

**FAA REAUTHORIZATION:
AVIATION SAFETY AND GENERAL AVIATION**

HEARING

BEFORE THE

SUBCOMMITTEE ON AVIATION OPERATIONS,
SAFETY, AND SECURITY

OF THE

COMMITTEE ON COMMERCE,
SCIENCE, AND TRANSPORTATION

UNITED STATES SENATE

ONE HUNDRED FOURTEENTH CONGRESS

FIRST SESSION

APRIL 28, 2015

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



U.S. GOVERNMENT PUBLISHING OFFICE

99-710 PDF

WASHINGTON : 2016

For sale by the Superintendent of Documents, U.S. Government Publishing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512-1800; DC area (202) 512-1800
Fax: (202) 512-2104 Mail: Stop IDCC, Washington, DC 20402-0001

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ONE HUNDRED FOURTEENTH CONGRESS

FIRST SESSION

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**FAA REAUTHORIZATION:
AVIATION SAFETY AND GENERAL AVIATION**

TUESDAY, APRIL 28, 2015

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

The Subcommittee met, pursuant to notice, at 2:30 p.m., in room SR-253, Russell Senate Office Building, Hon. Kelly Ayotte, Chairman of the Subcommittee, presiding.

Present: Senators Ayotte [presiding], Wicker, Fischer, Moran, Sullivan, Gardner, Daines, Cantwell, Nelson, Klobuchar, Blumenthal, Schatz, Booker, Manchin, and Peters.

**OPENING STATEMENT OF HON. KELLY AYOTTE,
U.S. SENATOR FROM NEW HAMPSHIRE**

Senator AYOTTE. Good afternoon, and welcome. Thank you all for being here.

Today's hearing is one in a series we are holding in preparation for this year's Federal Aviation Administration's reauthorization effort. And last week, we heard from experts and stakeholders on the certification process and airport infrastructure financing.

Today, we have the opportunity to discuss the single most important underlying issue for any reauthorization effort, and that's safety, the safety of our national airspace system and the safety of the flying public.

With that, I want to take a moment to recognize the family members of the victims of Colgan Flight 3407, which crashed near Buffalo in 2009, who I understand are here in the audience today. So, your sustained efforts to improve safety of our skies are very admirable, and we appreciate your coming to this hearing today.

Safety is, and must remain, our top priority. The United States national airspace system remains one of the safest in the world, even while being one of the most complex systems in the world. The safety record we enjoy is a product of hard work of both government and industry alike, but it requires vigilant and dedication to ongoing improvement and assessment.

Today's hearing covers a broad array of important issues, and I appreciate all of our witnesses for being here today.

In 2010, Congress enacted the Airline Safety and Federal Aviation Administration Extension Act. In 2012, Congress enacted the FAA Modernization and Reform Act. Today, I look forward to hearing from our witnesses about the safety improvements that have

been implemented since these laws were enacted, and what still remains to be done.

The FAA has made significant progress in implementing reforms mandated by the Airline Safety Act. And yet, some initiatives are left undone. In particular, I'd like to focus on the agency's progress in implementing the Pilot Records Data base. This is an important tool to make sure airlines have all the information needed to assess pilots applying for positions in the cockpit. And I urge the FAA to move quickly in implementing this reform.

More recently, some have noted a concern about the supply of pilots. Acknowledging there is some point of disagreement here, particularly with regard to the root cause of any real or perceived shortage, I hope to hear from each witness today on this issue so we can properly assess and understand the situation.

As we review the issue, I'm confident that no one on this committee, including me, wants to compromise passenger safety. We want to make sure that we have, obviously, well-qualified pilots to serve in our air system.

I also look forward to testimony on the mental and physical fitness of airline pilots. Tragically, the recent Germanwings crash has brought the aviation community's attention to the mental health of pilots as well as safety measures with respect to access to the flight deck. And we must learn from this incident. And certainly, any thoughts you have today for us to understand, we'd appreciate.

We will also have an opportunity to discuss safety management systems, pilot commuting, commercial aircraft tracking, flight data, recorder requirement modifications, and airport surface movement safety. We all know the airports and runways are complex areas with many moving parts. Again, vigilance is required, and I look forward to hearing from the—about the agency's ongoing efforts here to ensure the safety of our runways.

We will also examine issues affecting the general aviation community. General aviation is an important part of our civil aviation system, and encompasses aviation enthusiasts, recreational flyers, but, for a lot of rural communities, it also serves as a key link for businesses and first responders, especially in rural communities. And also, I know, for some of my colleagues, for example, in Alaska and Hawaii, this is a very important issue.

There are several pilots in my family, and I can certainly attest to the enthusiasm for flying and dedication to safety shown by the general aviation community.

A recent Government Accountability Office report indicated that total general aviation operations and annual hours flown by general aviation decreased between 2000 and 2010. Today, I want to better understand the reasons for these declines and what is happening in the general aviation industry, as well.

Today, we will hear from five witnesses: Ms. Margaret Gilligan, Associate Administrator for the Aviation Safety—for Aviation Safety at the FAA; the Honorable Christopher Hart, Chairman of the National Transportation Safety Board; Captain Chesley Sullenberger, retired pilot and safety consultant and, I think, well known to many of us as to—of his accomplishments and background—we're honored to have you here, Captain; Ms. Faye Malarkey Black, Interim President at the Regional Airline Association;

and Mr. Mark Baker, President and CEO of the Aircraft Owners and Pilots Association.

Thank you for being here. I look forward to your testimony.

And, with that, I would like to turn it over to my Ranking Member, Senator Cantwell.

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

Senator CANTWELL. Thank you, Chairman Ayotte.

And thank you, to all the witnesses, for being here today. I look forward to hearing your testimony.

I would especially like to acknowledge the families and the victims of the Colgan Air Flight 3407 who are with us here today. Thank you for your consistent advocacy and tireless work on behalf of a safer aviation system.

The FAA has implemented a number of safety improvements in the last 5 years, including pilot training, safety management systems, flight and duty time requirements, and pilot professionalism initiatives. We have moved the ball forward on aviation safety, but we cannot be complacent with the progress we've made. We've built on efforts from the past, leveraged science and data and technology to make aviation safer, but we have more work to do.

One area of work that remains is in the development of a comprehensive Pilot Records Database, which was mandated by the 2010 Airline Safety FAA Reauthorization. This is an important component of a data-driven safety regime to help prevent future tragedies. And I hope the FAA can move the development of these key safety tools forward more quickly.

The FAA's mission is to provide the safest, most efficient airspace system in the world. As we engage with the aviation stakeholders on the FAA reauthorization bill and discuss how to balance and allocate limited resources, we must prioritize safety above all else. There will always be competing priorities for aviation and business, and government's responsibility is to set and maintain the highest standards to protect passengers, pilots, and the public.

This is important and necessary. And we can see, from issues like the pilot fatigue rules, which will be discussed today—and, unfortunately, in Seattle last week, we had a maintenance crewmember fall asleep in the cargo hold of an airplane that also caused somebody to return. These rules on fatigue, and the latest research on sleep science and how various work and rest schedules impact performance, are very important. We've had hearings on this in the past, Madam Chair. We want our pilots to benefit from this research. And, unfortunately, the final regulations carved out cargo pilots. In the last two Congresses, I've worked with many others here to correct this divide between pilots, whether they're flying passenger or cargo planes, and I hope this year we can bring this to safety in our skies as we move forward on the FAA bill.

As we think about the national airspace's interconnected system, we also need to look at general aviation and how to make aviation safer. Next Gen will provide us with good data on weather and traffic, but we also have to look for opportunities in other ways for safety. One area we hope to see progress for general aviation is improved certification of safety-related equipment and technology. If

we're able to accelerate the certification timeline and reduce cost to operators, we can help enable operators to equip the aging general aviation fleet with cutting-edge safety technology and state-of-the-art components.

At our manufacturing and air certification hearing last Tuesday, we discussed the rewriting of the certification purposes for general aviation aircraft, part 23. And I want to underscore the potential safety benefits of this action for general aviation, in addition to the economic and logistical benefits.

As the FAA develops new general aviation certification rules, we should consider other areas to improve existing regulations. The FAA's reauthorization provides an opportunity to identify areas where we can enhance and streamline and refocus regulations into safety.

The National Transportation Safety Board has studied the issue of medical requirements. And I'm sure that we're going to hear about that today, as well, and recommendations to strengthen medical certification of operators. This committee engages in a conversation about ways to change pilot medical standards. We should consider ways to strengthen and improve those requirements, as well.

The FAA continues to study ways to improve safety through its research programs. And I know that they're studying everything from product on the plane, as well, like lithium ion batteries. Airlines, air manufacturers, administration, all have expressed concern over incendiary properties of lithium batteries. And, despite leading in the global community in research into hazardous fire proposed by bulk shipments of batteries, U.S. regulation has lagged behind. So, fortunately, the International Civil Aviation Organization has provided some base guidelines in this area.

Another field where the international community is directing significant attention is on flight tracking and flight data records. The disappearance of Malaysia Flight 370 underscored the gaps in the flight tracking system, as well as challenges posed in trying to locate a flight data recorder. Without understanding what happened, we are disadvantaged to try to prevent another situation. The NTSB has also studied this area, so I look forward to hearing NTSB Chairman Hart, his testimony on that.

Obviously, the security of our system is integral to the backbone of aviation, so I hope we can move forward with more safety, more implementation of Next Gen, and making sure that we have the properly trained pilots to foster growth in aviation.

So, thank you, Madam Chair, for holding this important hearing.

And again, thank you, to the witnesses.

Senator AYOTTE. Thank you so much, Senator Cantwell.

And we're very fortunate to have the overall Ranking Member, Senator Nelson, here for this hearing.

Senator Nelson.

**STATEMENT OF HON. BILL NELSON,
U.S. SENATOR FROM FLORIDA**

Senator NELSON. And let's get on with the witnesses. I'll enter a statement in the record.

And, Madam Chairman, I'm very proud of the work of this subcommittee. It's doing important stuff. And the subject matter of this hearing underscores the importance of the work of this subcommittee.

[The prepared statement of Senator Nelson follows:]

PREPARED STATEMENT OF HON. BILL NELSON, U.S. SENATOR FROM FLORIDA

Thank you to the witnesses for being here today to discuss safety and general aviation. I want to acknowledge the Colgan Air Flight 3407 Families. Thank you for your contribution to aviation safety, and for your continued commitment to protecting passengers.

Safe air transportation has enabled tremendous growth in this nation, connecting communities large and small to each other, and to the flow of Commerce.

Since the first commercial flight from Tampa to St. Petersburg in 1914, there have been tremendous advances in aviation that have dramatically improved safety. Improved technology, pilot training, and data-driven decision making have contributed to the safest period in aviation history.

Our aviation system has grown even safer by thoroughly investigating accidents so that we might learn from past mistakes and find a way to prevent them in the future. The tragic Colgan Air Crash in 2009 prompted an examination of the systems and circumstances that led to that accident.

