs the resources to carry out our vital safety mission. We received a \$145 million in the President's Fiscal Year 2024 budget, which is included in the House mark. The Senate has at \$134.3 million.

We need the Senate to match that number of \$145. Our agency's staffing and funding levels have remained somewhat stagnant since 1997. The small increases have gotten two well deserved pay increases for our staff.

But since I have become Chair, we have accomplished a lot. We have eliminated our backlog entirely. We have boosted staffing and we have made significant investments in IT. Thank you for your continued support, and I am happy to answer your questions.

[The prepared statement of Ms. Homendy follows:]

PREPARED STATEMENT OF JENNIFER L. HOMENDY, CHAIR,
NATIONAL TRANSPORTATION SAFETY BOARD

Good morning, Chair Duckworth, Ranking Member Moran, and members of the Subcommittee. Thank you for inviting the National Transportation Safety Board (NTSB) to testify before you today regarding the need to address close calls to improve aviation safety.

As you know, the NTSB is an independent Federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and the U.S. Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not have authority to promulgate operating standards, nor do we certificate organizations, individuals, or equipment. Instead, we advance safety through our investigations and recommendations, which are issued to any entity that can improve safety. Our goal is to identify issues and advocate for safety improvements that, if implemented, would prevent injuries and save lives.

When it comes to aviation, over the last several decades, the critical efforts of operators, manufacturers, labor unions, private aircraft owners and pilots, the FAA, Congress, and the NTSB have led to significant advances in technology and important legislative and regulatory changes that have contributed to the current level of aviation safety. These efforts, many of which have been in response to the lessons

learned from NTSB investigations, should serve as an example for a collaborative approach to safety in other modes of transportation.

Let's be clear that aviation is still among the safest modes of transportation for the travelling public.

Since 2010, the U.S. aviation system has experienced a record level of safety, as the number of deaths associated with U.S. civil aviation accidents decreased from 541 in 2009 to, according to our preliminary numbers, 357 in 2022—a decrease of over one-third (see attachment). Approximately 95 percent of aviation fatalities in 2022 occurred in general aviation accidents, with almost all the remainder (19 total) in Title 14 *Code of Federal Regulations* Part 135 commuter and on-demand operations, which include charters, air taxis, air tours, and air medical services flights (when a patient or medical personnel are on board).

However, we cannot become complacent. As recent news on runway incursions, near misses, and other serious safety incidents have made increasingly clear, the current moment is both challenging and pivotal in the realm of aviation safety. The number of runway incursion incidents classified as the most serious by the FAA varies from year to year; the trend, however, is not going in the right direction. The concerning uptick in such incidents is a clear warning sign that the U.S. aviation system is sharply strained.

In the wake of the pandemic, we're experiencing a massive resurgence of air traffic. We're also seeing staffing shortages; fatigue; distraction; deviations from Federal Aviation Regulations; and a lack of meaningful, value added training as the FAA and industry rely more and more on computer-based training and the issuance of bulletins as substitutes for hands-on training. We're also seeing a lack of redundancy around technology to prevent runway incursions and wrong surface landings. Redundancy is the foundation of our stellar safety record, but the aviation workforce is without a technological safety net.

Meanwhile, our airspace—already the most complex in the world—is about to become even more congested as drones, advanced air mobility, and commercial space launches and reentries increase. New fuels are on the horizon, including zero-emission and hydrogen aircraft, as well, and more and more lithium-ion batteries are being transported on cargo planes.

We cannot ignore or avoid the warning signs of strain from all these recent events. We cannot rest on our laurels and assume our safety record will maintain itself. We cannot wait until a fatal accident forces action. We must act *before* there is a tragedy.

NTSB's Longstanding Concerns with Runway Incursions

Since 1973, the NTSB has issued numerous safety recommendations to prevent runway incursions and other airport surface incidents.

On May 6, 1986, the Board published a Special Investigation Report, titled "Runway Incursions at Controlled Airports in the United States" and issued 14 recommendations to the FAA.¹ We also re-classified one recommendation as "Open—Unacceptable Action" and reiterated four previous recommendations.

In 1990, the Board placed airport runway incursions on its first Most Wanted List of Transportation Safety Improvements (MWL); the issue remained on the MWL year after year, in some form, until as recently as 2013, and continues to be of great concern to NTSB.

In 2000, the Board sent a letter to the FAA with six additional safety recommendations to prevent runway incursions. One of the six recommendations urged FAA to require—at all airports with scheduled passenger service—a ground movement safety system that will prevent runway incursions; the system should provide a direct warning capability to flight crews. In addition, we recommended that the FAA demonstrate through computer simulations or other means that the system will, in fact, prevent incursions (A-00-66). That recommendation remains our oldest "open" recommendation to FAA related to runway incursions; meaning, the FAA has not taken acceptable action on it.

In September 2017, nearly three months after Air Canada Flight 759 lined up to land on an active taxiway at San Francisco International Airport and overflew four airplanes, the Board held a forum on runway incursion safety issues. And in May 2023, we held a roundtable on runway incursions and wrong surface landings. As a result of that roundtable, we plan to hold three additional public meetings focused on mental health care in aviation, technology, and workforce training and development.

In my testimony today, I want to detail some of the NTSB's current investigations into runway incursions, wrong surface landings, and related incidents, discuss avail-

¹ *SIR8601.pdf* ([ntsb.gov](https://www.ntsb.gov))

able technologies for reducing and avoiding these types of incidents, and address further work that needs to be done to implement even just a few of the NTSB's nearly 300 open aviation recommendations.² Specifically, I want to highlight the need for more technology for runway and cockpit alerting. I also want to revisit ongoing concerns related to the air traffic control (ATC) workforce and efforts to right-size that workforce, and issues related to other aviation industry workers.

Finally, I would be remiss if I did not take this opportunity to address the importance of right-sizing the NTSB itself and ensuring we can continue to successfully investigate these near-miss aviation incidents—and many other safety incidents—in our national transportation system to promote lessons learned and help keep our skies and the travelling public safe.

NTSB Incident Investigations

The NTSB's Office of Aviation Safety currently has six particularly relevant investigations open into runway incursion events that occurred this year.

- On January 13, 2023, an American Airlines 777 crossed an active runway at JFK without clearance, causing a Delta 737 to abort takeoff. The two aircraft came within 1,400 feet of each other, putting 308 lives at risk.
- On January 23, 2023, a United Airlines flight at Inouye International Airport in Hawaii crossed the same runway where a Kamaka Air flight was landing. The aircraft came within 1,173 feet of each other, putting 303 lives at risk.
- On February 4, 2023, a Southwest passenger jet and a FedEx cargo plane were less than 200 feet from colliding at Austin-Bergstrom International Airport in Texas, putting 131 people in danger.
- On February 16, 2023, in Sarasota, Florida, an Air Canada Rouge A-321 was cleared for takeoff from the same runway where an American Airlines B-737 was cleared to land. The two planes came within 3,168 feet of each other, putting 372 lives at risk.
- On February 22, 2023, in Burbank, California, a Mesa Airlines jet initiated a go-around while a SkyWest jet was still departing the runway. The two planes came within 300 feet of each other, putting 118 lives at risk.
- On August 11, 2023, a Cessna business jet and a Southwest Airlines flight came close to colliding at San Diego International Airport. The planes were about 100 feet from each other, putting at least 117 lives at risk.

We are also investigating a recent collision that occurred on October 24, 2023, in which a Hawker 850XP airplane collided with a Cessna 510 airplane at William P. Hobby International Airport in Houston, Texas. Preliminary information indicates that the tower controller had instructed the crew of the Hawker to line up and wait, but the Hawker started a takeoff roll and its wing collided with the tail of the Cessna, which had landed on an intersecting runway. Luckily, no injuries were reported to any of the four people on the Cessna or to the three people on the Hawker.

In addition to our open investigations, we recently published final investigation reports on a close call this year in Boston,³ as well as two wrong-surface landing events last year—one in Tulsa⁴ and one in Pittsburgh.⁵

In Boston, Massachusetts, on February 27, 2023, at Boston Logan International Airport, a JetBlue flight initiated a go-around after a Hop-a-Jet flight took off without clearance on an intersecting runway. The planes came within 400 feet of each other.

In Tulsa, Oklahoma, on June 8, 2022, FedEx flight 1170 landed on the wrong runway at Tulsa International Airport. The captain and first officer were not injured, and the aircraft was not damaged. The flight was cleared for a visual approach and landing on runway 18L; however, the airplane landed on runway 18R. The airplane was operated as a Part 121 cargo flight from Fort Worth Alliance Airport in Fort Worth, Texas.

In Pittsburgh, Pennsylvania, on June 21, 2022, United Airlines flight 2627 was cleared for a visual approach and landing on runway 28C at the Pittsburgh International Airport, but instead lined up with and landed on runway 28L. None of the

²A report of all currently open safety recommendations related to aviation is available via the CAROL query tool on our website.

³National Transportation Safety Board. *Aviation Investigation Final Report for DCA23LA192*. Washington, DC: NTSB 2023.

⁴National Transportation Safety Board. *Aviation Investigation Final Report for DCA22LA126*. Washington, DC: NTSB 2023.

⁵National Transportation Safety Board. *Aviation Investigation Final Report for DCA22LA133*. Washington, DC: NTSB 2023.

174 occupants aboard the airplane were injured and the aircraft was not damaged. The regularly scheduled passenger flight was operating under the provisions of Part 121 from the Chicago O'Hare International Airport. The airplane was equipped with a runway awareness and advisory system, or RAAS, but the operator did not select the option to provide crews with an aural alert for the runway that the airplane would be approaching in flight. If the operator had selected this option, the system would have alerted the incident flight crew that the airplane was aligned with a runway that was not consistent with the landing clearance provided by ATC.

Finally, it is also worth recalling one other incident. On July 7, 2017, Air Canada flight 759 was cleared to land on runway 28R at San Francisco International Airport, but instead lined up on a parallel taxiway where four air carrier airplanes were awaiting takeoff clearance.⁶ The flight 759 crew initiated a go-around and reached a minimum altitude of about 60 feet, overflying the second airplane on the taxiway before starting to climb.

Alarming as they are, events like these are incredibly rare. Of the nearly 55 million airport operations in FY 2023, there have been 23 category A and B runway incursions, which are the most serious, up from 16 category A and B runway incursions in FY 2022. And while the rate of all incursions (categories A through E) seems to have slightly improved from 32.98 per million airport operations in FY 2022 to 32.22 in FY 2023, some important nuance is lost by reading too much into this improvement. In fact, the rate of category A and B runway incursions has increased from 0.3050 per million airport operations in FY 2022 to 0.4220 per million airport operations in FY 2023.

While aviation is still incredibly safe, and commercial aviation is the safest mode of transportation by far, it only takes one missed warning or incorrect response to a warning to become a tragedy and destroy public confidence in our system.

At the NTSB, we are incredibly careful to gather all the facts and evidence of a given incident before drawing conclusions or making safety recommendations. I will not undermine the meticulous work of our skilled investigators by drawing premature conclusions about ongoing investigations. Much more will be known when these investigations are completed.

In the past, for flight crews, we've cited operational errors, deviations from Federal Aviation Regulations, expectation or continuation bias, communication problems, such as misunderstanding clearances or inadvertent entry of a runway because of disorientation from runway and taxiway markings on airport surfaces, inadequate infrastructure or signage, and lack of technologies that can provide redundancy.

For controllers, we've cited staffing shortages which lead to scheduling issues and fatigue, lack of or deficient supervisory oversight, distraction, ineffective scanning, lack of meaningful, value-added training, and lack of technologies that can provide redundancy. Many runway incursions we've investigated are a combination of flight crew and controller factors. Again, these encompass many of the issues we've seen in the past. For now, however, there are a number of points we can consider.

First, trends around these most serious surface incidents and other near misses are not moving in the right direction, and we must respond to these incidents seriously. Any one of these near misses could have been a devastating tragedy. Any one of them could have meant lives lost. The current uptick in these events, and the recent incident in Houston, especially, in which two business jets actually made contact at non-taxi speeds on intersecting runways, should be an unambiguous warning to us all. We must not only continue to draw attention to this issue, but we must make substantive changes at airports across the country so we can maintain the country's strong aviation safety record.

Second, in connection with the above investigations that have already been completed and with prior investigations, the NTSB has made several safety recommendations to the FAA intended to prevent near-miss events. Some of those recommendations have been outstanding for many years without action, and include recommendations on ATC technology, direct flight crew warnings and cockpit alerting, and 25-hour cockpit voice recorders (CVRs).

Finally, the NTSB has found in our investigations of accidents that an effective means for managing and mitigating risks in an aviation operation is the use of a safety management system, or SMS. SMS is a formal, top-down, business-like approach to managing safety risk.

⁶National Transportation Safety Board. Taxiway Overflight Air Canada Flight 759 Airbus A320-211, C-FKCK. Washington, DC: NTSB.

Air Traffic Control Technology

One set of outstanding NTSB safety recommendations involves airport surface surveillance technology, which is a powerful tool to boost situational awareness at airports. The NTSB has recommended increased installation and use of such technology to strengthen runway safety for decades, with our oldest open recommendation on the subject issued to the FAA 23 years ago (Safety Recommendation A-00-66). And yet, today, airport surface surveillance technology exists at just 43 airports across the country.

Airport Surface Detection Equipment—Model X, or ASDE-X, uses ground radar and other electronic technology to allow air traffic controllers to track surface movement of aircraft and vehicles. It was developed to help reduce critical runway incursions. ASDE-X alerts air traffic controllers of potential runway conflicts by providing detailed coverage of movement on runways and taxiways. According to the FAA, of the approximately 450 U.S. airports with scheduled passenger service, ASDE-X is available at only 35 major airports across the country.

Airport Surface Surveillance Capability, or ASSC, is another system the FAA has developed for runway surface surveillance. It uses Automatic Dependent Surveillance-Broadcast, or ADS-B, data from aircraft to help inform ATC towers of aircraft positions; however, according to the FAA, ASSC is operational at only eight airports across the country (a ninth will be implemented at Joint Base Andrews over the next few years).

Of the runway incursions I mentioned earlier, ASDE-X alerted ATC of an impending collision in three cases: JFK, Boston, and San Diego. ASDE-X also alerted ATC before the runway collision in Houston. All but two of the category A and B incursions from FY 2022 happened at airports that either did not have surface surveillance technology or where the systems were not operational at the time of the incident.

It's clear that more airports across the country installing more of this technology, which was specifically designed to help prevent runway incursions, would dramatically improve safety. Getting lifesaving technology at more of the Nation's airports is an essential goal, but it is one that will require significant investment from Congress.

Direct Flight Crew Warnings and Cockpit Alerting

As valuable as they are, ASDE-X and ASSC only warn the ATC tower of impending risks and do not provide the direct cockpit warning to pilots that we have long recommended. In 2000, we recommended that the FAA develop a runway safety system that provides a *direct flight crew warning* of runway collision risk, similar to what traffic collision avoidance systems (which can be integrated directly into the pilot's navigation display) provide to pilots to avoid a midair collision (Safety Recommendation A-00-66). The Houston air traffic controller, for example, tried to get the Hawker pilot to stop on the runway, but during interviews after the event, the Hawker pilot stated he did not hear the controller's call. It may be that a direct flight crew warning would have helped avoid this collision.

The FAA has developed runway status lights (RWSL) to provide a direct warning capability to flight crews, but for only one type of runway collision risk. For example, RWSL likely would not warn pilots of the risk of one airplane landing on a runway while another airplane was taking off. As a result, the NTSB does not believe that the FAA's actions to date represent a full response to our 23-year-old recommendation (mentioned earlier in this testimony).

We continue to urge the FAA to require a system that provides direct warning capability to flight crews at all airports with scheduled passenger service, and to collaborate with aircraft and avionics manufacturers and software developers to create the technology for a cockpit system that directly alerts pilots when an airplane is not aligned with the intended runway surface. Such a system would have prevented the 2017 Air Canada overflight at San Francisco International Airport.

Twenty-Five Hour CVR Recommendation

In conjunction with our investigations into runway incursions and many other safety incidents, the NTSB has long been concerned about current FAA requirements for CVRs. Current FAA regulations require 2-hour CVR recording capability and provide guidance to the flight crew on how to safeguard CVR data after an accident or incident. Despite this, valuable CVR data continues to be overwritten and therefore unavailable for safety investigations, as happened in the 2017 incident in San Francisco, the recent runway incursion incident involving two Part 121 operators at John F. Kennedy International Airport in New York, and at least 12 other investigations since 2018. Our ongoing experience with overwritten CVR recordings

demonstrates the limitations of the current 2-hour recording requirement, particularly in cases where relevant data were overwritten due to the following:

- a delay in reporting a safety event that was not immediately recognized to be of a serious nature until further data review
- a failure to immediately deactivate the CVR following arrival after a safety event
- the time remaining in the flight after a safety event, which exceeded the CVR's 2-hour recording duration

As a result of these concerns, in 2018, we issued recommendations to the FAA to address the need to install CVRs with a minimum 25-hour recording capability on all newly manufactured airplanes required to have a CVR, and to retrofit the CVRs on existing aircraft required to have flight recorders.⁷ Newly manufactured airliners flying in Europe are already using 25-hour CVRs, following International Civil Aviation Organization standards.

We are very pleased with the FAA's March announcement that it was initiating rulemaking to require all newly manufactured airplanes that must have a CVR be fitted with one with a 25-hour recording capacity. For existing in-service airliners, the FAA told us it was starting an Aviation Rulemaking Committee to discuss the NTSB's recommendations. We are concerned the proposed rulemaking does not address existing aircraft, and, 8 months after the FAA said it initiated rulemaking, a notice of proposed rulemaking has not been published.

Air Traffic Controller Workforce and Training

When air traffic controllers signed up to serve on the frontlines of aviation safety, they knew they were choosing one of the most safety-critical jobs in transportation. Air traffic controllers are currently operating at dangerously low staffing levels. They are working mandatory overtime week after week, year after year, leading to fatigue and burnout, family stress, and work stress. We are putting the psychological stress of the entire aviation safety system on the shoulders of our ATC workforce, and this is unacceptable.

When it comes to recent, high-profile aviation incidents, errors by ATC, flight crews, or ground personnel are sometimes cited as a contributing factor, but only 3 of the Nation's 313 air traffic facilities (4 percent) have enough controllers to meet targets set by the FAA and the National Air Traffic Controllers Association (NATCA). Both the pandemic and significant retirements have combined to make an already too-small workforce even smaller and less experienced.

The ATC staffing shortage has had a snowball effect in that we are seeing scheduling practices that have resulted in more fatigue, distraction, and lack of or deficient supervisory oversight.

The last time the NTSB issued recommendations on air traffic controller fatigue was in 2007 (Safety Recommendations A-07-30 and -31 to the FAA, and Safety Recommendation A-07-32 to NATCA), and what we said then is just as true today: controller fatigue decreases aviation safety. The more than 170 fatigue-related safety recommendations that the NTSB has issued as far back as 1989 have addressed topics such as the adequacy of rest periods, scheduling practices, fatigue awareness training, and hours-of-service regulations. Even earlier, the NTSB addressed controller fatigue in a 1981 special investigation report on the Nation's ATC system. Citing extended work schedules among controllers in the aftermath of the 1981 strike, the NTSB issued Safety Recommendation A-81-145, which recommended that the FAA establish and implement a program to detect the onset of, and to alleviate, controller fatigue and stress. This recommendation was superseded by two more specific recommendations from the Board's 1983 follow-up study of the ATC system. Safety Recommendation A-83-35 urged the FAA to disseminate guidelines for controller stress and fatigue detection and management, and Safety Recommendation A-83-36 asked the FAA to expedite the development and implementation of a controller performance assessment program that would include attention to stress and fatigue.

In developing fatigue risk management practices for air traffic controllers in response to our 2007 recommendations, the FAA encountered problems due to staffing shortages. In some cases, air traffic managers were unable to keep their facilities staffed during operating hours because staffing shortages made it difficult or impossible to assign controllers whose work schedules complied with the fatigue guidelines. These struggles have continued in the years since these recommendations,

⁷National Transportation Safety Board. *Extended Duration Cockpit Voice Recorders*. Rpt. No. ASR-18/04. Washington, DC: NTSB 2018.

and evidence from our investigations into runway incursions continues to highlight the impact fatigue can have on controller performance.

The good news is that we know what we need to do to change this dangerous status quo. We need adequate staffing, quality training (including tower simulator training), and significant investments in more of lifesaving technologies I have already discussed, and the funding to make all three of those possible. The FAA is making strides in hiring and training, but the possibility of a government shutdown or flat funding and sequester threatens to pause or undo significant progress.

To be clear, these kinds of problems are not just limited to our ATC workforce. They permeate the entirety of our aviation workforce. At the NTSB's recent event on runway incursions, workers throughout aviation—pilots, mechanics, air traffic controllers, ramp agents, and others—reported dire needs. In fact, pilot fatigue was cited as a contributing cause of the June 2022 FedEx wrong surface landing at Tulsa International Airport. It's important to mention that cargo carriers are currently exempt from Federal regulations governing flight and duty time (known as the cargo carveout), which the NTSB strongly opposes. Maintaining the safety of our aviation system means supporting every corner of the aviation workforce.

Safety Management Systems

SMS is a formal, top-down, business-like approach to managing safety risk. It gathers data from routine operations that indicate a risk, but did not result in an accident, injury, or major loss. By looking at these indicators of a safety risk, and developing mitigations *before* an accident happens, and ensuring that the mitigations have been effective, an SMS is an effective tool to increase safety. An SMS may have highlighted examples of the miscommunications that were involved in the many of the runway safety events we have investigated, or problems with warnings not heard by the flight crew in the Tulsa event. By looking into these occurrences and developing mitigations before lives are lost an SMS is an effective management tool to increase safety.

The NTSB's Role in Maintaining Safety

I would be remiss if I did not take this opportunity to mention the needs of the NTSB itself. All the investigations I have discussed today—all the careful analysis and safety recommendations, and the material benefits they bring to the flying public—would not be possible without the NTSB's meticulous and expert investigators.

The purpose of our aviation investigations is to find safety issues and identify trends that must be addressed to improve aviation safety, as well as to provide information to the flying community and the public about lessons learned.

Our current authorization expired at the end of FY 2022, and earlier this year, we transmitted a reauthorization proposal to Congress, requesting resources and hiring flexibility to increase the number of investigators throughout the agency.⁸ I am happy to report that, over the last 2 years, we have already made great progress toward our goals to ensure that our employees have the right skill set, staffing up to our highest level since 2017 to 444 people on November 6, 2023. In FY 2023, we hired 71 people, the highest number in 10 years. Our reauthorization proposal anticipates adding roughly 15 new employees per year through 2027, in addition to filling the vacancies that will occur through retirements and separations.

Since February of 2022, we have significantly reduced the backlog of investigations open for more than 2 years from 442 to zero as of September 27, 2023, by filling open investigative and technical review positions, reassigning investigations that could be expedited, using reemployed annuitants to broaden the pool of report reviewers in the short-term, enhancing employee performance standards, and developing quality metrics and a means to track them for all investigations.

We cannot keep up the momentum and continue to serve as the global gold standard of aviation investigations without investment. The fact is, we've had the same level of staffing and nearly the same level of funding for almost two decades. Yet we have more complex investigations and government mandates to fulfill. That is why I have advocated strongly for increased authorization levels and increased appropriations to NTSB in FY24 and beyond. The President's budget request seeks \$145 million in FY24, and NTSB is grateful that the House THUD appropriations bill matched that funding level coming out of committee. I urge the Senate to match that level in its negotiations with the House chamber.

I also urge this committee to consider NTSB reauthorization as you move forward expeditiously on your FAA reauthorization legislation. I look forward to working with you on legislation that will allow us to hire professionals with the needed

⁸National Transportation Safety Board Draft Reauthorization Act of 2023. Washington, DC: NTSB.

skills, purchase the equipment necessary for those skilled professionals to do their jobs, and invest in staff training and development. Our workforce is our greatest asset and is essential to our mission to make transportation safer and to maintain our status as a leader in safety—both at home and internationally.

Conclusion

Again, thank you for the opportunity to discuss these critical aviation safety issues and the NTSB's perspectives and recommendations with the committee today. We believe strongly that continued vigilance and investment are needed in our aviation system. We recognize the progress that has been made; yet there will always be room for improvement. We stand ready to work with the committee to continue improving aviation safety, which includes ensuring that the NTSB has the resources needed to carry out our essential mission.

I am happy to answer your questions.

Senator DUCKWORTH. Thank you, Chairwoman Homendy. We will now recognize Mr. Tim Arel, Chief Operating Officer at FAA, Air Traffic Organization.

STATEMENT OF TIMOTHY L. AREL, CHIEF OPERATING OFFICER, AIR TRAFFIC ORGANIZATION, FEDERAL AVIATION ADMINISTRATION

Mr. AREL. Thank you, Chair Duckworth. Thank you, Chair Cantwell, and Ranking Member Moran. Thank you for the opportunity to testify, along with my fellow professionals, on an issue that has been referred to as close calls and near misses.

I appreciate you holding this hearing for your continued oversight, because transparency and a commitment to a continuous improvement are keys to improving aviation safety. You are familiar with the statistics. The U.S. aviation system, as Chair Homendy said, is the safest in the world.

There has not been a fatal crash involving a major U.S. airline since 2009, but in my 38 years of public service dedicated to aviation safety, I have come to understand that safety isn't a number or static place. It is a journey of continuous improvement, eliminating risk before it becomes a statistic.

Any significant event, whether isolated or indicative of a trend, is a concern and one we don't take lightly. One close call is one too many. Aviation safety is a team sport. Air traffic controllers, pilots, commercial operators, general aviation, and airports provide multiple layers of safety to protect the flying public.

We have intentionally built in redundancies in our technologies and procedures where with one fails, the other one kicks in. Let me stress, the level of safety we currently have is only possible because of transparency and constant collaboration between the FAA and the users of the national airspace system.

At the FAA, we are proactive—we are proud of our proactive safety culture, which means we value and encourage the sharing of data and safety information amongst the agency, industry, and labor to reduce risk, to learn from each other, and to collaboratively develop mitigations.

The bottom line is that sharing and exchanging safety information makes us safer and stronger. In Fiscal Year 2023, there were approximately 54.5 million takeoffs and landings in the U.S., and there were 1,756 total runway incursions.

It is important to note, as the NTSB has highlighted, the number of most serious runway incursions, those where a collision was nar-

rowly avoided or there was significant potential for a collision, what we call categories A's and B's, was a total of 23. Back to my point about transparency, all this information is available to the public.

However, even though significant runway incursions were only 1.3 percent of the total number of operations, any number is unacceptable. And we are earnestly pursuing the elimination of all significant safety events in the system. Our goal is zero significant safety events.

Transparent and collaborative reporting revealed an uptick in the most significant events early and the FAA immediately responded through the Administrator's call to action and other initiatives. A safety summit that was held in March 2023 brought together more than 200 safety leaders from across the aviation industry, including labor representatives from NATCA, ALPA, and PASS to discuss ways to enhance flight safety.

NTSB Chair Homendy spoke there as well, and that is where we committed to a goal of zero significant safety events. This is the same collaborative approach that was used to virtually eliminate the risk of fatalities aboard U.S. commercial airlines. The FAA has held a number of surface safety summits with individual users of our national airspace system, such as general aviation, air carriers, business aviation, and airport operators.

We hear a lot about technology solutions, and those are certainly key. We are fast tracking technologies to address specific safety concerns on the airport surface and are deploying a surface awareness technology at those locations that currently do not have a surface surveillance system.

The trend overall is going down, but it is not enough. As I stressed at the beginning of my testimony, while we were proud of our safety culture and the progress we have made, we do not have the luxury of complacency. We are optimistic that our ongoing work in collaboration, with industry and labor, will continue to lead to greater safety improvements.

The FAA will remain vigilant and continue collaborating with everyone that utilizes the national airspace system to enhance safety with a goal of eliminating significant safety events. Going forward, zero has to be the only acceptable number.

Thank you again for the chance to speak on this critical issue, and I look forward to answering your questions.

[The prepared statement of Mr. Arel follows:]

PREPARED STATEMENT OF TIMOTHY L. AREL, CHIEF OPERATING OFFICER, AIR TRAFFIC ORGANIZATION, FEDERAL AVIATION ADMINISTRATION

Chairs Cantwell and Duckworth, Ranking Members Cruz and Moran, and members of the subcommittee, thank you for the chance to be here today to testify about some of the significant events we have seen in the National Airspace System (NAS) this year. Before I delve into the details and the Federal Aviation Administration's (FAA) actions to address these events and prevent them in the future, I want to emphasize the seriousness with which we approach this issue. Collectively, air traffic controllers, pilots, commercial operators, general aviation, and airports all play an important role in minimizing risk within the system. Through years of collaboration with these stakeholders, the FAA has established multiple layers of safety that protect the traveling public from the time they board an aircraft to the time they deplane. These efforts include continued pilot outreach and training, controller awareness and training, investments in surface safety and situational awareness

technology tools, robust procedures managed by air traffic controllers, and the application of Safety Management Systems internally and across part 121 commercial operators as well as major airport operators.

The level of safety we have would not be possible without continuous transparent and collaborative communication between the FAA and industry. At the FAA, we are proud of our proactive safety culture, which emphasizes the value of nonpunitive sharing of data and safety information between the agency and industry to reduce risk and maximize safety. Nevertheless, we view even one runway incursion or other unsafe operation in the NAS as too many, and the FAA is committed to the relentless pursuit of continual improvement in everything we do. Any runway incursions or other event in the NAS, whether isolated or part of a possible trend, is a concern, and we don't take it lightly. We appreciate the oversight and attention this subcommittee has focused on this issue, as increased awareness helps us improve safety.

Runway Incursions

A runway incursion is any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft. Incursions are caused by operational incidents attributed to air traffic control action or inaction, pilot deviations, or vehicle/pedestrian deviations.

We measure four categories of runway incursions based on objective, observable standards:

- Category A is a serious incident in which a collision was narrowly avoided.
- Category B is an incident in which separation decreases and there is a significant potential for collision, which may result in a time-critical corrective/evasive response to avoid a collision.
- Category C is an incident characterized by ample time and/or distance to avoid a collision.
- Category D is an incident that meets the definition of runway incursion (*e.g.*, the incorrect presence of a single vehicle/person/aircraft on the protected area of a surface designated for the landing and take-off of aircraft) but results in no immediate safety consequences.

For Fiscal Year 2023, of the approximately 54.4 million takeoffs and landings in the NAS, there were 1,756 total runway incursions. Approximately 60 percent of those incursions were attributable to pilot deviations, approximately 20 percent were caused by air traffic controller action or inaction, and the remaining approximately 20 percent were caused by vehicle or pedestrian deviations. It's important to note that the total number of Category A and B runway incursions was 23. Although these statistics suggest that runway incursions account for approximately 0.003 percent of all NAS operations, and the more serious incursions in Categories A and B combined account for about 0.00004 percent of all NAS operations, we recognize that any number is an unacceptable safety risk and we are working hard to drive the number of such incursions to zero.

Overall, our data, which is regularly shared with Congress and publicly available, shows a recent downward trend in the rate of runway incursions. For example, in Fiscal Year 2022, there were approximately 33 incursions per one million takeoffs and landings. In Fiscal Year 2023, there were 32 incursions per one million takeoffs and landings. Although the change is modest so far, we are optimistic that our recent and ongoing work and collaboration with industry is bearing fruit and will lead to continued safety improvements in the NAS.

The FAA takes seriously every safety event in the NAS, whether it occurs on the surface or in the air. Through the promotion of Voluntary Safety Reporting Programs and expanded system monitoring through Aviation Risk Identification and Assessment, we identify and mitigate events that would have previously been unknown even two years ago. Our focus is on maintaining our status as the premier air navigation service provider, keeping aircraft safe, separated, and on time.

Safety Summit and Follow-on Actions

In March of this year, in response to an uptick in the most severe runway incursions, the FAA took a number of additional actions aimed at helping to drive down the incidence of all runway incursions. The Administrator's call to action led to a safety summit that brought more than 200 safety leaders from across the aviation industry to examine ways that safety could be enhanced to prevent future occurrences. These discussions covered commercial and general aviation operations, the air traffic system, and airport and ground operations. The FAA also held a series

of surface summits separately with stakeholders, including general aviation, air carriers, business aviation, and airport operators.

Since the safety summit, the FAA has taken a number of actions to enhance flight safety and reduce incursions:

- *March:* The FAA issued a *Safety Alert for Operators* (SAFO) identifying items for safety management focus, including guidance related to runway safety, and asking all pilots, air carrier management, and operators to review processes, procedures, or training to ensure operations are conducted at the highest level of safety, including adherence to air traffic control instructions and maintaining a “sterile cockpit” to mitigate risks associated with extraneous communication.
- *March:* The FAA announced additional steps the agency’s Air Traffic Organization (ATO) will take:
 - Ensure that supervisors devote their full attention to the operation and airfield during peak traffic periods at each facility.
 - Provide more dedicated training for unusual circumstances.
- *April:* The FAA named an independent safety review team to further examine ways to enhance safety and reliability in the Nation’s air traffic system. The Safety Review Team began its work in May and will complete its work this fall and present concrete recommendations on how the agency can advance air traffic safety.
- *June:* The FAA launched the “Stand Up for Safety” Campaign. The series will provide monthly, mandatory special emphasis training for our controller workforce, including operations supervisors and managers, in collaboration with the National Air Traffic Controllers Association (NATCA).
- *August:* The FAA announced it will hold runway safety meetings at approximately 90 airports between August and the end of September. The meetings, held annually at each airport with a control tower, are the primary forum for pinpointing and addressing airport-specific risk in the surface environment and are part of the ongoing work of the Runway Safety Action Teams discussed below.
- *August:* The FAA issued a SAFO with reminders of practices to prevent injuries while workers are towing aircraft and guiding them to and from gates. The SAFO reminds aircraft operators that it is important for personnel to remain clear of operating engines until they are shut down.
- *September:* The FAA tasked the Investigative Technologies Aviation Rulemaking Committee to provide recommendations on new technologies, such as cockpit alerting systems, designed to reduce runway safety events. When aircraft land on the wrong surface, it presents risks that can lead to catastrophic events where the surface could be closed, damaged, or an unsuitable length for a safe takeoff or landing.