Since that time we have improved pilot training, updated 50 year old fatigue rules, and mandated a comprehensive database for all pilots.

But work remains, and we must continue to strengthen our safety regime to protect lives.

The disappearance of Malaysia Air Flight 370 over a year ago and the Germanwings Flight 9525 crash last month are somber reminders of how critical this is.

I look forward to hearing from the witnesses about ways to make our system even safer whether through improved flight tracking, commercial pilot qualifications and medical evaluation, preventing lithium battery fires, or helping reduce the accident rate in the general aviation community.

Safety is the foundation upon which the entire aviation system is built, and it is our responsibility to protect and strengthen that foundation.

Senator AYOTTE. Well, thank you so much, Senator Nelson.

And, with that, I would like to call on our witnesses. And our first witness is Ms. Margaret Gilligan. Ms. Gilligan is the Associate Administrator for Aviation Safety at the Federal Aviation Administration.

Miss Gilligan.

**STATEMENT OF MARGARET GILLIGAN,
ASSOCIATE ADMINISTRATOR FOR AVIATION SAFETY,
FEDERAL AVIATION ADMINISTRATION**

Ms. GILLIGAN. Thank you, Senator Ayotte, Senator Cantwell, and members of the Subcommittee, not just for your commitment to aviation safety, but for holding this series of hearings and focusing on an issue of national importance.

Your guidance has had a tangible result. The United States of America enjoys the world's safest and most efficient aviation safety system.

We've been working for years to build on the trust that you've exhibited in our efforts. Indeed, the United States is doing much more than just holding steady at historically low accident rates. Aviation safety cannot rest on the status quo, regardless of how well things are going. By establishing strong safety partnerships, we're accelerating the state of aviation safety at a pace that is perhaps unrivaled in any industry.

The Airline Safety and FAA Extension Act of 2010 has certainly contributed to our progress. With the support of the Colgan families, and at your direction, we issued a final rule to prevent pilot fatigue which became effective more than a year ago. This sent a very clear message to industry that every airline must provide pilots sufficient time to get the rest needed for safe flight, and it underscored the point that every pilot has a personal responsibility to arrive at work fit for duty.

The Act triggered other rules, as well. With some very limited exceptions, we required airline pilots to have 1500 hours of flight-time experience. We strengthened the requirements for taking the Airline Transport Pilot Test, requiring applicants to have completed additional training in high-altitude operations and adverse weather. We published a final rule that advances the way pilots are trained, and added a requirement for training in the prevention and recovery from full stalls and upset conditions. That rule also made air carriers put remedial programs in place to track pilots with performance deficiencies.

In a system as safe as ours, with an industry as safety conscious as ours is, it is an extraordinary challenge to find a game changer, an approach that really has the potential to raise the safety bar even further. The requirement in the 2010 Act to publish a rule requiring Safety Management Systems did just that.

Safety Management Systems are the next great frontier for aviation safety. Until now, technology has driven safety improvements, from radar to jet engines to collision avoidance and now satellite navigation. SMS changes that landscape. SMS is a comprehensive approach to managing safety throughout an organization. It requires an organization-wide safety policy. It has formal methods for identifying hazards, mitigating and controlling risks, and continually assessing safety performance. SMS stresses not only compliance with technical standards, it puts increased emphasis on the overall safety performance of the organization. SMS is not a slogan. It requires establishing a safety culture, a culture that assures hazards are identified, actions are taken, and results are measured, and then it repeats the process again. In the business of aviation, safety cannot be an add-on, it must be built in through SMS. The airlines have learned that, and we thank this committee for its support.

Safety Management Systems have become the foundation for risk-based decisionmaking. Our resources will always be finite. FAA must put those resources where they're needed most. Risk-based decisionmaking allows us to make aviation safer and smarter. Because commercial accidents are so rare, we're focusing on mitigating risk that could lead to an accident. Risk-based decisionmaking lets us tackle the highest risk first, using our resources to improve safety where they will be the most effective.

The lynchpin for risk-based decisionmaking is the safety data shared throughout the industry. Safety data can come from any of the dozens of public and proprietary data bases, such as the Air Traffic Control System, the airplane itself, or the people who are involved in the operation. These data are fed into the Aviation Safety Information Analysis and Sharing System. And it works. Safety professionals recognize that there can be no secrets. This is

a voluntary effort. And we, in industry, are working with data that now represents 99 percent of U.S. air carrier commercial operations.

Before closing, I wanted to acknowledge our outstanding safety partnership with the general aviation community. GA pilots are known for their love of aviation, but they are equally committed to advancing safety. Their participation in the General Aviation Joint Steering Committee is of particular note. The Steering Committee meets quarterly to review accident trends, establish areas of special emphasis, and share information. In the past year alone, this group developed 29 separate safety enhancements to address loss-of-control accidents, which is the most prevalent category of accidents facing this community. Based on their recommendations, FAA has made it easier to install angle-of-attack indicators and allow pilots to better monitor stall margins. In short, they actively pursue ways to enhance safety, and that's what this partnership is all about.

This committee has given the FAA the authority to provide the level of safety we enjoy today. We look forward to working with you on the upcoming reauthorization to build on America's enviable aviation safety record. I'd be pleased to answer any questions you may have.

[The prepared statement of Ms. Gilligan follows:]

PREPARED STATEMENT OF MARGARET GILLIGAN, ASSOCIATE ADMINISTRATOR FOR AVIATION SAFETY, FEDERAL AVIATION ADMINISTRATION (FAA)

Senator Ayotte, Senator Cantwell, Members of the Subcommittee:

Thank you for inviting me to appear before you today to discuss the current state of aviation safety in the national airspace system. Aviation safety is the FAA's top priority and, while commercial aviation in the United States is holding steady at historically low accident rates, we remain focused to ensure we continue to identify and address risks to our system. Our progress over the last twenty years has been impressive. In the past, our philosophy was 100 percent compliance equals 100 percent safe but we were having accidents. We needed more than regulations. Today, we're proactive and identify and address risk to prevent accidents.

Our success in addressing risk and improving safety in aviation over the past two decades is the result of strong safety partnerships between government and industry to pursue safety improvement collaboratively and in a proactive manner.

In 1997, the White House Commission on Safety and Security set a goal of an 80 percent reduction in the fatal accident rate within 10 years and identified the need for strong government-industry partnerships to enhance safety and support the aviation system of the future. The National Civil Aviation Review Commission followed up with a strong recommendation that the Federal Aviation Administration (FAA) and industry work together to develop a comprehensive, integrated safety plan to implement existing safety recommendations. The Commission recommended performance measures and milestones be developed to assess progress in meeting the safety goal. The Commission also recognized the global nature of aviation demanded that aviation safety also be addressed worldwide.

The FAA, National Aeronautics and Space Administration (NASA), and industry determined their safety advocacy work was complementary, because they all use accident data to determine top safety areas. As a result, the Commercial Aviation Safety Team (CAST) was formed in 1998. The CAST model intended to use data to develop an understanding of the best actions or interventions to prevent accidents. The goal was to collaborate on identifying the top safety areas through the analysis of past accident and incident data, charter joint teams of experts to develop methods to understand the chain of events leading to accidents, identify effective interventions to address these safety areas, and remain focused on implementing these critical interventions.

The work of CAST has been extremely successful in the United States. Safety experts report that by implementing the most promising safety enhancements, along with new aircraft, improved regulations, and other activities, the fatality risk for

commercial aviation in the United States was reduced by 83 percent from 1998 to 2008.

CAST is currently co-chaired by the Vice-President of Safety, Security and Environment at American Airlines and me. Members include domestic and international government and industry organizations.

Today, CAST has evolved and the group is moving beyond the “historic” approach of examining past accident data to a more proactive approach that focuses on detecting risk and implementing mitigation strategies before accidents or serious incidents occur. CAST uses a disciplined, data driven approach to analyze safety information, identify hazards and contributing factors and uses that knowledge to continually improve the aviation system. Using data from non-accident sources and voluntary reporting programs, CAST has adopted nearly 100 safety enhancements. CAST aims to further reduce the U.S. commercial fatality risk by 50 percent from 2010 to 2025.

The work of this organization has been recognized with prestigious awards, including the Robert J. Collier Trophy and the Laurel Award from Aviation Week and Space Technology respectively.

The collaboration between government and industry, at all levels, has been instrumental in the success we have achieved in the improvement in aviation safety. Our continued success in advancing aviation safety depends on these strong safety partnerships built on trust and the ability to share safety information. As the work of CAST has evolved, so has the agency’s ability to collect and analyze safety information for aviation.

In 2007, the FAA launched the Aviation Safety Information Analysis and Sharing (ASIAS) program to help transform safety analysis from a forensic approach, looking at accidents and incidents after they occurred, to a risk management approach, allowing for proactive discoveries of safety concerns before they lead to significant events.

ASIAS is a voluntary collaborative information sharing program supported by the aviation community. It collects data from broad and extensive sources of aviation safety information for the purposes of advancing safety initiatives and discovering vulnerabilities in the air transportation system. It took years to establish voluntary safety programs and build trust within the aviation community. Congress has been an important advocate in helping us protect vital safety information. These safety information protections are imperative so that we can continue to provide the environment in which personnel with safety critical responsibilities are confident in voluntarily providing safety information so that carriers and government have real-time insight into potential systemic safety issues.

ASIAS partners with CAST to monitor known risk, evaluate the effectiveness of deployed mitigations and detect emerging hazards. There are currently 46 part 121 member air carriers, nine corporate/business operators, two manufacturers and two maintenance, repair and overhaul organizations participating in ASIAS. It continues to evolve, but has matured to the point that the FAA and industry can leverage voluntarily provided safety data from operators that represent 99 percent of U.S. air carrier commercial operations. ASIAS has established metrics that enable CAST to evaluate the effectiveness of mitigations. It is also expanding to support other areas in aviation.

In another related effort, the FAA is working to reduce safety challenges in general aviation (GA). Much like the CAST, the General Aviation Joint Steering Committee (GAJSC), which was established in the mid-1990s, established a data-driven, aviation-safety strategy to reduce general aviation fatal accidents. The FAA’s goal is to reduce the GA fatal accident rate by 10 percent over a 10-year period (2009–2018). Loss of control—mainly stalls—accounts for the most GA fatal accidents.

Through GAJSC, the general aviation community is realizing the benefits of collaboration. It is the key government-industry group working to reduce GA accidents. It is working to obtain broader data sources from the GA community to help better identify safety risks and implement enhancements to mitigate hazards. GAJSC participants include FAA, National Aeronautics and Space Administration (NASA), the National Transportation Safety Board (NTSB)—as an observer-Aircraft Owners and Pilots Association (AOPA), Experimental Aircraft Association (EAA), General Aviation Manufacturers Association (GAMA), National Business Aviation Association (NBAA) and National Air Transportation Association (NATA).

The group meets quarterly to review GA accident trends, establish areas for special emphasis, and share information. In the past year, the group developed 29 safety enhancements to address loss of control accidents, the most prevalent category of fatal GA accidents. For example, GAJSC efforts are making it easier to install some types of angle of attack indicators in GA aircraft, and allowing pilots to better monitor the stall margins of the aircraft they are flying. The GAJSC is also working on resources to help pilots better understand the effects of over-the-counter and pre-

scription medication and better understand how long they should wait prior to flying after taking different types of medication. As part of its continuing work, the GAJSC is focusing its efforts on engine related accidents and is working to adopt a set of safety enhancements aimed at these events.

The concept of collaborative, voluntarily shared safety information has evolved a great deal since its inception. The FAA explored the SMS concept as a component of system safety and collaborated closely with the International Civil Aviation Organization (ICAO) and other international stakeholders on the development of the SMS standards.

SMS is a formal, top-down, organization-wide approach to managing safety risk and assuring the effectiveness of safety risk controls. It includes systemic procedures, practices, and policies for managing safety risk. System safety is the application of both technical and managerial principles and skills to identify hazards and control risk. Most traditional regulations address technical issues. While these are important and have formed the basis of current successes, we're now increasing emphasis on how these technical processes are being managed. Risk Based Decision Making (RBDM) is central to the processes of SMS.

The evolution of SMS is the RBDM strategic initiative, one of the FAA Administrator's four strategic initiatives over the next five years. The vision for RBDM is that decisions are made with a full understanding of the safety impacts on the aerospace system. This means collecting and using data, analyzing that data and sharing it with the right people to ensure our decisions are better informed and take into account who they will impact and how. We will use RBDM and our other safety management activities to focus around high risk areas, leveraging our resources around those high-risk areas. We must take steps now to make sure that we are paying attention to the most important things first.

In order to realize our vision for RBDM, we have activities focused on ensuring that decision makers have the information regarding safety risk necessary to make well-informed decisions. These activities are necessary to increase data collection, sharing, and analysis to support decision makers. We are developing processes and tools to support decision makers and enable them to make better safety-informed decisions. We will also ensure that the information is properly aligned with and incorporated into FAA governance structures and processes through which decisions are made. Finally, there is an initiative focused on the FAA oversight model and implementation of SMS in industry. This initiative will complete the picture to ensure that FAA decisions affecting industry are made with safety risk fully considered and that oversight models are properly aligned with SMS in industry organizations.

Once we complete the activities that make up the RBDM strategic initiative, we will have instituted the approach within our SMS that will improve how we make decisions based on safety risk. The SMS will further provide the structure to make and manage those decisions.

A challenge we faced with SMS was our collaboration with stakeholders. We needed to evolve beyond the perception that the FAA was an enforcer of safety or the "Aviation Police." While enforcement is a tool to ensure compliance, it is not a panacea. Enforcement, by itself, can and does in many situations inhibit the open exchange of information. This in turn leads to ineffective solutions to safety problems. We must use our resources for oversight activities as effectively as possible, and need to change our oversight approach as we are limited in our ability to catch all safety hazards in the system. For carriers that want to operate at the highest level of safety, they know they will be able to get there more effectively with SMS. Commercial operators have an incentive to invest in SMS because, by addressing root causes of hazards before they occur, carriers can avoid the stigma and financial consequences of accidents. In all cases, though, we want to be sure that safety problems are fully addressed in the most effective manner. We feel that this is best addressed through coordinated and cooperative efforts on the part of both FAA and industry.

The FAA recognizes our role in assuring the public of a safe system, and we will not hesitate to use strict enforcement where necessary. As a safety oversight organization, stakeholders that are unwilling or unable to comply with our safety standards and pose an unmitigated safety risk cannot be overlooked under the assumption that collaboration should control in all circumstances. Regulations cover broad areas of risk that are common to all aviation operations or large sectors of these operations in the NAS. However, the product or service providers are also faced with risks that are unique to their individual situations and operational environments. Their safety management systems, whether formally mandated in regulations or not, must develop and implement approaches to identify hazards and control both types of risks.

SMS is ubiquitous, it is a safety policy that brings benefits to the aviation industry because it requires safety promotion to be put in place and requires safety assurance measures, as well as risk management application to succeed. While the vast majority of part 121 carriers voluntarily complied with SMS concepts, in January, FAA issued a final rule that required all part 121 operators to develop and implement SMS. This was done in response to Congressional direction, and we appreciate that you agree that the concept is yielding the desired results. As safety management systems mature and are implemented, our reliance on sound safety analysis to identify risks to the aviation system, mitigate hazards and track safety enhancements, will be the core to sustaining a safe and efficient national airspace system. This type of capability is achieved only through sustained safety partnerships and the reporting of critical safety information among aviation stakeholders. We must collaborate on safety analysis and best practices, and monitor safety performance and implementation of mitigation strategies. SMS, RBDM, and collaborative transparent information sharing between the FAA and industry will be the cornerstone for future FAA oversight and industry's management of the safety risks that affect their operations.

The FAA SMS Executive Council is responsible for setting the strategic direction for SMS implementation across the FAA. It provides executive-level guidance for FAA SMS-related issues. The FAA SMS Committee reports to the FAA SMS Executive Council and implements the Executive Council's strategic direction and guidance. As key milestones are met in the RBDM strategic initiative, the FAA SMS Executive Council and the FAA SMS Committee will incorporate RBDM outputs into the agency's safety management activities.

I understand that the series of hearings this Committee has been having are in support of your drafting a bill reauthorizing FAA's programs, which expire at the end of the Fiscal Year. I appreciate the opportunity the FAA has been given to offer our views on the various hearing topics. We look forward to working with your staff to provide any assistance as you proceed to the drafting process.

This concludes my statement. I will be happy to answer any of your questions at this time.

Senator AYOTTE. Thank you.

I would now like to call on the Honorable Christopher Hart, the Chairman of the National Transportation Safety Board.

Mr. Hart.

**STATEMENT OF HON. CHRISTOPHER A. HART, CHAIRMAN,
NATIONAL TRANSPORTATION SAFETY BOARD**

Mr. HART. Thank you. Good afternoon, Chairman Ayotte, Ranking Member Cantwell, and members of the Subcommittee. Thank you for inviting the NTSB to testify this afternoon on the important topic of FAA reauthorization.

At the same time that we are enjoying an exemplary and improving safety record for commercial aviation, as you've heard from Ms. Gilligan, general aviation has not experienced the same improvements. Through 2012, NTSB investigators gathered facts and issued probable cause determinations in about 1,500 general aviation accidents each year. The good news is that, in 2013, the number was reduced to 1224 crashes. But, 221 of them were fatal and killed 387 people. Each of these accidents is tragic, and we have a duty to learn from them to help prevent other families from experiencing this loss.

Our 2015 Most Wanted List includes several important priorities relating to aviation safety. These include distraction, public helicopter operations, loss of control in general aviation, procedural compliance, medical fitness for duty, and ending substance impairment in transportation. Each of these topics is discussed in more detail in my written statement. Today I will focus, first, on the importance of medical fitness for duty.

We have investigated accidents in every mode of transportation that resulted from medical disorders. In aviation, some medical conditions may result in the denial of an Airman Medical Certificate, but many others can be treated so that pilots can continue to fly. In order to help ensure that disabling medical conditions can be distinguished more reliably from those that are not, we have issued recommendations asking for a more comprehensive medical certification system in aviation and other modes of transportation. In aviation, this review is conducted, in the first instance, by a physician who is certified by the FAA to be an Aviation Medical Examiner, or AME.

For example, we have recommended pilot screening for obstructive sleep apnea (OSA). Experience has demonstrated that pilots who are diagnosed with OSA and are receiving treatment can operate safely.

Fatigue is a medical issue that can be caused by OSA or other factors. The FAA has taken strong steps to institute hours of service for commercial passenger pilots, but they have not done the same for cargo pilots. Fatigue can affect everyone, and all air operations should be treated the same, whether carrying passengers or pallets.

Another issue that relates to our ability to learn safety lessons from accidents and incidents is updating airplane recorder technology. Recorders significantly enhance our ability to determine what happened, and, from that, to make recommendations to prevent recurrences. From the early days of the NTSB, we have recommended that recorders be more robust because of the lessons learned in safety investigations. And today, more than 40 years later, we are again asking for more improvements to recorder technology. In January, we asked the FAA to require that commercial aircraft operating more than 50 nautical miles from shore be equipped to transmit their location within 6 nautical miles in the event of a crash, and to require that these aircraft be equipped with a low-frequency location device that would transmit their underwater location for at least 90 days. We also recommended a way to recover data without requiring underwater retrieval, and that all these new requirements should be harmonized internationally.

Also, accidents such as Silk Air, in 1997, Egypt Air, in 1999, and Air France, in 2009, remind us that seeing what is happening in the cockpit would help us know more about what caused an accident. So, the NTSB also recommended that cockpits have image recorders to capture that information for at least 2 hours. The concern that image recorders may be abused is a reminder of the unease from years ago that cockpit voice recordings would be abused. But, the industry has abundantly demonstrated its willingness and ability to use these recordings to improve safety rather than to punish.

Finally, there has been some discussion about the NTSB appeals process. We are committed to providing fair and speedy hearings for individuals and entities facing FAA enforcement actions. We have successfully implemented the changes to our system, passed by Congress in the 2012 Pilot's Bill of Rights. Among the changes are the removal of deference to the FAA and the adherence by our law judges to the Federal Rules of Evidence and Federal Rules of

Civil Procedure, to the extent practicable. The safety of our air-space system depends on a thoughtful, experienced, and timely review of the cases that are brought before us, and I pledge to you that the NTSB will continue to provide all of these.

This concludes my statement. I am happy to respond to your questions. Thank you for inviting us.

[The prepared statement of Mr. Hart follows:]

PREPARED STATEMENT OF HON. CHRISTOPHER A. HART, CHAIRMAN,
NATIONAL TRANSPORTATION SAFETY BOARD

Good afternoon Chairman Ayotte, Ranking Member Cantwell, and the Members of the Subcommittee. Thank you for inviting the National Transportation Safety Board (NTSB) to testify before you today.

The NTSB is an independent Federal agency charged by Congress with investigating every civil aviation accident and significant incidents in the United States and significant accidents and incidents in other modes of transportation—railroad, highway, marine and pipeline. The NTSB determines the probable cause of accidents and other transportation events and issues safety recommendations aimed at preventing future accidents. In addition, the NTSB carries out special studies concerning transportation safety and coordinates the resources of the Federal Government and other organizations to provide assistance to victims and their family members impacted by major transportation disasters.