Moreover, over the course of Fiscal Year 2023, the FAA awarded grants for 55 runway safety projects under the Bipartisan Infrastructure Law and 154 runway safety projects under the Airport Improvement Program, totaling more than \$1.0 billion. These projects will reconfigure taxiways that may cause confusion, install airfield lighting, signage or markings, or construct new taxiways to enhance safety on the airfield.

Longterm Runway Safety Initiatives

The actions since March that are noted above are a small fraction of the overall sustained effort that the FAA and industry have undertaken over time to lower runway incursions. Runway safety will continue to be a high priority for the FAA, and we will continue to develop and refine initiatives to enhance runway safety. Here are some of the more significant FAA initiatives that are moving the needle on safety.

- *Runway Safety Council.* The FAA convened the Runway Safety Council (RSC) to fundamentally change the existing safety culture and move toward a systemic proactive management strategy that involved cooperation throughout the FAA and among the different segments of the aviation industry. By applying the formalized and proactive approach of the ATO’s Safety Management System, the RSC is advancing the shift from a compliance-based safety system to a risk-based, data-driven, integrated systems solution to runway safety. Collaboration with the aviation community is a key component of runway safety. The RSC includes aviation stakeholders from across FAA Lines of Business, including Airports, Aviation Safety, and the ATO, as well as FAA employee

labor organizations like Professional Aviation System Specialists and NATCA, and industry representatives such as aircraft operators, airline representatives, and flight instructors.

- *Runway Safety Action Teams.* Runway Safety Action Teams (RSAT) bring local airport stakeholders together at least once a year at towered airports to identify risks to surface safety at individual airports and develop plans to mitigate or eliminate those risks. RSATs provide the foundation of the Runway Safety Program at individual airports. The RSAT meetings are the primary forum for pinpointing and addressing airport-specific risks in the surface environment. The product of a RSAT meeting is a Runway Safety Action Plan in which the stakeholders document and agree to pursue specific actions intended to improve surface safety.
- *Runway Incursion Mitigation.* The Runway Incursion Mitigation (RIM) program is a national initiative at airports with a history of runway incursions to identify airport-specific risk factors that might contribute to a runway incursion. These risk factors may include unclear taxiway markings, airport signage, and more complex issues such as the runway or taxiway layout. The FAA then works with the airport sponsors to develop strategies to mitigate runway incursions at these locations. Currently, 131 unmitigated RIM locations have been identified across 80 airports. To date, the program has mitigated 99 locations. Other solutions like operational modifications or a hot spot designation (to optimize pilot awareness) are employed when physical changes are not feasible or best suited. There is a 78-percent average reduction of runway incursions at mitigated RIM locations. The RIM program continuously monitors these locations for reoccurrence and assesses incoming data for any new RIM location candidates.

Runway Safety Technologies

Investment in technology will continue to be an effective mechanism to enhance aviation safety and runway safety in particular. We are committed to the continued development and deployment of safety technologies in support of aviation safety. Here are some examples of technologies that are advancing safety.

- *Technology Sprints.* The FAA has announced that we are pursuing a technology sprint by fast-tracking the deployment of three initiatives to address specific safety concerns on the airport surface.
 - The Surface Awareness Initiative will deploy a situational awareness display of airport surface traffic to tower air traffic controllers for airports that do not currently have a surface surveillance system.
 - The Approach Runway Verification will add functionality in the Standard Terminal Automation Replacement Terminal System (STARS) to provide controllers with alerts of wrong runway, closed runway, and wrong airport alignments to prevent wrong surface landings.
 - The Runway Incursion Device will provide a memory aid device that generates an audible and visual alert to controllers to enhance situational awareness of occupied and closed runways, which we plan to deploy to over 70 towers.
- *Runway Status Lights.* The FAA developed Runway Status Lights (RWSL) technology to increase situational awareness for flight crews and airport vehicle drivers and thus serve as an added layer of safety. A RWSL system derives traffic information from surface and approach surveillance systems and illuminates red in-pavement airport lights to signal a potentially unsafe situation. Runway Entrance Lights are deployed at taxiway/runway crossings and illuminate if it is unsafe to enter or cross a runway. Takeoff Hold Lights are deployed by the departure hold zone and illuminate red when there is an aircraft in position for departure and the runway is occupied by another aircraft or vehicle and it is unsafe for takeoff. RWSL is operational at 20 U.S. airports.
- *Airport Surface Detection Equipment, Model X.* Airport Surface Detection Equipment, Model X (ASDE-X) integrates data from a variety of sources, including radars, transponder multilateration systems, and Automatic Dependent Surveillance—Broadcast (ADS-B) to provide accurate target position and identification information and thus give controllers a more reliable view of airport operations. ASDE-X provides tower controllers a surface traffic situation display with visual and audible alerting of traffic conflicts and potential collisions. ASDE-X is operational at 35 airports in the United States.
- *Airport Surface Surveillance Capability.* Airport Surface Surveillance Capability (ASSC) is similar to ASDE-X. It improves surface surveillance and situational

awareness in all kinds of weather. With ASSC, air traffic controllers see aircraft and ground vehicles on the airport surface and on approach and departure paths within a few miles of the airport. Like ASDE-X, ASSC fuses data from multiple sources, including radars, to provide a highly accurate display for controllers with the same visual and aural alerting capabilities. ASSC is operational at nine airports in the United States.

- *Runway Incursion Warning Systems and Vehicle ADS-B Transmitters.* Runway Incursion Warning Systems (RIWS) and vehicle ADS-B transmitters are available for installation on airport and airline-owned vehicles that regularly operate in the movement area. These technologies enhance situational awareness for surface operators and Air Traffic Controllers. FAA has been actively encouraging airports to voluntarily equip their vehicles. Grants are available for installation of these systems. As a result, there are now over 2,100 vehicles equipped with ADS-B transmitters at airports with ASDE-X and ASSC and over 1,000 vehicles equipped with a RIWS.
- *From the Flight Deck and the Runway Safety Pilot Simulator.* The FAA has produced 100 site-specific “From the Flight Deck” videos to educate and inform pilots and controllers of the risks associated with operating at specific airports around the NAS. Other videos cover safety topics, including wrong surface landings, complex airfield geometry, hold short, wrong direction intersection take-offs, and more. Additional airport videos are forthcoming.

FAA’s Runway Safety Pilot Simulator video series is a self-guided resource to assist flight instructors with teaching student pilots surface safety best practices before they step foot into the cockpit. It allows student pilots to navigate on airport surfaces while communicating with air traffic control and gain experience following instructions provided by air traffic control. The scenarios are interactive and allow viewers to make decisions based on air traffic control instructions.

- *Pilot Information on Airports Across the NAS.* To supplement From the Flight Deck videos, we began publishing additional information on faa.gov. This content includes details such as airport-specific cautions, information local controllers want pilots to know, airport communications, airspace details, more general best practices, lost communications tips, and other preflight planning resources. This supplemental web content is currently available for 25 airports across the NAS, with more content in development.

Controller Hiring

Finally, although eliminating runway incursions requires close coordination and collaboration with industry, we recognize the vital role we play in working to avoid and eliminate them. Part of that work is the hiring and training of air traffic controllers. The President’s FY 2024 budget request includes funding for the hiring and training of 1,800 controllers, an increase of 300 above the hiring level for FY 2023. This funding supports the continued training of the 1,500 controllers hired in FY 2023. The FAA Academy’s training schedule in execution for FY 2024 will support the FAA’s overall goal to hire 1,800 controllers to include the added training cost for the additional 300 controllers reflected in the FY 2024 budget request. The budget request will allow the FAA to continue progress toward attaining the necessary Certified Professional Controller staffing levels to meet current traffic demands, which have returned to, or in some markets exceeded, pre-pandemic levels. The 2023 Controller Workforce Plan released in May includes facility-specific staffing targets. As we continue to work with our labor partners, we also submitted to Congress the results of the Collaborative Resource Workgroup and look forward to continued discussion and progress as we all work toward the shared goal of staffing targets to meet traffic demands.

Conclusion

I would like to reemphasize the seriousness with which we approach this issue and assure you that although we are proud of our safety culture and the work we have done, the FAA will doggedly press for continued collaboration with industry to further enhance safety initiatives and technologies to reduce runway incursions with the goal of eliminating them. Thank you again for the chance to speak about this critical safety issue.

Senator DUCKWORTH. Thank you, Mr. Arel. And now, I recognize Mr. Rich Santa, President, National Air Traffic Controllers Association, for 5 minutes.

**STATEMENT OF RICH SANTA, PRESIDENT, NATIONAL AIR
TRAFFIC CONTROLLERS ASSOCIATION, AFL-CIO (NATCA)**

Mr. SANTA. Chair Duckworth, Ranking Member Moran, Chair Cantwell, thank you for this opportunity to testify today.

The most important action Congress can take for the safety of the national airspace system would be to pass a long term, comprehensive FAA reauthorization bill before the end of this year that directs the FAA to adopt a controller staffing target that has been developed by the Collaborative Resource Work Group as the basis for the FAA's Controller Workforce Plan, and to maximize controller hiring for the duration of that bill.

There are over 1,000 fewer controllers today than there were a decade ago. Continuing to follow the same flawed model that the FAA utilizes, after more than a decade of missed hiring goals and missed staffing projections, will continue this downward trend. A new approach is desperately needed.

The FAA must adopt the updated and more accurate operational staffing targets that were jointly developed by the Collaborative Research Work Group. They were developed by a team comprised of FAA's air traffic organization and NATCA.

And FAA, MITRE Corporation Center for Advanced Aviation System Development verified and validated that group's work. The facility staffing targets that the FAA utilizes today in our facilities were developed almost a decade ago.

It is beyond time to update them. The new CRWG staffing targets need to be used as the basis for the FAA's annual control of workforce plan moving forward so that Congress and aviation industry have a complete, and most importantly, accurate picture in view of the staffing needs of the NAS.

We appreciate the Commerce Committee's inclusion of the CRWG staffing targets in its draft reauthorization bill. Understaffing, the FAA requires mandatory overtime to our controller workforce, including regular 6 day workweeks and 10 hour days. This leads to fatigue.

Last year, controllers at 40 percent of our facilities worked 6 day workweeks at least once a month, and several of our facilities requires 6 day workweeks and 10 hour days every single week.

Air traffic control is already a highly stressful profession. Working 200 hours per month layers on significant fatigue and inserts additional risks into the NAS. In fact, in June, the DOT Inspector General issued an audit concluding that while the United States has one of the safest air traffic systems in the world, the lack of fully certified controllers poses a potential risk to air traffic operations.

To reach the CRWG's staffing targets, the FAA must hire to the maximum throughput of the FAA Academy, for more than just the next 5 years. We are thankful for the bipartisan group of Senators who have co-sponsored the important Air Traffic Controller Hiring Act of 2023, which we believe should be included in the base reauthorization bill.

The FAA also needs to be transparent with its need for increased funding for its facilities and equipment budget, which provides resources for physical infrastructure repairs and sustainment, equipment modernization, and major capital projects. Congress has al-

ways met the agency's stated need, but the FAA has consistently requested less than it needs. It hasn't even adjusted for inflation.

This has prevented the agency from meeting its equipment sustainment replacement and modernization needs, resulting in a significant backlog. Moving to a fix on failed model has led the FAA's inability to maintain and replace critical safety equipment that has exceeded its expected life and introduced unnecessary risk into the system.

The failure of the U.S. NOTAM system earlier this year resulting in a shutdown of the airspace was a glaring example of this risk. Funding limitations have also delayed the FAA from designing and implementing new technology to improve safety, such as the airport surface surveillance situational awareness tools that are so desperately needed to address runway incursions, a top safety concern.

NATCA is supportive of the Senate's THUD appropriations bill because along with the funding from the Infrastructure Investment and Jobs Act, it will meet the FAA's needs this year. Finally, I want to stress the need to avoid a Government shutdown.

That would force the FAA to suspend hiring, close its training academy, delay the pipeline of new controllers, delay modernization, which would be a catastrophic impact to the national airspace system. Thank you so much for your time, and I look forward to your questions.

[The prepared statement of Mr. Santa follows:]

PREPARED STATEMENT OF RICH SANTA, PRESIDENT, NATIONAL AIR TRAFFIC
CONTROLLERS ASSOCIATION, AFL-CIO (NATCA)

Thank you for the opportunity to testify on behalf of the National Air Traffic Controllers Association, AFL-CIO (NATCA) at today's hearing titled "Addressing Close Calls to Improve Aviation 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.

Executive Summary

The National Airspace System (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.

The most important action Congress can take for the safety of the NAS would be to pass a long-term, comprehensive FAA Reauthorization bill before the end of the year.

For the better part of two decades, the Federal Aviation Administration (FAA), like much of the Federal government has faced an unstable, unpredictable funding stream—whether due to the risk of lapsed appropriations or the risk of lapsed authorization—with interruptions that have negatively affected all aspects of the Agency, 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 have submitted insufficient FAA budget requests to Congress that do not meet the full needs of the NAS. Historically, Congress provides the Agency with the resources it requests through both authorization of top-line numbers and the annual appropriations process, but because FAA requests 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.

Another area where this dynamic occurs is controller staffing. There are approximately 1,000 fewer Certified Professional Controllers (CPC) than there were a decade ago. Continuing to follow the flawed controller staffing model developed annually by FAA's Office of Finance and Management after more than a decade of missed hiring goals and staffing projections, followed by reduced expectations the following year would be deeply problematic. Reducing air traffic capacity due to understaffing, as FAA did this past summer in the New York airspace, only serves to undermine the efficiency of the NAS.

FAA must adopt the new, more accurate operational staffing targets that were developed by the Collaborative Resources Workgroup (CRWG). These staffing targets should form the basis for FAA's annual Controller Workforce Plan (CWP) moving forward, so that Congress and the aviation industry have a complete and accurate view of the staffing needs of the Agency.

We appreciate the Commerce Committee's inclusion of the CRWG's staffing targets in its draft FAA reauthorization bill. If FAA uses the CRWG as the basis for its CWP, Congress will finally get a complete and accurate picture of the FAA's controller staffing needs. In addition to limiting NAS capacity, understaffing also requires FAA to assign mandatory overtime to controllers on a regular basis, which leads to fatigue. Fatigue introduces unnecessary risk in the NAS. Chronic fatigue and stress multiply that risk.

FAA also must be transparent with its need for improved funding for its Facilities and Equipment (F&E) budget, which provides resources for physical infrastructure repairs and sustainment, equipment modernization, and major capital projects. NATCA estimates that FAA requires approximately \$4.5 billion for F&E activities in Fiscal Year (FY) 2024, and this number will approach nearly \$6 billion in the near future. Despite this increasing need, for the past decade, FAA has consistently requested only approximately \$3 billion per year in annual appropriations.

Congress has always met the Agency's stated need, but that has prevented FAA from meeting its own equipment sustainment, replacement, and modernization needs, creating a significant backlog. That backlog will worsen if FAA continues to submit annual budget requests that do not reflect its true needs moving forward. Failing to maintain and replace critical safety equipment that has exceeded its expected life introduces unnecessary risk into the system. Further, funding limitations prevent the FAA from designing and implementing new technologies that will improve safety, such as an airport surface surveillance situational awareness tool to address wrong surface landings—a top safety concern.

NATCA's testimony will focus on: (1) the current controller staffing crisis and training challenges and how they could affect safety and efficiency; (2) the negative effects of equipment and infrastructure backlogs and how those affect critical modernization and infrastructure programs, including significantly delaying the development and implementation of new safety technology that will improve surface surveillance at airports and help mitigate the risks of runway incursions; and (3) the negative effects that a potential shutdown would have on the NAS, as well as on the nearly 20,000 air traffic controllers and other aviation safety professionals represented by NATCA.

I. Controller Staffing and Training Hampered

For years, NATCA has been alerting policymakers that the controller staffing shortage negatively affects all aspects of the NAS. Despite meeting its self-imposed air traffic controller hiring goals for much of the past decade, the FAA has not kept up with attrition. Consequently, as of the end of Fiscal Year (FY) 2022, there were 1,200 fewer CPCs employed by the FAA than at the end of FY 2012. Currently, many of FAA's fully certified controllers are working mandatory overtime hours, frequently 6-day workweeks and 10-hour days, to make up for the staffing shortage. Some have even been working those schedules for their entire careers. Over the long-term, this will continue to introduce unnecessary risk into the system.

When there are too few fully certified professional controllers (CPCs), positions have to be combined, resulting in divided attention between different responsibilities. Most commonly, controller staffing shortages are mitigated through reducing efficiency—meaning flight delays. Chronically understaffed facilities also introduce unnecessary safety risks into the system.

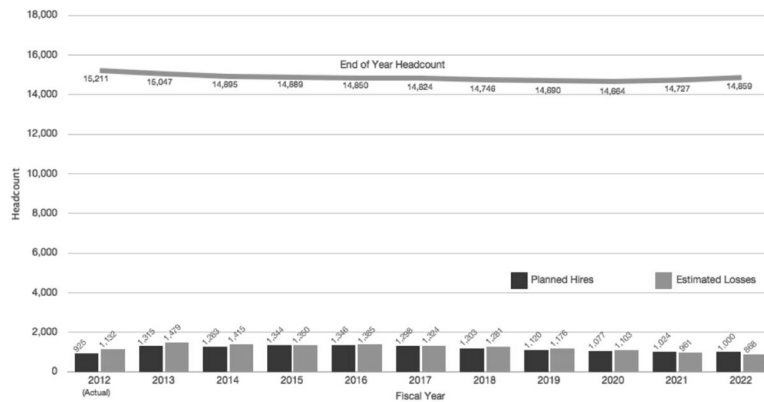
Although the FAA has taken steps in the right direction, such as upwardly adjusting its hiring goals for each of FY 2024–2026 to 1,800 new hires, a government shutdown would cause immediate and irreparable harm to the FAA's near-term plans to address controller staffing. At minimum, the FAA's training academy in Oklahoma City discontinues operations during a shutdown and the students are sent home, while new classes of controller trainees in the pipeline will have their start-

dates significantly delayed, leading to additional attrition among the scheduled new hires.

Even before the current funding uncertainty began, according to the FAA's Controller Workforce Plan, 40 percent of those who were members of a hiring class between 2014 and 2017 were removed from the FAA, resigned, or are still in training, meaning FAA can only expect about 60 percent of controller trainees to reach full certification within five to seven years of their hire. As a result, because it takes between one and three years for a new FAA Academy graduate to reach full certification, an increased hiring goal would take several years to have any positive effect on CPC totals. If the Academy is closed and hiring stops, the FAA's CPC shortage will become even more pronounced for the next five to seven years.

A 2023 shutdown certainly would not be the first major disruption to FAA funding that has harmed controller staffing levels. In 2013, across-the-board spending cuts as a result of Sequestration forced the FAA to institute a hiring freeze and shutter the FAA Academy between March and December of that year. This came at a time in which the FAA was struggling to replace retiring controllers, and the Agency has never made up for that sequester-related hiring freeze. In fact, in its 2013–22 Controller Workforce Plan, FAA stated to Congress that it planned to hire 1,315 controller trainees in 2013 and 1,263 in 2014. Yet, when it hired only 554 controller trainees in 2013, missing its target by over 700 because of sequestration, the following year it only amended its 2014 hiring target to 1,286 adding merely 23 additional new trainees—a goal it missed by over 170.

Figure 3.1: Projected Controller Workforce Controller Trends



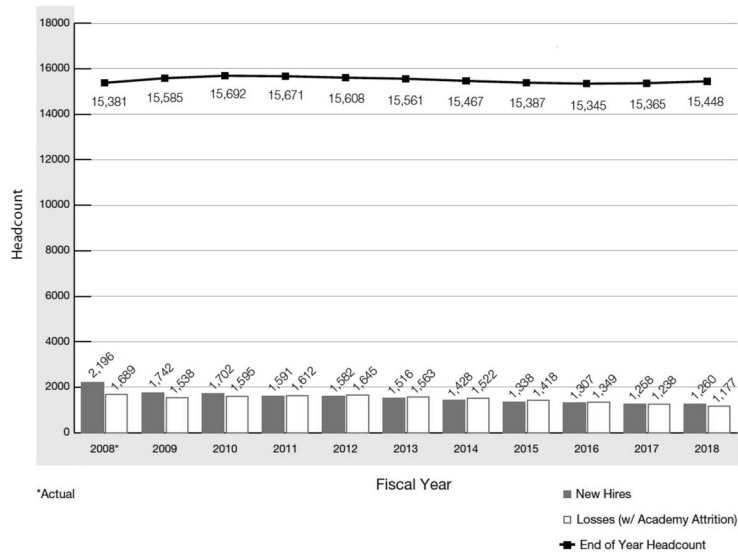
Note: Annual hires and losses are a relatively small proportion of the total controller workforce. Forecast does not include the effects of sequestration.

A Plan for the Future, 10-Year Strategy of the Air Traffic Control Workforce 2013-22, Chapter 3: Staffing Requirements, at 13.

It's also important to note that in 2013, FAA projected essentially a flat total headcount including CPCs and trainees over the next decade. Instead, it immediately missed even that modest pace in 2013, hovered between 700–800 below that goal for much of the decade, and then once COVID-19 began, fell about 1,400 behind.

But, if you go back further to the 2009 CWP, the same table showed targets of significantly more hiring and total on-board headcount of between 15,365 to 15,692 for each year over the next decade.

Figure 3.1 Projected Controller Workforce



NOTE: Annual hires and losses are a relatively small proportion of the controller workforce.

A Plan for the Future, 10-Year Strategy for the Air Traffic Control Workforce 2009-2018, Chapter 3: Staffing Requirements, at 12.

Sequestration also forced the FAA to issue a “save money furlough” affecting every employee, including air traffic controllers. During the week of April 21–27, 2013, delays nearly tripled at our Nation’s airports, from 5,103 to 13,694, when compared to the same week the year before and the year after.

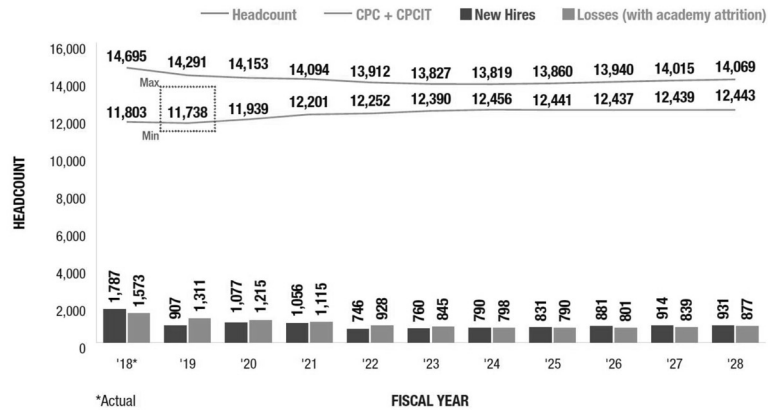
Then, again, in late Sept. 2013, because Congress had not passed appropriations bills to fund the government for FY 2014, the government was forced to shut down for 16 days shuttering much of the FAA along with it, which resulted in furloughs to FAA employees. The Office of Management and Budget (OMB) estimates that these furloughs cost the government a total of \$2.5 billion.

In early 2018, Congress and the White House failed—on two separate occasions—to enact funding legislation and the government was shut down for three days between Jan. 20–22, and then again on Feb. 9. On March 23, Congress narrowly avoided its third Federal government shutdown in a two-month period when it passed an omnibus spending package that funded the government and also extended FAA authorization through Sept. 30, 2018. Prior to that, Congress was on its fifth consecutive CR and fifth consecutive extension to FAA authorization.

From Dec. 2018 through Jan. 2019, the NAS suffered through the longest government shutdown in U.S. history, exacerbating a controller staffing crisis that continued to go from bad to worse.

By the 2019–2028 CWP, FAA Finance had long abandoned its goals of approximately 15,500 total on-board headcount including CPCs and trainees from a decade earlier and even abandoned the total on-board headcount including CPCs and trainees from 2013 of approximately 14,800. Without justification or explanation, it had adjusted that target all the way down to under 14,000. What prompted this reduced staffing target? Only FAA Finance can answer that question, but you won’t find it in any CWP. Instead, you only will find justification for a new headcount number each year, because presumably FAA Finance assumes Congress will not compare past CWPs or notice its consistent failure to meet its stated hiring targets and goals.

FIGURE 3.1 PROJECTED CONTROLLER TRENDS



Air Traffic Control Workforce Plan 2019-2028, Chapter 3: Staffing Requirements, at 15.

Fourteen months later, the COVID-19 Pandemic forced the FAA to close its training Academy again and, even after it reopened, enrollment capacity was reduced by 50 percent to maintain health and safety protocols.

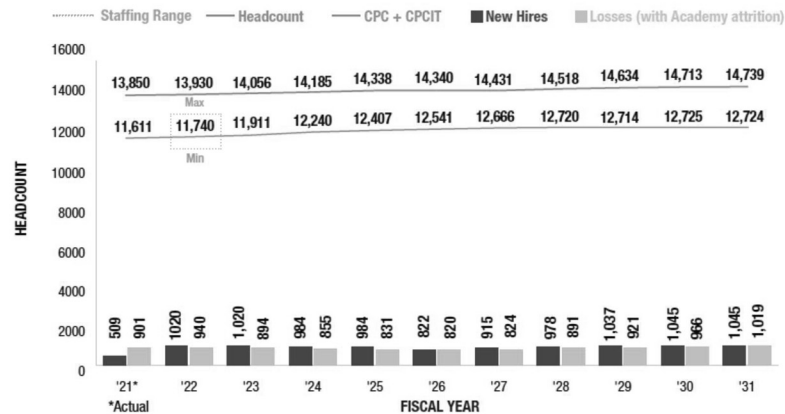
Although FAA reduced its hiring goals in three different years (2013, 2019, and 2021) reacting to a major disruption, the Agency curiously chose not to increase its hiring goals in the following year even though it has significantly more capacity at the Academy to do so. *See Staffing Fact Sheet (Appendix B).*¹

A longitudinal review of FAA's CWP's from 2009 through 2021 reveals that FAA Finance has always projected that FAA only needs approximately the same number of controllers that it has at that particular moment in time (Appendix C). As it consistently missed its hiring targets and otherwise failed to keep up with attrition, the on-board controller number has decreased throughout that time. FAA Finance consistently said it only needs the new, lower controller headcount number each year and looking forward over the next decade. The long-term effect of this practice has led to the FAA's current state: an untenable one in which many controllers work mandatory 10-hour days, and six-day workweeks. Those requirements are based on a system that FAA Finance created of its own device. And it's one they would have continued but for the scrutiny of this Subcommittee in recent years.

By 2022, after the staffing attrition due to the pandemic, FAA Finance finally conceded that it needed more controllers and reset its long-term target by 2031 back to 14,739, essentially what it said FAA needed back in 2012. But, having never reached its prior targets and only driving those numbers down year after year after year, NATCA and this Subcommittee have no guarantee that FAA will maintain this new target for the remainder of the next decade, given its consistent practice to change its plan in each of the previous 15 years.

¹NATCA has not yet received end of Fiscal Year 2023 data from FAA. Consequently, Appendix B is through the end of Fiscal Year 2022.

FIGURE 3.1 PROJECTED CONTROLLER TRENDS



Air Traffic Control Workforce Plan 2022-2031, Chapter 3: Staffing Requirements, at 15.

Moreover, we know from the last shutdown that some of our most experienced controllers decided to retire, while others tendered their resignations well-short of their retirement age in order to meet their financial obligations and provide for their families. Cumulatively, these delays to controller training, early retirements, and unexpected attrition wreak havoc on controller staffing throughout the system.

Recognizing that controller staffing is a major problem for the FAA, in Dec. 2022, then-Acting Administrator Billy Nolen directed the FAA's Air Traffic Organization (ATO) to restart the CRWG and partner with NATCA to collaboratively determine the number of CPCs needed to meet operational, statutory, and contractual requirements, including resources to develop, evaluate, and implement processes and initiatives affecting the NAS. In the weeks that followed, the parties diligently worked with the MITRE Corporation's Center for Advanced Aviation System Development to develop CPC operational staffing targets at each of FAA's 313 air traffic control facilities. The CRWG completed its work at the end of January and presented its report to the then-Acting Administrator and NATCA President in mid-February.

Nine months later, the FAA has *not* yet agreed to adopt the jointly developed CRWG's CPC targets as the basis for its annual CWP to provide Congress and the aviation industry with a more complete and transparent view of FAA's operational workforce needs. We hope that new FAA Administrator Michael Whitaker will recognize the important collaborative work done by the FAA and NATCA and adopt the CRWG's targets, while dispensing with the failed FAA Finance model.

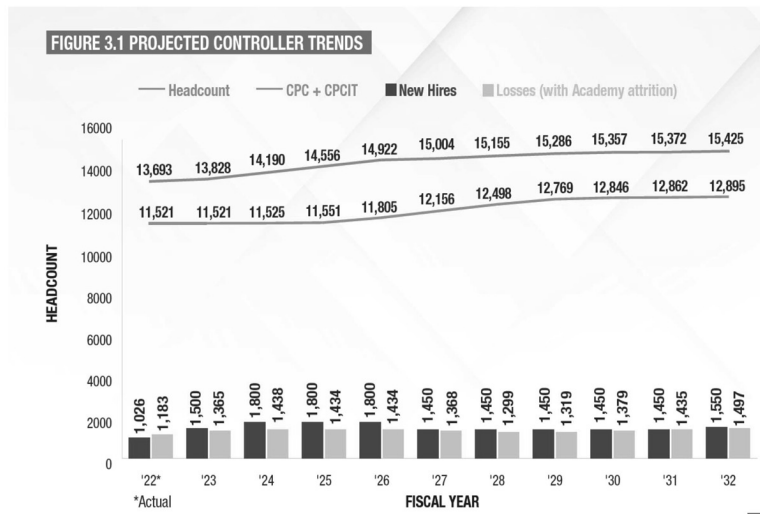
As we highlighted above, the current CWP is flawed because it relies on a "finance driven" staffing model that the FAA uses to develop facility-by-facility staffing. That model, developed by FAA's Office of Finance and Management (AFN or FAA Finance) incorrectly combines CPCs and CPC-ITs (controllers who were fully certified at a previous facility but are "in training" and not yet fully certified at their new facility). The CWP also ignores existing CPC staffing targets that were developed nearly ten years ago, which the reconstituted CRWG report updated based on current needs. Most importantly, it rejects FAA's own Air Traffic Organization's analysis that the system is severely understaffed.

The Department of Transportation Office of Inspector General (DOT OIG) issued a report in June that agreed with the CRWG's analysis. The DOT OIG's Audit Report AV2023035, titled *"FAA Faces Controller Staffing Challenges as Air Traffic Operations Return to Pre-Pandemic Levels at Critical Facilities"* concluded that "while the United States has one of the safest air traffic systems in the world, the lack of fully certified controllers, operational supervisors, and traffic management coordinators pose a potential risk to air traffic operations." DOT OIG Audit Report at 18.

Regarding controllers, the DOT IG wrote, "FAA continues to face staffing challenges and lacks a plan to address them, which in turn poses a risk to the continuity of air traffic operations." DOT OIG Audit Report at 6 (*emphasis added*). For example, the DOT IG "determined that 20 of 26 (77 percent) critical facilities are staffed below the Agency's 85-percent threshold" and that "managers we interviewed

at 16 of the 17 facilities likewise told us their facilities were not adequately staffed. For example, at several facilities, controllers were working mandatory overtime and 6-day work weeks to cover staff shortages.” DOT OIG Audit Report at 5, 8.

Without rationale, FAA Finance revised its staffing targets upward after the CRWG issued its report. Not coincidentally, it also was after the Senate Commerce Committee and the U.S. House of Representatives’ Transportation and Infrastructure Committee both introduced legislative language to require the FAA to adopt the CRWG targets as the basis for the CWP. Nevertheless, FAA Finance continued with its intentionally misleading blending of CPCs and CPC-ITs into one group, despite pending legislation that requires them to report both groups separately.



Air Traffic Control Workforce Plan 2023-2032, Chapter 3: Staffing Requirements, at 15.

As soon as this Subcommittee turns its attention to other pressing matters, NATCA is concerned that FAA Finance will begin lowering its targets again consistent with past practice.

Referencing the above chart, notice that FAA Finance now believes it needs over 15,400 total headcount (not the 13,800 total headcount it published that it needed just a few years ago). This higher headcount is the same total it needed, and had, in 2009, but the Agency won’t be able to achieve those totals for another decade due to the failures of its finance-driven staffing model over the last decade, which drove the number down.

This revision by FAA Finance is entirely disingenuous because FAA has needed that many total controllers the entire time and FAA Finance intentionally reduced the targets every year until Congress was forced to intervene in recent years.

Continuing to follow FAA Finance’s hiring plan—constructed by a line of business that has no experience operating or managing the air traffic system—after more than a decade of missed goals, incorrect projections, and reduced expectations is a fool’s errand.

II. Cascading Delays to Critical Modernization and Infrastructure Programs Jeopardize Safety of the NAS

Stop-and-go funding negatively affects critical modernization and infrastructure programs such as delaying development, testing, and implementation of new technologies, as well as delaying the sustainment and repair of existing safety-critical equipment. Delays to these types of programs have real world consequences.