Since its inception, the NTSB has investigated more than 140,500 aviation accidents and thousands of surface transportation accidents. On call 24 hours a day, 365 days a year, NTSB investigators travel throughout the country and internationally to investigate significant accidents and develop factual records and safety recommendations with one aim—to ensure that such accidents never happen again. The NTSB’s annual Most Wanted List highlights safety-critical actions that the U.S. Department of Transportation (DOT), United States Coast Guard, other Federal entities, states, organizations, and others need to take to help prevent accidents and save lives.

To date, we have issued over 14,000 safety recommendations to nearly 2,300 recipients. Because we have no formal authority to regulate the transportation industry, our effectiveness depends on our reputation for conducting thorough, accurate, and independent investigations and for producing timely, well-considered recommendations to enhance transportation safety.

In January, the NTSB released its Most Wanted List for 2015.¹ It identifies our top 10 areas for transportation safety improvements. Each year, we develop our Most Wanted List based on safety issues we identify as a result of our accident investigations. This year our priority areas include three multimodal items that affect aviation safety as well as three aviation-specific issues—

- Preventing Loss of Control in Flight in General Aviation
- Strengthening Crewmembers’ Procedural Compliance
- Requiring Medical Fitness for Duty
- Ending Substance Impairment in Transportation
- Disconnecting from Deadly Distractions
- Enhancing Public Helicopter Safety

Each of these Most Wanted List issues emphasizes the need for critical actions by the aviation safety regulator—the FAA— manufacturers, operators, pilots, and airport authorities. The NTSB readily acknowledges the impressive work and oversight performed by the FAA, and its track record in ensuring that this country’s aviation system is the safest in the world. Yet, there will always be room for improvement, and the accidents and incidents that the NTSB investigates attest to the fact that safety improvements are still necessary to prevent future accidents.

General Aviation Safety

The U.S. commercial aviation system is experiencing an unprecedented level of safety. With regard to general aviation (GA) accidents, there has been a decrease in all measures. The total number of general aviation accidents decreased by 249

¹See www.ntsb.gov/mostwanted for more details.

in 2013, bringing the number to 1,222.² The number of fatal accidents (221) and fatalities (387) also declined from the previous year; however, the accident rate per 100,000 flight hours (5.85) has remained relatively the same. Although GA represented almost 50 percent of the estimated total flight time of all U.S. civil aviation in 2013, it accounted for 94 percent of fatal accidents. As required by statute, the NTSB determines the probable cause of all aviation accidents, and one thing we have learned is that unfortunately, the same factors continue to cause most of the accidents.

The leading causes of GA accidents are loss of control, engine failure, flying in conditions that are beyond the pilot or aircraft's abilities, and collision with terrain. GA is essentially an airline of one, which means the entire aviation community must work harder to reach each pilot or mechanic who populates this community to address these issues and prevent accidents. Preventing Loss of Control in Flight in GA is on the NTSB's 2015 Most Wanted List in order to bring attention to the issue.³

Last month, the NTSB issued four Safety Alerts, which are included with my testimony, and last week we issued a Video Safety Alert.⁴ The NTSB's purpose in issuing these safety alerts and video is to increase awareness, education, and training for private pilots and aviation maintenance technicians. The alerts are brief information bulletins that pinpoint particular safety hazards and offer practical remedies to address these risks. They also serve to focus the NTSB's GA outreach efforts during the coming year. Three of the safety alerts are geared towards pilots and address mountain flying skills and survival equipment considerations, transition training before flying an unfamiliar aircraft with different flight characteristics or avionics, and performing thorough and advanced preflight checks on aircraft that have just received flight control or trim system maintenance. The Safety Alert aimed at mechanics discusses flight control and trim system misrigging problems. Each Safety Alert includes accident summaries from some of our accident investigations and the role the safety issue played in those accidents. The Video Safety Alert titled, *Airplane Misrigging: Lessons Learned from a Close Call*, highlights an inflight emergency that occurred near St. Louis in December 2014. The video features interviews with the two pilots who experienced reversed trim system control in a Cessna T182T and the mechanic who performed the maintenance. Both the pilots and the mechanic provide important insight to help other pilots and mechanics avoid becoming involved in a similar situation. I'm pleased to report that within the first 24-hours after we posted the video on the NTSB public website, the video received over 44,000 separate "hits." The Safety Alerts and video provide general guidance on how to apply the lessons learned from accidents and incidents and provide pilots and mechanics with free educational resources to learn more about prevention strategies.

Additionally, over the past five years, the NTSB has conducted several GA safety studies. In 2014, we examined the prevalence of drug use by all pilots who died in crashes and found an upward trend in the use of both potentially impairing medications and illicit drugs.⁵ Almost all of the crashes—96 percent—were in general aviation. I will discuss this study in more detail later. Last year, NTSB also issued a Special Investigation Report on the Safety of Agricultural Aircraft Operations.⁶ As a result of the safety issues identified in the study, the NTSB issued safety recommendations to the FAA and the National Agricultural Aviation Research & Education Foundation urging the two organizations to work together to develop and distribute agricultural operations-specific guidance on fatigue management, risk management, aircraft maintenance, and pilot knowledge and skills tests. In 2012, we examined the safety of experimental amateur-built aircraft, which represent about 10 percent of the GA fleet but are involved in a higher proportion of GA accidents.⁷ The NTSB recommended expansion of documentation requirements for initial aircraft airworthiness certification, verification of the completion of Phase I flight testing, improvement of pilots' access to transition training, encouragement of the use

² <http://www.nts.gov/investigations/data/SiteAssets/Pages/Accident-data-review/2013%20Preliminary%>.

³ http://www.nts.gov/safety/mwl/Documents/MWL_2015_Factsheet_07.pdf.

⁴ Mastering Mountain Flying, SA-039; Understanding Flight Experience, SA-040; Pilots: Perform Advanced Preflight After Maintenance, SA-041; and Mechanics: Prevent Misrigging Mistakes, SA-042.

⁵ NTSB, *Drug Use Trends in Aviation: Assessing the Risk of Pilot Impairment*, No. NTSB/SS-14/01 (September 9, 2014).

⁶ NTSB, *Special Investigation Report on the Safety of Agricultural Aircraft Operations*, No. NTSB/SIR-14/01 (May 7, 2014).

⁷ NTSB, *The Safety of Experimental Amateur-Built Aircraft*, No. NTSB/SS-12/01 (May 22, 2012).

of recorded data during flight testing, ensuring that buyers of used experimental aircraft receive necessary operating and performance documentation, and improvement of aircraft identification in registry records. In a study of airbag restraints in GA aircraft, the NTSB concluded that aviation airbags can mitigate occupant injuries in some severe but survivable crashes.⁸ In 2010, the NTSB looked at “glass cockpits” in GA, which are the newer electronic displays in some planes.⁹ The results of this study suggested at the time that the introduction of glass cockpits had not yet resulted in a measurable improvement in safety when compared to similar aircraft with conventional instruments. There is a need to ensure pilots have system specific knowledge to safely operate aircraft with glass cockpit avionics and to capture maintenance and operational information to assess the reliability of glass cockpit avionics.

We will continue our efforts to improve the safety record of general aviation, and we look forward to finding new and innovative ways to communicate this message to more pilots and mechanics.

Strengthening Procedural Compliance

The NTSB continues to seek new ways to strengthen procedural compliance, from identifying inadequate procedures, to ensuring comprehensive training, to reemphasizing practices that reinforce crew compliance. Recent accidents underscore the importance of procedural compliance. In 2013 there were two major controlled flight into terrain accidents in which crews did not follow standard operating procedures—Asiana flight 214 in San Francisco, California, and UPS flight 1354 in Birmingham, Alabama. The NTSB is examining whether procedural compliance may have played a role in a number of other ongoing air carrier accident and incident investigations as well. Over the last 10 years, the NTSB has investigated more than a dozen airline or commercial charter accidents involving procedural, training or compliance issues.

Sometimes crews do not comply with air carriers’ standard operating procedures, such as flying stabilized approaches, making required callouts, maintaining quiet (or sterile) cockpits, and monitoring critical flight parameters like airspeed. But other times, the procedures themselves aren’t good enough. For example, an airplane ran off the end of the runway in a case in which an airline did not require crews to calculate landing distance on arrival.¹⁰ This is only one of many such cases. In other cases, training does not adequately prepare crews.¹¹

Aviation accidents and incidents can be prevented through collaborative efforts by crews, operators, and regulators. Working together, they can develop effective procedures and training, and ensure that crews do what they are trained to do. I am a strong believer in the power of collaboration to produce continuous improvement because of the amazing safety improvement that this industry has enjoyed as a result of its collaborative process known as CAST, the Commercial Aviation Safety Team. The core of the CAST process is very simple: everyone who is involved with this issue—in this case, further reducing the risk of aviation fatalities and improving a safety record that is already very good—should be involved in developing the solution, including industry, organizations representing employees, and government agencies. This model has more recently been extended to the general aviation community through the General Aviation Joint Steering Committee (GAJSC) which uses the CAST processes to improve GA safety through data-driven risk reduction efforts that focus on education and training. Similarly, GAJSC participants include the FAA and industry stakeholders such as pilot organizations, instructors, mechanics, builders and manufacturers. Collective and collaborative leadership is needed to promote and reinforce a culture of continuous safety improvement beyond mere compliance—a culture essential to safety.

⁸NTSB, *Airbag Performance in General Aviation Restraint Systems*, No. NTSB/SS–11/01 (January 11, 2011).

⁹NTSB, *Introduction of Glass Cockpit Avionics into Light Aircraft*, No. NTSB/SS–10/01 (March 9, 2010).

¹⁰NTSB, *Runway Overrun and Collision Southwest Airlines Flight 1248, Boeing 737–7H4, N471WN, Chicago Midway International Airport, Chicago, Illinois on December 8, 2005*, Rpt. No. AAR–07–06 (October 2, 2007).

¹¹See e.g., NTSB, *Runway Overrun During Rejected Takeoff, Global Exec Aviation, Bombardier Learjet 60, N999LJ, Columbia, South Carolina on September 19, 2008*, Rpt. No. AAR–10–02 (April 6, 2010); NTSB, *Loss of Control and Crash, Marlin Air, Cessna Citation 550, N550BP, Milwaukee, Wisconsin on June 4, 2007*, Rpt. No. 09–06 (October 14, 2009).

Pilot Training and Professionalism and Disconnecting from Distractions

Colgan Air flight 3407 crashed on approach to the Buffalo Niagara International Airport in Buffalo, NY on February 12, 2009.¹² As a result of that accident investigation, the NTSB issued recommendations to address pilot and crew training, maintaining detailed training records, making this information available to other airlines that are considering hiring a pilot, and mentoring and professionalism programs.¹³ Congress enacted some of these recommendations into law in the Airline Safety and Federal Aviation Administration Extension Act of 2010 (the 2010 Act), such as the requirement that FAA create a new centralized database of FAA and air carrier pilot records that are retained for the life of a pilot and that airlines review those records during the hiring process.¹⁴ These recommendations¹⁵ remain open as the FAA works to develop a notice of proposed rulemaking (NPRM) to create a pilot records database (PRD), and we will determine if the rulemaking meets the intent of the recommendations. While some of the NTSB's recommendations have been or are being addressed by FAA, other recommendations concerning pilot leadership training and professionalism remain open with unacceptable responses.¹⁶ Also, in the Colgan Air flight 3407 accident investigation, we found that industry changes, including two-pilot cockpits, had resulted in opportunities for pilots to upgrade to captain without having accumulated significant experience as a first officer in a Part 121 operation. Without important opportunities for mentoring and observational learning, which characterize time spent in journeyman pilot positions, it was difficult for a pilot to acquire effective leadership skills to manage a multicrew airplane.

The 2010 Act included a mandate for the FAA to develop regulations to encourage and promote airline flight crew professionalism and mentoring. The FAA developed an NPRM and submitted it to the Office of Management and Budget in May 2011. Three years later, in April 2014, the NPRM was returned to the FAA for revisions. As of today, despite the 2010 Act, the NPRM has not yet been published.

In addition to Colgan Air, we have seen other accidents and incidents that are tragic reminders that more needs to be done to improve aviation safety. As we have learned through our accident investigations, when flight crews and controllers deviate from standard operating procedures and established best practices, the consequences can be tragic.

- In the March 15, 2012, fatal crash following an in-flight fire involving a Convair CV-440-38, N153JR, operated by Fresh Air, Inc, the flight crew's failure to maintain adequate airspeed after shutting down the right engine due to an in-flight fire resulted in either an aerodynamic stall or a loss of directional control.¹⁷
- In the July 31, 2008, accident involving East Coast Jets flight 81, a Hawker Beechcraft Corporation 125-800A, N818MV, crashed while attempting to go around after landing on runway 30 at Owatonna Degner Regional Airport, Owatonna, Minnesota. The two pilots and six passengers were killed, and the airplane was destroyed by impact forces. The captain allowed an atmosphere in the cockpit that did not comply with well-established procedures, and this atmosphere permitted inadequate briefing of the approach and monitoring of the current weather conditions; inappropriate conversation; nonstandard terminology; and a lack of checklist discipline throughout the descent and approach phases of the flight.¹⁸
- An engine fire on an American Airlines MD-80 in 2007 involved a crew engaged in non-pertinent discussion during taxi and after landing "indicating that a casual atmosphere existed in the cockpit." This casual atmosphere "before takeoff affected and set a precedent for the pilots' responses to the situations in flight

¹²NTSB, *Loss of Control on Approach: Colgan Air, Inc. Operating as Continental Connection Flight 3407, Bombardier DHC-8-400, N200WQ, Clarence Center, New York on February 12, 2009*, Rpt. No. AAR-10-01 (February 2, 2010).

¹³A-10-10 through -34; reiterated recommendations A-05-1, A-05-14, and A-07-13.

¹⁴Pub. L. 111-216, August 1, 2010.

¹⁵A-10-17 through -20.

¹⁶Recommendations A-10-10, -16, and -30 have been closed with unacceptable action. Recommendations A-10-13, -14, -15, and -22 remain open with unacceptable responses.

¹⁷NTSB, *Crash Following In-Flight Fire Fresh Air, Inc. Convair CV-440-38, N153JR, San Juan, Puerto Rico on March 15, 2012*, Rpt. No. AAR-14-04 (November 17, 2014).

¹⁸NTSB, *Crash During Attempted Go-Around After Landing, East Coast Jets Flight 81, Hawker Beechcraft Corporation 125-800A, N818MV, Owatonna, Minnesota on July 31, 2008*, Rpt. No. AAR-11-01 (March 15, 2011).

and after landing, eroding the margins of safety provided by the SOPs and checklists, and increased the risk to passengers and crews.”¹⁹

- In the 2006 fatal wrong runway takeoff accident in Lexington, KY, involving Comair, it was “the flight crew’s noncompliance with standard operating procedures [which] . . . most likely created an atmosphere in the cockpit that enabled the crew’s errors.” Contributing to the probable cause was “the flight crew’s non-pertinent conversation during taxi, which resulted in a loss of positional awareness.”²⁰

Another concern for the NTSB is the mode confusion that can result from increasing automation. A classic accident of this type was the crash of Asiana Airlines flight 214 in 2013 when it struck a seawall while on approach to San Francisco International Airport.²¹ The pilots relied too much on automation that they didn’t fully understand and mismanaged the landing as it went wrong. As the airplane reached 500 feet above the airport elevation, the approach was not stabilized as the airplane was slightly above the desired glidepath. The descent rate was too high, and the airspeed was decreasing. Based on these indications, the flight crew should have determined that the approach was unstabilized and initiated a go-around, but they did not do so. The crew did not become aware of the problem until the airplane reached 200 feet, and did not initiate a go-around until the airplane was below 100 feet, at which point the airplane did not have the performance capability to accomplish a go-around. The flight crew’s insufficient monitoring of airspeed indications during the approach resulted in part from over reliance on automation. Unfortunately, this manifests a problem that is industry-wide, and not just limited to these pilots having a bad day. The bottom line is that automation is very beneficial, and it has a demonstrated history of improving safety, reliability, and productivity. Unfortunately, however, the industry still has a way to go to achieve a better understanding of the human/automation interface.

Last but not least, while new connectivity has enabled new safety technologies, it has also enabled new forms of distraction, leading to accidents, even in the most strictly regulated transportation enterprise of aviation. As a result of the NTSB’s investigation of both Northwest Flight 188 that overflew its Minneapolis destination because the pilot and co-pilot were distracted by their laptops and Colgan Air Flight 3407, where the first officer sent a text message on her personal cell phone during the taxi phase of the accident flight, we issued a safety recommendation to the FAA to amend the Federal Aviation Regulations (FAR) to require Part 121, 135, and 91 subpart K operators to incorporate explicit guidance to pilots prohibiting the use of personal portable electronic devices on the flight deck.²² In addition, Congress mandated that the FAA promulgate a rule which would prohibit the use of personal wireless communications devices and laptop computers by flight crewmembers during all phases of flight in Part 121 operations. The FAA issued an NPRM for this requirement in January 2013.²³ The NTSB submitted comments to the docket in support of the proposed rule but recommended that the final rule incorporate the broader scope of its February 2010 safety recommendation by expanding the proposed rule to Part 135 and 91 subpart K operators. The final rule, published in February 2014,²⁴ limited the prohibition to flight crew members in operations under Part 121. While the final rule is a step in the right direction, it is not enough and more needs to be done to expand the applicability of the rule to Part 135 and 91 subpart K operators. Accidents like that on August 26, 2011, near Mosby, Missouri, involving an Emergency Medical Service helicopter and a distracted pilot drive this fact home. All on board that helicopter were killed in the accident.²⁵

¹⁹NTSB, *In-Flight Left Engine Fire American Airlines Flight 1400, McDonnell Douglas DC-9-82, N454AA, St. Louis, Missouri on September 28, 2007*, Rpt. No. AAR-09-03 (April 7, 2009).

²⁰NTSB, *Attempted Takeoff From Wrong Runway, Comair Flight 5191 Bombardier CL-600-2B19, N431CA, Lexington, Kentucky on August 27, 2006*, Rpt. No. AAR-07-05 (July 26, 2007).

²¹NTSB, *Descent Below Visual Glidepath and Impact With Seawall, Asiana Airlines Flight 214 Boeing 777-200ER, HL7742, San Francisco, California on July 6, 2013*, Rpt. No. AAR-14-01 (June 24, 2014).

²²A-10-30.

²³78 Fed. Reg. 2912 (January 15, 2013).

²⁴79 Fed. Reg. 8257 (February 12, 2014).

²⁵NTSB, *Crash Following Loss of Engine Power Due to Fuel Exhaustion Air Methods Corporation Eurocopter AS350 B2, N352LN, Near Mosby, Missouri, August 26, 2011*, Rpt. No. AAR-13-02 (April 9, 2013).

Requiring Fitness for Duty, Ending Substance Impairment, and Addressing Human Fatigue

Requiring Medical Fitness for Duty is on the NTSB's 2015 Most Wanted List in order to bring attention to this critical issue in all modes of transportation.²⁶ Medical conditions and treatments that impair transportation professionals' performance directly affect safety. To mitigate the risk to the public, the NTSB has made recommendations for a comprehensive medical certification system for safety-critical transportation personnel, including these features:

- a complete medical history of the applicant, taken at prescribed intervals, that includes medications, conditions, and treatments as well as a physical examination
- specific historical questions and physical examination procedures to identify applicants at high risk for sleep disorders
- identification of specific conditions, treatments, and medications that initially disqualify applicants for duty, with certification contingent on further testing (specific to each condition)
- explicit and uniform processes and criteria for determining when the applicant has a treated but otherwise disqualifying condition
- certificates that are good only for a limited time for applicants with conditions that are currently stable but known to be likely to deteriorate, to ensure appropriate retesting
- medical examiners who
 - are licensed or registered to both perform examinations and prescribe medication in a given state;
 - are specifically trained and certified to perform medical certification exams; and
 - have ready access to information regarding disqualifying conditions and required further evaluation
- a review system for medical examiners' work product(s) with both the information and capacity to identify and correct errors and substandard performance
- the capacity to prevent applicants who have been deferred or denied certification from finding another provider who will certify them
- a process for dealing with conditions which could impair safety and are diagnosed between certification exams.

The medical requirements for pilots are robust. These standards are important because of the impact that accidents can have on public safety and passengers, and we find in all modes that adverse health conditions can lead to accidents. Some pilots are not medically fit to operate aircraft, and those suffering from impairing medical disorders should not be at the controls unless and until they receive medical treatment that mitigates the risk to the public.

In addition, NTSB investigations have found impairment by various substances as a cause or a contributing factor in transportation accidents, and use of over-the-counter (OTC) and prescription medications as well as illicit drugs is generally increasing. Since there is a great amount of overlap among these groups—the same substance may be available by prescription or over the counter and many medications are also used illicitly by people without a prescription for their psychoactive effects—I will use the term “drugs” broadly to mean any of these substances. Aircraft are complex machinery that require pilots to be at their best—not impaired by alcohol or drugs. In September 2014, the NTSB issued a safety study that examined trends in the prevalence of drugs identified by toxicology testing of fatally injured pilots between 1990 and 2012.²⁷ The goals of the study were to describe the prevalence of OTC, prescription, and illicit drug usage among fatally injured pilots over time and evaluate the need for safety improvements related to pilots' use of drugs. Study results showed the prevalence of potentially impairing drugs increased from an average of 11 percent of fatally-injured accident pilots during the period from 1990–1997 to an average of 23 percent of accident pilots during the period 2008–2012. During the same time periods, positive marijuana results increased from 1.6 percent to 3.0 percent. But the most commonly found impairing substance in fatal crashes was diphenhydramine, a sedating antihistamine and an active ingre-

²⁶ http://www.nts.gov/safety/mwl/Documents/MWL_2015_Factsheet_08.pdf.