Each year, the NAS experiences hundreds of safety events such as wrong-surface landings and runway incursions. Particularly critical at this point in time, a shutdown would significantly delay development, testing, and implementation of a new surface surveillance situational awareness tool that will help controllers identify and detect when and where aircraft and ADS-B equipped vehicles are on airport surfaces.

Although it is still in its infancy of development, this situational awareness tool would fulfill a similar role as the Airport Surface Detection System—Model X (ASDE-X) and Airport Surface Surveillance Capability (ASSC) at airports that do not currently have any surface surveillance technology. However, unlike ASDE-X and ASSC, this tool would be limited only to visual indicators and will not include “safety logic” enhancements, which is the predictive software that alerts controllers and provides an audible alarm as soon as the safety risk is detected by the program.

To draw a parallel to motor vehicle technology, these tools are similar to the differences in a car’s blind spot warning system. Today, many cars have some form of blind spot detection system. Some systems provide a warning light, an audible alarm, and automatic collision assistance, while other systems simply provide a flashing light on a side mirror. Both systems help prevent vehicle accidents, and although one certainly provides more redundancy than the other, both are significantly safer than what drivers had access to prior to the first such system in 2001.

As of today, only 44 airports across the NAS have either ASDE-X or ASSC, and despite being a recent technological upgrade, these programs are in a sustainment-only posture within the FAA. The FAA does not have the funding nor contractual capability to expand these programs to new facilities. As a result, the aviation industry, NATCA, and the FAA began working on the development and implementation of a situational awareness tool to help air traffic controllers mitigate these risks.

The successful and timely implementation of this situational awareness tool likely will hinge on two factors: the availability of sufficient funding for this program, and an intentional acceleration of the FAA’s acquisitions management process so that this tool can reach air traffic facilities sooner rather than later. Even if these hurdles are cleared, the current timeline for first-facility installation is June 2024, at the earliest. Any future funding disruptions or budgetary shortfalls, including a flat Facilities and Equipment (F&E) budget due to a long-term Continuing Resolution, will delay this timeline significantly.

Moreover, in the event of further funding disruptions, the programs listed below will experience the following negative effects, just to name a few:

- *En Route Automation Modernization (ERAM)*—Testing and build deployment at air traffic facilities must be rescheduled, which will cause delays.
- *Standard Terminal Automation Replacement (STARS)*—Deployment of a new wrong surface alerting tool known as Arrival Runway Verification (ARV) will be delayed.
- *DataComm*—Facility training at Jacksonville Center (ZJX) and Fort Worth Center (ZFW) would stop and additional classes would be necessary. Cleveland Center (ZOB) implementation would be delayed approximately 60 days.
- *Enterprise Information Display Systems (E-IDS)*—Software testing events must be delayed.
- *Airspace*—New instrument procedure development will be negatively affected, although the extent of the harm and the length of the delay will vary depending on each facility’s ability to adjust to a new timeline.

During a shutdown, work on Voluntary Safety Reporting Programs (VSRPs), which provide for critical communication between air traffic safety action program review teams and furloughed staff, is deferred, resulting in the inability to properly identify and mitigate safety and training deficiencies. The safety reporting program for NATCA represented engineers and service area support staff also does not operate; all work on existing reported safety issues and associated mitigation activities is suspended during a shutdown.

The FAA is behind schedule and continues to suffer through budgetary shortfalls on many critical modernization and infrastructure programs. Over the past 14 years, the FAA’s F&E budget has not kept pace with inflation. In FY 2009, the F&E budget was \$2.942 billion. It subsequently was lower than that in each Fiscal Year through 2017, before it peaked at \$3.3 billion in FY 2018. However, since then it has remained just above or below \$3 billion.

Estimating for a modest 2 percent average annual inflation rate over the last 14 years, the FAA’s F&E budget should be over \$3.8 billion based on its 2009 budget.

This loss of spending and buying power for modernization and infrastructure programs forced FAA into a “fix-on-fail” model by requiring it to prioritize mandatory costs such as subscription services and leases, basic ATC facility sustainment, salaries, travel, and major support contracts, along with NAS system sustainment. This prioritization leaves little to no money for important programs such as ATC facility replacement, the NAS facility sustainment backlog, the NAS system sustainment backlog, NAS system improvements, radar and surveillance sustainment and re-

placement, and Air Route Traffic Control Center (ARTCC) and Terminal Radar Approach Control facility (TRACON) consolidation, just to name a few.

NATCA was pleased to see the President's budget request for \$3.46 billion for F&E for FY 2024, which in addition to \$1 billion from the Infrastructure and Jobs Act (IIJA) for facilities meets FAA's \$4.5 billion need in FY 2024. We support the Senate's Transportation, Housing and Urban Development, and Related Agencies (THUD) appropriations bill that would fully meet this need. We are concerned, however, because NATCA projects FAA's F&E budget need to be between \$5.5 and \$6 billion in the near future, and the IIJA funding will expire at the end of FY 2027.

In the coming years, FAA also will face unprecedented technological challenges. The continued development and rapid proliferation of advanced air mobility, drones, and other new entrants could jeopardize NAS safety and efficiency if not integrated properly. NATCA must be involved in all discussions surrounding the safe and efficient integration of these programs.

III. Negative Effects of Government Shutdown on Aviation Safety

We know the kind of irreparable harm that a shutdown would have on the NAS because we have experienced them numerous times over the past two decades. In just the past five years, we have experienced three government shutdowns, while we have experienced 19 additional threatened lapses in appropriations, four threatened lapses in FAA authorization, and a narrowly averted debt ceiling crisis just this past summer. *See* Appendix A.

For example, the 35-day government shutdown from Dec. 2018 through Jan. 2019 eroded critical layers necessary to support and maintain the safety of the NAS. When the longest shutdown in U.S. history finally ended, the NAS—as well as the frontline FAA workforce represented by NATCA—was on the verge of unravelling, as many programs that reduce risk and increase safety completely stopped.

Controllers were distracted because they were thinking about the shutdown and how they would struggle to pay their mortgages, car payments, and for food and other household expenses. Federal employees are paid bi-weekly and by the time the shutdown ended, they had missed more than two-full pay periods of income. To earn income and take care of their families, in addition to performing their regular stressful duties of separating and sequencing traffic, some controllers also were driving an Uber or Lyft or waiting tables before and after their FAA shifts.

Air traffic control is a complex, high consequence occupation requiring multiple layers of safety processes and procedures (*i.e.*, safety reporting, quality control, quality assurance, training) to ensure we deliver the highest level of safety to the flying public. Many of these supporting functions are suspended during a shutdown because they do not meet the criteria to continue operating during a lapse in appropriations. You would never ask a surgeon to perform a surgery without their surgical team. You also should not ask controllers to perform their critical safety work without their support team.

NATCA members work hard to mitigate distractions and reduce fatigue in our workforce, but shutdowns increase fatigue and create unnecessary distractions for controllers while they are working airplanes. The added pressure and stress that a shutdown introduces into the NAS is intense.

NATCA is extremely concerned about the negative and cumulative effects that a shutdown would have on the current controller staffing crisis and training challenges.

Unlike air traffic controllers who continue to work without pay during a shutdown, NATCA also represents approximately 3,000 additional aviation safety professionals who would be furloughed, and whose critical safety work is not performed. For instance, NATCA represents FAA staff support specialists who work at air traffic control facilities to provide tactical, strategic, and administrative support for training; quality assurance/quality control of air traffic control and traffic management; manage and redesign airspace and air traffic control procedures; support operational automation, military operations, and air traffic safety management systems.

NATCA also represents aircraft certification engineers, who assist in design, production approvals, and airworthiness certification of aircraft and their components, as well as aerospace engineers who design and construct critical infrastructure necessary for safe flight operations including air traffic control towers, radar maintenance and installation, navigational aids, and communications systems. These FAA employees are furloughed during a shutdown and are prohibited from completing their important work.

Moreover, beyond the immediate harms to controller staffing and the frontline workforce, shutdowns also delay the implementation of critical modernization technology, as well as the sustainment and repair of existing safety-critical equipment.

For instance, certain programs will experience significant negative effects as a result of a shutdown such as En Route Automation Modernization (ERAM), Standard Terminal Automation Replacement (STARS), DataComm, Enterprise Information Display Systems (E-IDS), and multiple airspace modernization efforts at individual facilities across the NAS. A shutdown also will significantly delay development, testing, and implementation of a new situational awareness tool that will help controllers detect and prevent wrong surface landings.

IV. Conclusion

To enhance safety, Congress must continue its efforts to pass a long-term, comprehensive FAA Reauthorization bill by the end of the year that provides for maximum hiring of air traffic controller trainees in order to meet the operational needs of the NAS. It must also ensure that FAA addresses its backlog of equipment maintenance, repair, and replacement. Further, it must avoid another harmful government shutdown and ensure robust FAA funding levels, especially for the operations and F&E budgets, so that the FAA and NATCA can continue their critical safety and modernization work.

We thank this Subcommittee for its commitment to transparent controller staffing through the adoption of the CRWG CPC staffing targets in the draft FAA reauthorization bill. We hope additional language to require controller “max hiring” as described above will also be included in the legislation.

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

Thank you for the opportunity to testify.

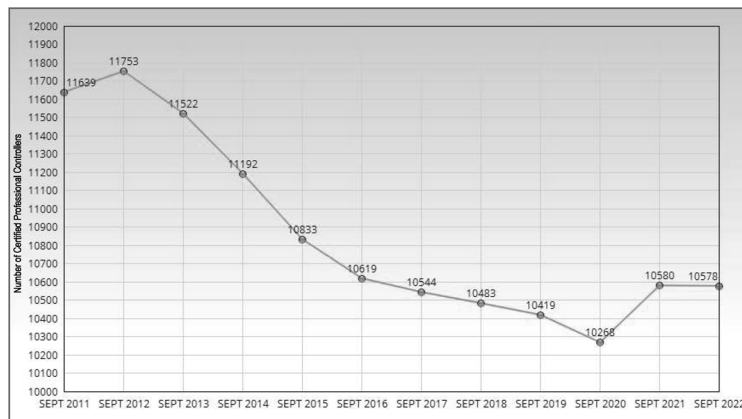
APPENDIX A—HISTORICAL SHUTDOWN TIMELINE

- **2007–2015**
 - Congress temporarily extended FAA authorization 23 times, while the system endured a partial FAA shutdown due to a lapse in authorization, a government-wide shutdown due to a lapse in appropriations, sequestration mandated across-the-board spending cuts, air traffic controller furloughs that caused crippling flight delays, and a hiring freeze, as well as numerous threatened shutdowns.
- **2018**
 - **January 20–22: THREE DAY SHUTDOWN.**
 - **February 9: SHUTDOWN.**
 - **March 23:** Threatened lapse in appropriations.
 - **March 31:** Threatened lapse in FAA authorization.
 - **October 1:** Threatened lapse in FAA authorization.
 - **October 7:** Threatened lapse in FAA authorization.
 - **December 7:** Threatened lapse in appropriations.
 - **December 22: 35–DAY SHUTDOWN.**
- **2019**
 - **February 15:** Threatened lapse in appropriations.
 - **October 1:** Threatened lapse in appropriations.
 - **November 21:** Threatened lapse in appropriations.
 - **December 20:** Threatened lapse in appropriations.
- **2020**
 - **October 1:** Threatened lapse in appropriations.
 - **December 11:** Threatened lapse in appropriations.
 - **December 21:** Threatened lapse in appropriations.
 - **December 27:** Threatened lapse in appropriations.
- **2021**
 - **September 30:** Threatened lapse in appropriations.
 - **December 3:** Threatened lapse in appropriations.
- **2022**
 - **February 18:** Threatened lapse in appropriations.
 - **March 11:** Threatened lapse in appropriations.

- **September 30:** Threatened lapse in appropriations.
- **December 14:** Threatened lapse in appropriations.
- **December 23:** Threatened lapse in appropriations.
- **December 30:** Threatened lapse in appropriations.
- **2023**
 - **June 2023:** Debt ceiling crisis narrowly averted.
 - **October 1:** Threatened lapse in appropriations & FAA authorization.
 - **November 17: GOVERNMENT FUNDING EXPIRES.**
 - **December 31: FAA AUTHORIZATION EXPIRES.**

Appendix B

Air Traffic Controller Staffing: 2011-2022



FISCAL YEAR	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
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
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
CPC-IT	965	1,143	1,187	1,200	1,218	1,259	1,205	1,320	1,414	1,309	1,031	943
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
AG	676	671	440	665	936	878	883	980	882	873	917	643
Retirement Eligible	3,064	3,224	3,077	2,982	3,355	2,915	2,410	1,842	1,004	1,143	≈1,000	631
FAA Planned To Hire	829	981	1,315	1,286	1,772	1,619	1,781	1,701	1,431*	910	910**	1,020
FAA Actually Hired	824	925	554	1,112	1,345	1,680	1,880	1,786	1,010	920	510	1,026

*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

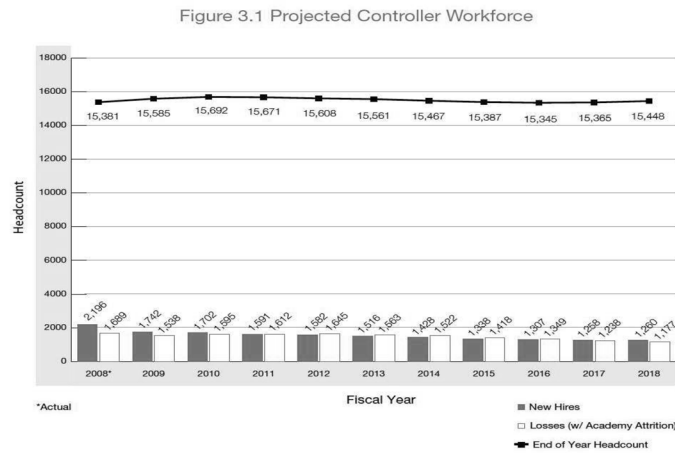
Source: FAA Finance Staffing Data Snapshot

Appendix C

Figure 3.1 from FAA's Annual Controller Workforce Plans 2009-2023 (except 2010)
Projecting Future Air Traffic Controller Hiring, Losses, and Total Certified Professional Controllers plus trainees (total headcount), and Certified Professional Controllers plus Certified Professional Controllers in Training (2014-2023)

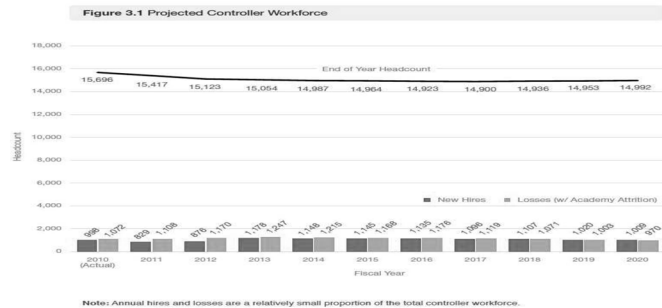
2009-2018:

Figure 3.1 shows the expected end-of-year headcount, losses and new hires by year through FY 2018. Figures for FY 2008 represent actual end-of-year headcount, losses and hires.

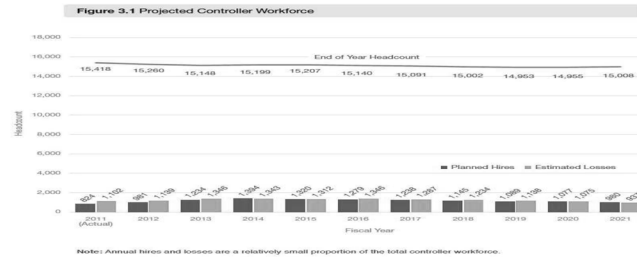


NOTE: Annual hires and losses are a relatively small proportion of the controller workforce.

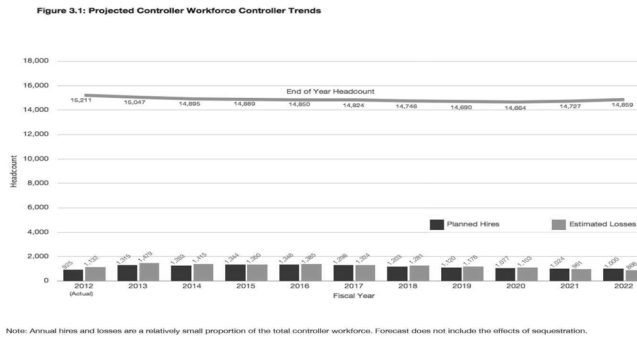
2011-2020:



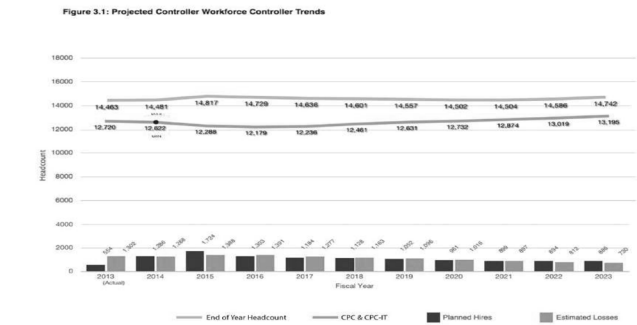
2012-2021:



2013-2022:

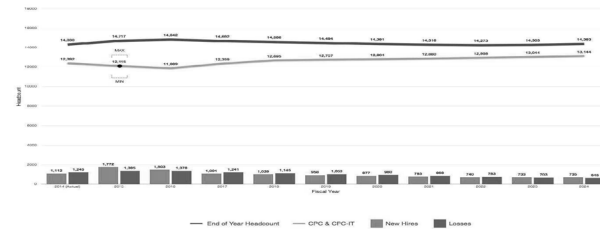


2014-2023:



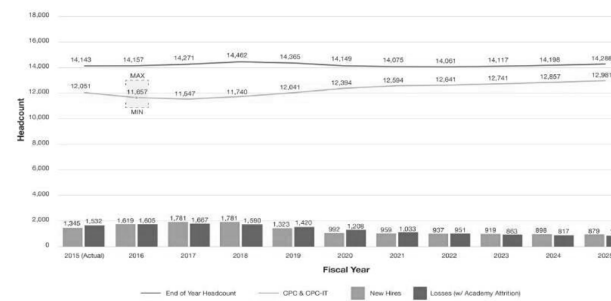
2015-2024:

Figure 3.1: Projected Controller Workforce Trends



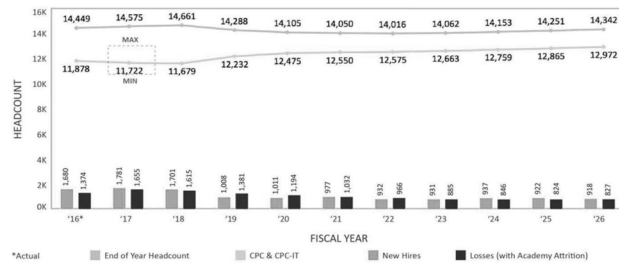
2016-2025:

FIGURE 3.1 PROJECTED CONTROLLER TRENDS



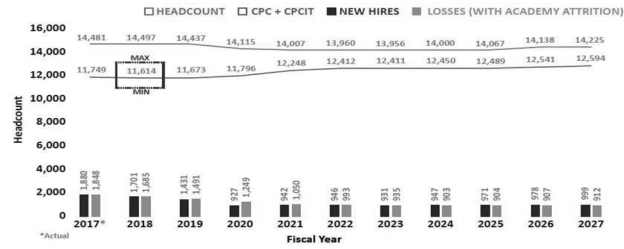
2017-2026:

FIGURE 3.1 - Projected Controller Trends



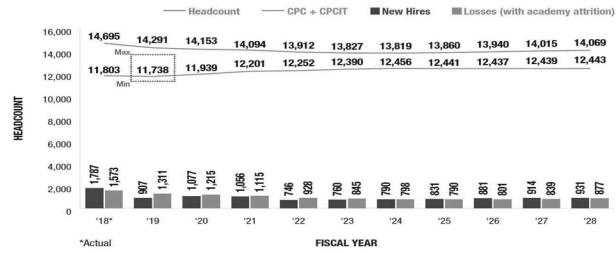
2018-2027:

FIGURE 3.1 | PROJECTED CONTROLLER TRENDS



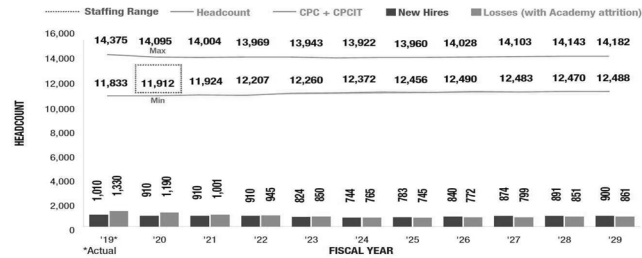
2019-2028:

FIGURE 3.1 PROJECTED CONTROLLER TRENDS



2020-2029:

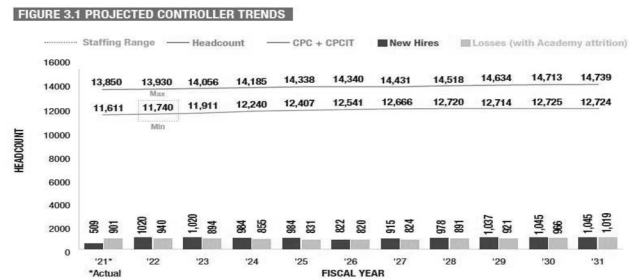
FIGURE 3.1 PROJECTED CONTROLLER TRENDS



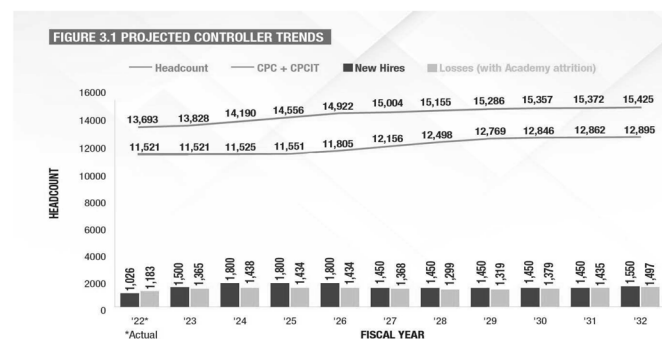
2021-2030:



2022-2031:



2023-2032:



Senator DUCKWORTH. Five minutes exactly. I am very impressed.
Mr. SANTA. I am air traffic controller—

Senator DUCKWORTH. That is an air traffic controller speaking right there. He is on the dot. Thank you, Mr. Santa. I now recognize Captain Ambrosi for his remarks.

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

Mr. AMBROSI. Thank you. I am not sure I will be quite so accurate as Rich was, but good morning. Thank you, Chair Cantwell,

Ranking Member Cruz, Chair Duckworth, Ranking Member Moran, and members of the Committee for holding this hearing.

My name is Jason Ambrosi. I am an international captain on the Boeing 767 and President of the Airline Pilots Association International. It is an honor to testify today representing more than 77,000 airline pilots who fly for 42 airlines in the United States and Canada.

I would like to begin by thanking this committee and the entire committee for its commitment to keeping American aviation system the safest in the world. In the context of this extraordinary level of aviation safety that Government, labor, and industry have achieved in the United States, recent near misses remind us that we can never let our guard down.

From employees to procedures, there is a lot of new in the post-COVID air transportation system. We must do more, not less, to safeguard airline passengers, crews, and shippers. The success that we have achieved in the aviation system didn't happen by chance. Rather, it stems from decades of industry wide work and commitment to collaboration, data collection and analysis, and hazard identification and mitigation.

Our progress has also resulted from critical changes to regulations governing pilot qualification and training, fatigue, airline operations and maintenance, and technology. Airline pilots and other aviation employees are proud to play a critical role in aviation safety. Through voluntary safety reporting programs, we are the ones, often the only ones, to identify safety issues before they develop into accidents.

The presence of two highly trained and well-rested pilots working on every airliner flight deck is another critical factor in safety. We saw this during the near-miss incident in Austin this past February that could have resulted in tragedy were it not for the actions of the two FedEx pilots working on board that flight deck together.

Such incidents make it clear that with demand returning more quickly than some anticipated, this is no time to reduce safety. Rather, these events compel us to strengthen safety through data collection efforts such as the Commercial Aviation Safety Team and technologies like NextGen.

More work can and must be done to prevent near misses and other incidents. ALPA is calling for expanding the capabilities at more U.S. airports and areas including flight profile optimization, STARS remote surveillance displays, ADS-B out equipage, and NextGen equipage. ALPA strongly supports doing more to advance NextGen to enhance pilots and air traffic controllers' ability to pinpoint the position of aircraft while in flight and on the ground.

Moving NextGen forward will not only help prevent near misses and enhance safety, but it will also improve traffic management and aircraft utilization, reduce flight delays, cut aviation emissions, and contribute to airline profitability.

We commend the U.S. Government for investing \$26 million in new funding to install or replace legacy aviation systems with new technology to ensure that pilots and controllers benefit from the state-of-the-art runway, surveillance, and information. And we sup-

port the White House request for additional funding to extend these safety improvements to more U.S. airports.

ALPA is committed to ensuring that all U.S. airports benefit from the same high level of safety, regardless of size or location. This committee's bipartisan FAA Reauthorization Act of 2023 included provisions to enhance safety and prevent near-miss incidents. We thank you for your focus on these important safety advancements.

Recently, there has understandably been heightened awareness of aviation workers' mental health. No one is more committed than ALPA to ensuring that airline pilots are fit for duty and have the support that they and all of us need when facing challenges. In 2024, ALPA will mark its 50th year of developing and implementing programs that support pilot mental health.

Our work has set the standard for the global airline industry and is even used by other industries and countries. However, we as an industry must do more. We applaud this committee for addressing this issue in your 2023 reauthorization bill. This is a good start, and we stand ready to work with any stakeholder to make improvements in this critical area.

Thanks to this committee and its commitment to collaborating with labor and other aviation stakeholders, U.S. air travel is extraordinarily safe. ALPA pilots are dedicated to protecting this Nation's global leadership and moving forward to advance safety in our skies. Thank you.

[The prepared statement of Mr. Ambrosi follows:]

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

On behalf of the Air Line Pilots Association, International (ALPA), I want to thank you for inviting me to testify on Addressing Close Calls to Improve Aviation Safety. My name is Jason Ambrosi, and I am a current and qualified international captain on the Boeing 767 at Delta Air Lines and serve as the president of ALPA. ALPA is the largest pilot union in the world as well as the largest nongovernmental aviation safety organization, with a history of safety advocacy spanning more than 90 years.

While the U.S. aviation system remains the safest in the world, this outcome is not guaranteed. The recent spike in close calls reminds all of us that safety is a matter of relentless vigilance. To improve our safety, particularly with regard to close call incidents, it is imperative that we continue to mitigate risk through data analysis, the installation of surface safety systems, modernization of the National Airspace System (NAS), and continued cooperation between industry stakeholders and regulators.

The Aviation System is Safe but More Work Needs to be Done

Despite an increase in the number of close calls reported earlier this year, the United States aviation system continues to operate at a very high level of safety. This success stems from decades of industry-wide work and commitment to collaboration, data collection and analysis, hazard identification and mitigation, as well as critical changes to the regulatory framework governing pilot qualification and training, fatigue, airline operations and maintenance, and technology. Professional pilots, flight attendants, air traffic controllers and Air Traffic Control (ATC) system technicians, among other aviation employees, play a central role in keeping our skies safe. Two highly trained and well-rested pilots are an important contributing factor to system safety. As just one example, in early February, when FedEx 1432 was on approach to land on the same runway that Southwest Airlines flight 708 was using for takeoff at Austin Bergstrom International Airport, if not for the actions of the FedEx pilots the incident could have been an accident.

While it is important to be cognizant of today's high level of system safety, even one runway incursion is one too many. Thankfully, we are not discussing accidents,

but instead near-miss events in an environment of more than 52 million takeoffs and landings a year. It is clear the system is under strain, and we need to aggressively pursue solutions to stop these events.

The Return to Normal is Not Complete

With demand returning significantly quicker than anticipated, the post-COVID return to air travel changed the compositional makeup of the workforce, created a massive training and reallocation of pilot labor, and created strains on incumbent employees across the system. To ensure these dynamics do not interfere with system safety, it is important that a “back to basics” philosophy continue to be a core part of industry culture.

For pilots, the combination of “early out” retirement inducement programs, carrier allocation of pilots during COVID, and record mainline hiring in 2022 created changes in experience, pilot availability, and movement between seat and aircraft. While the “early out” retirements have drawn considerable attention, the main effect was to reduce carrier costs during COVID, accelerate retirements relative to the baseline for 2021–2023, and enable younger pilots to remain in the system. With the approximately 3,800 early retirements in 2020 primarily for pilots between the ages of 62 to 65, there was some ripple effect down the ranks as pilots backfilled those positions, particularly for long-haul routes. However, most of the early out pilots would be retired by this point, so the effect is near its end, as retirements begin to stabilize and return to their pre-pandemic, forecasted levels.

More significantly, carrier decisions during COVID on pilot utilization related to aircraft and fleet management created a large training event across the pilot ecosystem. Given low demand, most carriers parked planes, bumped pilots off larger aircraft to smaller aircraft fleets and types, furloughed during the lapse of the first Payroll Support Program (PSP), and placed pilots on inactive status. Given pilots are a seniority-structured profession, this resulted in a massive, across-the-board reallocation of pilots. At the time, such decisions likely seemed reasonable to carriers as the industry, manufacturers, and analysts predicted an approximately three-to-five-year recovery lag. However, because demand returned significantly quicker than predicted, airlines had to reverse these decisions and effectively retrain nearly every pilot, sometimes back to the equipment they flew prior to the pandemic, while accommodating *new* pilot hiring due to substantial post-COVID growth. By not keeping all of their pilots up to date on recurrent training requirements and allowing pilots’ currency to lapse due to their inactivity, pressure was put on other pilots who were working hard to support the needs of the airlines. The massive retraining episode shuffled pilots between aircraft fleets and types to accommodate relatively junior pilots replacing senior positions and incoming pilots to accommodate carrier growth. This dynamic has played out across the industry, as new hire ramp workers, flight attendants, controllers, mechanics, and other safety critical personnel enter the industry.

With all the changes and newly emerging challenges in the post-COVID operating environment, it is clear that there is a need to re-focus on key aspects of the operations. Put simply, there is a need to get back to the basics. Many of the near misses can be avoided when all parties adhere to the fundamental principles taught in training, such as focusing on the task at hand, minimizing distractions, and using all available resources. Given the large number of new hires, in particular, a “back to basics” mentality has emerged as part of the training and onboarding of many new employees industry wide.

How the Safety System Works

Safety tracking and risk identification and mitigation systems are at work at the airline, airport and enterprise level. At the airline level the focus is on safety management systems (SMS). SMS is used to identify, address, and reduce organizational and systemic risks. The goal of SMS is to identify active failures and inadequate defenses so that hazards can be contained while preventative measures can be reinforced. SMS adds value to an organization’s safety structure by identifying hazards and mitigating risks before they develop into full accidents. The systems are complex and require assessments of human factors and their relation to other workplace components. The most successful SMS incorporates a collaborative effort between the organization, labor, regulator, manufacturers, and other stakeholders to build a robust and diverse SMS team.

One of the foundational activities in SMS is the use of voluntary disclosure programs, where pilots and other front-line workers can anonymously raise safety concerns through an aviation safety action program report. Airlines with a healthy and positive safety culture will receive a significant volume of reports. On a recurring basis the airline management, pilots, and an FAA representative review all reports

to determine what lessons can be learned and how to address the safety risk identified. It is this continuous evaluation of new risks and hazards that is core to safety management systems. Within the context of the FAA reauthorization, Senator Capito's efforts to expand protections for deidentified volunteer reports across all voluntarily submitted flight safety information sent to the FAA would both increase the volume and depth of data for identification and risk mitigation.

The safety system is at work at the airport level where collaboration between air traffic controllers, pilots, airport leadership, the FAA and others takes place regularly. At each airport with an operating air traffic control tower, Runway Safety Action Teams (RSAT) review operational issues, concerns and risks. These meetings are FAA led, and ALPA participates as a partner. Airports with commercial airline services are just now beginning to implement Safety Management Systems due to the FAA's Final Rule on Airport Safety Management Systems promulgated in February of 2023. Requiring certain airport certificate holders to develop, implement, maintain, and adhere to an airport SMS we believe will further increase airport safety.

At the national airspace level there are multiple activities focused on improving system safety, including:

- Commercial Aviation Safety Team (CAST). ALPA continues to collaborate on consensus plans to eliminate safety hazards in partnership with the FAA and airlines. Collaboration allows for identifying improvements in training, procedural designs, and other aspects of an operation.
- Aviation Safety Information Analysis and Sharing (ASIAS). This safety group expands upon the commercial aviation focus of the CAST and includes both airlines and business aviation representatives. The key attribute of ASIAS is "big data" analysis. Using many different data streams, including in-flight developments, inputs from airlines, manufacturers, dispatchers, Air Traffic Control, and airports. Information is compiled and fused together so that data mining and analysis can be conducted. A critical aspect of this process is that data is deidentified so that individuals are not singled out. Instead, the focus is on trends, early warning signs, and being ready to take immediate action when the data shows that there is an issue that needs to be addressed. The FAA and industry evaluate trends monthly and will meet more frequently if needed. As part of ASIAS, the group will also initiate special focus projects that look at key recent events across the airspace system.
- Beyond CAST and ASIAS, there are numerous FAA headquarters and regional safety risk mitigation panels to address specific operational changes occurring on a daily basis. ALPA pilots bring real world experience to relay critical information directly to decision makers to ensure that risks and hazards are appropriately addressed. For example, this process at the FAA also includes the needed risk assessments for new entrant and commercial space operations.