²⁷ NTSB, *Drug Use Trends in Aviation: Assessing the Risk of Pilot Impairment*, No. NTSB/SS-14/01 (September 9, 2014).

dient in many OTC allergy formulations, cold medicines, and sleep aids. Of note, 96 percent of the pilots in this study were flying in general aviation operations when their fatal accident occurred.

As a result of this safety study, the NTSB recommended that FAA: (1) develop, publicize, and periodically update information to educate pilots about the potentially impairing drugs identified in FAA toxicology test results of fatally injured pilots, and make pilots aware of less impairing alternative drugs if they are available; (2) obtain information about the number and flight hours of pilots flying without medical certificates because the FAA identifies “active pilots” as those who maintain their medical certification; (3) develop and distribute a clear policy regarding any marijuana use by airmen regardless of the type of flight; and (4) conduct a study to assess the prevalence of OTC, prescription, and illicit drug use among flying pilots not involved in accidents, and compare those results with findings from pilots who have died from aviation accidents to assess the safety risks of using those drugs while flying.²⁸ In addition, the NTSB recommended that the 50 states, the District of Columbia, and the Commonwealth of Puerto Rico: (1) include in all state guidelines regarding prescribing controlled substances for pain a recommendation that health care providers discuss with patients the effect their medical condition and medication use may have on their ability to safely operate a vehicle in any mode of transportation and (2) enhance communication among prescribers, pharmacists, and patients about the transportation safety risks associated with some drugs and medical conditions.²⁹

In addition, fatigue remains an issue of concern. For more than 20 years, the issue of reducing accidents caused by fatigue was on the NTSB’s Most Wanted List of safety improvements. Since 1972, the NTSB has issued more than 200 human fatigue-related safety recommendations in all modes of transportation, including more than 53 recommendations addressing fatigue in aviation.³⁰ For example, we have recommended that all pilots be appropriately evaluated for obstructive sleep apnea and treated, if necessary.

We removed fatigue from our Most Wanted List in November 2012 to acknowledge the new flight and duty time rules for commercial passenger operations promulgated by the FAA. For the first time, the new rules recognize the universal factors that lead to human fatigue such as time of day, length of duty day, workload, whether an individual is acclimated to a new time zone and the likelihood of being able to sleep under different circumstances. However, flight and duty time rules cannot control what employees do on their own time. In addition, we remain concerned that the new rule does not apply to cargo pilots, nor to Part 135 operations. Fatigue is fatigue, whether passengers or pallets are being transported; it degrades every aspect of human capability. Another fatigue issue not addressed by the new rules is pilot commuting; a concern the NTSB identified in the Colgan Air accident. We have seen the effects of fatigue in too many of our accident investigations. We will continue working toward one level of safety throughout the industry.

Enhancing Public Helicopter Safety

On September 27, 2008, a Maryland State Police (MSP) helicopter, Trooper 2, received a medevac flight request to pick up two patients involved in an automobile accident. Trooper 2 reached the accident site, loaded the patients, but never reached the hospital. On June 9, 2009, a New Mexico State Police (NMSP) helicopter pilot received a request for an aerial search for a lost hiker. The NMSP pilot landed the helicopter, located the hiker, departed from the mountain, but did not make it back to base. A very similar situation occurred on March 30, 2013. The Alaska Department of Public Safety (ADPS) helicopter pilot received a request to rescue a stranded snowmobiler. The pilot landed the helicopter, located the snowmobiler, departed from the frozen lake, but did not reach the designated landing zone. Prior to accepting their missions, both the MSP and NMSP pilots expressed concern about weather conditions. Although the pilot of the ADPS helicopter did not discuss the weather with anyone, he should have been aware of the deteriorating conditions. However, all three pilots accepted and attempted to complete the missions even when faced with poor weather at night. And tragically, the helicopters crashed before reaching their destinations, killing a total of nine people. Crashes involving public helicopters are not just limited to those used by law enforcement agencies. On August 5, 2008, a U.S. Forest Service (USFS) helicopter conducting firefighting missions in California impacted trees and terrain during the initial climb after takeoff. The pilot, the safety crewmember and seven firefighters were killed in this accident.

²⁸ A-14-92 through -95.

²⁹ I-14-1 and -2.

³⁰ See, e.g., A-06-10, A-08-44, and A-09-61 through -66.

As a result of the 2008 USFS accident in California, the NTSB recommended that FAA develop and implement a surveillance program specifically for Part 135 civil aircraft operators that provides contract support to government entities in order to maintain continual oversight to ensure compliance with Part 135 requirements.³¹ The NTSB also recommended the FAA take appropriate actions to clarify FAA's authority over public aircraft and identify and document where such oversight responsibilities reside in the absence of FAA authority.³² In 2014, the FAA published an Advisory Circular³³ which sought to clarify oversight responsibilities for civil aircraft operators providing contract support to government entities, as recommended. However, the Advisory Circular does not provide for continual FAA oversight of the airworthiness of aircraft that hold civil airworthiness certificates and that operate part of the time as public aircraft and part of the time as civil aircraft—a position that is contrary to current guidance in FAA Order 8900.1. We strongly encourage FAA to revise the Advisory Circular to provide for this oversight.

Since 2004, the NTSB has investigated more than 130 accidents involving federal, state, and local public helicopter operations, including the 4 mentioned above. Fifty people lost their lives and nearly 40 were seriously injured in these accidents. The lessons learned as a result of these investigations have the potential to make federal, state, and local public helicopter operations safer.

Aircraft Recorder Recommendations

Notwithstanding the NTSB's nearly 50 years of aviation accident investigations and role in securing improvements in recorder capabilities and locator technologies, the NTSB clearly recognizes that sophisticated aircraft accident investigation and analysis cannot be accomplished without recorded flight data. In order for our important work to continue and make a difference in saving lives, we must ensure that the technologies are available to locate aircraft wreckage and recorders after an accident and that critical flight data can be recovered.

The NTSB has long been concerned about rapid recovery of recorded information to guide investigations, help determine accident causes, and develop recommendations to prevent recurrences. To focus attention on this issue, the NTSB convened its *Emerging Flight Data and Locator Technology Forum* on October 7, 2014, in Washington, D.C.³⁴ Forum discussions among government, industry, and investigative experts helped identify the following safety issues:

- The need for improved technologies to locate aircraft wreckage and flight recorders following an accident in a remote location or over water
- The need for timely recovery of critical flight data following an accident in a remote location or over water

Other noteworthy information provided at the forum includes the following:

- *Deployable recorder technologies:* These technologies can be used to recover flight data without the delay of a long and expensive underwater recovery. Deployable recorders have been used in military and over water helicopter applications since the 1960s and are currently available from several manufacturers. They combine traditional flight data recorder and cockpit voice recorder functions into one unit and are capable of providing a comparable amount of flight data. They are designed to separate from the aircraft upon fuselage structural deformation or when submersed in water. If in water, they float indefinitely on the surface. These units are also equipped with emergency locator transmitters that operate on the 121.5 megahertz and 406 megahertz frequencies for location and recovery. Standards already exist for automatically deploying flight recorders.
- *Triggered flight data transmission:* A manufacturer of flight data transmission technology testified that triggered flight data transmission was not only feasible, but already in service on some aircraft. Additionally, at this time, manufacturers and operators are equipping their aircraft with commercial satellite communications systems that can support broadband video, voice, and data transmissions. Commercial satellite systems on the market today are primarily used for passenger and crew connectivity and can support speeds of 200–400 kilobits per second. Higher speed capability is forthcoming. Such bandwidth would enable real-time parametric flight data transmission to begin after a trig-

³¹ A–10–149.

³² A–10–150.

³³ FAA, Advisory Circular 00–1.1A: Public Aircraft Operations (February 12, 2014).

³⁴ Additional information about the forum is available at http://www.nts.gov/news/events/Pages/2014_Flight_Data_Locator_FRM.aspx.

gering event as well as transmission of a limited amount of stored flight data recorded before the triggering event.

On January 22, 2015, the NTSB issued a series of safety recommendations to the FAA³⁵ calling for improvements in locating downed aircraft and ways to obtain critical flight data faster and without the need for immediate underwater retrieval. In issuing its recommendations, the NTSB recognized that there are significant ongoing international industry and regulatory efforts to develop and adopt standards for enhanced aircraft position reporting and supplemental methods for recovering flight data. Achieving these goals on a global basis will demand a harmonized approach that addresses the needs of many stakeholders and ensures that domestic and foreign parties operate under equivalent standards. We also strongly support the need for performance-based standards for emerging technologies and data recovery. We applaud Ambassador Lawson and the International Civil Aviation Organization (ICAO) for their continued important work in addressing these issues.

The NTSB recommendations urge the FAA to:

- Require that all aircraft used in extended overwater operations (*i.e.*, operations that occur over water at a distance of more than 50 nm from the nearest shoreline) and operating under Part 121 or Part 135 of the FAR that are required to have a flight data recorder and cockpit voice recorder be equipped with
 - a tamper-resistant method to broadcast to a ground station sufficient information to establish the location where an aircraft terminates flight as the result of an accident within 6 nautical miles of the point of impact, and
 - an airframe low frequency underwater locating device that will function for at least 90 days and that can be detected by equipment available on military, search and rescue, and salvage assets commonly used to search for and recover wreckage.
- Require that all newly manufactured aircraft used in extended overwater operations and operating under Part 121 or Part 135 of the FAR that are required to have a flight data recorder and cockpit voice recorder be equipped with a means to recover, at a minimum, mandatory flight data parameters; the means of recovery should not require underwater retrieval. Data should be captured from a triggering event until the end of the flight and for as long a time period before the triggering event as possible.
- Coordinate with other international regulatory authorities and ICAO to harmonize the implementation of the above-identified requirements recommended by the NTSB for locating where an aircraft terminates flight as the result of an accident and recovery of mandatory flight data parameters.
- Identify ways to incorporate adequate protections against disabling flight recorder systems on all existing transport category aircraft.
- Require that all newly manufactured transport category aircraft incorporate adequate protections against disabling flight recorder systems.

In addition, the NTSB has continued to re-emphasize the need for cockpit image recorders on commercial airplanes. In 2000, the NTSB issued two safety recommendations to the FAA on cockpit image recording systems and protection against deactivation of recording systems in response to investigations of several accidents involving a lack of information regarding crewmember actions and the flight deck environment, including ValuJet Flight 592, SilkAir Flight 185, Swissair Flight 111, and EgyptAir Flight 990. One recommendation³⁶ asked the FAA to require that that in-service aircraft operated under 14 CFR Part 121, 125, or 135 be equipped with a crash-protected cockpit image recording system. The second recommendation³⁷ asked for similar action for newly manufactured aircraft that would be operated under 14 CFR Part 121, 125, or 135. Both recommendations also asked that the FAA require placing recorder system circuit breakers in locations the flight crew could not access in-flight.

In the SilkAir and EgyptAir crashes, the flight data recorder and cockpit voice recordings provided limited information about crew actions and the status of the cockpit environment. Further, in the Air France Flight 447 crash and the September 3, 2010, crash of a Boeing 747-44AF, operated by United Parcel Service while attempting to return to Dubai International Airport following an in-flight cargo fire, the ac-

³⁵ A-15-1 through -6.

³⁶ A-00-30. In 2006, the NTSB reiterated A-00-30 as a result of its investigation of a 2004 accident involving Corporate Airlines Flight 5966, a BAE-J3201 aircraft, in Kirksville, Missouri.

³⁷ A-00-31.

cident aircraft were equipped with FDRs that greatly exceeded the minimum parameter requirements. However, in these accidents, critical information related to the cockpit environment conditions (for example, crew actions and visibility), instrument indications available to crewmembers, and the degradation of aircraft systems was not available to investigators. Modern cockpit imaging systems can provide the information needed to help determine the cause of these types of accidents and to identify revisions needed to prevent a recurrence of the accident.

Air Transportation of Lithium Batteries

There are two types of lithium batteries: primary and secondary. Primary lithium batteries are non-rechargeable and are commonly used in items such as watches and pocket calculators. They contain metallic lithium that is sealed in a metal casing. The metallic lithium will burn when exposed to air if the metal casing is damaged, compromised, or exposed to sustained heating. Secondary lithium batteries, also known as lithium-ion batteries, are rechargeable and are commonly used in items such as cameras, cell phones, laptop computers, and hand power tools. Secondary lithium batteries contain electrically charged lithium ions, and a flammable liquid electrolyte. External damage or overheating of the battery can result in thermal runaway or the discharge of flammable electrolyte. Another type of secondary battery, known as lithium polymer batteries, contains a flammable polymeric material rather than a liquid, as the electrolyte. Halon suppression systems, the only fire suppression systems certified for aviation, can be used to help control flames in lithium battery fires but will not extinguish the fire.

The demand for primary and secondary lithium batteries has skyrocketed since the mid-1990s as the popularity and use of electronic equipment of all types has grown. As the use of lithium batteries has increased, the number of incidents involving fires or overheating of lithium batteries, particularly in aviation, has likewise grown. The NTSB has investigated three such aviation accidents: Los Angeles, California (1999); Memphis, Tennessee (2004); and Philadelphia, Pennsylvania (2006). In addition, the NTSB has participated in the investigations of two accidents involving fires that may be related to lithium batteries that occurred on cargo airline flights operating in foreign countries: Dubai, United Arab Emirates (2010), and Jeju Island, Republic of Korea (2011).

The fires in these accidents included both primary and secondary lithium batteries, and the NTSB issued several recommendations as a result of these investigations. As a result of its investigation of the Los Angeles and Memphis incidents, the NTSB recommended that the Pipeline and Hazardous Materials Safety Administration (PHMSA), with the FAA, evaluate the fire hazards posed by lithium batteries in an aviation environment and require that appropriate safety measures be taken to protect the aircraft and occupants. The NTSB also recommended that packages containing lithium batteries be identified as hazardous materials, including appropriate labeling of the packages and proper identification in shipping documents when transported on aircraft. These recommendations have been closed with acceptable action by the regulators.

Following the Philadelphia accident, the NTSB issued six safety recommendations urging PHMSA to address the problems with lithium batteries on a number of fronts, including reporting all incidents; retaining and analyzing failed batteries; researching the modes of failure; and eliminating regulatory provisions that permit limited quantities of these batteries to be transported without labeling, marking, or packaging them as hazardous materials. In January 2008, the NTSB issued additional recommendations to PHMSA and the FAA to address the NTSB's concerns about the lack of public awareness about the overheating and ignition of lithium batteries. PHMSA issued an NPRM³⁸ in January 2010 to address some of these recommendations, and the final rule was issued in August 2014.³⁹ The final rule is discussed in further detail below.

In September 2010, a Boeing 747-400F, operated by UPS, crashed on a military base in Dubai, United Arab Emirates (UAE), while the crew was trying to return to the airport for an emergency landing due to a fire in the main deck cargo compartment. Both crewmembers died as a result of injuries sustained during the crash, and the aircraft was a total loss. The UAE led this investigation,⁴⁰ and issued a

³⁸ 75 Fed. Reg. 1302 (January 11, 2010).

³⁹ 79 Fed. Reg. 46012 (August 6, 2014).

⁴⁰ Foreign investigative entities have authority equivalent to the NTSB under ICAO Annex 13. For this accident, in particular, the NTSB has been involved as the accredited representative as the State of Operator, Registration, and Manufacturer. The operator, manufacturers, and reg-

final report on July 24, 2013.⁴¹ The report found that at least three shipments of lithium ion battery packs that meet Class 9 hazardous material designation were onboard. In addition, in July 2011, a Boeing 747-400F, operated by Asiana Cargo and transporting a large quantity of lithium batteries, crashed about 70 miles west of Jeju Island, Republic of Korea, after the flight crew declared an emergency due to a cargo fire and attempted to divert to Jeju International Airport. Again, both crewmembers died as result of injuries sustained during the crash, and the aircraft was a total loss.

The NTSB held a public forum in April 2013 on lithium ion batteries in transportation.⁴² We learned that lithium ion batteries are becoming more prevalent in the various transportation modes, national defense, and space exploration. Panelists stated that because of their high energy density and light weight, these batteries are natural choices for energy. These benefits, however, also are the source of safety risks. We also heard about manufacturing auditing, robust testing, and monitoring and protection mechanisms to prevent a catastrophic event.

When Congress enacted the FAA Modernization and Reform Act of 2012, it included a provision (section 828) that U.S. hazardous materials regulations (HMR) on the air transportation of lithium metal cells or batteries or lithium ion cells or batteries could not exceed the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air*. Consequently, in January 2013, PHMSA published an NPRM stating that it was considering harmonizing requirements in the HMR on the transportation of lithium batteries with changes adopted in the 2013–2014 ICAO Technical Instructions and requested additional comments on (1) the effect of those changes, (2) whether to require compliance with the ICAO Technical Instructions for all shipments by air, both domestic and international, and (3) the impacts if PHMSA failed to adopt specific provisions in the ICAO Technical Instructions into the HMR.⁴³ In the NTSB's comments on the NPRM, we noted the disparity between requirements in the HMR, which had weaker standards at the time, and the ICAO Technical Instructions. We explained that failure to require domestic shipments of lithium batteries to comply with regulations equivalent to the ICAO Technical Instructions would place the United States in an inexplicable position of having weaker safety standards at a time when it should be leading the way in response to serious safety concerns about transporting these materials. PHMSA's final rule harmonized the HMR with the ICAO Technical Instructions as well as with applicable provisions of the United Nations Model Regulations and the International Maritime Dangerous Goods (IMDG) Code.⁴⁴

The NTSB notes the DOT has for some years worked to ensure that the HMR are compatible with international standards and, accordingly, has been very active in the development of international standards for the transportation of hazardous materials. However, the DOT has never relinquished its rulemaking authority to an international body. The NTSB concurs with that position and firmly believes the DOT should implement more stringent standards in U.S. regulations if deemed necessary.

Update on Crash of Scaled Composites' SpaceShip Two

On October 31, 2014, Scaled Composites' SpaceShip Two crashed in the Mojave Desert during a test flight. The NTSB launched a go team under our authority to investigate the accident. This is not the first commercial space investigation the NTSB has conducted, and we believe there are important safety lessons to learn as a result of this investigation. Our final report, which we expect to release later this summer, will cover topics such as human factors, vehicle systems, and operations. We will inform Congress and the public of our findings when the investigation is completed.

ulator (FAA) are technical advisors to the NTSB accredited representative. The NTSB plans to issue recommendations based on the findings of the UAE investigation.

⁴¹ General Civil Aviation Authority of the United Arab Emirates, Uncontained Cargo Fire Leading to Loss of Control Inflight and Uncontrolled Descent into Terrain, (July 24, 2013). Available at <http://www.gcaa.gov.ae/en/ePublication/admin/iradmin/Lists/Incidents%20Investigation%20Reports/Attachments/40/2010-2010%20%20Final%20Report%20%20Boeing%20747-44AF%20%20N571UP%20%20Report%2013%202010.pdf>

⁴² Additional information about the forum is available at http://www.ntsb.gov/news/events/Pages/2013_Lithium_Batteries_FRM.aspx.

⁴³ 78 Fed. Reg. 1119 (January 7, 2013).

⁴⁴ 79 Fed. Reg. 46012 (August 6, 2014).

Closing

Madame Chairman, the NTSB has a long record of support for improving aviation safety. As you know, our mission is to promote safety, and the implementation of our recommendations in these areas would help promote and improve safety.

Thank you for the opportunity to testify before you today. I look forward to responding to your questions.

NTSB Safety Alert, NATIONAL TRANSPORTATION SAFETY BOARD

Mechanics: Prevent Misrigging Mistakes

Verify correct directional travel of controls and trim

The problem

- Incorrect rigging of flight control and trim systems has led to in-flight emergencies, accidents, and even deaths.
- Four such mishaps within a 2-year span share common safety issues:
 - Maintenance personnel who serviced or checked the systems did not recognize that the control or trim surfaces were moving in the wrong direction.
 - Pilots who flew the airplanes did not notice the control anomalies during their preflight checks.
- Anyone can make mistakes. In some cases, the mechanics who performed the work incorrectly were highly experienced.