These broad system-level safety activities are foundational to prevent near misses from becoming accidents. In some cases, these activities overlap. While that may seem duplicative, overlap is actually a critical piece of the safety net when the same operational change is discussed in two or three different forums. The continued efforts to ensure that safety data is evaluated for new risks and to ensure that the identified risks are adequately mitigated is very important.

Action Needed to Eliminate Close Calls at Airports

Many of the recent close call events have been in and around the airport operating environment and more focus is needed to mitigate such events moving forward. ALPA is primarily concerned with the close calls in the movement area of the airport, where FAA air traffic controllers manage the movement of aircraft and other surface vehicles. The following steps, at a minimum, must be taken:

- Surface safety systems need to be installed at all airports as soon as possible, regardless of the costs, given the urgency of the current situation. In the Fall of 2003, the Airport Surveillance Detection Equipment, Model X (ASDE-X) was deemed suitable for widespread deployment. It is unacceptable that 20 years later a surface surveillance system like ASDE-X is only installed at 35 airports around the country. That is woefully inadequate. Our air traffic controller workforce needs these capabilities at all airports. We rely on their complete understanding of the operations, and they must have the tools to fulfill their critical safety role. We strongly urge the Committee to eliminate whatever barriers the FAA identifies to rapidly expand surface surveillance to all airports with an air traffic control tower.

- Another legacy system that works extremely well is the Runway Status Lights (RWSL) system. Runway Status Lights tell pilots and vehicle operators to stop when runways are not safe. Embedded in the pavement of runways and taxiways, the lights automatically turn red when other traffic makes it dangerous to enter, cross, or begin takeoff. The lights provide direct, immediate alerts and require no input from controllers. Runway Status Lights are operational at 20 airports across the U.S. There is a critical need for expanding Runway Status Lights to more airports and to more runways. While the cost is high, if we are going to prevent near misses as well as accidents, the cost-benefit decision-making process must be reconsidered to aggressively pursue these safety advancements. For example, ALPA has identified 15 airports that currently have RWSL but do not have them installed at key runways and five airports that would benefit from the installation of an RWSL system.

FAA Call to Action and NTSB Surface Safety Roundtable Offer Possibilities

ALPA was selected as a co-chair of a new aviation rulemaking committee that will look at aircraft systems that can be used for increasing surface safety, wrong-surface landings and other safety risks that were the focus of the FAA safety summit. For example, flight deck enhancements are important for flight crews to increase situational awareness and receive alerts early enough to take action to avoid a near miss or an accident. The new rulemaking committee is just getting underway, and recommendations will go to the FAA after further evaluation and dialogue. The charge for the committee's work is that no stone should go unturned as we look to advancements in technology to help address these near miss events.

The NTSB's roundtable this May also represented an important opportunity to discuss safety with a diverse cross section of the industry and I thank Chair Homendy for her diligence on this topic. The NTSB highlighted that surface safety remains one of the longest outstanding recommendations for the FAA, that "back to basics" is a key piece of its future actions list, and expanding ATC and flight deck technology must be done without delay.

FAA Reauthorization Provides Opportunities

This Committee's bipartisan Federal Aviation Administration (FAA) Reauthorization Act of 2023 includes a number of important provisions to improve safety and prevent near miss incidents. First and foremost, 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:

- *Flight profile optimization (Sec. 405)*. By developing predictable, reliable and repeatable flight profiles that airline pilots can expect to receive, there are reduced safety risks because of an absence of the use of unpredictable routes and unanticipated operational changes.
- *STARS Remote Surveillance Displays (Sec. 406)*. By adding a remote surveillance display as a minimum level of equipment to all air traffic control towers, including FAA contract towers, safety will be improved.
- *ADS-B OUT Equipage Study; Vehicle to Vehicle Link Program (Sec. 410)*. By expanding the incentives for all aircraft in the airspace to equip with Automatic Dependent Surveillance-Broadcast (ADS-B) and to broadcast their position and other important information, safety will be improved.
- *NEXTGEN Equipage Plan (412)*. By identifying the needed upgrades to aircraft avionics, safety of operations can improve due to the increased quality of on-board navigation capabilities that pilots can utilize. Some of the airline aircraft need upgrades, and this section is key to identify what those upgrades should be. However, the provision fails to include pilot representatives as a stakeholder. Since pilots are using the NextGen equipage, we hope this can be remedied.
- *PBN Report and Utilization Plan (Sec. 413)*. Safety improves if Performance Based Navigation (PBN) can be utilized as the "baseline" navigation capability in the airspace. However, until aircraft equipage including necessary upgrades to certain aircraft can be accomplished, it will be virtually impossible to make this transition. Investment in a minimum level of equipage for the NextGen capabilities is a critical step and then the safety benefits will follow.

The system safety improvements that have created a much safer airline industry over the last 10 years did not come about by accident. They represent a vigilant

commitment between government, industry and labor to identify risk, mitigate it, and ensure the legal and regulatory framework is based on safety. The proliferation of near miss incidents requires continued resolve and collaboration based on a back-to-basics framework for the workforce, the immediate deployment of necessary runway, surface, and flight deck technologies, and the greater use of data, data sharing, and industry collaboration for hazard identification and risk mitigation.

Senator DUCKWORTH. Not bad. Only he had an extra 4 seconds. I now recognize former FAA Administrator, Randy Babbitt. Thank you.

**STATEMENT OF J. RANDOLPH “RANDY” BABBITT,
BABBITT & ASSOCIATES, LLC**

Mr. BABBITT. Thank you, Chair Duckworth, and Chair Cantwell, and Vice Chair Moran. Thank you for having me here today. I am pleased to be speaking today with you, with folks from the FAA, the NTSB, and labor in general.

And I was pleased to lead the FAA and ALPA in the past. I was a commercial airline pilot for a number of years. As ALPA President, I worked back in the day with Administrator Hinson to launch the FAA’s Aviation Safety Action Program. We also secured one level of safety, and that is when we moved part 135 operations and their regulations to comply with 121 operations.

We all at that point in time, we also required each of our ALPA pilot groups to establish and embrace professional standards. And as President Obama’s FAA Administrator, I worked with the FAA safety professionals, which had been—and we updated the pilot rest rules, which had been on the NTSB’s most wanted list for about two decades.

So, we got that done. We worked with carriers to implement the Aviation Safety Information Analysis and Sharing System. We advanced work with the commercial aviation safety team cast, which reported in 2008 that the risk in fatal commercial accidents had been reduced by 83 percent.

And all that work was done in conjunction and working together with all the parties. However, in mid-2009, I testified before this very committee after a tragic accident, and knowing we must do more to enhance aviation safety, I instituted a call to action, urging unions to focus on professionalism and professional standards committees.

We asked the carriers to adopt voluntary safety and data sharing programs. Data, when shared and acted upon, without fear and no retribution, is what makes us safe. And this remains critical as it is clear that what got us here today is not a guarantee it will take us into the future.

A lack of accidents today is simply not a good predictor of future accidents. Our environment is changing, and recent close calls and incursions are symptoms of strain. And I highly urge a strong refocus on professionalism, eliminating complacency if it can, and boosting crew resource management throughout our operations.

And as our operating environment evolves, the training of our professionals has to advance with it. Flight simulators can be used in structured training courses to accurately recreate the experience of flight operations and a fully immersive experience, forcing pilots to encounter aircraft malfunctions, rare events like rapid decom-

pression, emergency descents, high speed rejected takeoffs, dual engine failures, severe icing conditions, flight control malfunctions, full stalls, and doing all of this without placing any lives in danger.

Simulators also present the opportunity to incorporate actual accident and incident scenarios in training. Pilot should experience the factors that led to the accident and learn how to successfully recover so that such accidents never happen again.

The tools are here. It is backed by substantial data, and yet there is a hesitation to act. But the focal rule was never meant to be static. The Safety Act clearly directs that proper, “supplemental training may be used to offset flight time requirements when doing so brings us to a higher level of safety.”

And as knowledge and training techniques progress, additional training credit should be—and should be well used to improve, excuse me, both safety and skills. The FAA has followed up with two aviation rulemaking committees comprised of experts from across aviation, including ALPA, and the members of both arcs have unanimously supported supplemental training and recommended a curriculum to replace simple flight hours with advanced training and mentoring.

This guidance has not been implemented and in my opinion it should be. I am not alone in saying this. Our current Administrator has urged the adoption of modern training techniques like simulation.

And earlier, I joined with eight former FAA administrators and two former ALPA presidents, I happened to be in both buckets, to urge the adoption of tested and trusted new technologies to strengthen air safety.

We said in that letter, if scenario based simulator training was a routine part of gaining 1,500 required hours required for an ATP, we could require updating training and expose the kind of scenarios that have led to the recent rash of runway incursions and near misses.

We also said, as pilot training and technology evolves, it is the responsibility of the FAA and policymakers to evolve with it. Well, that concludes my message today, and I look forward to answering your questions. Thank you.

[The prepared statement of Mr. Babbitt follows:]

PREPARED STATEMENT OF J. RANDOLPH “RANDY” BABBITT,
BABBITT & ASSOCIATES, LLC

Introduction and Background

Chair Duckworth, Vice Chair Moran, and members of the Commerce Committee, thank you for inviting me here today to review current safety issues and the state of aviation safety today.

I am pleased to be here today alongside individuals from the FAA, NTSB, and representatives from organized labor. I am here today as a private citizen and safety consultant, and as a frequent user of a system that has become as safe as it has today thanks to the tireless work of thousands of professionals from air carriers, labor representatives and frontline employees, as well as the FAA and the NTSB, in advancing safety. As I have noted before, history has shown that we are able to implement safety improvements far more quickly and effectively when the FAA, industry, and labor work together on agreed upon solutions.

Throughout my career, including my years as a commercial airline pilot, I had the pleasure of experiencing this work up close and personal. For example, when I served as the President of the Air Line Pilots Association (ALPA) for eight years in the 1990s, I worked with then FAA Administrator David Henson on what would

become known as the Aviation Safety Action Program (“ASAP”.) Working together, we saw ASAP developed by the FAA and implemented nationwide. Later in my tenure at ALPA, I pressed for “One Level of Safety,” bringing Part 135 operator standards for commuter carriers up to Part 121 standards. Achieving this marked a major step forward in aviation safety. During my time at ALPA, we pressed forward internally and required all ALPA pilot groups to have Professional Standards Committees. I was also a member of the FAA’s Management Advisory Council (MAC) for a decade, chairing the MAC for two years. I joined more than a dozen aviation professionals from public and private sectors on the MAC serving in a voluntary capacity to help ensure our airspace remains one of the safest and most efficient in the world.

Later, I was appointed and confirmed as the FAA Administrator, and I was honored to serve the Agency and the public for 2½ years. There I joined a group of dedicated safety professionals who were doing impressive work. Together, we achieved some very important safety milestones, including critically needed updates to Flight & Duty time regulations, something that had been on the NTSB’s Most Wanted list for nearly two decades at that time. Working with our air carriers, we also refined and implemented the Aviation Safety Information Analysis and Sharing (“ASIAS”) system.

A Call to Action

In 2009, in my role as FAA Administrator, I came before this Committee to discuss a “call to action” in the face of a crisis following a tragic accident. We issued a “call to action” and brought in the heads of all the major pilot unions to instill the need for increasing professionalism. We urged better utilization of each air carrier’s Safety Committee and Professional Standards Committee. The response was excellent, and carriers responded with helpful feedback and worked with their committees to support the initiatives. We built on earlier work of the FAA, labor, and industry including the Commercial Aviation Safety Team (“CAST”.) Developed in 1997, CAST created an integrated, data-driven strategy to reduce the commercial aviation fatality risk in the United States and promote new government and industry safety initiatives throughout the world. By 2008, CAST was proud to report the risk in fatal commercial accidents had been reduced by 83 percent.

I’m proud of the progress we have continued to make in the years since the 2009 “call to action.” I am even more proud of the work my colleagues at the FAA, and the professionals at every FAA since, have made on the principals that matter most to aviation safety: the sharing of information and data without fear; whether that is from front line employees to management, or management to the FAA or airline to airline. It is data, when shared and acted upon without fear, that makes us safer.

This work is critical because it is clear to every aviation safety professional that what got us to today’s unprecedented level of safety will not get us where we need to go. Today’s system is very safe, but we cannot measure safety by a lack of accidents. The lack of an accident today is simply not a predictor of a future accident or lack thereof tomorrow.

Today, the increasing amount of traffic from drones and the forecast for autonomous operations adds volume and complexity to the air traffic control system. Rapid changes in our aviation system are taking place, even as there are signs, in the form of incidents and incursions, that show the system may be straining under its existing traffic.

This presents a different kind of crisis and a different “call to action” is needed. While programs like free flight have the potential to vastly modernize the system and significantly reduce delays and traffic conflicts, a review of recent incidents and near collisions puts a bright light on the need for additional focus on professionalism, eliminating complacency and a renewed focus on Crew Resource Management (“CRM”) at our carriers.

A current state “call to action” would be perfectly in order for the new FAA Administrator, the Honorable Michael Whitaker. This “call to action” would ideally bring together leadership from our pilot and controller unions along with safety committees from the various carriers and the FAA, taking additional input from the NTSB, to review a range of areas where improvements can be made to aviation safety.

Modern Training for a Modern System

Modernizing the overall aviation operating environment and the training of its professionals is critical for sustaining and advancing aviation systems and is a crucial component of this needed “call to action.” Today’s sophisticated flight simulators, when used as part of a structured training program, can play an important role in advancing safety.

Broadly, the aviation industry is moving to performance-based training rather than prescriptive training. This reflects that the way people learn has changed as well as the increasing sophistication of modern tools and technology. New technology, particularly simulators, allows high-fidelity training for events that we never could have trained to in the past using an aircraft, for example, stall recovery. Flight simulators can be used as part of a structured training course to accurately recreate the experience of flight operations in a fully immersive experience, forcing pilots to encounter aircraft malfunctions, including rare events like rapid decompressions, emergency descents, high-speed rejected takeoffs, dual engine failures, severe icing conditions, flight control malfunctions and full stalls, all without placing any lives in danger. Simulators also present the opportunity to incorporate actual accident and incident scenarios into pilot training.

Furthermore, the newest simulators have advanced in quality yet are much less expensive to purchase and operate. Use of simulators and structured training could therefore lower barriers to entry into the profession and open up high quality training to a wider group of aspiring pilots.

Incorporating this type of realistic training and experience in a structured and controlled way will add to the existing margin of safety in commercial operations.

We now have qualitative methods to measure actual transfer of knowledge. We can determine proficiency based on performance, not just on the number of hours of training. In 2009, the FAA advanced an ANPRM aiming to incorporate training best practices and tools so that all operators could use the upgraded standards.

Simulators also present the opportunity to incorporate actual accident and incident scenarios into training. Pilots should experience the factors that led to accidents and successfully recover, so that such accidents can never happen again. There should be a continuous feedback loop so that as new errors, whether they be mechanical, environmental, or pilot-induced, from FAA and NTSB investigations and recommendations, are rapidly incorporated back into training. As a current example, we could now require updated training on the kinds of scenarios that have led to recent runway incursions and close calls.

The tools are here—supported by substantial data. However, there has been a hesitancy to move, in some cases borne of fear that advancing pilot training would conflict with the FAA's 2013 First Officer Qualification rule (FOQ), or the *Airline Safety Act of 2010* which mandated the rule. However, direction from and language in the developed in the *Safety Act* clearly provides that proper "Supplemental Training" could be used to offset flight time requirements, where that training offers a higher level of safety than accumulating flight time. Additionally, that rule was not meant to be static. As knowledge and training techniques progress, new training providers should be considered, and additional training credits should be allowed when they can be demonstrated to improve safety.

The FAA has indeed followed up and chartered two Aviation Rulemaking Committees ("ARC") in 2013 & 2021. The ARCs in both cases were well-staffed and represented with input across the industry, including the Air Line Pilots Association. The results received unanimous support from the members of the ARCs of both timeframes and both acknowledged the value of supplemental training.

Both ARCs laid out a draft curriculum that effectively substitutes advanced training and mentoring to replace simple, single-engine flight hours. Notably, the FOQ does not focus on training but simply adds an arbitrary level of flight hours required to enter Part 121 Operations as a pilot. Further, neither the FAA nor the NTSB found any value in the FOQ hour mandates and have so stated.

Aviation has a long history of well qualified people and organizations seeking changes to improve training and better use of simulation. I'm pleased to note that one of those well-qualified people is the Honorable Michael Whitaker, our current FAA Administrator. In his paper on "The Evolving Role of Training in Aviation Safety" written April 21, 2015, he highlights the need to adopt more modern training techniques and embrace the advantages of modern simulation to supplement traditional training. I believe that is even more important and pertinent today.

Military and Global Gold Standards

More than a decade has passed from the date the *Safety Act* was passed and far better programs and training equipment are now available to produce better trained pilots.

Pilot training and simulation technology advances have prompted the U.S. Air Force to more than triple the amount of simulator training for its new pilots. Policy-makers and the FAA hold military pilot training and fight experience in such high regard that a pilot leaving the military for an airline pilot job needs only 750 hours of total military time instead of the 1,500 hours required for an Air Transport Pilot

certificate. In effect, credit is given for the superior training provided by the military, which includes significant emphasis on simulator training.

Looking abroad to the European Union, where air carriers have excellent safety records and currently operate in and out of dozens of U.S. airports, I have had recent communications with flight operations and training people from Lufthansa and have reviewed their Ab Initio training program. Their current system has fully trained pilots going on the line with around 400 total flight hours.

Modern instructional methods and equipment being embraced by our military as well as international air carriers with enviable safety records, allow them to train pilots in far less time and with lower carbon footprints through better use of simulation and training curriculum. The result is better trained pilots. Aviation experts, both domestic and international, know that little is learned in flying solo in a single engine light aircraft when compared against a robust curriculum with a syllabus that includes simulation of emergencies, weather, and crew resource management in a multicrew environment.

I am not alone in saying this. Earlier this fall, I joined a letter to this Committee that was authored by a total of eight former FAA Administrators and two former Presidents of the Air Line Pilots Association (I count myself twice because I'm in both of those buckets). We share the view that the adoption of tested and trusted new technologies will strengthen American airspace safety.

Quoting from that letter¹, we said "Simulators also present the opportunity to incorporate actual accident and incident scenarios into training . . . There should be a continuous feedback loop so that new errors, whether they be mechanical, environmental or pilot-induced, from FAA and NTSB investigations and recommendations, are rapidly incorporated back into training. For example, if such scenario-based simulator training was a routine part of gaining the 1,500 hours required for the ATP, we could now require updated training on the kinds of scenarios that have led to the recent rash of runway incursion near-misses."

We also emphasized: "as pilot training technology evolves, it is the responsibility of the FAA and policy makers to evolve with it."

Conclusion

Aviation is a business where one mistake is one too many. The United States continues to enjoy an extremely high level of aviation safety, and the continuation of that level of safety relies on each of us setting aside differences and coming together to make changes that allow us to constantly stay ahead in a changing environment. Incorporating modern tools, technologies and training, and continuously advancing each, is an important component of that work.

Chair Duckworth, Vice Chair Moran, Members of the Committee, this concludes my prepared remarks. Thank you again for inviting me to discuss the state of aviation safety today, and my views on areas where we can improve it together. I look forward to discussing and answering any questions you may have.

Senator DUCKWORTH. Thank you, Mr. Babbitt. I will now recognize myself for 5 minutes of questions. As you know well, addressing pilot fatigue was a high priority issue for the FAA under your leadership.

In December 2009, then FAA Associate Administrator, Margaret Peggy Gilligan, testified before this very committee that, and I quote, "we believe," this is quoting her, "we believe that it is critical, whenever possible, to incorporate scientific information on fatigue and human sleep physiology into regulations on flight crew scheduling. Such scientific information can help to maintain the safety margin and promote optimum crew performance and alertness during flight operations."

More importantly, FAA acted in late 2011 to publish new rules on pilot fatigue, which many, including the then Chair of NTSB believe was a contributing factor to the deadly, tragic, and preventable Colgan crash that killed 50 people in early 2009. FAA rules were common sense, limit the amount of time pilots can be on duty

¹ A copy of the full letter is attached as an addendum to my testimony.

and pilots flight time, and implement a minimum requirement of rest before duty day.

Chair Homendy, you recently stated, and I quote, “when it comes to these recent high profile aviation incidents, mistakes by air traffic control, flight crews, or ground personnel are sometimes cited as a contributing factor, but is it really human error when 96 percent of your workplaces are exhausted and don’t have adequate staffing?”

Chair Homendy, is it time for FAA and Congress to reexamine and update rest rules that are tailored to optimize air traffic controller performance?

Ms. HOMENDY. Well, it isn’t just the number of hours, it is the scheduling practices. And then if you are already short staffed, then you have people who are working mandatory overtime, 6 days a week, 10 hour days. And then when you look at the schedule, it is a constantly rotating schedule.

I have one from one event, a scheduled for a week from one event that we are currently investigating. You have got two evenings, a morning shift, another evening shift, another morning shift, a day off, an evening.

All of that can impact your circadian rhythm. So, and then where you end up with that is distraction, fatigue. You are missing things. You are forgetting things. That is all an impact.

Senator DUCKWORTH. I feel like, you know, what was taken as the minimum amount of rest has now become the standard way that we schedule folks, and I don’t think that that is sustainable.

President Santa, could you share the air traffic controller workforce perspective on why rest rules are needed to better protect ATC crews and the flying public?

Mr. SANTA. Thank you for the question. It comes down to the redundancy and the resiliency of our staffing. We are so short staffed in most or many of our facilities that service air travel right now, that we don’t have the opportunity or the capacity to have a 5-day workweek with 8 hour days.

The norm, like you said, keeping the system active, keeping the capacity at the level that it is expected to be requires 6 day workweeks and 10 hour days due to the fact the hiring, FAA’s model hiring and what they produce on the controller workforce plan has exasperated the situation, resulting in 1,000 fewer controllers and this elevated aviation upturn.

It is unsustainable and needs to be changed through FAA reauth, because the FAA has been unwilling to collaboratively involve these new processes.

Senator DUCKWORTH. Thank you. If Congress’s primary role in passing the Airline Safety Act of 2010 was to prevent future Colgan area type disasters, one must recognize that it has been a success, starting with a 99.8 percent reduction in part 121 fatalities since the enactment—since when the rules went into effect.

We must never take the post Colgan safety system for granted, and that is why I strongly oppose tinkering with the 2010 law statutory requirements, including the 1,500 hour rule.

Now, I as a military pilot, I flew simulators, and I agree. If you have six degrees of motion full immersion simulators, that is an immense tool and a very useful tool. But I do think that if we just

substitute some of the 1,500 hours and just say structured simulator time, but don't specifically say what type of simulator, what kind of training that is going to be—you can burn holes in the sky in a simulator just as well as you can burn holes in the sky in a 152.

So, I think we need to be clear when we say let's talk about simulators, that we are talking about full motion, six degree, full immersion simulators and not Microsoft Flight Simulator sitting in a hotel ballroom someplace.

Our safety management system protocols do not appear to be accounting for new risks in our system, and the aggregate of these risks are just less experienced workforce and pervasive air traffic controlling—control shortages.

Mr. Ambrosi, at a time when we have a 737 and a 767 flying within 100 feet of each other, and every other month seems to bring new chilling runway incursion or near miss, would you agree that the most prudent and safest course of action would be to add additional experience and training requirements rather than seeking to weaken or water down to 1,500 hour rule?

Mr. AMBROSI. Well, thank you for the question. Absolutely. It is an all of the above. You need that real world experience, as well as better training. So, it is an all of the above.

Senator DUCKWORTH. I do think that what we can do is, as you are trying to get to that 1,500 hour rule, we could break that down. And so, you actually need a certain number of IMC hours, you need a certain number of, you know, cross-country hours and be very specific in that, which is what happens in the military, which is much more structured than the average person trying to get to 1,500 hours at the local FBO. I am out of time—over time. And with that, I will recognize the Ranking Member Moran for his questions.

Senator MORAN. Chairwoman, again, thank you. Mr. Santa, thank you for highlighting the importance of no shutdown.

It ought to be evident, but you outlined a number of serious things that can and will happen if we fail to come together. And again, while we are trying to get ahead of the problem, this would put us behind the ball one more time.

So, thanks for bringing that to our attention, to my attention, and we will work to try to avoid any kind of gap in funding. And Chair Homendy, thank you for reminding me. I am a new member of the Transportation HUD Appropriations subcommittee, and I will take your suggestion and your request at heart.

It is not always that I get asked to follow the House lead, but I appreciate you bringing that to my attention as well. Mr. Arel and Mr. Santa, last holiday season, we experienced some significant operational, really a meltdown, across the U.S. airspace.

That was exacerbated by NOTAM system outage, which we have working to solve with legislation as well. It led to thousands of cancellations. What can I tell my constituents and Americans about what to expect this holiday season with Thanksgiving approaching and the winter holidays just around the corner?

Mr. AREL. Thank you, Senator. I can assure you that we have been working collaboratively with both labor and industry to ad-

dress the issues that were highlighted during some of the more challenging times last holiday season.

Of course, we had a significant weather event that was unprecedented in some ways with the deep freeze that immediately followed the snowstorm that had occurred. I just met recently this week with all of my counterparts across the airlines. They are in a much better position as far as their overall staffing, their operational control, and the amount of coordination they do with the FAA.

Additionally, while we are working to prioritize and train as many controllers, hire and train and certify as many controllers as possible—while we have a long way to go, many of the facilities are much healthier than they were previously.

And then we work collaboratively, to the extent possible, to have as many people in place to support those peak holiday periods. Once we were through the Christmas and New Year holidays last year, the follow on holiday travel periods where we see that peak in demand, we were much smoother, had much less interruptions.

We certainly had some challenging weather events that we don't expect traffic to fly through, but overall, the recovery from each of those weather events, generally speaking, were 1 day recoveries versus the multi-day type of recovery that you saw last year. We feel in a much better position than we did last year, and we are continuing to get better.

Mr. SANTA. Thank you for the question. I am going to assume that the Government doesn't shut down because that changes everything.

Senator MORAN. Ironically, I was sitting here thinking, that is related to the shutdown. Just thinking that personally. I may need to be flying because I can't get home before—because of a shutdown during the holidays. So, this is not a personal question necessarily, but maybe.

Mr. SANTA. So, I am going to take the actual aspects of our situation and not the changes in weather in this situation, because we are not healthier than we were last year controller wise. I think FAA's numbers indicate we have potentially six more air traffic controllers than we had last year systemwide.

That is not an expansive increase of what we need. We are at, if I can get the numbers here—our certified air traffic controller number right now is 10,721. Using their decade old number, we should be at 13,097, and using the new collaborative resource work group number, we should be at 14,335. It is an unhealthy system that needs maximum hiring by the FAA's own admission for 10 years to get us to the old number.

Ten years of maximum hiring at the current throughput to get us to a 10 year old number. At that point, it would be a 20 year old staffing number in our facilities.

Senator MORAN. What role does that the size of the class and the capabilities of training and education in Oklahoma City at the Air Traffic Control Training Center, what role does that play in the lack of necessary air traffic controllers?

Mr. SANTA. I do admit, I think the capacity is right around 1,800, potentially to 2,000. And if they are working to try to increase that along with us, moving some of the ancillary things out of Oak City.

But the more throughput we get, the more controllers that we can hire, the more success we will have sooner. We cannot unqualify the standards or the professionalism or the expectation that when you certify in a facility, you are capable in doing this most challenging profession at the highest level. So, challenging, but more throughput is needed.

Senator MORAN. Without changing the qualifications. There is nothing wrong. In fact, it is very helpful to increase the size of the class?

Mr. SANTA. Absolutely. If we can increase the throughput without changing the qualifications, it is much needed.

Senator MORAN. Thank you.

Senator DUCKWORTH. Chair Cantwell.

The CHAIR. Thank you. Thank you, Madam Chair. Captain Ambrosi, pilots have rest requirements. Why is that?

Mr. AMBROSI. Because we need rest. We absolutely need rest. And, you know, out of the 2010 bill, there were a lot of reforms, not just pilot training, but we went to a science-based fatigue, flight and duty time rest rules about 8 years ago, and it has been a success because now it is based on science, not some arbitrary number where it limits our duty day instead of just flight time.

But, you know, having an adequately rested pilot or controller or anyone that is a frontline worker is essential.

The CHAIR. Well, that is where I was going, because to your side there is the Chair of the NTSB, and she is saying she is worried about their fatigue level. So, as a captain, you are worried about the air traffic controller fatigue system?

Mr. AMBROSI. I think Rich is probably better to comment on how their scheduling goes, because I am not an expert in air traffic control scheduling. But I can tell you as a pilot, our rest is essential. So, I would imagine it would be similar for them.

The CHAIR. Thank you. So, I wanted to ask about this also—did you want to make a comment about that, Mr. Santa? OK. The air surface detection equipment model.

One of the things the technology does do is it helps illuminate the risks and certainly in a busy environment and certainly one in which people are paying attention to lots of different things, the fact that it can be a more illuminating visual so that it is getting people's attention is also part of this system.

We have, in the Senate bill, increased the funding \$18.2 billion over 5 years, an increase that would put money to, as I said earlier, upgrade all the large and mid-size airports. I am assuming all of you support this investment, but if you could just give me a verbal.

Ms. HOMENDY. Yes, but we would always also like technology in the cockpit of an airplane.

The CHAIR. The same technology you are saying?

Ms. HOMENDY. There is direct alerting technology to pilots that can alert them that they are on the wrong runway, that they are on a taxiway, or that there is something in front of them.

The CHAIR. OK. Just down the line of support, do you support this language that is in the bill?

Mr. AMBROSI. Absolutely.

Mr. SANTA. Absolutely, thank you.

Mr. BABBITT. Absolutely.

Mr. AREL. Yes, Senator.

The CHAIR. OK. So, it takes—my understanding is it takes almost a year to get all this implemented, even if we got this bill passed right now. So, I am assuming, Chairwoman Homendy, that you think this is something we should work with and dispatch to get this technology deployed as soon as possible?

Ms. HOMENDY. Absolutely. It has prevented some almost accidents. And so, we need the technology. Again, we need technology for air traffic controllers, but we also need technology in the cockpit of airplanes.

The CHAIR. But the situational awareness. I think, Mr. Babbitt, back to the original Next Gen days, the whole concept about NextGen is to digitize our system off of the radar system, but the whole aspect of it on the ground that would also give you situational awareness was one of the things trumpeted by the bill.

And we can sit here all day and probably think about why we are in this situation of near misses. I think you described it accurately. You are coming out of the COVID and re—you know, ramping up in traffic.

We have situations where we don't have the workforce that maybe we—would give us the rest time. But we do know that we have technology solutions, that if we just got them deployed, this would help.

Ms. HOMENDY. Well, and usually what I hear when I talk about technology is, it is too expensive, and we don't have the resources. We have to give the FAA the resources to invest. They need those resources. So, we are strongly supportive of giving them the funding that they need to succeed at their jobs.

The CHAIR. Thank you. Thank you, Madam Chair.

Senator DUCKWORTH. Thank you, Chairman Cantwell. Next to speak will be, Senator Sinema, recognized for 5 minutes. She is via remote.

We can move on to the next Senator who is waiting to speak and come back to Senator Sinema when she is available. I also have Senator Thune. Is he available? We are running all over the Capitol today, all of us in and out, so.

**STATEMENT OF HON. KYRSTEN SINEMA,
U.S. SENATOR FROM ARIZONA**

Senator SINEMA. Madam Chair, can you hear me?

Senator DUCKWORTH. Now I can. Senator Sinema, you are recognized for 5 minutes.

Senator SINEMA. Wonderful. Thank you. I apologize for the technical difficulties. Thank you to each of our witnesses for joining us today.

Aviation safety is the FAA's mission, and I have long stated that the United States needs to remain the gold standard of aviation safety. To continue to set that gold standard, we need to continue to utilize all the tools available to us and hold hearings like this one to discuss opportunities to advance aviation safety.

I appreciate the Committee's emphasis on not simply maintaining safety, but innovating to improve our national airspace. The number of near misses makes it clear that now is the time to act

to improve safety. It is unacceptable to wait for a tragedy that forces into action.

We have heard a lot today about how essential simulator technology is for training air traffic controllers because it allows hands on training for emergencies and unforeseen events without endangering actual aircraft.

In fact, the FAA specifically called for updating simulator technology for air traffic controllers in response to recent near misses. We should all have the same desire to use the most advanced technologies to update our pilot training rules, and we should make sure that the 1,500 hours of pilot training provides the best and most practical training available in order to maximize safety.

Administrator Babbitt, you joined each of our other Senate-confirmed FAA administrators since 1997 and two former ALPA presidents in a letter arguing that advanced flight simulator technology is required to ensure the best training outcomes. Your testimony today reiterates the need for training to evolve with technology.

Can you explain why modern advanced flight simulators are essential to modern pilot training, including the unique ability to practice avoiding near misses and dealing with other emergencies?

Mr. BABBITT. Thank you for the question. And yes, I think it is incredibly important. I think what you have in modern simulation today is the ability to recreate or repeat events that have already happened.

You can put people in situations that you would never put them in, in a real airplane. You would not take an airplane into heavy icing conditions. You would not do the—but you can do things you can simulate.

For example, a clearance that clearly was a conflict and you have to abort. Show the pilot how that happens. What happened, what went wrong, did anybody learn something from this? Let's not do it again.

And those are the types of things that immersive simulation can do. And we have the capacity to actually have controllers control airplanes on radar scopes and in simulators together so they can practice these things.

And I think it is a terrific advantage. I think it enhances safety greatly. If you have already seen a maneuver two or three times and know which got—you know what got you into it and how to properly get out of it, I think that is a great benefit.

Senator SINEMA. Well, thank you. Now, Chair Homendy, has the NTSB ever made a safety recommendation to the FAA based on a relationship between the exact number of hours spent flying an aircraft versus using other kinds of structured training programs?

Ms. HOMENDY. No, Senator, we have not.

Senator SINEMA. Thank you. Now, Chair Homendy, do you agree with each of the former FAA administrators and Administrator Whitaker that based on your experience at the NTSB incorporating the most advanced simulator technology into structured pilot training programs may play a role in improving safety outcomes?

Ms. HOMENDY. Yes, there is a role for technology. What doesn't exist is the safety data to show how much sim time, and how much actual flying time is the right amount, so.

Senator SINEMA. Thank you. Now, Mr. Santa, as discussed here today, air traffic control's staffing is an integral component of our safety in our national airspace.

I understand the FAA has the authority for direct hiring of individuals into en route and terminal facilities from FAA certified colleges and academies such as Arizona State and Embry-Riddle Tech Universities. Now, I could do this by reviving the Collegiate Training Initiative or CTI Program.

You, yourself went through the—went from the Community College of Beaver County through CTI and were directly hired into a chronically understaffed facility.

Do you think the FAA should establish a program like this to direct hire into facilities to supplement the staffing of our facilities across the country?

Mr. SANTA. Thank you for the question. It would certainly be valuable to increase the throughput and subsidize the academy, but as I said before, the standards can't be lessened by those schools and the oversight needs to be maintained.

Senator SINEMA. Thank you. And my last question. Mr. Santa, today at most airports, controllers still use paper flight strips to keep track of flights. I have actually seen it myself in Arizona. The FAA's Terminal Flight Data Manager Program, or TD—TFDM is modernizing the system and will increase controllers situational awareness to allow them to better handle fluctuations and traffic volume in changing weather.

Unfortunately, due to budget constraints, the FAA recently reduced the number of airports that received this important technology from 89 down to 49, including removing four airports in my home state of Arizona.

Could you talk about how TFDM reduces operational safety risk by increasing controllers' heads-up time and why controllers at all these airports will benefit from TFDM?

Mr. SANTA. It is not only TFDM, but it is all modernization installed. And every tool and every implementation of new, collaboratively determined technology helps our controllers with separation, surface surveillance, management of traffic and capacity. And my latest—my most recent data says it is down from 89 to 32 sites due to lack of funding. So, it continues to track down due to lack of funding.

Senator SINEMA. Thank you, Madam Chair.

Senator DUCKWORTH. Thank you, Senator. I now recognize Senator Klobuchar for her 5 minutes.

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

Senator KLOBUCHAR. Thank you very much. Thank you to all of you. We have a—I am trying to get the video on here. There we go. We are in the middle of a big judiciary hearing, so. I appreciate the ability to ask some questions via video. We have seen an alarming number of close call incidences on airport runways throughout the year. And these incidences are preventable.

We all know that because we go—have gone for years without incidents like this. The NTSB has called for the expanded use of airport technologies to mitigate the risk. I have an amendment to the

FAA bill to direct the FAA to issue recommendations on cockpit alerting technologies that directly alert crews and pilots of potential incursions to prevent these near misses.

How can equipping pilots with technology prevent runway incursions and close calls? And I would ask that of you, Ms. Homendy.

Ms. HOMENDY. Yes. Thank you very much. And it is one of our oldest recommendations going back to 23 years. I mean, the reason why you have cockpit alerting is if the controller misses something. And if the controller misses something, then something can alert the pilots to take action.

Senator KLOBUCHAR. OK. Thank you. Mr. Arel, can you discuss why cockpit alerting systems are important and when we can expect a requirement from the FAA?

Mr. AREL. Thank you, Senator. As an air traffic controller and within the air traffic organization, that would be outside our area of expertise or responsibility. I can—I would defer to our—my colleagues in aviation safety on the regulatory side or anyone with the flight tech area of concern.

Ms. HOMENDY. Senator, may I?

Senator KLOBUCHAR. Yes, you could. And then I have to go in to vote in this markup right now, and they need me there in person. So do you want a quick answer and then I will go in there.

Ms. HOMENDY. Oh, understood. We—this is the same thing we saw in 2007. There were a number of runway incursions, including in O'Hare and then Seattle. And then a terrible tragedy occurred and 49 out of 50 people on the plane died. At that point, we issued recommendations for technology. It is critical to save lives.

Senator KLOBUCHAR. OK. Very good. I appreciate that and I am going to follow up in writing. And thank you, Madam Chair, for giving me this opportunity. Thank you.

Senator DUCKWORTH. Thank you, Senator Klobuchar. I do not have any other Senators in line to ask additional questions at this time, so we are going to begin a second round of questions. I want to follow up the simulator discussion.

There are already multiple ways to get to the ATP requirement under the 1,500 hour rule. If you are a military pilot, you only need 750 hours because of the very structured training you get as a military pilot and the use of full motion simulators.

If you graduate from a 4-year aviation school, many of which are very good ones in Kansas by the way, for my Ranking Member, then you only need 1,000 hours because of that good, structured training and the simulators that are used. If you go to a two-year program and get an Associate Degree in aviation, you only need 1,250 hours.

Where we are right now is this discussion on the 1,500 hour rule is to—is there is a difference in opinion of what exactly is a simulator. You can't just say structured flight training in a simulator will qualify you one-for-one, zero sum game.

Every hour you fly on a simulator, you can deduct an hour away from the 1,500 hour rule, especially if you don't define what type of simulator. And that is the key thing, because there is a hesitation to act because we know in industry, or at least in some carriers, they will fail to use simulator time effectively.

Look no further than the Colgan incidents where they—they have simulators, but in the NTSB's accident report from the Colgan incident, it was found that Colgan Company training did not have part of their training syllabus for simulator training at the time of the accident, procedures for how to deal with a stick pusher system to overcome the icing condition.

And they were never taught that, even though they had simulators. I think that if we are going to talk about simulators, then we need to specifically say, full motion, full immersion, level D flight simulator.

Mr. Ambrosi, rather than pitting simulator training against real world flight hours, would ALPA support FAA establishing additional simulator training hours requirements that would ensure all ATP certificate holders, in addition to earning at least 1,500 flying in an aircraft, gain a minimum level of experience training in level D full flight simulators that are equipped with software capable of accurately recreating flight conditions for the most daunting and dire emergency situations?

Mr. AMBROSI. The short answer is yes. But if I may, Congress and through this FAA 2010 bill has created the safest system out there. We have a 99.8 percent reduction, as you indicated earlier.

So, also in that bill, Congress had the foresight to say, if technology comes along, there is a process to look through, as was testified earlier. So, legislate—there needs to be no change to the legislation. We are in the right place here. It is an all of the above. I completely agree with you on the level of simulation.

Our airline—there are industry today that are already trying to walk back that level of simulation that you just discussed by saying maneuvers that were intended to be done in a full flight, six degree in motion simulator are now being performed in a level 7 training device.

So, if airlines are already trying to save money by walking back what is already in that, I agree with your sentiment that we need to absolutely make sure that any simulator training is performed in the best simulators.

Senator DUCKWORTH. Thank you. Mr. Babbitt, you are nodding. I mean, I will give you a chance to say something about it.

Mr. BABBITT. Well, I agree completely. I think we have the technology today to do all of the various things you have discussed. But I also would note for the record that there are places where different types of simulation become important.

So, for example, the first day that you have gotten out of ground school, and you are going to go into flight training, you need to sit in a \$17 million simulator to figure out where the switches are? No, you don't.

You can sit in the stationary device and learn. Does that count the same? No, it does not. But I would add that it is helpful. But later simulation, I do think, and the arcs that we have seen, both of them have curriculums that discuss the maneuvers and the quality of the simulation, and it is spelled out. And I agree with Captain Ambrosi that it is right in front of us. We just need to adopt it.

Senator DUCKWORTH. It is. And the thing with those lower level flight simulators, they are appropriate for certain types of training.

When I—after I was wounded and I was working toward getting my private pilot's license, even though I was a commercial helicopter pilot, I had to learn to do takeoffs and landings. I fly with just my one left prosthesis on. I don't wear a right leg. And I had to learn crosswind landings. And we did that in a Redbird simulator, right. Various, you know, lower technology until I got good with it, proficient with it.

But none of that time counted toward the minimum amount of time that I would need. We don't subtract that time. That is in addition. That is why I, you know, I proposed to Experienced Pilots Save Lives Act, and my bill would actually build on being more clear about what type of training you need before you become a first officer with an ATP.

So, for example, I think we need 900 hours of cross-country flight time. 200 hours of that should be—200 hours total should be night flight time. 375 hours of flight time in the class of airplane for which you are seeking your rating. 75 hours of instrument flight time in actual IMC. 200 hours of cross-country flight time in an airplane as a pilot in command or a second in command, performing the duties of a PIC, while under the supervision of a PIC. 50 hours of night flight time.

We want pilots to have actual flight time experience that is relevant. We don't want them in at 152 burning holes in the sky. But you don't want to do that in a simulator either. And I think that is part of the discussion we have to have here is, how do we get to 1,500 hours? How do we get to that first officer seat in that commercial airliner, whether it is a regional jet, or a 737, or whatever that is, and we have to do that in a way that we put forth the best, safest pilots possible.

And I am concerned that we are doing a one-for-one swap without clearly stating—one-for-one swap in that 1,500 hours, without clearly stating exactly what type of simulator is being used and what type of training is being used.

And, you know, as Captain Ambrosi, Mr. Babbitt, would you associate yourself with my assessment there, that it is important to be specific as to what type of simulator and—

Mr. AMBROSI. I can tell you from industry, if you don't, or if you are not specific, they will go to the minimal.

So, we absolutely need to spell out exactly what needs to be done, and what level of simulation, and what structure needs to be to any training that you are referring.

Because if not, if you leave it nebulous and ambivalent, x credit for who knows what, they will make it a race to the bottom.

Mr. BABBITT. And I would agree. I think you made—you have to be crystal clear on—the quality of the simulation gets you so much. And as I mentioned earlier, the arcs have defined some of the—but I think one of the things that everybody should remember with simulation, you are teaching a technique.

Senator DUCKWORTH. Yes.

Mr. BABBITT. This is how you do this. And you can do it without danger. If you make a mistake, OK, so the simulator crashes, but nobody gets hurt. But you won't do it again. And so, it is a technique training, and I think you can't use that completely to say, well, that is all the flight time I need.

No, that is not accurate either. But it is a great training tool. It is a great exposure. You have seen these things before. You have seen it in simulations, so you are prepared for it when it happens. Early pilot told me a long time ago, "good pilots never surprise pilots."

Senator DUCKWORTH. Thank you. Thank you, Mr. Babbitt. I am going to indulge further. I am going to give you extra time, Mr. Moran. Mr. Santa, I want to get back to this crew rest idea. We understand and base aircrew rests on scientific methods, as this Captain Ambrosi has mentioned, and that is really important.

I remember when I was at Walter Reed, one of my first surgeries, for which I was conscious, I was going to go into surgery for, was going to be a 14 hour surgery. And my surgeon came up to me just as they were putting the anesthetic to be able to put me under, and said, I have been planning this all week.

I know exactly what I am going to do. It is going to be 14 to 18 hour surgery. We are going to take care of you. You are going to be great. I have been up all night thinking about this. And just as I was about to go to sleep, the last thing I remember saying to him was like, did you get any sleep, doc?

Because I would feel better knowing that you had gotten some sleep. And then so, I wanted Mr. Santa to give you time to talk about this rest issue, because I do believe that we have gotten to a point with air traffic controllers, because there is such staffing shortages, because there is such demand that we are going with the minimum rest required in order to give someone before they show up for work the next day. And that minimum should not become the standard.

Mr. SANTA. Thank you for the time. I just want to clarify a few things. Our schedules are in accordance with the orders to allow enough rest. It is the expansion of 10 day—10 hour days and 6 day workweeks that really exasperates the fatigue and introduces potential risks.

With a fully functioning and fully staffed air traffic control facility, that would be lessened. The FAA's chronic statement is, we can get more productivity out of our controllers, and we need to change the schedules of our controllers.

No, the answer is not continuing to burden us with more fatigue and continuing to burn us with more effort and work. It is hiring the right amount of controllers so that our facilities are not 70 and 60 and 80 percent staffed. It is untenable and it needs to be corrected through hiring and not changing the standards.

Senator DUCKWORTH. Thank you. Senator Cruz is recognized for 5 minutes.

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

Senator CRUZ. Thank you, Madam Chair. I would like to start off with Mr. Arel. For the past decade, the FAA has met or nearly met its hiring goal for air traffic controllers. This year, the FAA hired 1,500 future controllers to go through the ATC academy.

Next year, that number will be 1,800, but 30 percent are likely to wash out. Add in retirements and other constraints, and how many controllers will we be at next year?

Mr. AREL. Thank you, Senator. Repeat the question, how many controllers total we have or hired?

Senator CRUZ. How many will we be at next year?

Mr. AREL. As we continue to certify controllers, we expect to be over 11,000 certified controllers. Making our way up, we intend to continue to hire at our maximum current rate of 1,800 or slightly better in the near future.

Senator CRUZ. So, at this rate, it would take years for the FAA to hire enough controllers to meet the need, especially given that it is a multiyear process from initial hiring to becoming a fully certified controller. Would an additional ATC controller training facility help boost capacity and improve retention and performance of the workforce?

Mr. AREL. Senator, one of the challenges that we have, or the greatest challenge is not the physical space or the amount of the academy, it is the number of retired controllers, either military or FAA, that are available to provide instruction and are willing to locate to where the region where the academy may be.

Some of the strategies that we are trying to explore is augmenting the training in our current Oklahoma City Academy for—to operate our classes out to other Federal facilities and freeing up those—that finite number of instructors that are available to provide that instruction to focus on new hires at the academy.

So, it is a delicate balance of trying to find the right qualified people to provide that training.

Senator CRUZ. Thank you very much. Chair Homendy, thank you for being here today. And staying on the subject of air traffic controllers, an OIG report says, 77 percent of critical ATC facilities are understaffed, with New York Terminal Radar Approach Control at 54 percent. Given that a majority of the critical ATC facilities are understaffed, are you concerned about the impact of that on safety of the airspace?

Ms. HOMENDY. Absolutely. I am happy to continue.

Senator CRUZ. Please.

Ms. HOMENDY. OK. I just want to be respectful of your time. Absolutely, I am worried about safety. What is happening from the staffing shortage is that air traffic controllers are being required to do mandatory overtime.

And what happens with mandatory overtime? You—it ends up leading to fatigue and distraction, which is exactly what we are seeing as part of these incident investigations. And it all just comes down to the shortage of staffing.

Senator CRUZ. You recently said that “the FAA system for certifying pilots and mechanics hasn’t kept up with the science around mental health, let alone modern attitudes,” and called it an “open secret that current rules incentivize pilots to lie about their mental health history or avoid seeking health.”

Yesterday, I sent you a letter expressing my concern about this issue and asking what safety changes should be made. Does the FAA and the NTSB have a full understanding of how pervasive pilot mental health issues are?

Ms. HOMENDY. If we just took CDC numbers of one in five U.S. adults live with a mental health challenge. That is about 58 million Americans.

And then we look at FAA civil airmen statistics which show that there are about 757,000 pilots, including students, recreational, sport. Then you are looking at about 114,000 to 151,000 pilots that have mental health challenges. People are suffering in silence.

Senator CRUZ. Captain Ambrosi, it is very concerning that ALPA, and the FAA refused to comply with the National Academies study that Congress asked for in the 2018 FAA Reauthorization.

It is Congress's job to provide oversight of Federal programs, and both the FAA and ALPA deliberately stood in the way of that by refusing to provide data owned by the Federal Government needed for the report. And I would urge ALPA to reconsider your refusal to cooperate.

Turning to a question, in October, an Alaska Airlines pilot tried to crash an airplane. The pilot has claimed to have been suffering from mental issues and had taken psychedelic mushrooms in the days prior to the incident. Do you know when the Alaska Airlines pilot was last drug tested?

Mr. AMBROSI. I do not.

Senator CRUZ. Does ALPA support additional drug testing requirements for pilots to make sure that they haven't been abusing substances before they fly?

Mr. AMBROSI. The ongoing drug testing program is reviewed regularly. I am not an expert on the drug testing program, but pilots are the highest—one of the highest scrutinized professions out there.

We go through regular drug testing, regular checks in training, line checks, line observations, so an extremely rare incident is this. I share your outrage at this specific incident, whoever, you know—it calls for a panel to discuss mental health is what we should do.

Senator CRUZ. So why did ALPA refuse to cooperate with the National Academies study that Congress had mandated?

Mr. AMBROSI. So, I think the HIMS program is being conflated with pilot mental health. The HIMS program is an occupational substance abuse and treatment program. And we actually did cooperate with the Academy.

However, as the study notes, ALPA is not the owner of that data base. So, I received your letter yesterday. I am happy to do more research on it and reply with—in writing and meet with your team to discuss further by the deadline.

Senator CRUZ. Thank you. I appreciate that.

Senator DUCKWORTH. Senator Thune.

STATEMENT OF HON. JOHN THUNE, U.S. SENATOR FROM SOUTH DAKOTA

Senator THUNE. Thank you, Madam Chair. Let me just start by saying that the wider use of new technologies has and will continue to improve ATC and airport situational awareness. And I also see technology playing a crucial role in training more well-rounded and well-prepared airline pilots.

As the number of incidents increases, the last thing this committee should do is remain complacent, which is why Senator Sinema and I offered an amendment to the Senate FAA Reauthorization, codifying the recommendations of the air carrier training arc to create a 2-month enhanced qualification program.

This detailed course of instruction paired with advanced simulator training from seasoned airline pilots would expose trainees to the cockpits of the jets that they would actually be flying, and importantly, allow them to experience what it is like to handle challenging and dangerous situations in those cockpits.

Mr. Babbitt, your bipartisan letter calling on Congress to expand the use of simulator training stated that, and I quote, “requiring the repeated practice of the prevention of and recovery from myriad real-world accident scenarios in full motion flight simulators will make better pilots.”

Could you elaborate on why the use of new simulator technologies is so crucial to training well-rounded pilots?

Mr. BABBITT. Sure. And thank you for the question. I think the ability we have today with the modern simulation exposes pilots to situations that they—you simply wouldn’t put them in. We killed a number of pilots in the past, accidents, practicing engine failures on takeoff in real airplanes. If it didn’t go well, they died.

And we learned from that. And we have now created scenarios. The other thing I think we get into in the simulation world is the ability to put people in an environment. I don’t just mean in the airplane. I mean in the cockpit environment. You have 1,500 hours. Is any of that with another pilot? Are you always just a pilot in command?

And the answer, you could be. Well, that is not what you are going to do when you do—have to work as a commercial airline pilot. You are going to be in a crew situation. You need to understand crew resource management.

You need to know what happens when the captain is suggesting something that you don’t think is operationally correct. Have you learned how to deal with that? You do in a simulator. And so, I think all of these lead us to much better training. They have been exposed to many things that you simply won’t get exposed to.

Are you going to fly your light airplane into a heavy thunderstorm and hail? No, you are not. Not twice. So, you know, these do put us in situations where you can learn from it. Wow, we will never do that again. I see what happened.

Myself as an example. In 1981, there was a tragic accident, wind shear in Dallas-Fort Worth. Every airline pilot in this country had to go get an hour in a simulator because Airbus, Boeing, and the FAA together changed the technique to recover from stalls. Every pilot in this country had to go get an hour in a simulator, and I remember mine.

They said, just shoot the approach and recover just like you knew how to do. And we did and we crashed. They said, now we are going to use the new technique. We learned it and it was great exposure, and we have learned so much.

Wind shear is not the problem that it was back then. So, I think simulation adds a huge layer of learning and expertise and coordination to the system and safety.

Senator THUNE. Thank you. Ms. Homendy, I fully recognize the value of cockpit experience, and I see time in real aircraft is an essential part of training airline pilots, but I am concerned that the—accumulation, as Mr. Babbitt has noted, of flight hours, doesn’t pro-

vide trainees with adequate exposure to commercial aircraft or prepare them for the unexpected, potentially dangerous scenarios.

Do you see a role for the enhanced use of new technologies, including advanced full flight simulators, to improve exposure of prospective airline pilots to scenarios that they couldn't otherwise encounter in real aircraft?

Ms. HOMENDY. Yes, there is always a role for simulators as part of training, but the most realistic scenario based training so that pilots become proficient.

Senator THUNE. Thank you. Let me just, if I could, Mr. Arel, during my time as Chairman of this Committee, we considered and enacted the FAA Reauthorization Act of 2018, and included prioritization of NextGen upgrades to bolster the Nation's air traffic control system.

These upgrades, in addition to employing concepts such as dynamic airspace management, will allow the United States to better utilize existing infrastructure, increasing the capacity and efficiency of the NAS.

Recent ATC issues at airports across the country have certainly highlighted the need for modernization. From your perspective, what technology upgrades should be prioritized to avoid preventable incidents like those we have seen around the country?

Mr. AREL. Thank you, Senator. Anything that helps to increase situational awareness for everyone involved is a great technology improvement.

And the agency is in the process of doing a technology sprint, launching three areas of technology, one around approach runway verification, which will be or is available in all of our approach control automation systems now and can be programmed locally to detect wrong surface landing.

There is the runway incursion device that will be deployed in the next year, year and a half, at over 70 towers to provide an audible and visual alarm to controllers if they were to clear someone for takeoff or landing on a runway that had been released for another activity.

And then last, a service awareness initiative that we have kicked off for rapid acquisition and hope to have in place at our first facility by June of 2024 for commercially available services that provide situational awareness, similar to what any pilot can bring into their aircraft now with an iPad and they have good situational awareness of aircraft operating around.

So, anything that increases the sharing and real time exchange of data between aircraft operators and air traffic controllers, and provide that common situational awareness, as well as safety logic, is all helpful.

Senator THUNE. Thank you. Madam Chair, my time has expired, but I have some additional questions I would like to submit for the record.

Senator DUCKWORTH. Thank you. Without objection. Senator Hickenlooper.

**STATEMENT OF HON. JOHN HICKENLOOPER,
U.S. SENATOR FROM COLORADO**

Senator HICKENLOOPER. Thank you, Madam Chair. I thank all of you for being here. This certainly is a timely opportunity to make sure that we get not just Senators educated, but the broader population of our country and the world.

Mr. Arel, let me start with you. The cost to build a traditional air traffic control tower can reach up to \$20 million. For airports serving rural communities, this can be a real impediment. Colorado, we have the Northern Colorado Regional Airport, which is actually going out and trying to build their own tower to attract new and reliable air service from airlines by making sure that they do install a remote tower project.

So, if approved by the FAA, this will, without question, grow the local economy. It is important for the FAA safely—it is important that the FAA safely integrates leading edge technology into our aviation system.

So, my question is, what is the FAA doing to spur innovation and safety in these regional airports that really do play such a big role, such as Northern Colorado airport, in pursuing remote tower projects?

Mr. AREL. Thank you, Senator. My organization works closely with our NextGen organization as they explore remote tower technology. And certainly, there is an opportunity there and some promise.

The initial technology that has been evaluated to date did have some shortfalls. I can tell you, as a former controller, what we want to make sure is that the system works, that it is reliable, and that it provides that level, that equivalent level of safety that we see in a staffed tower. There is, again, some promise.

We are continuing to do that work, NextGen. Our NextGen office is bringing additional technology into our tech center in New Jersey, where we are allowing vendors to bring in that technology, demonstrate it, build that level of trust prior to us issuing a certification, that it meets that same standard as our staffed towers.

Senator HICKENLOOPER. Great. That is—I mean, anything I say, I have heard this—we have been watching part of this from the office, that safety first is pretty much the mantra that I expect and what we have been hearing.

Ms. Homendy, these recent runway near misses, these incidents of close to catastrophic proportions seem to be increasing at an alarming rate. In September, DIA, Denver International Airport, sorry, opened a new taxiway that hopefully is going to eliminate what they call a hotspot, where aircraft volume has increased risks of unintended, or not unintended, but all—air airspace collisions.

The bipartisan infrastructure law continues to make strategic investments to improve airfield lighting, to modernize runways, taxi infrastructure, improve safety. Which effective project designs, which best practices, does the NTSB recommend that airports should implement following these recent runway safety meetings that, you know, I assume is happening nationwide?

Ms. HOMENDY. We don't have any current recommendations on that. I think we may have past recommendations that we have closed, and I am happy to give those to you.

Senator HICKENLOOPER. Great. But I think it is obviously a national issue. And I think the more ways we can look at it, the more successful we will be.

Mr. Ambrosi, the Bureau of Labor Statistics estimates that there will be a 13 percent increase in the need for pilots by 2030. Some people think that might be conservative. Obviously, aviation is a key part of our economy. Job growth also affects a lot of other components and elements of our economy.

Among the many pathways available for an aspiring student to become a certified pilot, airlines are also establishing dedicated academies. United Airlines has their Aviate Academy to further increase the training available to young pilots. Obviously, I think this increases safety.

In Denver, we have Metropolitan State University, which is the first university in Colorado to be accredited by the FAA, to offer a curriculum to aspiring pilots so that they can achieve a restricted air transport pilot certificate. And MSU is partnering with a number of affiliate flight schools in the communities in the greater metropolitan area.

Would you describe the impact, or how would you describe—or could you describe, I know you can, could you describe the impact that accredited university programs like MSU's in Denver, that they have on growing the pipeline of training pilots?

Mr. AMBROSI. Absolutely. Thank you for the question. As you know, there is more than one pathway to getting that ATP, and having an academic program such as that—you know, a two-year degree gets you a 250 hour reduction.

A four year degree gets you a 500 hour reduction. It gets you that RATP, as you mentioned. That is because of advanced academics. So, these pilots are learning more there. They are getting these advanced academics, which is a credit toward the program. So, it is a very good pipeline.

The aviation schools such as that are—the pipeline is full. It is good to be a pilot right now and people are coming to these schools and in rapid fashion to be part of this occupation. So, it is an essential part of what we do to get pilots in the pipeline.

Senator HICKENLOOPER. Great. I was very impressed. We went through it and looked at what they were doing, and it was a great source of optimism. So, anyway, thank you all for all the work you are doing to keep the skies safe. I yield back to the Chair.

Senator DUCKWORTH. Thank you. The incredibly patient, Senator Markey.

**STATEMENT OF HON. EDWARD MARKEY,
U.S. SENATOR FROM MASSACHUSETTS**

Senator MARKEY. Thank you, Madam Chair. And thank you for holding this incredibly important hearing. I share my colleague's serious concerns about the recent series of near-miss incidents which have impacted my home state of Massachusetts as well.

In late February, two planes nearly collided at Boston Logan Airport when one attempted to take off as another one was landing. And in March, the wings of two United Airlines planes clipped each other at Logan.

Fortunately, no one was seriously hurt in these incidents, but passengers and flight crews are understandably worried about the safety of U.S. air travel. So, Chair Homendy, I understand that the National Transportation Safety Board investigated the near-miss at Logan from February.

Can you provide an update on that investigation?

Ms. HOMENDY. Yes. We issued a final report on that investigation. And the Hop-a flight pilot heard—thought he heard that he could go forward. He was told to line up and wait, but he began his takeoff roll, and said that—reported to us that he was not feeling well that day and that possibly he was experiencing some things from the cold weather in Boston.

Senator MARKEY. And how do you correct that with that pilot? He misheard an instruction?

Ms. HOMENDY. Yes. I mean, there has been a lot of fatigue, distraction. Pilots mishearing instructions in all the investigations that we are conducting. I mean, the one thing that is good about your airport is you have SDX. It is not the same in other airports.

Senator MARKEY. And what does that mean? What is that—?

Ms. HOMENDY. So SDX alerts the controllers that there is an impending collision and can take action to prevent it.

Senator MARKEY. Should that be mandatory at all airports?

Ms. HOMENDY. I think it should be mandatory at the most at least medium or large sized airports. But right now—

Senator MARKEY. Is that what saved us at Logan?

Ms. HOMENDY. Yes.

Senator MARKEY. Yes. So—

Ms. HOMENDY. That takes resources for the FAA. We need robust funding for the FAA—sustainable funding.

Senator MARKEY. But again, like when you are driving a car, if the driver makes a mistake, the airbag is still there as to back up, so—

Ms. HOMENDY. Exactly. It provides the safety net.

Senator MARKEY. And that is what SDX is.

Ms. HOMENDY. That is right.

Senator MARKEY. SDX is the airbag. It is the extra safety as to whether it has been operator error.

So, I think that is something that we should absolutely be talking about. And I am glad—again, I am glad that NTSB is investigating these incidents. Now, I would like to turn to another threat to aviation safety, climate change. From increased turbulence in the sky to flooded runways, climate change is already having serious consequences for our aviation system.

Coastal airports, like in my home state of Massachusetts, are especially threatened by ocean level rise. Our airport is just on landfill in Boston Harbor, which is the second fastest warming body of water on Earth.

That is how fast it is all warming there. As a Brookings report declared earlier this year, America's airports aren't ready for climate change. If we don't invest in climate resilience at our airports, we are in for a bumpy ride.

To each of our witnesses, starting with Chairman Homendy, do you agree that climate change is a significant threat to aviation safety?

Ms. HOMENDY. I am not a climate change expert, but I agree.

Senator MARKEY. Captain.

Mr. AMBROSI. Yes. So, I would agree I am not a climate change expert, but we completely agree and pilots do a lot to try to minimize carbon emissions, also noise. So, we are an active participant in reducing greenhouse gases in the aviation profession.

Senator MARKEY. Thank you.

Mr. AREL. As an air traffic controller, it has really not impacted us at all. So personally, I believe that climate change has an impact. But as an air traffic controller, I can say yes.

Senator MARKEY. Thank you.

Mr. BABBITT. Yes, I think you are seeing more violent weather, which is not helpful. Also, the slowly rising temperatures. Aircraft, a lot of people aren't aware of it, but as the temperature gets higher and higher, the aircraft needs longer runways. And so, you are pushing the envelope there as well.

Senator MARKEY. Thank you. Yes, sir.

Mr. SANTA. Thank you, Senator. We certainly have seen a significant increase in severe weather throughout this last summer season. And we would—we join in supporting everything we can do to minimize the impacts of that.

Senator MARKEY. Thank you. And that is why I filed legislation with Senator Sullivan, the Airport Infrastructure Resiliency Act, bipartisan. We can see it is coming.

We need to actually have more protection. And another piece of legislation, Airline Operational Resiliency Act, with Senators Fischer and Welsh and Capito aim to improve the overall resiliency.

And finally, today's hearing would be incomplete if we didn't discuss the role that airports service workers play in keeping our airports safe. Baggage handlers, wheelchair attendants, gate attendants, other workers play an essential role in our aviation system.

And by providing airport service workers a living wage and benefits, we ensure that airports have a well-trained and experienced workforce to identify security incidents and respond to emergency situations.

When we shortchange airport service workers, we leave our airports and passengers vulnerable. Earlier this morning, I rallied with airport service workers, SEIU, and called on Congress to pass the Good Jobs for Good Airports Act.

And that will ensure that these workers, these hidden figures at the airport who ensure that the planes can take off every day and safely, get fair wages, health care benefits, sick time, which they are not getting right now.

And we have to make sure that all this Federal money that we send to airports actually gets distributed in a way that is a lot more fair. And we saw how hard they worked during the pandemic.

We saw the risks that they took for their health and their families in order to make the rest of us safe at those airports, and we just have to rectify that historic imbalance in terms of how much the airlines are profiting by the billions and how much these workers are still being left behind without the benefits they deserve.

So, I just want to raise that once again. And thank you, Madam Chair, for your great leadership.

Senator DUCKWORTH. Thank you, Senator Markey. As we have heard today, there are many things that we can do to improve the safety of our aviation system in this country, which is the global leader in safety when it comes to commercial aviation operations.

Today's hearing demonstrates that we must address the serious near misses we have seen recently with utmost sense of urgency and to prevent future incidents. We have dealt with everything from workforce shortages for air traffic controllers, to pilots, to maintenance workers, and the pending FAA reauthorization legislation addresses this.

And in partnership with my ranking member, we have tripled the funding in this FAA reauthorization bill for pilots, for maintenance workers, for air traffic controllers, all of those programs. In the midst of this serious discussion, reducing the amount of aeronautical experienced pilots is the wrong idea at the wrong time.

And I just want to reiterate the history of the 1,500 hour rule. It came about post Colgan crash. And Congress went to the airlines and said, what is the minimum number of flight hours that is needed? And it was the airlines who came back and said 1,500 hours.

This number was reached through consultation with the commercial air carriers who came back and said that is what is required. And that level has kept us safe, has kept the flying public safe, in the years since.

There are already multiple ways to become a commercial airline first officer. There are multiple ways already to get that ATP. Not every pilot that ends up in a commercial airline as a first officer has 1,500 hours. You can be an airline—you can become a military pilot, 750 hours. You can go to a 4-year aeronautical program with a very structured training program, very rigorous program. You can do 1,000 hours.

You can attend at any one of our great 2 year programs. We have many of those in Illinois very proud of them—1,250 hours. And then for those who don't go through any of those formal programs, who just go down to the local FBO and start learning to fly, and that is a very legitimate, valid way to work your way in, it is 1,500 hours.

Rather than watering down existing safety standards, we must always be looking to enhance aviation safety. Today we have discussed the fact that a simulator is not a simulator is not a simulator. We cannot forget that the United States can only lead in aviation if it leads to aviation—if it leads in aviation safety.

And again, if we are going to be talking about simulators, we need to be clear what type of simulator we are talking about. Because as Captain Ambrosi says, if you just say structured training and don't define what that simulator is, there would be a race to the bottom by the airlines to go with the lowest level of simulator, the cheapest level of simulator possible, and that is not going to be beneficial to the flying public.

With Administrator Whitaker at the helm, and he has strong tailwinds with almost unanimous 98 to 0 confirmation vote, the FAA already has a legal authority, the expertise, and the discretion to issue standards on pilot training and qualification.

You can already do that. In fact, FAA's Aviation Rulemaking Committee is already looking at whether it is appropriate to create yet another pathway to becoming an airline pilot, first officer with fewer than 1,500 hours.

Again, we have the 4-year program, 1,250—1,000 hours, 2 year program 1,250, military pilots 750, and the FAA is already looking and already has the authority to create yet another pathway. We have an Administrator, we have safety experts at FAA, and a process to study this issue to see if changes are required.

And if they are, the FAA can certainly act on that. I believe that we do not need any legislative change that could lower that safety bar if you are going to use language such as structured simulator training without defining what that simulator is. I don't think that preemptively reducing the 1,500 hours that was recommended by the airlines and has resulted in over 10 years of safe aviation operations is the way to go.

Now, if you are going to do that, again, then we need to say, hey, if you are going to get a minimum level experience in a flight simulator, that needs to be a level D, full flight simulator, equipped with software capable of accurately recreating flight conditions for the most daunting and dire emergency operations.

You know, there are simulators for surgeons as well who can practice different surgeries without actually having to do it on the patient first. But I will paraphrase Captain Sullenberger who said, you know, if we don't—if we have a doctor shortage and we have a surgeon shortage, the solution isn't to say, let's make medical school 2 years.

The solution isn't to say, let's just have surgeons only do training on a surgery simulator and they don't actually have to operate on patients. That is not the solution. I don't think this is the either extreme end.

I am just saying that if we are going to put in simulators and we are going to reduce the flying hour requirements for that first officer, then let's be clear about what we are substituting it with and let's be precise about what we are substituting it with. Let's have a curriculum for what that is going to be.

Again, you can fly holes in the sky in a simulator just as well as you can fly holes in the sky in a 152. I want to thank our witnesses for your participation today. The hearing record will remain open for 4 weeks until December 7, 2023.

Any Senator that would like to submit questions for the record should do so two weeks from now by November 23. We ask that responses be returned to the Committee by December 7, 2023.

And that concludes today's hearing. Thank you, everyone.

[Whereupon, at 11:43 a.m., the hearing was adjourned.]

A P P E N D I X

PREPARED STATEMENT OF ED BOLEN, PRESIDENT AND CEO, NATIONAL BUSINESS AVIATION ASSOCIATION

Chair Cantwell, Ranking Member Cruz, Subcommittee Chair Duckworth, Subcommittee Ranking Member Moran and Members of the Subcommittee on Aviation Safety, Operations, and Innovation, thank you for holding this hearing to examine and address close calls in the National Airspace System and improve aviation safety. On behalf of the National Business Aviation Association's (NBAA's) 11,000-member companies, I am honored to submit testimony for this hearing.

NBAA's members, many of which are small businesses, rely on general aviation aircraft to meet some portion of their transportation needs. These aircraft provide connectivity to communities in every state, which is especially critical to communities with little or no airline service. Business aviation is keeping small businesses globally competitive and bolstering our national economy with 1.2 million American jobs and \$247 billion in economic output.

The aviation industry overall—from commercial aviation, to general aviation, manufacturing, Advanced Air Mobility and other emerging technologies and associated businesses—accounts for more than 5 percent of the United States gross domestic product.

We applaud Chair Cantwell and Ranking Member Cruz for holding this hearing focused on safety—a core value for our industry. Since the dawn of flight, safety has been integral to everything we do, on the ground and in the air. Since NBAA was founded in 1947, we have been intentional in developing partnerships with government leaders and other stakeholders to deliver the products, procedures and policies that continually increase the safety of flight. Because of this continued, comprehensive focus on innovative approaches to safety, aviation is the safest mode of transportation, and the U.S. stands as the global leader in aviation safety.

Safety is not a destination—it is a journey and a practice that requires vigilance and a supportive culture to thrive. Although the business aviation community has built an impressive safety record, there have been some recent incidents that require thorough review and response.

General aviation (GA) has a strong role to play in shaping the future of aviation safety, in part because it is the proving ground for the industry. GA is where aviation was born, and it's the point of entry for many in the community, from the pilot's first hours of flight to the mechanic's first oil change.

We take this responsibility seriously. Just this week, nearly 500 business aviation professionals are gathering in Wichita, KS for the Bombardier Safety Standdown presented in close partnership with NBAA. This annual event, which began in 1996, is a premier forum to bring our community together and work on solutions to improve aviation safety standards and sustain positive changes within the industry. The aviation safety program is free of charge and the information is catered towards pilots, crewmembers, maintenance technicians and managers, no matter what aircraft they operate. In addition to the event, the Safety Standdown website provides access to live seminar webcasts, as well as a variety of safety-related articles written by experts in the industry.

Recognizing the increase in serious numbers of incursions and the recent near misses and close calls involving business aviation aircraft, NBAA continues its efforts and collaboration with the FAA, NTSB, NATCA and other organizations to raise awareness and to develop and promote educational resources on the subject.

NBAA members have organized a number of committees to engage in improving safety across the industry. Foremost, our Safety Committee, one of our oldest committees, biennially studies and identifies *Top Safety Focus Areas*, to help promote safety-enhancing discussions and initiatives within flight departments and among owner-flown operations.

We are proud to announce that NBAA is standing up a Runway and Surface Safety Working Group that brings experts together across NBAA committees and across the industry to address the recent runway incidents and incursions.

NBAA has played a leadership role in a number of stakeholder meetings over the course of the last year to discuss close-call events. I participated in the FAA Safety Summit, held this spring emphasizing those efforts. NBAA's Director of Airports has been serving as the Industry Co-Chair of the Surface Safety Group and representing the industry on the Runway Safety Council. NBAA participated in the NTSB Runway Incursion Roundtable this spring. We have written a number of web stories and have held a number of podcasts on the subject, most recently one with the Chair of NTSB and the FAA Manager of Runway Safety. We are planning for a second portion of that in partnership with NATCA, to focus on pilot-controller interactions related to runway safety and wrong-surface operations, as well as a live webinar. NBAA members and staff participate in the local Runway Safety Action Team (RSAT) and Special Focus RSAT meetings and other runway safety initiatives across the country and those presented virtually.

Building a Culture of Safety

In addition to responding to specific events in the national airspace system, a key strategy for continually enhancing business aviation's safety posture is to cultivate a culture of safety, from training and education to studying and mitigating human factors, to acknowledging excellence in safety leadership within the industry. Everyone—from the pilot, to the cabin crew, to the dispatcher, to the maintenance technician and beyond—has an important role in the safety of flight.

Technologies, and their implications for aviation, are a key element in the safety formula, but technology cannot replace the human element in the equation. That's why the business aviation community places a sharp strategic focus on human factors—how fatigue, stress, confusion and other influences can impact decision-making—in thinking about safety.

There are a number of misperceptions that can lead a pilot to take off or land from a wrong taxiway, runway, or even a wrong airport. These incidents are known as wrong-surface events. They often involve human factors, and reducing them is a top priority for FAA, NBAA and the industry. We are actively working with the FAA and other stakeholders in the Surface Safety Group focused on developing tools to increase situational awareness for pilots at airports with a high number of wrong-surface incidents.

The association participated in the FAA's Surface Safety Symposium, which brought together commercial airlines, ground vehicle drivers and general aviation pilots and operators to discuss and develop solutions to runway and surface safety challenges. NBAA also provided a platform to the FAA Runway Safety organization at its October 2023 NBAA-BACE, which included 20,000 attendees from across the industry, to engage with attendees during the convention's Meet the Regulators session.

NBAA is also working to reduce runway excursions, another event often driven by human factors, in which an airplane inappropriately exits a runway. Like incursions, these events require strategically driven mitigation planning, along with tools developed by experts for industry. To that end, the association has gathered some of the best expertise on excursions at events, including our National Safety Forum in 2022, and continues to develop resources, including our Guide for Reducing Business Aviation Runway Excursions, which has been updated by the Safety Committee in collaboration with the Domestic Operations Committee and is in the process of being published.

In 2022, NBAA launched its Business Aviation Safety Manager Certificate Program. This online accreditation was designed to educate individuals to effectively manage a business aviation organization's proactive safety efforts. It includes an in-depth look at the four elements of a Safety Management System (SMS), including Safety Policy, Risk Management, Safety Assurance and Safety Promotion, as well as modules on Safety Leadership and Emergency Response. The effort goes beyond initial education, by connecting certificate applicants to each other, in a community of engagement through peer-to-peer learning that fosters continuous safety improvement across the board, while also meeting the specific operational needs of any given aviation operation. In just a single year since this program's launch, more than 300 people have completed the course, obtaining recognition for safety leadership, while building an enduring peer community of safety advocates in business aviation.

NBAA honors safety leadership in other important ways. For several decades the association has annually issued its Flying Safety Awards, a standards-based honor that recognizes exceptional achievement in safe flying operations, and pays tribute to the skill of a company's management, maintenance, pilot, scheduler/dispatcher and support-personnel teams.

NBAA's Safety Committee administers the annually issued Dr. Tony Kern Professionalism in Aviation Awards, which specifically honor individuals for outstanding professionalism and leadership in support of aviation safety. The committee's newest honor, the Above and Beyond Award, is given to individuals whose application of safety best practices played a key role in avoiding injury, loss of life, or catastrophic aircraft damage in hazardous flying circumstances.

Addressing Human Factors to Strengthen Safety

Safety in aviation goes beyond the flight deck to all aspects of the industry. Recognizing this, the NBAA maintenance committee has taken a proactive approach by developing educational initiatives at its annual Maintenance Conference to emphasize the crucial role of the human factor in ensuring safety. This initiative underscores the fact that, despite the advancements in technology and the stringent protocols in place, we must remember that aviation professionals are only human. By addressing human factors in maintenance practices and procedures, the committee seeks to foster a culture of vigilance, continuous learning, and open communication to mitigate risks and enhance safety across the aviation industry. These efforts are critical to addressing safety issues before they ever reach the flight deck.

Another important part of the work to address the impact of human factors on aviation safety lies in our sector's focus on mental health and fitness for duty. More than a small-bore approach to myriad, stand-alone psychological and physical symptoms, the work in this area looks at the whole person, recognizing that aviation is a physically and mentally demanding environment in which a clear mind and well-rested, healthy body is essential to safe business aircraft operations, maintenance and management.

Studies confirm the prevalence of this concern, as well as the need for both action and compassion on the matter: one recent report¹ concluded that nearly 60 percent of pilots avoid seeking health care due to the fear of losing their aviation medical certificate. NBAA is concerned that some aeromedical certification requirements may needlessly impede eligibility for pilot certification, severely dissuading pilots from seeking treatment for a troubling condition.

As with so many other aspects of aviation safety, partnerships between industry and government can produce solutions to the problem without compromising safety, and we have proven successes with such an approach. For example, we have worked with the FAA to develop multiple pathways for Aviation Medical Examiners (AMEs) to issue airmen medical certificates at the conclusion of an exam, thereby minimizing wait times for FAA reviews. We have also emphasized the need for AMEs to research and identify for aviators the full menu of pharmacological treatment options that can safely be used in the aviation environment to address a given condition, and to better define the criteria for requiring or deferring neurocognitive testing.

We continue to be an active partner in educating the business aviation community on these policies; in the past year alone, NBAA hosted an interactive News Hour webinar and a National Safety Forum discussion with aviation mental health experts and the FAA Federal Air Surgeon. We have engaged with the aviation community on these policies at events such as the Experimental Aviation Association's annual AirVenture Oshkosh show, the University of North Dakota's yearly Aviation Mental Health Symposium, as well as regularly held FAA Human Intervention Motivational Study and InfoShare Conferences and FAA General Aviation Joint Safety Committee (GAJSC) meetings, among others.

Collectively, these efforts will help address misperceptions about mental wellness and fitness for duty, while reducing barriers that interfere with obtaining treatment and healthcare, getting pilots the help they need, maintaining pilots' livelihoods, aiding employers in understanding the readiness of their workforce—and, most importantly, enhancing safety.

Safety Leadership Through Pioneering Technologies

As this committee knows, many of the technologies and solutions that have revolutionized aviation safety were born in the business aviation community. We led the way with GPS, a transformative navigation and safety technology. We led the way in development of airborne collision-avoidance systems that ensure situational awareness at all altitudes. We led the way in developing enhanced vision systems that can identify unanticipated ground obstructions in thick fog, and see through clouds to locate terrain while in flight. We partnered with the FAA in integrating the Reduced Vertical Separation Minimum (RVSM) technology that has vastly in-

¹Hoffman *et al.*, 2022. Healthcare Avoidance in Aircraft Pilots Due to Concern for Aeromedical Certificate Loss. *J Occup Environ Med.* 64(4):e245-e248. 11

creased the efficiency and safety of aviation system management. Similarly, we were the early adopters of Automatic Dependent Surveillance Broadcast (ADS-B), a cornerstone technology for ushering in the next generation aviation system's enhancements to safety, as well as efficiency and sustainability.

Safety Leadership Through Data-Based Programs

Of course, the deployment of world-leading technologies has been only one piece of the safety equation for aviation. The development and implementation of innovative programs that identify the root causes of safety threats, and offer proven ways to eliminate them, is also a key building block for a solid safety foundation.

For example, 20 years ago, NBAA and its members joined with the International Business Aviation Council in developing the safety focused International Standard for Business Aircraft Operations (IS-BAO), a set of best practices focused on safety management as a data-driven team effort, including pilots and cabin crew, schedulers, dispatchers, maintenance technicians and others.

Since the program's founding, more than 700 business aviation operators in 35 countries have become IS-BAO registered, improving their safety risk profile. Today, the business aviation community is an active participant in a variety of government-industry programs that aggregate operational data to identify risks, capture behaviors that contribute to accidents, and pinpoint ways to mitigate those events.

As just one example, we can point to the FAA's Aviation Safety Information Analysis and Sharing program, also known as "ASIAS," in which more than 150 organizations capture and coordinate data and other information critical to avoiding a variety of unusual events, including bird strikes, mid-air collisions, course deviations and other aviation safety hazards.

NBAA has promoted ASIAS through discussions at our National Safety Forum on specific aviation hazards, during the NTSB Roundtable discussion at NBAA Business Aviation Convention and Exhibition (NBAA-BACE), in articles published in NBAA's safety-focused Business Aviation Insider magazine, and through our ongoing engagement at the ASIAS Executive Board and GA Issues Analysis Team governance levels within the program. As part of Safer Skies, launched in 1998, the FAA and the general aviation community jointly pursue a goal of reducing GA fatal accidents.

The GAJSC uses a data-driven, consensus-based approach to analyze safety data to develop specific interventions that will mitigate the root causes of accidents. The GAJSC focuses on proactively assessing data to identify new emerging issues and threats to general aviation safety, analyze them, and develop mitigation strategies to address and prioritize safety issues to prevent accidents.

NBAA, a founding member of the GAJSC, has supported the valuable safety studies and analyses conducted by this group, and worked to educate our members on the tools created to address specific safety risks. The current goal is a safety improvement over the FY18 target of 1.00 fatal accidents per 100,000 flight hours to a FY28 target of 0.89 fatal accidents per 100,000 flight hours.

Leadership in Safety Policy Development

A comprehensive approach to safety involves not just an investment in new technologies, or simply the development of risk-mitigation programs, but also a continuing commitment to an effective and tailored policy framework that matches the size and operational realities of business aviation. For a safety mandate to realize the benefits it seeks, it must have flexibility to scale, to fit the largest commercial operation, or the smallest charter business. NBAA and its members have led the way in this area. For example, the business aviation community has most recently been focused on a policy proposal put forward by the FAA in January, which would extend the requirement for implementation of SMS programs beyond those for the airlines to many business aircraft operations.

While NBAA and its members have always supported rigor in ensuring everyone involved in a flight maintains a premium on safety, we know that an SMS suited for the largest airline will not likely be transferable to a small operation with a single airplane. We can look outside of the United States to learn lessons as we review the FAA's new proposal. Our focus will be on ensuring that any resulting program is not only flexible, but also meaningful in driving safety, rather than confusion due to compliance burdens and other missteps that have been characteristic of the introduction of SMS for business aviation in Canada and elsewhere.

For example, Canada's SMS implementation in the mid-2000s created significant industry concerns due to lack of scalability and the government's poor transition from an historic view of prescriptive oversight to one in which risk is defined by the operator. As a result, it has taken nearly two decades to modernize those initial

regulations so that they reflect the vast diversity of operations subject to the mandates involved.

A similar operator experience with an SMS rollout in New Zealand was shared in AvWeb:

“We’ve gone through SMS in New Zealand . . . We were promised from the start that it would be scaled to the size of our operations, but in the end we had to do all the requirements, even if the CAA [Civilian Aviation Authority] guys acknowledged it made little sense for us . . . The hardest part of implementation was a lack of understanding from CAA about SMS, since they were quite new to it as well, so we had little effective guidance (despite a lot of effort on their part) and a lot of inconsistent directives.”

The U.S. aviation industry cannot afford to repeat the poorly developed SMS deployment we have seen elsewhere. We must get this right from the start in order to leverage the safety benefits that we know SMS can deliver. The business aviation community has experience partnering with the government in the development of effective, customized policies, and we enthusiastically welcome the same approach to the consideration of SMS requirements for our sector.

Continually Improving Safety

The general aviation community appreciates the leadership and work of this Committee on the policy solutions that strengthen our unrivaled national airspace system, sustain vigilance across the industry on safety and maintain the role of the United States as the world leader in aerospace. NBAA appreciates the opportunity to contribute to the record on this important issue and will continue to engage with our members and other stakeholders to continually improve aviation safety.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARIA CANTWELL TO
JENNIFER L. HOMENDY

Efforts to Address Near-Misses

Chair Homendy, you participated in FAA’s Safety Summit back in March. You said then that “the absence of a fatality or an accident doesn’t mean the presence of safety.” I couldn’t agree more, and that is why we must take each one of these close calls so seriously and it is also why we need a FAA Reauthorization bill to strengthen aviation safety.

You have been vocal about the effectiveness of surface situational awareness technologies, such as Airport Surface Detection Systems (ASDE–X) and Airport Surface Surveillance Capability (ASSC), crediting them with helping avoid potential accidents at Boston Logan in February and at JFK in January. You have also said that February’s near-miss in Austin would never have gotten that far if the airport been equipped with these technologies.

Question 1. Section 404 of the Senate FAA bill directs FAA to submit an action plan for upgrading existing and implementing surface situational awareness technologies at more airports. Do you agree that expanded deployment of these technologies at more commercial airports would help reduce the number of near-misses?

Answer. I strongly agree. There are approximately 450 commercial service airports within the United States. Of these, only 43 (or less than 10 percent) have ASDE–X or ASSC technologies installed and operational. More airports across the country installing more of this technology would dramatically improve safety. I do want to clarify that the JetBlue crew in the incident in Boston initiated the go around prior to the ASDE–X alerting. In addition, as I testified, though extremely valuable for safety ASDE–X and ASSC only warn the air traffic control tower of impending risks and do not provide the direct cockpit warning to pilots that we have long recommended. Especially considering current funding constraints that may limit the ability to upgrade existing and implementing new surface surveillance technology, the NTSB strongly urges that technologies be developed and implemented to directly alert pilots in the cockpit of impending runway incursions without relying on a runway surveillance safety system at the airport. A system to provide direct alerts to flight crews has been a key element of an NTSB safety recommendation now open for over 23 years.

Question 2. In your testimony, you stress that Safety Management Systems (SMS) provide operators with standardized risk-management procedures and processes to increase aviation safety. SMS is based on sharing data to identify and address safety patterns. How can Safety Management Systems help prevent near-misses and close-calls from happening in the first place?

Answer. SMS is a formal, top-down, business-like approach to managing safety. It gathers data from routine operations to identify indicators of specific safety-related risks. By looking at these indicators and developing mitigations *before* an accident happens, and ensuring that the mitigations are effective, an SMS can be an effective tool to increase safety.

In the area of runway safety, an operator can use SMS to identify problems with radio communications, warnings not perceived by flight crew, or flight crews' elevated workload and distraction, all of which have been identified in runway safety-related events. Identifying specific risks in these areas can allow an operator to develop and implement tailored safeguards before lives are lost. In this way, SMS can be an effective management tool for an operator to increase flight operation safety. The same approach can be used by the FAA to manage safety-related risks in the air traffic control (ATC) system.

Currently only Part 121 air carriers (generally larger airlines and regional carriers, as well as cargo carriers) are required to incorporate an SMS into their operations; the FAA has only encouraged all other operators to voluntarily implement an SMS. The NTSB believes that Part 91 revenue passenger-carrying and Part 135 operators would benefit from an SMS to ensure that operational risks are sufficiently mitigated. In addition, it is critical that the FAA oversee these operators' SMSs to ensure that mitigations are in place to address potential safety hazards.

We welcome the FAA's action on this issue through their January 10, 2023, notice of proposed rulemaking to update and expand the requirements for SMSs. This includes a requirement that manufacturers have in place an appropriate SMS as we have previously recommended and which Congress required in 2020. We have called on the FAA to expedite progress on adopting a final rule that requires Part 135 operators, all Part 91 revenue passenger-carrying operators, and manufacturers to develop and implement an SMS.

Question 3. In the Aircraft Certification, Safety and Accountability Act (ACSAA), I pushed for a report to FAA and Congress so we can stay ahead of emerging trends impacting safety. Data is critical in an information age. So how can NTSB, FAA and stakeholders work more closely together to identify and address safety trends like near misses?

Answer. The collaboration among operators, manufacturers, labor unions, private aircraft owners and pilots, the FAA, Congress, and the NTSB over the last several decades has been critical to the current level of aviation safety; yet we cannot be complacent. We must continue to work together to identify emerging safety concerns and gather data regarding incidents that may be warnings about broader gaps in safety.

One example of how NTSB has worked to stay ahead of emerging trends is our 2021 safety research report which examined the prevalence and risk factors of turbulence-related accidents in Part 121 air carrier operations. A review of our accident data indicated that turbulence-related accidents are the most common type of accident involving air carriers operating under Part 121, accounting for more than a third of all such accidents from 2009 to 2018. Most of these accidents resulted in one or more serious injuries but no aircraft damage. Our report assessed the effectiveness of policies, programs, technologies, and other applicable safety countermeasures; and made recommendations for improving turbulence avoidance and injury mitigation. Since that report, we continue to see and investigate turbulence-related events. When we make recommendations to improve safety, it is imperative that the recommendation recipients consider and take action to improve safety.

Over the last couple of years we have worked to meet the challenges that come with the increasing growth and innovation in transportation by becoming a more data-driven agency to improve safety. We established a dedicated executive position to lead a future Office of the Chief Data Officer to grow the agency's data, strategic planning, and enterprise risk management programs. A full-time chief data officer is being recruited to lead this office. Our reauthorization and appropriations requests are critical to this effort to allow us to hire professionals with the required skills, to purchase the equipment and systems necessary for those skilled professionals to do their jobs, and to invest in crucial staff training and development.

Pilot Mental Health

In early November you announced that the NTSB would spearhead a series of roundtable discussions pertaining to aviation safety, with the first roundtable on December 6 focused on mental health. I'm pleased to see NTSB taking a leadership role here, particularly after two recent incidents that raise questions about whether we are doing enough to support pilot mental health.

In the Senate FAA bill, we included Section 509 to establish an aviation medical modernization working group that would issue recommendations relating to FAA's

special medical issuance backlog, updates to FAA's testing rules for mental health conditions, and the modernization of FAA's approach to approving medications to treat conditions such as depression and anxiety.

Question 1. Do you believe FAA is committing adequate resources to evaluate and modernize its response to pilot mental health conditions? Do you believe bringing together medical professionals via the aviation medical modernization working group established in section 509 of our bill is a step in the right direction?

Answer. The FAA, like all agencies, is working with a constrained budget. I testified before the committee that the FAA needs more resources so it can dedicate appropriate resources to safety priorities. The Office of Aerospace Medicine is no different. Until 2019, the FAA had just one chief psychiatrist performing specialty review; as of 2023 a fourth staff psychiatrist has been added, along with one staff neuropsychologist. The need for the FAA's 2023 actions was reinforced by panelists participating in our recent December 6th roundtable as was the need for the FAA to more effectively and efficiently review deferrals. As noted by the May 2023 DOT OIG report, structural problems, the cultural stigma, or the fear of being grounded cause pilots to underreport their mental health care or to avoid seeking care in the first place, which is a transportation safety risk.¹

In fact, in my opinion, some necessary changes to the FAA's mental health approach should require little study and should be implemented without delay. Consistent with the DOT IG's findings, the longer-term questions about mental health in the aviation industry could certainly benefit from a working group. Participants in our roundtable indicated that they have been subject to disincentives for reporting or seeking care for treatable mental health conditions. I believe the FAA can and should adapt and clarify its processes to empower pilots and air traffic controllers to confidently seek mental health care that will improve their personal wellbeing and enhance public safety.

Question 2. Should we be concerned that, as some have alleged, the current special medical issuance backlog and time it takes for FAA to evaluate and issue decisions relating to pilot medical conditions dissuades pilots from being forthcoming about their medical history and mental health? What more could FAA be doing to address this issue?

Answer. Consistent with the OIG report, I believe that pilots are dissuaded from being forthcoming about their mental health history and struggles. Pilots and members of our ATC workforce, too, are suffering in silence. The FAA could benefit from increased resources to work through its backlog and to build out an infrastructure that can effectively handle increased reporting while keeping deferred applicants informed. Continued FAA review of its mental health special issuance standards (including list of approved antidepressants) will also be important.

At our December 6 mental health summit, we heard from aviation professionals frustrated not only by the system's slow pace, but also by its limited transparency. A professional awaiting FAA review of a deferred medical application is facing uncertainty about career, livelihood, security, and identity. People in this position want to know where in the process they stand, why, and about how long they should expect to wait. Approaches should be considered, too, that categorically remove certain cases from the deferral backlog and allow the FAA to focus resources on serious mental health concerns rather than requiring professionals with mild symptoms to undergo disproportionately burdensome review processes. At the same time, an appropriate level of oversight is necessary to identify and mitigate risk, and to promote the safety and well-being of aviation professionals and the flying public. Achieving this balance will require resources.

At our mental health summit, we heard from experts and aviation professionals that structured peer support programs have the potential to serve as a foundational mental health resource in aviation. Airline pilot peer support programs have found that the great majority of initial contacts in such programs are resolved without escalation. However, the vast majority of pilots in the U.S. do not have access to peer support programs. These include general aviation pilots, pilots for revenue-generating operations under parts 91 and 135, and many major commercial airline pilots. This is an equity issue that must be addressed.

¹Department of Transportation Office of the Inspector General Report (AV2023038), "FAA Conducts Comprehensive Evaluations of Pilots With Mental Health Challenges, but Opportunities Exist to Further Mitigate Safety Risks."

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JACKY ROSEN TO
JENNIFER L. HOMENDY

Aging Infrastructure Impacting Aviation System

Aviation professionals are only as effective as the infrastructure and technology they rely on. According to the President's most recent budget request, the average age of an FAA Air Traffic Control facility is over 60 years old, and more than half of terminal facilities are more than 40 years old. These facilities regularly operate with degraded technology systems, resulting in a lack of accurate wind speed and direction calculations, the failure of radio frequencies within congested airspace, and the malfunctioning of runway lights. Many airports also lack functioning radar systems used to track airborne and taxiing planes, meaning that some controllers have no visual awareness of the aircraft they are directing, especially in poor weather conditions.

In lieu of functioning radar systems in Air Traffic Control facilities, many controllers are filling the gaps by resorting to using public flight-tracking websites that aren't approved by the FAA.

Perhaps most alarming are the reports that the FAA lacks the funding to install runway warning systems to help prevent runway collisions. Only forty three of the Nation's more than five hundred airports serving commercial flights have runway collision-avoidance systems. This is simply not good enough.

Question 1. How can we improve the existing technology and infrastructure utilized by air traffic controllers and aviation professionals to reduce potential risk and manage congested airports and complicated airspace at our Nation's airports?

Answer. Technology and infrastructure improvement begins with investment. If we want to maintain the international gold standard in aviation safety, preserve public trust, and continue to support the growth of the aviation industry, we must invest the resources necessary to ensure our ATC workforce is fully supported and the technologies our workforce utilizes are not relics of the past century. Ensuring more airports have access to life-saving technology is a much-needed step in this direction.

Safety for Passengers

Investments in technology are necessary to help keep the flying public safe from preventable accidents. While there hasn't been a fatal crash involving a major U.S. airline in over a decade, many passengers are wary of flying amid recent highly-publicized safety incidents.

Question 1. The 2022 holiday travel season was one of the busiest to date, marked with a slew of flight delays and cancellations amid pilot and controller workforce shortages—all of which we hope to avoid this year. Can you discuss why passengers planning to travel this holiday season should feel safe and confident about their travel plans?

Answer. As I've stated many times, the U.S. aviation system oversees the safest airspace in the world. Since 2010, our system has experienced a record level of safety, as the number of deaths associated with U.S. civil aviation accidents decreased from 541 in 2009 to, according to our preliminary numbers, 357 in 2022—a decrease of over one-third. Approximately 95 percent of aviation fatalities in 2022 occurred in general aviation accidents, with almost all the remainder (19 total) in Title 14 *Code of Federal Regulations* Part 135 commuter and on-demand operations, which include charters, air taxis, air tours, and air medical services flights (when a patient or medical personnel are on board). The runway incursions discussed in my testimony are serious incidents requiring a serious response from policymakers and operators within the U.S. aviation system, but we must be clear that we are talking about an extremely small percentage of overall airport operations across the country. Flying remains one of the safest possible forms of transportation for the traveling public, who are far more likely to be involved in a crash on our roads on the way to the airport than to be involved in any crash at the airport.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. TED CRUZ TO
JENNIFER L. HOMENDY

Pilot Mental Health

Question 1. From an overarching perspective, does the Federal Aviation Administration (FAA) and NTSB have a clear and full understanding of how deep and pervasive the issues of pilot mental health and stability are across the aviation industry?

Answer. No. The FAA has information on the number of special issuances for mental health issues that are processed, but this number does not include cases where the pilot or controller does not disclose these problems. Research suggests that there is significant underreporting of mental health issues by pilots. For example, a 2006 study of toxicological test results among fatally injured pilots found that only 6 percent had reported their use of detected psychiatric medications to the FAA (Canfield, *et al.*, 2006).

According to the CDC, about 20 percent of the U.S. population lives with a mental illness, and about 4 percent have a serious mental illness. According to the Bureau of Labor Statistics, there were about 91,700 airline pilots, copilots, and flight engineers working in 2022. If airline pilots were representative of the general population, this would suggest that about 18,000 are experiencing a mental health problem, with about 3,700 experiencing a serious one.

Studies of pilots that involve reviews of government databases suggest pilots experience fewer issues than the general population, whereas studies involving confidential surveys suggest they may have a higher prevalence of mental health issues (Ackland, *et al.*, 2022). The true incidence is unknown. In our December 6, 2023, summit, we heard from person after person, however, that pilots, student pilots, and other aviation workers face significant barriers to accessing mental health care, care that others in high-stress work environments have access to and care that all people may find useful over their lifetimes due to any number of normal life circumstances, such as the death of a loved one or a divorce.

Question 2. Does NTSB believe there are alternative solutions Congress should consider in addressing and monitoring pilot mental health?

Answer. The NTSB has not issued recommendations on this topic. However, there are clearly many informed perspectives from which to approach this issue. We learned from some of these perspectives during our December 6, 2023, summit, at which aviation industry professionals, academics, and other experts shared diverse suggestions in an open forum. Additionally, we note that consensus recommendations have been offered by other entities; however, the FAA has failed to implement many of them and more action is needed. For example, the FAA's Pilot Fitness Aviation Rulemaking Committee issued several recommendations in 2015, including the following:

- The FAA should ensure all Aviation Medical Examiners (AME) demonstrate knowledge in assessing basic mental health concerns, and enhance AME training on this topic.
- Air carriers should develop effective pilot assistance programs.
- The FAA should encourage air carrier operators to implement mental health education programs for pilots and supervisors that improve awareness and recognition of mental health issues, reduce stigmas, and promote available resources to assist with resolving mental health problems.
- The FAA should assemble and disseminate information on benchmark pilot support programs, which includes pilot assistance programs, to serve as a resource for air carriers to develop new or improve existing programs.
- Encourage advocacy for a uniform national policy on mandatory reporting of medical issues that affect public safety.

The Aerospace Medical Association's Mental Health Working Group issued a number of recommendations in 2021, urging the FAA to promote a culture of reporting while striving to maintain safeguards for individual privacy. The group also offered the following additional, specific recommendations:

- A regulatory framework that incorporates health promotion (wellbeing) and pathways to recovery.
- Regulators should facilitate the development of a "safe harbor" for disclosing mental problems and receiving treatment.
- Blanket mandatory reporting of all pilots with mental health problems to the aeromedical authorities should not be encouraged, as it will likely deter people from seeking help. (7–17)
- Regulators, operators, and industrial groups should explore ways of minimizing the risk of income loss due to mental illness. Suitable insurance should be mandated.

Question 3. Does FAA's existing pilot medical programs help encourage or discourage pilots from speaking out on their mental well-being?

Answer. There is a high rate of nondisclosure of mental health issues among participants in the FAA's existing pilot medical programs. The reasons for this include

social stigma and concerns about removal from flying status, loss of income, and loss of livelihood. Any effort to improve the rate of self-disclosure would need to address these inhibiting factors while also ensuring safety.

Drug Testing

Question 4. Current FAA regulations require airlines to randomly drug test between 20 and 25 percent of their pilot workforce each year. In your view, what changes to current drug testing requirements are needed?

Answer. Our investigations to date have not yet identified necessary revisions to airline pilot drug-testing requirements.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. TED BUDD TO JENNIFER L. HOMENDY

Question. In addition to investigating aviation accidents, the NTSB also plays an important role in adjudicating enforcement actions that the FAA brings. Chair Homendy, do you believe it is important for NTSB to be a neutral and impartial decisionmaker in these proceedings?

Answer. The NTSB and our Office of Administrative Law Judges are critical parts of the airmen appeals process to ensure that the FAA's aviation enforcement actions are lawful and factually justified. The overall fairness of those proceedings hinges on our objectivity, which is an adjudicative cornerstone we hold in the highest regard. Supreme Court precedent provides for appropriate deference to rulemaking agencies for determining sanctions, and we do believe it is important for the NTSB to have the ability to consider the reasonableness of such actions, as justice demands, relative to the particular facts and circumstances presented by each case.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARIA CANTWELL TO TIMOTHY L. AREL

Improve Controller Training

According to a June 2023 DOT OIG report, the average time to train fully certified controllers has increased since the halt in controller training caused by the COVID-19 pandemic. The same report verified that today, it can take more than three years to train a controller. FAA must invest more in making advanced technologies available to help address the controller training backlog. For example, Tower Simulation Systems (TSS) are identical computerized simulations of tower environments that enable controllers to train on air traffic skills such as enforcing safe runway occupancy, spacing, and sequencing requirements for aircraft. According to the FAA, controllers at FAA's operational facilities only have access to 57 "fixed" TSS at major airports and 50 "mobile" units in comparison to the 185 total FAA-operated towers across the system. The Senate FAA bill (Section 530) would increase access to Tower Simulation Systems nationwide to facilitate quality on-the-job training and help accelerate the time it takes for controllers to become fully certified.

Question 1. Would you agree that Tower Simulation Systems improve controller training? How are they used to help controllers understand and mitigate operational risks?

Answer. The Tower Simulation System (TSS) enhances controller training. The TSS is a full-scale tower simulator that provides an interactive, highly realistic environment for controllers to learn, practice, and perfect skills. The voice recognition feature allows trainees to practice air traffic procedures as if they were speaking directly to aircrew. The recorded playback feature allows instructors to review and evaluate performance in the moment, providing trainees with immediate feedback. High fidelity training scenarios allow trainees to practice and perfect numerous air traffic procedures in a safe environment before the trainee is certified and transitions to the air traffic control tower. Additionally, the TSS offers refresher training which allows certified controllers to increase proficiency and promote behaviors essential for the identification, mitigation and/or management of safety-of-flight risks.

Question 2. Do you believe increasing investments in making Tower Simulation Systems available will increase safety in the National Airspace System?

Answer. Yes. According to a 2021 study by Ernst and Young, the TSS reduces time to certification by 27 percent, which contributes to an increased throughput of new hire controllers and addresses staffing shortages that potentially introduce risk to the NAS. It also enables certified air traffic controllers the opportunity to practice safety procedures in a simulator.

Question 3. Moving forward, what is FAA's plan to increase installations of and controller access to this technology?

Answer. The FAA is committed to achieving its air traffic controller hiring goals, and continued investment in the TSS plays a key role. Over the next five years, the FAA will plan and execute an increase to the footprint of the TSS program with the procurement of additional systems to ensure each air traffic control facility is equipped with a training simulation system.

Airport Surface Surveillance Technology

In response to the near-misses we have witnessed recently, NTSB has called for expanding the use of surface situational awareness technologies—such as Airport Surface Detection Systems (ASDE-X) and Airport Surface Surveillance Capability (ASSC). These technologies help air traffic controllers track the movement of aircraft and vehicles on the runway to avoid potential conflicts, and also alert controllers when a plane is lining up on the wrong runway or taxiway. This technology has been successfully deployed at Sea-Tac Airport in Washington state. Since it was implemented there in 2018, on at least fifty (50) occasions it has prevented pilots from mistakenly landing in the wrong place. We need this technology at more airports.

FAA Clarification: ASDE Taxiway Arrival Prediction (ATAP) is a capability that has been deployed in all 44 ASDE-X and ASSC systems. It alerts an aircraft lining up on a closed runway or taxiway. It does not alert for an aircraft lining up on the wrong runway. ATAP is credited with one save at Seattle, and at least 75 saves across all 44 airports with ASSC or ASDE-X.

Question 1. The Senate FAA bill would increase funding to \$18.2 billion over five years for FAA's Facilities & Equipment ("F & E") account—a \$600 million increase over authorized funding levels in the 2018 bill—that funds capital investments related to airport safety infrastructure. Do you believe increased funding for the F & E account can be helpful in upgrading and replacing aging surface situational awareness technologies? If so, why?

Answer. Long-term, stable, and sufficient funding for the agency's capital needs will allow the agency to modernize the most complex airspace in the world. Additional funding for the F&E account would be critical in upgrading multiple technologies, including upgrading, and replacing aging surface situational awareness technologies.

Question 2. The FAA has only deployed existing surface situational awareness technologies at 44 airports. What is FAA doing to improve runway safety at airports without surface surveillance capabilities? Do you agree that legislation pushing for increase safety technology and resources, like found in the Senate FAA bill, will help?

Answer. The FAA is focusing on deploying technologies that are agile, efficient, and cost-effective in providing surface situational awareness solutions across our airspace. The three technologies that make up the Surface Safety Portfolio will enhance surface situational awareness for controllers. These technologies are the Approach Runway Verification (ARV), Runway Incursion Device (RID), and the Surface Awareness Initiative (SAI). All of these technologies are planned for deployment and installation at airports in 2024.

- ARV alerts air traffic when an approaching aircraft is lined up with the wrong airport surface. ARV completed key site verification in September 2023.
- RID is a memory aid for controllers to provide additional situational awareness of occupied or closed runways. RID provides an audible and visual alert to controllers when a runway is not available for departing or landing aircraft.
- SAI uses commercially available technologies that display airport surface traffic to controllers in towers for airports that do not currently have a surface surveillance.

Additionally, the FAA works collaboratively across the agency and with industry to identify and address the root causes of identified surface safety issues and mitigate associated safety risk at specific facilities. The data may lead to the identification of a surface safety "Hot Spot" or recurring issue. Hot Spots are quickly mitigated by developing and disseminating communications to stakeholders, development of From the Flight Deck videos, Pilot Handbooks, and Arrival Alert Notices. These communications support awareness of the root causes of surface incidents at airports by all parties, and thereby improve surface safety. Other mitigations could include improved airport signage and markings, plans for runway and taxiway redesign, changes to procedures and phraseology, as well as pilot and controller forums and outreach.

Runway Safety Action Team (RSAT) meetings are required at each facility at a minimum of once per year. These meetings are designed to bring local stakeholders together to discuss current surface safety issues at the airport and to identify action items for future mitigations. RSAT meetings focus on surface Hot Spots, active and upcoming construction projects, possible wrong surface risk, and discussion on recent events that have occurred on the airport. These discussions provide an opportunity for all parties to learn from the event to prevent future occurrences. In FY2023, all 267 FAA and all 253 FAA Contract Tower facilities completed their required annual RSAT meetings.

In addition, Surface Safety outreach programs include monthly meetings with controllers, pilot groups and airport operators, pilot controller forums, and monthly e-mail outreach on upcoming projects and hot topics. These programs have contributed to surface event reductions and runway safety improvements through heightened awareness. Facilities with active outreach activities have shown marked reductions in runway incursions.

The FAA established the Runway Incursion Mitigation (RIM) program in 2015. This program identifies airport locations with a history of runway incursions. These locations then become a priority for the FAA and industry to implement mitigations. Since 2015, 75 of these locations at airports with no ground surveillance have implemented mitigations, with an average runway incursion reduction of approximately 75 percent.

Question 3. The FAA is partnering with the private industry in developing low-cost alternatives to ASDE-X and ASSC that can be viable options for airports without existing surface surveillance capabilities. What is the status of these newer, successor technologies and when should we expect widespread distribution of surface situational awareness technologies across the NAS?

Answer. As stated above, the FAA is focusing on deploying technologies that are agile, efficient, and cost-effective in providing surface situational awareness solutions across our airspace to provide widespread distribution. The three technologies that make up the Surface Safety Portfolio will enhance surface situational awareness for controllers. These technologies are the Approach Runway Verification (ARV), Runway Incursion Device (RID), and the Surface Awareness Initiative (SAI). All of these technologies are planned for deployment and installation at airports in 2024.

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- For SAI, the FAA throughout 2023 has had multiple engagements with industry to conduct market research on available technologies that can address the need to proliferate surface awareness technologies throughout the NAS.

Many of these technologies are used today by airlines and airport operators providing airport ramp surveillance information. The FAA intends to initially deploy these solutions in June 2024 with a more widespread rollout to follow.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. TAMMY DUCKWORTH TO
TIMOTHY L. AREL

Airport Surface Detection System

The Airport Surface Detection System, which dates to the 1990s, has become a critical surface situational awareness tool for ATC, and we have a 23-year old NTSB recommendation describing why the technology should be installed airports across the country.

Unfortunately, both Congress and the aviation industry have fallen short over many decades in providing the level of investment that would enable FAA to ensure its controllers working at airports, such as Austin-Bergstrom, have the benefit of this additional layer of defense.

Question 1. Given the current budget environment and lack of funding for this critical technology, what can we do over the next year to improve safety and deploy critical aviation technologies in a manner that prioritizes the most high-risk locations for initial installation?

Answer. The FAA is focusing on deploying technologies that are agile, efficient, and cost-effective in providing surface situational awareness solutions across our airspace. The three technologies that make up the Surface Safety Portfolio will enhance surface situational awareness for controllers. These technologies are the Approach Runway Verification (ARV), Runway Incursion Device (RID), and the Surface Awareness Initiative (SAI). All of these technologies are planned for deployment and installation at airports in 2024.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JACKY ROSEN TO
TIMOTHY L. AREL

Aging Infrastructure Impacting Aviation System

Aviation professionals are only as effective as the infrastructure and technology they rely on. According to the President's most recent budget request, the average age of an FAA Air Traffic Control facility is over 60 years old, and more than half of terminal facilities are more than 40 years old. These facilities regularly operate with degraded technology systems, resulting in a lack of accurate wind speed and direction calculations, the failure of radio frequencies within congested airspace, and the malfunctioning of runway lights. Many airports also lack functioning radar systems used to track airborne and taxiing planes, meaning that some controllers have no visual awareness of the aircraft they are directing, especially in poor weather conditions.

In lieu of functioning radar systems in Air Traffic Control facilities, many controllers are filling the gaps by resorting to using public flight-tracking websites that aren't approved by the FAA.

Perhaps most alarming are the reports that the FAA lacks the funding to install runway warning systems to help prevent runway collisions. Only forty-three of the Nation's more than five hundred airports serving commercial flights have runway collision-avoidance systems. This is simply not good enough.

Question 1. How can we improve the existing technology and infrastructure utilized by air traffic controllers and aviation professionals to reduce potential risk and manage congested airports and complicated airspace at our Nation's airports?

Answer. With respect to deployment of additional tools and technology to improve surface surveillance at additional airports across the National Airspace System, the FAA is focusing on deploying technologies that are agile, efficient, and cost-effective in providing surface situational awareness solutions across our airspace. The three technologies that make up the Surface Safety Portfolio will enhance surface situational awareness for controllers. These technologies are the Approach Runway Verification (ARV), Runway Incursion Device (RID), and the Surface Awareness Initiative (SAI). All of these technologies are planned for deployment and installation at airports in 2024.

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Long-term, stable, and sufficient funding for the agency's capital needs will allow the agency to modernize the most complex airspace in the world.

Safety for Passengers

Investments in technology are necessary to help keep the flying public safe from preventable accidents. While there hasn't been a fatal crash involving a major U.S.

airline in over a decade, many passengers are wary of flying amid recent highly publicized safety incidents.

Question 1. The 2022 holiday travel season was one of the busiest to date, marked with a slew of flight delays and cancellations amid pilot and controller workforce shortages—all of which we hope to avoid this year. Can you discuss why passengers planning to travel this holiday season should feel safe and confident about their travel plans?

Answer. The U.S. aviation system is the safest in the world. There has not been a fatal crash involving a major U.S. airline since 2009. The FAA has multiple layers of safety that protect the traveling public from the time they board an aircraft to the time they deplane.

During the 2023 Thanksgiving holiday travel season traffic was up more than 4 percent over 2022 and delays were down 12 percent. Only 1.5 percent of the 350,000 flights were canceled. The FAA implemented a Holiday Airspace Release Program (HARP), route structure and traffic management initiatives to manage the increased volume and complexity.

Question 2. In addition to ensuring the safety of passengers, what changes if any has the FAA implemented to ensure the reliability of flight schedules during this upcoming holiday season?

Answer. The FAA and the Department of Defense (DOD) expanded the airspace included in the Holiday Airspace Release Program (HARP). HARP allows civil flights to access airspace typically reserved for military use. This year's route expansion allows for the release of an additional 22 pieces of airspace on the Eastern Seaboard on Thanksgiving, Christmas, MLK and President's Day holidays as well as the preceding weekends. DOD and FAA are in discussions to streamline coordination timeframes for HARP for more dynamic scheduling of airspace (altitudes and timing of use) and to allow for more flexibility for civil and DOD scheduling needs.

The Air Traffic Control System Command Center (ATCSCC) has added regional planning discussions to its daily planning cadence. The ATCSCC runs telcons with air traffic control facilities, airlines, and other flight operators every two hours to coordinate management of the National Airspace System (NAS). The regional planning discussions have improved the situational awareness for areas that may see more impactful constraints such as weather and volume, provided industry with early notice about potential delays and traffic management initiatives, and allowed airlines to make informed decisions about their operations to adjust timing or routing of flights as needed.

Collaboration between National Weather Service (NWS), Center Weather Service Units (CWSU) and airline meteorological services has improved with the implementation of the new NWS weather group chat 2.0 feature. The chat feature provides the teams with the ability to discuss potential differences in weather forecasting to make FAA and industry planning processes more predictable, and therefore improve operational outcomes. It assists with strategizing and implementing appropriate mitigations to weather constraints.

The addition of newly FAA-created "escape routes" for Central Florida has improved flexibility for airlines to fly lower altitude routes to mitigate lengthy departure delays that often happen during Florida's thunderstorm season. Jacksonville Center (ZJX) has developed a capping and tunneling strategy that has shown improved capabilities during high volume events that allow for flights to transition ZJX at mid-level altitudes and climb to higher altitudes once beyond impacted airspace. These routes, as well as improvements and modification to existing Northeast corridor escape routes, continue to provide added options to industry and facilities to alleviate potential airport surface congestion during severe weather and high-volume events.

The ATCSCC continues to work with facilities and airline partners to adjust Ground Delay Program (GDP) and Airspace Flow Program (AFP) parameters to utilize shorter duration and focus on timely exit strategies. This allows for fewer delays and less canceled flights for industry. This in conjunction with development and utilization of Integrated Departure Arrival Capability (IDAC) has improved flow concerns out of south Florida onto the Atlantic Routes (ARs) northbound and across the Gulf westbound.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. RAPHAEL WARNOCK TO
TIMOTHY L. AREL

Terminal Flight Data Manager

At many airports across the country, air traffic controllers still rely on paper flight strips to keep track of flights.¹ The Federal Aviation Administration's (FAA) Terminal Flight Data Manager (TFDM) is a NextGen system designed to improve the management of airport surface traffic, including aircraft departures, by replacing paper flight strips with an automated electronic system.² In 2018, the FAA anticipated that implementation of TFDM would be complete at 89 airports by 2028.³ According to a 2023 Government Accountability Office report, the FAA has fallen short of its TFDM implementation goals and has responded by revising its projected completion date to 2030 and decreasing the number of airports designated to receive this technology from 89 to 49.⁴

The Savannah/Hilton Head International Airport in Savannah, Georgia, is one of the 40 airports that were removed from the FAA's TFDM implementation list.⁵ On November 1, 2023, the Department of Transportation (DOT) Office of Inspector General (OIG) reported that delays in the deployment of TFDM and the NextGen Air Transportation System are some of the Department's top management challenges for Fiscal Year 2024.⁶

Question 1. Does TFDM reduce operational safety risk at airports?

Answer. TFDM provides capabilities that will reduce operational safety risk compared to the paper flight strip environment today:

- Ability to electronically toggle a runway as open/closed, automatic notification to controllers of closed runways, and marking of all affected electronic flight strips.
- Safety logic to prevent the progression of an electronic flight strip into the next logical action if that action places the flight on a closed runway.
- Automatic marking of electronic flight strips when data changes, and inclusion of additional data elements not available with paper flight strips.
- Automatic generation and display of runway placards that indicate closed runways and other memory joggers.

These enhancements improve controller situational awareness and help identify potentially hazardous situations on the surface.

Question 2. What must the FAA do to address the issues raised in the DOT Inspector General report?

Answer. The DOT OIG report focused on challenges related to pandemic impacts on the program. TFDM's primary issue was the inability for the team to travel and access the air traffic facilities to implement TFDM systems into the field. These restrictions drove a significant delay in the TFDM deployment schedule, resulting in cost growth. Facility access and travel are no longer a challenge for the program. The FAA addressed the cost growth due to these delays by reducing the waterfall from 89 sites to 49 sites.

Question 3. Why was Savannah/Hilton Head International Airport removed from the FAA's list of airports scheduled to receive TFDM technology?

Answer. In reducing the 40 sites from the TFDM strategic plan due to COVID pandemic cost impacts, the FAA considered the current implementation status (sites currently being deployed), the expected benefits of TFDM deployment at each site, and the number of operations at the facility to determine the sites that would remain on the TFDM deployment waterfall. Based on this criteria, Savannah/Hilton Head International Airport was removed from the TFDM waterfall.

Facility Staffing Timeline

On November 1, 2023, DOT OIG released its audit of DOT's top management challenges for Fiscal Year 2024.⁷ The report identified inadequate air traffic controller staffing at critical facilities as one of the main potential causes of flight

¹ https://www.faa.gov/air_traffic/technology/tfdm/efs

² <https://www.gao.gov/products/gao-24-105254> at 12.

³ <https://www.gao.gov/products/gao-24-105254> at 12.

⁴ <https://www.gao.gov/products/gao-24-105254> at 22.

⁵ https://tfmlearning.faa.gov/assets/media/CDM/CDM_2022/TFDM_CDM_General_Session.pdf.

⁶ <https://www.oig.dot.gov/library-item/39685> at 10.

⁷ Id.

delays and cancellations.⁸ According to the report, 20 of the FAA's 26 most critical facilities were staffed below the agency's 85 percent threshold as of March 2022.⁹ Moreover, staffing challenges and pauses in air traffic controller training during the pandemic have resulted in increased certification timelines for controllers.¹⁰

Question 1. What is the FAA doing to address this challenge?

Answer. We are getting healthier every year and making steady progress back to where we were before COVID. This is a process that takes time to ensure appropriate levels of training and we are committed to it.

In 2022, the FAA established the Air Traffic Controller (ATC) Certification Training Process Initiative to address overall attrition. This initiative focuses on increasing the ATC hiring pipeline, improving Academy execution, and increasing the number of certified professional controllers. With a focus on these three areas, the FAA intends to streamline the path to certification and outpace attrition. The Initiative played a key role in FAA exceeding its aggressive FY2023 hiring goal of 1,500.

In addition to the fully certified controllers in our workforce, there are currently more than 2,700 trainees seeking full certification at 313 air traffic control facilities. Out of the 2,700 trainees, 1,500 plus are certified on one or more position within their respective facility and required to maintain currency on those positions.

Because these trainees can staff positions they are certified on, some facilities experience less significant staffing shortages. The presence of previously certified controllers, particularly CPC-ITs, helps alleviate staffing shortages at some facilities as they progress toward full certification.

The FAA is also investing in the modernization of the Tower Simulation System (TSS), which is proven to reduce time to certification by 27 percent for new hires and 21 percent for Certified Professional Controllers in Training (CPC-ITs). The upgrade of the TSSs will contribute immensely to the ongoing effort to address staffing shortages.

Question 2. Under current FAA hiring practices, how long will it take the FAA to fully staff all air traffic facilities with the needed number of fully certified controllers?

Answer. Based on hiring plans put forth in the 2023 Controller Workforce Plan, the FAA will have the number of fully certified controllers required to fully staff all air traffic control facilities between 2027–2032. Through increased hiring and training, FAA is looking for opportunities to increase the number of certified controllers beyond current projections over the next five years.

Question 3. Under current hiring practices, how long will it take to lift the capacity restrictions caused by controller staffing shortages?

Answer. The FAA has an aggressive hiring plan in place. In unusual cases where staffing has not been able to outpace attrition and impacted throughput, we have found it necessary to consider other means to address staffing issues, such as slot waivers at New York TRACON, or transferring responsibility for a number of airspace sectors to another adjacent facility.

Data Communications

In the 2018–2019 NextGen Implementation Plan, the FAA outlined a plan to implement the Data Communications system, which would enable air traffic controllers to send more reliable, pre-scripted text-based messages with departure clearance instructions and reroutes directly to pilots, reducing the potential for miscommunications.¹¹ The FAA reached its implementation milestone for deploying the system at airport towers, reaching 65 airport towers by July 2022. However, the FAA missed its target for implementation at en route centers, reaching only 12 of 20 centers by September 2023. More airports have requested Data Communications capabilities for their towers, but the FAA has stated that it does not plan to expand capabilities to smaller airports.¹²

Question 1. Does the FAA have plans to bring Data Communications capabilities to smaller, regional airports? If not, why?

Answer. Bringing Data Comm capabilities to smaller regional airports is not currently planned. There is no business case nor the infrastructure to support the capability at smaller airports and many of the aircraft that use these small airports are not equipped with Data Comm capabilities.

⁸*Id.* at 9.

⁹*Id.* at 9.

¹⁰*Id.* at 10.

¹¹https://www.faa.gov/sites/faa.gov/files/2022-06/NextGen_Implementation_Plan_2018-19%20%281%29.pdf at 12–16.

¹²<https://www.gao.gov/products/gao-24-105254> at 16.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. TED CRUZ TO
TIMOTHY L. AREL

ATC Delays

According to Airlines for America,¹ the overall direct/indirect cost of flight delays and cancellations in the National Airspace System (NAS) was \$28 billion in 2018. Those costs have increased significantly since then. In New York, air traffic control (ATC) staff shortages have resulted in tens of thousands of delays and cancellations.

Question 1. From 2018—present, how many passenger delay minutes have been caused by short-staffing at N90? Please break down by calendar year.

Answer. The table below contains the delay minutes attributed to N90 staffing over the past six calendar years. The figures for 2023 are through Nov. 28. These delay minutes are from OPSNET, a system that captures reportable delay for the FAA. OPSNET reflects aircraft delays when under FAA control. It should be noted that OPSNET does not permit a facility to record secondary causes even though there are often multiple causal factors. Note that in 2022, as flights in the NY area began to approach pre-COVID levels, traffic management initiatives were needed to allow the available controllers to safely manage the traffic, resulting in delays even on days when weather was not a significant factor.

Year	Delay Minutes Caused by N90 Short Staffing
2018	—
2019	948
2020	—
2021	437
2022	19,998
2023	178

Question 2. When tens of thousands of consumers are either inconvenienced or stranded because of a government failure, who bears the cost?

Answer. The FAA's mission is to provide the safest and most efficient aerospace system in the world. When circumstances require it, the FAA does place a higher priority on the safety of the traveling public than the capacity at a particular airport or region. Nevertheless, we continue to seek improvement in our performance, and we look forward to working with Congress to address the causes of flight delays.

Question 3. Does the government write each disrupted passenger a check or are airlines ultimately held liable for the Federal Aviation Administration's (FAA) failure to staff and operate the NAS?

Answer. Airlines are not held responsible for compensating passengers or providing services such as meals or hotels for cancellations or delays caused by weather or management of the national airspace system.

Question 4. What percentage of delays across the NAS originate in the New York area?

Answer. A 2012 study by MITRE found that one third of U.S. flights are directly impacted by delays in New York and Philadelphia. An update to the study would be needed to narrow this finding down to New York only.

Question 5. When delays are due to government shortcomings, are these statistics made public in a transparent way?

Answer. The FAA and the Air Traffic Organization strive to be transparent in how we carry out our mission. In support of that transparency, we maintain a public facing website that provides continuous real time flight delay information at: <https://www.fly.faa.gov/flyfaa/usmap.jsp?legacy=true>.

The Department of Transportation issues a monthly consumer report that details various causes of flight delays. The report can be found here: <https://www.transportation.gov/individuals/aviation-consumer-protection/air-travel-consumer-reports>.

N90

The New York Terminal Radar Approach Control Facility (N90 TRACON) has been chronically understaffed for decades. Congress has on multiple occasions directed the FAA to reexamine or reorganize the airspace managed by N90. The FAA, to its credit, has attempted to execute reorganization plans only to be stymied by

¹"U.S. Passenger Carrier Delay Costs." Airlines for America. May 24, 2023. Available at <https://www.airlines.org/dataset/u-s-passenger-carrier-delay-costs/#:~:text=In%202022%2C%20the%20average%20cost,%percent20to%20%2442.15%20per%20minute>.

political pressure. Earlier this year, the FAA reduced the volume of flights into and out of the New York area and cited staffing at N90 as a reason. Shortly after announcing the volume reduction, the FAA put the planned transfer of New Jersey airspace to the Philadelphia TRACON on “pause” until the end of the year.

Question 1. How many Certified Professional Controller (CPC) and Certified Professional Controllers-In Training (CPC-IT) were assigned to N90 at the following periods of this year (please quantify by CPC and CPC-IT separately):

a. January 1, 2023

Answer. CPC 123, Trainees 54

b. March 22, 2023

Answer. CPC 129, Trainees 67

c. May 15, 2023

Answer. CPC 127, Trainees 70

d. August 8, 2023

Answer. CPC 129, Trainees 69

e. September 15, 2023

Answer. CPC 130, Trainees 66

f. November 5, 2023

Answer. CPC 132, Trainees 72

Question 2. In the March notice announcing the waivers, the FAA stated, “Dedicated training initiatives have been successful in reducing most of the training backlog with the exception of N90.”²

a. What training initiatives were successful at locations other than N90?

Answer. FAA’s Technical Training Organization (AJI) uses standard and innovative processes to meet the evolving training needs of the Air Traffic Organization. For example, AJI established a Regional Graduate Training initiative to address a training backlog at the FAA Academy and select field facilities due to the COVID-19 pandemic. Under this initiative, AJI initially established three satellite training locations in the NAS: Phoenix, San Diego, and Chicago, to resume Terminal RADAR (RTF) and TRACON Skill Enhancement Workshops (TSEW) training. This initiative has been a success and has demonstrated the possibility of alleviating training throughput pressure not only at the Academy in Oklahoma City, but at other field facilities as well.

b. What training initiatives were not successful in training more controllers or improving retention at N90?

Answer. The FAA has employed a number of initiatives over the last several years to attract and retain controllers at N90. This includes controller incentive pay (CIP), targeted hiring from the local area, and priority placement for controllers not currently at N90 who ask to be transferred there. The list below highlights some of the key incentives the FAA has offered.

- FEB 2014, Return Rights and Priority Release—148 CPC and 31 Trainees
- MAR 2016, Return Rights and Priority Release—140 CPC and 40 Trainees
- JUL 2016, Training Incentive (additional 15 percent for On-the-Job Training and \$3,000 lump sum to all CPC in area when trainee achieves CPC level 3 certification)—132 CPC and 37 Trainees
- JUL 2017, Training Incentive (extended from 2016) and Annual Leave Buy Back—132 CPC and 21 Trainees
- AUG 2017, Enhanced CIP and Return Rights—133 CPC and 16 Trainees
- MAR 2018, New York Local Hiring Law—131 CPC and 23 Trainees
- APR 2018, No-experience Direct Hire Initial Screen—131 CPC and 26 Trainees
- MAY 2018, Ten Eleven Twelve Radar Assessment (TETRA)—130 CPC and 30 Trainees
- JUN 2018, Annual Leave Buy Back—128 CPC and 30 Trainees

Question 3. In postponing the planned transfer of airspace to Philadelphia, the FAA and the National Air Traffic Controllers Association have claimed the performance of N90 has improved. What metrics did the FAA set for performance that N90 has met?

²“Federal Register Notice of Limited Waiver of Slot Usage Requirement for Summer 2023.” Federal Aviation Administration. March 22, 2023. Available at <https://www.faa.gov/general/federal-register-notice-limited-waiver-slot-usage-requirement-summer-2023>.

Answer. FAA and NATCA agreed earlier this spring to monitor the performance of the facility over several months and then manage the airspace appropriately. The agency appreciates the benefit of that additional time and data and is now collaborating with NATCA on next steps and will keep the Committee up to date in the coming weeks.

Question 4. How many times did the FAA order volume reductions at John F. Kennedy International Airport, LaGuardia International Airport, or Newark International Airport because of controller staffing issues? Please provide the number of volume reductions for each airport for calendar year 2023.

Answer. The FAA acted preemptively to reduce volume in the New York airspace by offering slot usage relief at the New York airports and encouraging voluntary participation by the airlines. The result was a hand-back of approximately 6 percent of the New York airport slots by the airlines for the summer 2023 scheduling season which significantly contributed to a reduction in delays in the area. Modeling shows that had these reductions not taken place, delays would have been 31 percent higher in the NY area.

The FAA has also offered a 10 percent slot usage waiver for the NY airports during the winter 2023/2024 and summer 2024 scheduling seasons.

The FAA's primary way to reduce volume at an airport is through traffic management initiatives such as a ground stop (GS) or ground delay program (GDP). While the FAA utilized these initiatives many times over the course of the year at the New York area airports, no GS/GDPs were attributed to staffing. Notwithstanding the lack of evident data, staffing shortages do cause a reduction in capacity and if they occur at the same time as a weather-or volume-related program, they will be a significant contributory factor for delays in the New York market.

The Traffic Flow Management System (TFMS) which implements these programs, does not permit a facility to record secondary causes. In the event that there is heavy weather, high volume and a staffing shortage, weather is usually chosen as the prevailing condition.

Question 5. How much longer have weather-related ground-stops lasted at New York area airports because of ATC staffing?

Answer. If there were staffing shortages causing reduced capacity at the time of weather-related traffic management initiatives, the duration of those initiatives would have been extended. However, the FAA is unable to determine how much additional time weather-related GDPs and GSs have run as a result of short staffing.

Question 6. What long-term solutions are under consideration for N90?

Answer. The FAA is considering transferring the N90s Newark (EWR) air space management to Philadelphia Tower/TRACON (PHL).

Question 7. How much money was spent to renovate the Philadelphia TRACON in anticipation of it receiving responsibility for New Jersey airspace?

Answer. The FAA spent \$15 million on renovating the PHL TRACON to accommodate a possible move of EWR air space.

Deploying Runway Technologies

Question 1. Can you clarify the distinction and capabilities between ASDE-X runway lighting technology, and ADS-B mandated equipage for aircraft flying in and out of airports?

Answer. Airport Surface Detection Equipment—model X (ASDE-X) and Airport Surface Surveillance Capability (ASSC) provide airport surface event information to air traffic controllers to enhance their situational awareness. This includes a display of aircraft on the airport surface and alerting if a conflict is projected to occur. Runway Status Lights (RWSL) are embedded in the pavement and inform pilots when it is unsafe to enter, cross, or depart from a runway. RWSL uses the position information of aircraft and vehicles obtained from the ASDE-X and ASSC systems to automatically illuminate and extinguish lights.

All ASDE-X and ASSC airports are within Class B and Class C airspace, which require ADS-B equipage per FAR 91.225. ADS-B is one of several surveillance sources that are provided to the ASDE-X and ASSC systems. ADS-B uses satellite position services to track aircraft and vehicles more accurately. The increased accuracy of ADS-B surveillance provides measurable benefits to operators, air traffic controllers, and the flying public by enhancing the situational awareness, safety, and efficiency at these facilities.

Question 2. Which surface surveillance technology is proven to be most beneficial to preventing aviation near miss incursions, accidents, and incidents?

Answer. The FAA currently has surface surveillance at 44 airports which include Airport Surface Detection Equipment—model X (ASDE-X) and Airport Surface Sur-

veillance Capability (ASSC). These two systems have been instrumental in reducing risk on the surface by alerting controllers to potential collisions.

All surface surveillance technologies contribute to provide safety improvement benefit both in the airport traffic control tower and in the cockpit. The FAA is exploring technologies that can be deployed quickly, like Surface Awareness Initiative (SAI), to enhance controllers' situational awareness where that capability does not currently exist. The FAA is also researching Runway Incursion Prevention through Situational Awareness (RIPSA), to enhance pilot situational awareness at airport surface areas most prone to incidents. The prototype RIPSA system will be installed and evaluated at San Antonio International Airport in 2024. RIPSA will employ the same in-pavement lights that are deployed at Runway Status Lights sites to protect runway/taxiway entrances.

The lights will be driven by surveillance inputs including a new lower cost surface movement radar, ADS-B, and a feed from the airport surveillance automation system. RIPSA Runway Entrance Lights (RELs) provide a direct visual warning to pilots and vehicle operators that it is unsafe to enter or cross a runway.

Question 3. Will the Austin-Bergstrom (AUS) airport be receiving new surface surveillance technology in 2024? How will this technology improve runway safety across the airport?

Answer. Yes, AUS will receive a solution to be acquired under the Surface Awareness Initiative (SAI) program and is scheduled for 2024. SAI solutions must display all ADS-B aircraft (a mandate for AUS airspace) on the surface movement area including runways, taxiways, intersections, and if desired by ATC, terminal ramps. Currently AUS has no enhanced surface situational awareness capabilities. In addition, a new function within the Standard Terminal Automation Replacement System (STARS), tower and terminal radar approach controllers primary display, called Approach Runway Verification (ARV) that provides wrong surface landing alerts will be adapted and installed for Austin-Bergstrom in early 2024.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. TED BUDD TO
TIMOTHY L. AREL

Question 1. Near misses at Boston Airport in February, Indianapolis Airport and San Diego Airport in August, and an actual collision at Houston Hobby Airport last month all involved aircraft given a line up and wait clearance. While a line up and wait clearance can be helpful in increasing the runway throughput and reducing pre-takeoff delays, it does present risks in busy runway environments. What limitations does FAA place on issuing line up and wait clearances?

Answer. Limitations/Procedural requirements in FAA Order JO 7110.65 are as follows:

1. When issuing the instruction to line up and wait (LUAW), the controller must preface the instruction with the runway to be used and receive correct readback.
2. An aircraft issued instructions to LUAW must not remain on the runway in position for more than 90 seconds without the controller providing additional instructions.
3. If an airport has an Airport Surface Detection Equipment (ASDE) system operating with a fully operational Safety Logic System, the controller may take certain actions that otherwise would be prohibited at airports without this technology. For example, at a facility with a fully operational Safety Logic System, the controller may have an aircraft on the runway in LUAW position and still clear an arrival to land on the same runway. If the Safety Logic System was inoperative, in limited mode, or not installed, the controller would be prohibited from issuing the landing clearance while an aircraft was occupying the same runway with a LUAW clearance.
4. When an aircraft is authorized to LUAW, the controller must inform the pilot of the closest traffic within 6 flying miles requesting a full-stop, touch-and-go, stop-and-go, option, or unrestricted low approach to the same runway.
5. The controller may not authorize an aircraft to LUAW at any time when the runway intersection to be used is not visible from the tower.
6. The controller may not authorize an aircraft to LUAW when the departure point (runway full length or intersection) is not visible from the tower, unless the aircraft's position can be verified by the ASDE, or the runway is used for departures only.

7. The controller may not authorize aircraft to simultaneously line up and wait on the same runway, between sunrise and sunset, unless the local assist/local monitor position is staffed.
8. When aircraft are authorized to LUAW on runways that intersect, the controller must exchange traffic information between that aircraft and the aircraft that is authorized to line up and wait, depart, or arrive to the intersecting runway(s).
9. When a controller delivers or amends an ATC clearance to an aircraft holding in LUAW position, an additional clearance must be issued to prevent the possibility of the aircraft beginning takeoff roll, such as “hold in position” to ensure the pilot understands the transmission is for purposes other than issuing a departure clearance.
10. When authorizing an aircraft to LUAW at an intersection, the controller must state the runway intersection.

Additionally, facility air traffic managers must comply with the following LUAW provisions of FAA Order JO 7210.3 in developing local LUAW procedures:

1. Air traffic managers must determine an operational need exists prior to authorizing LUAW operations.
2. Air traffic managers must issue a facility directive containing procedures to ensure the efficient use of runways, positive control, and coordination of aircraft/vehicles on or near active runways.
3. Air traffic managers must develop procedures to be included in a facility directive for the mandatory use of an approved memory aid at the appropriate operational position(s) when a LUAW clearance has been issued.
4. Air traffic managers must ensure that when LUAW is used in the operation, the local control position is not combined with any other non-local control position. This reduces controller workload and ensures maximum effort can be concentrated on scanning runways and associated traffic.
5. Air traffic managers must conduct an annual review of LUAW operations, and forward findings to their Service Area Director of Air Traffic Operations.

Question 2. Is FAA reviewing those limitations in light of recent incidents?

Answer. In an ongoing effort to reduce safety risks associated with Line Up and Wait (LUAW) operations, FAA facilities using these procedures were required to conduct a joint review of their local procedures beginning on August 15, 2023, through August 29, 2023. If the review was not completed by August 29, 2023, then the facility was required to suspend LUAW operations. Utilizing the Local Safety Council, facilities verified that facility LUAW procedures complied with current FAA policies and, if applicable, identified and submitted best practices or local procedures that contribute to the successful implementation of LUAW operations.

If it was determined that the facility's LUAW procedures or application were not compliant with FAA policies, the facility was required to suspend LUAW operations and work collaboratively to correct the deficiencies. All local facility changes to LUAW procedures require coordination per FAA Order JO 7210.3 paragraph 10–3–8 LINE UP AND WAIT (LUAW) OPERATIONS.

This review provided FAA air traffic facilities with an opportunity to work together and collaboratively to identify and reduce risks associated with LUAW operations.

In addition, the ATO monitors and analyzes events associated with LUAW operations that result in unintended outcomes. This analysis is performed monthly by subject matter experts. The ongoing effort provides leadership with quantitative data as it relates to the effectiveness and proper use of LUAW processes and procedures.

A more detailed and targeted assessment of LUAW procedures was conducted by ATO Safety in August 2023. The assessment identified six observations and made nine recommendations for best practices to facilities that use the procedure.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARIA CANTWELL TO
RICH SANTA

Controller Staffing

As of August 2023, FAA reported having 13,300 total controllers—about 10,700 certified professional controllers in the system plus about 2,600 controllers in various stages of training. We know the FAA is experiencing a shortage of about 3,000

controllers despite already reaching its hiring target of 1,500 controllers for Fiscal Year 2023. That is why we include a requirement in the Senate FAA bill for the agency to update its controller staffing models to get an accurate count of controllers needed per facility and close this staffing gap as soon as possible.

We know that interest in becoming a controller is not the issue. Last year, FAA received about 58,000 applications for 1,500 open positions. While candidates must achieve high scores on the Air Traffic Skills Assessment exam to attend the FAA Academy, the Academy's capacity to educate controllers is capped at about 1,800 trainees. To enable more controllers to be hired, the Senate FAA bill (Section 533) requires FAA to develop a plan to double its capacity and facilities to educate and train more controllers each year.

Question 1. Given current capacity constraints, how important is it that the FAA hires and educate the highest number of controllers possible per Fiscal Year?

Answer. As I outlined in my written testimony, it is absolutely critical that the FAA engage in max hiring of air traffic controllers for the duration of the next FAA reauthorization bill. Recently, the FAA has taken steps in the right direction, such as upwardly adjusting its hiring goals for each of FY 2024–2026 to 1,800 new hires, which is roughly the capacity of the FAA Academy in Oklahoma City.

However, according to the FAA's Controller Workforce Plan, 40 percent of controllers who were members of a hiring class between 2014 and 2017 were removed from the FAA, resigned, or are still in training, meaning FAA can only expect about 60 percent of controller trainees to reach full certification within five to seven years of their hire. As a result, because it takes between one and three years for a new FAA Academy graduate to reach full certification, even an increased hiring goal above and beyond the current capacity of the Academy would still take several years to have any positive effect on CPC totals.

In contrast, the FAA's finance-based controller hiring plan has been and will continue to be ineffective. The FAA's National Airspace System Safety Review Team (SRT) report issued earlier this month reinforces what NATCA has been saying about controller staffing for a decade when it concluded that "when retirements and other attrition is accounted for, the [FAA's] hiring plan produces a negligible improvement over today's understaffed levels, resulting in a net increase of fewer than 200 air traffic controllers by 2032. The [Air Traffic Organization] must determine staffing needs based on actual system needs rather than on Academy throughput and budgetary constraints."

Question 2. Do you agree that current capacity at the FAA Academy is not adequate to educate enough controllers to help meet projected workforce needs over the next 10 years?

Answer. In all likelihood, yes. If the FAA had taken a holistic, consistent, and sustained approach to hiring and training air traffic controllers over the previous two decades, we would not be in the position we are today, and the current capacity may have been sufficient. However, at this point, the current capacity is likely insufficient given the status quo.

Question 3. If not, should FAA look at increasing both brick-and-mortar and technological capacity to improve the agency's ability to educate and train more controllers? How could this increase FAA's ability to educate more developmental controllers?

Answer. Yes and NATCA stands ready to consider practical options and collaborate on viable solutions. NATCA supports the Senate's draft FAA Reauthorization bill that includes both expansion of the FAA's training capacity through its Academy and the implementation of Tower Simulator Systems in every tower that does not already have one. This will improve training times once trainees graduate from the Academy and enhance recurrent training for Certified Professional Controllers by allowing them to practice situations that are not regularly occurring including different types of emergencies.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JACKY ROSEN TO
RICH SANTA

Aging Infrastructure Impacting Aviation System

Aviation professionals are only as effective as the infrastructure and technology they rely on. According to the President's most recent budget request, the average age of an FAA Air Traffic Control facility is over 60 years old, and more than half of terminal facilities are more than 40 years old. These facilities regularly operate with degraded technology systems, resulting in a lack of accurate wind speed and direction calculations, the failure of radio frequencies within congested airspace, and

the malfunctioning of runway lights. Many airports also lack functioning radar systems used to track airborne and taxiing planes, meaning that some controllers have no visual awareness of the aircraft they are directing, especially in poor weather conditions.

In lieu of functioning radar systems in Air Traffic Control facilities, many controllers are filling the gaps by resorting to using public flight-tracking websites that aren't approved by the FAA.

Perhaps most alarming are the reports that the FAA lacks the funding to install runway warning systems to help prevent runway collisions. Only forty three of the Nation's more than five hundred airports serving commercial flights have runway collision-avoidance systems. This is simply not good enough.

Question 1. How can we improve the existing technology and infrastructure utilized by air traffic controllers and aviation professionals to reduce potential risk and manage congested airports and complicated airspace at our Nation's airports?

Answer. As I outlined in detail in my written testimony, the FAA desperately needs to continue modernizing technology and improving, repairing its infrastructure throughout the National Airspace System. The most important component of improving this is stable, sufficient funding levels. Without that, critical modernization and infrastructure programs experience delays in development, testing, and implementation, as well as delays to the sustainment and repair of existing safety-critical equipment.

The biggest hurdle to achieving stable, sufficient funding is the FAA's willingness to be transparent with its need for improved funding for its Facilities and Equipment (F&E) budget. NATCA estimates that FAA requires approximately \$4.5 billion for F&E activities in Fiscal Year (FY) 2024, and this number will approach nearly \$6 billion in the near future. Despite this increasing need, for the past decade, FAA has consistently requested only approximately \$3 billion per year in annual appropriations.

Congress has always met the Agency's stated budgetary needs, but that has prevented FAA from meeting its own equipment sustainment, replacement, and modernization needs, creating a significant backlog. The FAA's self-inflicted budgetary shortfalls have not even kept up with inflation over the past 14 years. This loss of spending and buying power for modernization and infrastructure programs forced FAA into a "fix-on-fail" model by requiring it to prioritize mandatory costs and leaves little to no money for other important modernization and infrastructure programs.

NATCA was pleased to see the President's budget request for \$3.46 billion for F&E for FY 2024, which in addition to \$1 billion from the Infrastructure and Jobs Act (IIJA) for facilities meets FAA's \$4.5 billion need in FY 2024. We support the Senate's Transportation, Housing and Urban Development, and Related Agencies (THUD) appropriations bill that would fully meet this need. We are concerned, however, because NATCA projects FAA's F&E budget need to be between \$5.5 and \$6 billion in the near future, and the IIJA funding will expire at the end of FY 2027.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. RAPHAEL WARNOCK TO
RICH SANTA

Terminal Flight Data Manager

At many airports across the country, air traffic controllers still rely on paper flight strips to keep track of flights.¹ The Federal Aviation Administration's (FAA) Terminal Flight Data Manager (TFDM) is a NextGen system designed to improve the management of airport surface traffic, including aircraft departures, by replacing paper flight strips with an automated electronic system.² In 2018, the FAA anticipated that implementation of TFDM would be complete at 89 airports by 2028.³ According to a 2023 Government Accountability Office report, the FAA has fallen short of its TFDM implementation goals and has responded by revising its projected completion date to 2030 and decreasing the number of airports designated to receive this technology from 89 to 49.⁴

¹ https://www.faa.gov/air_traffic/technology/tfdm/efs

² <https://www.gao.gov/products/gao-24-105254> at 12.

³ <https://www.gao.gov/products/gao-24-105254> at 12.

⁴ <https://www.gao.gov/products/gao-24-105254> at 22.

The Savannah/Hilton Head International Airport in Savannah, Georgia, is one of the 40 airports that were removed from the FAA's TFDM implementation list.⁵ On November 1, 2023, the Department of Transportation (DOT) Office of Inspector General (OIG) reported that delays in the deployment of TFDM and the NextGen Air Transportation System are some of the Department's top management challenges for Fiscal Year 2024.⁶

Question 1. Does TFDM reduce operational safety risk at airports?

Answer. Yes, TFDM has the capability of automating the majority of flight strip modification and coordination that currently is manually performed by controllers. By automating these processes, it can reduce controller workload in this area and allow them to focus more attention on safety issues.

Question 2. Will Air Traffic Controllers benefit from the implementation of TFDM at airports across the country?

Answer. Yes, TFDM not only automates many coordination and scheduling functions that reduce controller workload, but it also creates, updates, and displays electronic flight strips that assist in mitigating legibility issues for controllers.

Question 3. What must the FAA do to address the issues raised in the DOT Inspector General report?

Answer. Unfortunately, in regard to TFDM, without stable, sufficient funding levels, there is little the FAA can do to achieve its goals and address the issues raised in the OIG report.

As I outlined in detail in my written testimony, the biggest hurdle to achieving stable, sufficient funding is the FAA's willingness to be transparent with its need for improved funding for its Facilities and Equipment (F&E) budget. NATCA estimates that FAA requires approximately \$4.5 billion for F&E activities in Fiscal Year (FY) 2024, and this number will approach nearly \$6 billion in the near future. Despite this increasing need, for the past decade, FAA has consistently requested only approximately \$3 billion per year in annual appropriations.

Congress has always met the Agency's stated budgetary needs, but that has prevented FAA from meeting its own equipment sustainment, replacement, and modernization needs, creating a significant backlog. The FAA's self-inflicted budgetary shortfalls have not even kept up with inflation over the past 14 years. This loss of spending and buying power for modernization and infrastructure programs forced FAA into a "fix-on-fail" model by requiring it to prioritize mandatory costs and leaves little to no money for other important modernization and infrastructure programs.

NATCA was pleased to see the President's budget request for \$3.46 billion for F&E for FY 2024, which in addition to \$1 billion from the Infrastructure and Jobs Act (IIJA) for facilities meets FAA's \$4.5 billion need in FY 2024. We support the Senate's Transportation, Housing and Urban Development, and Related Agencies (THUD) appropriations bill that would fully meet this need. We are concerned, however, because NATCA projects FAA's F&E budget need to be between \$5.5 and \$6 billion in the near future, and the IIJA funding will expire at the end of FY 2027.

Question 4. Why was Savannah/Hilton Head International Airport removed from the FAA's list of airports scheduled to receive TFDM technology?

Answer. Although NATCA continues to advocate for the FAA to complete its full 89-site waterfall, the FAA unilaterally chose to reduce programmatic funding and limit deployment at larger airports that would assist in justifying the TFDM "business case."

Facility Staffing Timeline

On November 1, 2023, DOT OIG released its audit of DOT's top management challenges for Fiscal Year 2024.⁷ The report identified inadequate air traffic controller staffing at critical facilities as one of the main potential causes of flight delays and cancellations.⁸ According to the report, 20 of the FAA's 26 most critical facilities were staffed below the agency's 85 percent threshold as of March 2022.⁹ Moreover, staffing challenges and pauses in air traffic controller training during the pandemic have resulted in increased certification timelines for controllers.¹⁰ In your testimony, you noted that delays to controller training, early retirement, and unex-

⁵https://tfmlearning.faa.gov/assets/media/CDM/CDM_2022/TFDM_CDM_General_Session.pdf.

⁶<https://www.oig.dot.gov/library-item/39685> at 10.

⁷*Id.*

⁸*Id.* at 9.

⁹*Id.* at 9.

¹⁰*Id.* at 10.

pected attrition have negatively affected certified controller staffing and have forced many fully certified air traffic controllers to work mandatory overtime hours to make up for staffing shortages.¹¹

Question 1. Under current FAA hiring practices, how long will it take the FAA to fully staff all air traffic facilities with the necessary number of fully certified controllers?

Answer. As I outlined in my written testimony, the FAA's National Airspace System Safety Review Team (SRT) report issued earlier this month reinforces what NATCA has been saying about controller staffing for a decade when it concluded that "when retirements and other attrition is accounted for, the [FAA's] hiring plan produces a negligible improvement over today's understaffed levels, resulting in a net increase of fewer than 200 air traffic controllers by 2032. The [Air Traffic Organization] must determine staffing needs based on actual system needs rather than on Academy throughput and budgetary constraints."

At that pace, given the FAA's current hiring practices, the length of time that it would take FAA to fully staff all air traffic facilities would be measured in decades rather than years.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. TED CRUZ TO
RICH SANTA

N90

The New York Terminal Radar Approach Control Facility (N90 TRACON) has been chronically understaffed for decades. Congress has on multiple occasions directed the Federal Aviation Administration (FAA) to reexamine or reorganize the airspace managed by N90. The FAA, to its credit, has attempted to execute reorganization plans only to be stymied by political pressure.

Earlier this year, the FAA reduced the volume of flights into and out of the New York area and cited staffing at N90 as a reason. Shortly after announcing the volume reduction, the FAA put the planned transfer of New Jersey airspace to the Philadelphia TRACON on "pause" until the end of the year.

Question 1. What metrics did the FAA set for performance that N90 has met?

Answer. NATCA is not aware of any specific metrics FAA has set for N90 performance.

Question 2. If the FAA determined transferring responsibility for New Jersey airspace to Philadelphia TRACON was the best decision for the National Airspace System (NAS) safety and efficiency, does NATCA commit to supporting the FAA and helping to facilitate the change?

Answer. NATCA does not make decisions to transfer airspace. It negotiates the procedures and appropriate arrangements regarding the effects on bargaining unit employees of the FAA's decision to transfer airspace. If the FAA decides to transfer any airspace throughout the NAS, NATCA will negotiate in good faith regarding the working conditions of all NATCA represented affected employees. NATCA will stand behind its negotiated agreement with the FAA.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. TED BUDD TO
RICH SANTA

Question. In cases not involving a line up and wait clearance, runway incursions can occur when an airplane enters a runway without a clearance, or a clearance is erroneously issued. In other words, runway incursions can often involve pilot or controller error. Mr. Ambrosi, Mr. Santa, are your organizations sponsoring any programs to promote runway safety awareness among your members?

Answer. NATCA and the FAA jointly sponsor several such programs. For example, we collaboratively developed the "Stand Up for Safety" campaign which reinforces our continued commitment to maintaining and promoting a robust and healthy safety culture. The campaign focuses on topics like Line Up and Wait, highlighting our commitment to safety and a "just safety culture."

NATCA and the FAA also jointly sponsor the "Partnership for Safety" program for which our mission is to facilitate the identification and mitigation of hazards at the local facility level through "Local Safety Councils" made up of NATCA and agency representatives. Each month the Partnership for Safety program delivers brief-

¹¹ <https://www.commerce.senate.gov/services/files/5FC4E704-5AEF-4FDE-A88A-CC6CD8823B65%20Rich%20Santa%20November%202019,%202023%20Committee%20Testimony>

ings on safety topics that are developed from topics trending in the Voluntary Safety Reporting Programs and information received from the Confidential Information Share Program.

Semiannually, all operational personnel, including Air Traffic Controllers, also receive training on topics collaboratively identified for National Recurrent Training. Currently, NATCA and the FAA are developing a recurrent training module on runway incursions. Controllers at every towered airport will receive this training, consisting of runway incursion data and trending information, along with causal and contributing factors for runway incursions.

In addition, NATCA and the FAA collaboratively developed “From the Flight Deck” videos and Pilot Handbooks to help mitigate surface safety risks. These videos and handbooks address numerous aspects of runway safety. The Pilot Handbooks capture air traffic controller insight and recommendations, providing clarity and familiarity to pilots operating at a specific airport.

Air traffic controllers and pilots are valuable resources for each to learn from the other. This starts with Flight Deck Training for controllers and facility tours for pilots. NATCA also promotes pilot-controller forums that provide pilots with direct access and engagement with air traffic controllers to help mitigate surface safety risks and create viable solutions.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARIA CANTWELL TO
JASON AMBROSI

Flight Deck Collision Avoidance Systems

Following the incidents from this past year, the FAA has tasked the Investigative Technologies Aviation Rulemaking Committee to examine aircraft alerting systems that are designed to improve situational awareness for pilots and increase surface safety. ALPA was selected to co-chair this committee and will lead the effort to recommend enhancements to flight deck technologies to the FAA.

Question 1. Our FAA bill recognizes the importance of aircraft being equipped with runway traffic alerting systems, and I’m grateful for the leadership of my colleague, Senator Klobuchar, on this issue. Do you think the FAA should be taking a close look at ensuring aircraft are equipped with the latest traffic alerting technologies, such as Automatic Dependent Broadcast—Surveillance (ADS-B) In, as the Klobuchar amendment to the FAA bill would require?

Answer. ALPA is supportive of broader equipage and use of ADS-B In for real time alerting and improved situational awareness on the flight deck of air carrier aircraft when operating on the surface of an airport, and in all other phases of flight. As I indicated in my testimony, we should leverage appropriate, system-wide technologies and capabilities to add more layers of safety protection and ensure a continued record of no major fatal hull-loss accidents in passenger airline operations.

Question 2. Since 2020, aircraft operating in most controlled airspace have been required to use ADS-B Out to broadcast relevant information about their location, ground speed, and altitude to air traffic control. ADS-B In, which is a voluntary technology for operators, allows pilots to have that same information about nearby air traffic. Do you believe that ADS-B In can improve the situational awareness of pilots?

Answer. ALPA believes that ADS-B In capabilities can be used to improve situational awareness for pilots in a variety of scenarios. In 2012 as part of the FAA’s ADS-B In Aviation Rulemaking Committee final report, ALPA supported the development of surface based ADS-B In applications, particularly the “SURF Indications and Alerts (SURF IA)” capability as initially defined in RTCA. This capability can provide flight deck alerting of imminent runway incursion situations. However, this capability is not yet mature or available for purchase. When thoughtfully integrated into the pilot workload demands, information and alerting systems can greatly enhance the pilot’s situational awareness and ability to take corrective or preventive actions to safety events.

However, it should be noted that when considering safety mitigation strategies and capabilities, ALPA is a strong proponent of conducting a thorough safety risk management assessment to ensure the addition of new or enhanced capabilities does not introduce other unforeseen hazards to airline operations.

Question 3. Do you believe that all commercial and regional aircraft should be equipped with ADS-B In technology or other similar traffic alerting systems?

Answer. ALPA is supportive of the development of a comprehensive strategy that results in advancements in the safety of airline operations on the airport surface.

There are multiple technologies including ADS-B in, that could and should be used to achieve increased levels of safety. Systems that pilots have at their disposal in the flight deck should be designed to provide time critical information to pilots, without reliance on air traffic control or other ground-based infrastructure. If installed, these systems would also be usable at airports that do not have surface safety infrastructure, and as such could be usable at every airport. Flight deck based surface safety and alerting systems should be strongly considered in order to reduce the risk of accidents.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JACKY ROSEN TO
JASON AMBROSI

Aging Infrastructure Impacting Aviation System

Aviation professionals are only as effective as the infrastructure and technology they rely on. According to the President's most recent budget request, the average age of an FAA Air Traffic Control facility is over 60 years old, and more than half of terminal facilities are more than 40 years old. These facilities regularly operate with degraded technology systems, resulting in a lack of accurate wind speed and direction calculations, the failure of radio frequencies within congested airspace, and the malfunctioning of runway lights. Many airports also lack functioning radar systems used to track airborne and taxiing planes, meaning that some controllers have no visual awareness of the aircraft they are directing, especially in poor weather conditions.

In lieu of functioning radar systems in Air Traffic Control facilities, many controllers are filling the gaps by resorting to using public flight-tracking websites that aren't approved by the FAA.

Perhaps most alarming are the reports that the FAA lacks the funding to install runway warning systems to help prevent runway collisions. Only forty three of the Nation's more than five hundred airports serving commercial flights have runway collision-avoidance systems. This is simply not good enough.

Question 1. How can we improve the existing technology and infrastructure utilized by air traffic controllers and aviation professionals to reduce potential risk and manage congested airports and complicated airspace at our Nation's airports?

Answer. In my testimony I discussed the important need for the FAA to have stable and reliable funding. ALPA firmly believes this is a foundational element that can be improved upon to reduce potential risk and manage congested airports and complicated airspace at our Nation's airports.

The stable, consistent, and adequate funding of air traffic control ensures that our Nation's air traffic controllers are provided with critical safety enhancing technologies, systems, and training. Just as importantly, a stable and reliable funding mechanism also ensures that there is adequate staffing levels in all of the air traffic control facilities. Without a full cadre of air traffic controllers, the air traffic control system cannot perform as intended. Congress has all the necessary tools and authority to address this important aspect of the future of the air traffic control system.

On February 14, 2023, I sent a letter to this Committee's leadership to submit into the record for the February 15, 2023 hearing titled, *"The Federal Aviation Administration's (FAA) NOTAM System Failure and its Impacts on a Resilient National Airspace."* In that letter ALPA discussed this topic in greater detail pointing out that in the past, Congress has provided the FAA with a single year's worth of funding for multiyear modernization projects, such as NOTAM system upgrades. This "band aid" approach 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 also hinder the infrastructure modernization process. With all of 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. Giving 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 Americans who depend on safe and reliable air transportation.

Nearly a year later, ALPA holds fast to these statements. We continue to believe that the stable, reliable and continuous funding of the FAA is foundational to proactively ensuring that continued improvements in safety performance are achievable and sustainable across the National Airspace System.

Enhancing Safety Through Emerging Technology

The advent of new and exciting technologies like air taxis deliver tremendous promise, but also raise an additional layer of aviation safety concerns. A NASA project recently completed its first step towards achieving an In-Time Aviation Safety Management System, which would address potential hazards expected with new modes of flights entering U.S. airspace. Still, operating within U.S. airspace is only getting more complex, especially with new entrants into our airspace.

Question 1. How should the aviation community realistically integrate new technologies, like air taxis and unmanned air vehicles, into an aging system that appears to be struggling to undergo basic safety improvements for manned, commercial flights?

Answer. ALPA continues to participate in many activities that are focused on the safe integration of new types of operations into the national airspace system. These activities include consensus standards development, participation on FAA established Aviation Rulemaking Committees (ARC's), review and comment on the many numerous requests by new-entrant operators for regulatory waivers and exemptions, participation in FAA Safety Risk Management Review panels, and more.

ALPA also continues to promote a data-driven, predictive safety risk management approach to the integration of new entrants. A data-driven approach can be successful when combined with a solid foundation of Federal Aviation Regulations that establish rules for aircraft certification, certificated operations, pilot training, maintenance, and other key operational parameters. These two aspects—data collection analysis and proactive safety mitigation, and a solid regulatory framework for operators—are key to the safe introduction of new entrants into the airspace system.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. TED BUDD TO
JASON AMBROSI

Question. In cases not involving a line up and wait clearance, runway incursions can occur when an airplane enters a runway without a clearance, or a clearance is erroneously issued. In other words, runway incursions can often involve pilot or controller error. Mr. Ambrosi, Mr. Santa, are your organizations sponsoring any programs to promote runway safety awareness among your members?

Answer. The Air Line Pilots Association, International (ALPA) has had continuous collaboration with the FAA and the National Air Traffic Controllers Association (NATCA) on promoting runway safety awareness among the ALPA membership. We jointly evaluate surface safety incidents as part of the ongoing safety data and analysis activities in the Aviation Safety Information Analysis and Sharing (ASIAS) program. In addition to this, we continue to partner on numerous events and awareness enhancing activities. For example, last September at the ALPA Air Safety Forum ALPA led a panel discussion on the important topic of surface safety. There were representatives from the FAA and NATCA on the panel. As I mentioned in my written submission, ALPA is also jointly participating with the FAA and NATCA at Runway Safety Action Team (RSAT) meetings at every airport that has an air traffic control tower. ALPA and NATCA have a long history of partnering on promoting surface safety. For example, our organizations have partnered on training materials that discuss the importance of surface safety and how to mitigate undesired outcomes. ALPA has also promoted runway safety awareness through multiple, direct communications to its more than 77,000 members to remain vigilant and to stay focused on the important task of safely operating on the surface of the airport.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARIA CANTWELL TO
RANDY BABBITT

Short-term Extensions and Shutdown

As you know Mr. Babbitt, the short-term extension of the 2018 FAA reauthorization bill expires at the end of the year. During your 2-year tenure leading the FAA, you went through nine (9) extensions in just those two years. And in fact, after the 2003 FAA Reauthorization law expired in 2007, the FAA and industry had to endure 23 short-term extensions before a proper, long-term reauthorization was finally passed in 2012. This is no way to govern, and it is not something I want to see happen again.

Question 1. Which is better for the FAA and industry: (i) the stability of a long-term reauthorization bill that advances aviation forward, or (ii) an endless string

of short-term extensions that do nothing to address the near-misses and close-calls we have discussed today?

Answer. The FAA is a large organization and having a clear view of forecast budgets allows financial stability for planning, funding, and advancing the interests of safety. And operational integrity is dependent on financial stability and is of the utmost importance and value to any company or large organization. The FAA it is no exception and having a confirmed budget allows continuous improvements and organizational stability.

Question 2. A government shutdown is potentially 2 months away. Would a government shutdown make aviation less safe?

Answer. The professionals at the FAA have historically kept the system running and safe during past shutdowns. And while “back pay” is often provided, the financial difficulties imposed on loyal employees being asked to work without pay is simply unnecessary and unfair. And being candid, while the system will maintain a high level of safety, it clearly would be far better and safer to have a stable ongoing funded budget on which to depend. Employees, many operating in highly stressful environments, on which our air transport systems depend, do not need the additional stress of working and not knowing when they might next be paid.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JACKY ROSEN TO
RANDY BABBITT

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Aviation professionals are only as effective as the infrastructure and technology they rely on. According to the President's most recent budget request, the average age of an FAA Air Traffic Control facility is over 60 years old, and more than half of terminal facilities are more than 40 years old. These facilities regularly operate with degraded technology systems, resulting in a lack of accurate wind speed and direction calculations, the failure of radio frequencies within congested airspace, and the malfunctioning of runway lights. Many airports also lack functioning radar systems used to track airborne and taxiing planes, meaning that some controllers have no visual awareness of the aircraft they are directing, especially in poor weather conditions.

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Question 1. How can we improve the existing technology and infrastructure utilized by air traffic controllers and aviation professionals to reduce potential risk and manage congested airports and complicated airspace at our Nation's airports?

Answer. In today's world, technology advances at a blistering pace. There are significant technological changes and improvements available to provide increased safety margins and smoother operations, both with enormous economic advantages to both airlines and travelers by adopting such new technology. Additionally, equipment exists today to safely warn and protect against runway incursions and near collisions.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. TED CRUZ TO
RANDY BABBITT

Question 1. Is the 1,500-hour rule an effective measure for ensuring a pilot's skills, experience, and qualifications meet the high standards we expect of airline pilots?

Answer. No, the 1500 hours was an arbitrary number as a base placeholder in the original legislation. The legislation then went on to provide that offsets should be provided where a curriculum, mentoring, and advanced skills training are incorporated into pilot training.

Examples currently recognized would be graduates from colleges and universities that are FAA approved may reduce the 1500 hours to 1000 hours upon graduation of the approved curriculum. Graduates with associate degrees may reduce the 1500 hours to 1250 hours. And pilots having trained to fly in the United States military can reduce the time required to 750 hours.

Notably the FAA has held two aviation rulemaking committees (“ARCs”) and both have made clear recommendations of curriculums to be followed to allow for further reductions from the 1500 hour rule. The shortcoming of the current 1500-hour rule is that it simply added 1250 hours on top of the Commercial rating requirements to be eligible for a restricted ATP and thus meeting the requirements to operate as a crew member for a Part 121 carrier. The legislation was silent on the 1250 additional hours, with no requirements for monitoring, a curriculum, or any performance testing, just acquire 1250 more simple flight hours. By not adopting available new technology in flight training, aircraft simulation and curriculums of today for today’s environment is leaving safety opportunities on the cutting room floor. Today’s simulator capabilities are in full use in all branches of our military and that every major airline and provides exposure to and training for procedures and maneuvers likely to be encountered in airline operations, including maneuvers too risky to demonstrate in real aircraft.

We can train pilots better, make them safer and have them trained to be professional pilots by following the advice of both recent ARCs as well as the guidance set forth in the legislation itself from 2010.

Question 2. When Congress was drafting the Airline Safety and Federal Aviation Administration Extension Act of 2010, did the FAA and Congress discuss how the law could be updated in the future to account for safety advancements?

Answer. Yes, having testified in several of the hearings that led up to the legislation, the language that was developed allowed for and anticipated modifications as technology improved and knowledge gained for training pilots in today’s advanced aircraft and operations in a highly sophisticated Air Traffic Control (“ATC”) environment. Following the passage of the legislation, the FAA appropriately convened Aviation Rulemaking Committees (“ARCs”) to review and suggest changes to be implemented following the guidelines laid out in the legislation.

Unfortunately, none of the changes proposed have been implemented following either the 2013 ARC or the 2021 ARC, despite being drafted and unanimously supported with full industry input.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. TED BUDD TO
RANDY BABBITT

Question. The FAA has increasingly been adopting performance-based standards for aircraft certification. But it has not done the same for airmen certification. Can you explain some of the benefits of performance-based standards in airmen certification?

Answer. No response from witness.