Related incident and accidents:

- In December 2014, the pilot of a Cessna T182T airplane experienced extreme nose-down control forces on the yoke shortly after takeoff. The airplane had just undergone maintenance on the elevator trim system, and the mechanic briefed the pilot about the work before the flight. Both the pilot and the pilot-certificated passenger needed to pull hard aft on the yoke to prevent the airplane from pitching down, even though the elevator pitch trim indicator showed a nearly full nose-up trim position. The pilot remembered that work had been done on the elevator trim system, and he thought that there might be some kind of control-reversal problem. While maneuvering for the emergency landing, the pilot applied nose-down trim control inputs and found that the extreme control forces lessened, and he successfully landed the airplane. The elevator trim control cables were misrigged such that the elevator trim control was reversed. The mechanic who performed the work had 26 years of experience and described that he had carefully checked the trim tab deflection angles. However, he did not recognize that the trim tab moved in the wrong direction. The mechanic who checked the work had 24 years of experience and noted that the cable rigging problem could not be clearly visually identified through the airplane's access panel. The maintenance manual provided the following information: "Make sure that the trim tab moves in the correct direction when it is operated by the trim wheel. NOTE: Nose down trim corresponds to the tab UP position." (CEN15IA079)¹
- In May 2013, the pilot of a Schweizer SGS 2-33A glider received serious injuries after the glider crashed due to improper rigging of the rudder control cables. The glider had just received an annual inspection, and its rudder had been removed and reinstalled. The mechanic who conducted a flight control check after the annual inspection with assistance from another pilot seated in the cockpit stated that he confirmed movement of the rudder while at the rear of the glider; however, he did not see which pedal the pilot was pushing and did not verbally confirm the corresponding position of the rudder pedals. The mechanic had 35 years of experience and had assembled hundreds of gliders. (ERA13LA229)
- In October 2013, the private pilot and passenger in a Piper PA-22 received serious injuries when the airplane crashed during takeoff on its first flight since an annual inspection in which frayed elevator control cables were replaced. During the takeoff roll, when the pilot applied forward stick controls to raise the tail, the tail did not rise, and the airplane instead "jumped" off the runway. The pilot reduced engine power and attempted to control the airplane's pitch, but

¹ These pilots and the mechanic are featured in the NTSB's safety video, "Airplane Misrigging: Lessons Learned from a Close Call," which is available on the NTSB's safety videos web page at <http://www.ntsb.gov/safety/safety-alerts/Pages/Safety-Videos.aspx>.

it responded abnormally and crashed. The elevator control cables were installed incorrectly such that the elevator moved in the direction opposite to that commanded. (*ERA14LA015*)

- In July 2014, the pilot of a Piper PA-12 airplane was fatally injured after his airplane pitched up steeply during takeoff and crashed after the airplane had undergone extensive maintenance. The elevator control cables were installed incorrectly such that the elevator moved in the direction opposite to that commanded. (*ANC14FA050*)

What can maintenance personnel do?

- Become familiar with the normal directional movement of the controls and surfaces before disassembling the systems. It is easier to recognize “abnormal” if you are very familiar with what “normal” looks like.
- Carefully follow manufacturers’ instructions to ensure that the work is completed as specified. Always refer to up-to-date instructions and manuals—including airworthiness directives, maintenance alerts, special airworthiness information bulletins, and unapproved parts notifications—when performing a task.
- Be aware that some maintenance information, especially for older airplanes, may be nonspecific. Ask questions of another qualified person if something is unfamiliar.
- Remember that well-meaning, motivated, experienced technicians can make mistakes: fatigue, distraction, stress, complacency, and pressure to get the job done are some common factors that can lead to human errors. Learn about and adhere to sound risk management practices to help prevent common errors.
- Ensure that the aircraft owner or pilot is thoroughly briefed about the work that has been performed. This may prompt them to thoroughly check the system during preflight or help them successfully troubleshoot if an in-flight problem occurs.

Interested in more information?

The reports for the accidents referenced in this safety alert are accessible by NTSB accident number from the Accident Database and Synopses web page at <http://www.nts.gov/layouts/ntsb.aviation/index.aspx>.² Each accident’s public docket is accessible from the NTSB’s Docket Management System web page at <http://dms.nts.gov/pubdms/>.

Education and training are critical to improving GA safety. The Federal Aviation Administration (FAA) Safety Team (FAASafetyTeam) provides access to online training courses, seminars, and webinars to provide mechanics with recurrent training that focuses on accident and incident causal factors, special emphasis items, and regulatory issues. The courses listed below (and many others), as well as seminar and webinar information, can be accessed from the FAASafetyTeam website at www.faasafety.gov. (Course access requires login through an existing free FAASafetyTeam account or creating a new one.)

- *Dirty Dozen: Human Error in Aircraft Maintenance*
- *Human Factors Primer for Aviation Mechanics*
- *Failure to Follow Procedures: Installation*
- *Failure to Follow Procedures: Inspections*
- *Aircraft Maintenance Documentation for AMTs*
- *Fatigue Countermeasure Training*

“Aviation Maintenance Technician Handbook—General” (FAA-H-8083-30) includes an “Addendum/Human Factors,” which discusses the human factors-related conditions behind most maintenance errors. The addendum (which is also called chapter 14) can be accessed from the FAA’s website at www.faa.gov.

“Acceptable Methods, Techniques, and Practices—Aircraft Inspection and Repair” (FAA Advisory Circular 43-13-1B) contains a Personal Minimums Checklist in chapter 13 that lists actions to reduce maintenance errors.

Aircraft Safety Alerts, including airworthiness directives, maintenance alerts, special airworthiness information bulletins, and unapproved parts notifications, can be accessed from www.faa.gov/aircraft/safety/alerts.

²Less-recent fatal accidents that may also be of interest are *CHI05FA038*, *CHI08MA270*, and *DCA03MA002*.

This NTSB safety alert and others can be accessed from the NTSB's Safety Alerts web page at <http://www.ntsb.gov/safety/safety-alerts/Pages/default.aspx> or searched from the NTSB home page at <http://www.ntsb.gov/Pages/default.aspx>.

NTSB Safety Alert, NATIONAL TRANSPORTATION SAFETY BOARD

Pilots: Perform Advanced Preflight After Maintenance

Be vigilant for flight control and trim anomalies

The problem

- In-flight emergencies, accidents, and deaths have occurred after pilots flew aircraft with incorrectly rigged flight control or trim systems.
- Four such mishaps within a 2-year span share common safety issues:
 - Maintenance personnel who serviced or checked the systems did not recognize that the control or trim surfaces were moving in the wrong direction.
 - Pilots who flew the airplanes did not detect the control anomalies during their preflight checks.
- In many cases, although maintenance personnel made mistakes, the pilots could have prevented the accidents by performing thorough or advanced preflight checks.

Related incident and accidents:

- In December 2014, the pilot of a Cessna T182T airplane experienced extreme nose-down control forces on the yoke shortly after takeoff. The airplane had just undergone maintenance on the elevator trim system, and the mechanic briefed the pilot about the work before the flight. Both the pilot and the pilot-certificated passenger needed to pull hard aft on the yoke to prevent the airplane from pitching down, even though the elevator pitch trim indicator showed a nearly full nose-up trim position. The pilot remembered that work had been done on the elevator trim system, and he thought that there might be some kind of control-reversal problem. While maneuvering for the emergency landing, the pilot applied nose-down trim control inputs and found that the extreme control forces lessened, and he successfully landed the airplane. The elevator trim control cables were misrigged such that the elevator trim control was reversed. The airplane's checklist for the exterior inspection of the empennage during preflight included "Trim Tab—CHECK security." (*CEN15IA079*)¹
- In October 2013, the private pilot and passenger in a Piper PA-22 received serious injuries when the airplane crashed during takeoff on its first flight since an annual inspection in which frayed elevator control cables were replaced. During the takeoff roll, when the pilot applied forward stick controls to raise the tail, the tail did not rise, and the airplane instead "jumped" off the runway. The pilot reduced engine power and attempted to control the airplane's pitch, but the airplane responded abnormally and crashed. The elevator control cables were installed incorrectly such that the elevator moved in the direction opposite to that commanded. The pilot's preflight check of the airplane was also inadequate. (*ERA14LA015*)
- In July 2014, the pilot of a Piper PA-12 airplane was fatally injured after his airplane pitched up steeply during takeoff and crashed. The investigation found that the elevator control cables were installed incorrectly such that the elevator moved in the direction opposite to that commanded. The preflight checklist for the airplane required the pilot to verify that the flight controls were free and correct. (*ANC14FA050*)
- In May 2013, the pilot of a Schweizer SGS 2-33A glider received serious injuries after the glider crashed due to improper rigging of the rudder control cables. The glider had just received an annual inspection, and its rudder had been removed and reinstalled. If the pilot had conducted a thorough preflight inspection, he should have been able to detect that the rudder control cables were rigged incorrectly. (*ERA13LA229*)

¹ These pilots and the mechanic are featured in the NTSB's safety video, "Airplane Misrigging: Lessons Learned from a Close Call," which is available on the NTSB's *safety videos web page* at <http://www.ntsb.gov/safety/safety-alerts/Pages/Safety-Videos.aspx>.

What can pilots do?

- Become familiar with the normal directional movement of the flight controls and trim surfaces of the aircraft you fly before it undergoes maintenance. It is easier to recognize “abnormal” if you are already very familiar with what “normal” looks like.
- After maintenance, check systems more thoroughly than the normal preflight checklist implies. For example, if a preflight checklist states, “Trim—Set Take-off,” verify not only the trim setting but also proper directional travel.
- Be prepared to abort the takeoff if something does not seem right.
- Avoid interruptions and distractions during your preflight inspection to ensure that you do not skip or misevaluate the items you are checking.
- If you suspect that there is a problem with a flight control or trim system, ask qualified maintenance personnel to inspect the aircraft. Do not attempt to perform such work yourself if you are not appropriately qualified, certificated, and authorized to do so.

Interested in more information?

The accident reports for each accident summarized in this safety alert can be searched by accident number from the NTSB’s Aviation Accident Database web page at http://www.nts.gov/_layouts/ntsb.aviation/index.aspx.² Each accident’s public docket is available on the NTSB’s Accident Dockets web page at <http://dms.nts.gov/pubdms/>.

The Federal Aviation Administration (FAA) Safety Team (FAASTeam) pamphlet, “*Advanced Preflight*,” (FAA-M-001) provides guidance to help pilots develop the necessary knowledge and techniques to reduce the risk of undetected maintenance problems, including how to:

- Conduct a complete review of maintenance-related records and data
- Develop an “additional items checklist” to be used in conjunction with the aircraft’s preflight checklist

The pamphlet can be accessed (without login) from the FAASTeam website at http://www.faa.gov/gslac/ALC/libview_normal.aspx?id=63083.

The FAA’s “*Pilot’s Handbook of Aeronautical Knowledge*” (FAA-H-8083-25A) discusses aeronautical decision-making and risk management in *chapter 17*. It provides basic tools to help pilots assess risk and manage it in a positive manner; proper preflight inspections are an important part of risk management and risk intervention. The “*Risk Management Handbook*” (FAA-H-8083-2) provides a more in-depth discussion of risk management principles. Both handbooks can be accessed from the FAA’s website at www.faa.gov.

An online article in *Flight Training* (an Aircraft Owners and Pilots Association publication), “*How to Preflight an Airplane: Understanding How is as Important as Actually Doing It*,” provides tips on checking controls and other items. It is available at <http://flighttraining.aopa.org/students/presolo/skills/howtopreflight.html>.

An online article, “*Things You Miss on Preflight*,” provides several anecdotes about preflight-related mishaps. Originally from *Aviation Safety* magazine, it can be found at http://www.avweb.com/news/redundant/preflight_pilot_airplane_flight_nts Inspection_207_912-091.html.

Related regulations:

- Title 14 *Code of Federal Regulations* (CFR) 91.7 states, in part, that “the pilot in command of a civil aircraft is responsible for determining whether that aircraft is in condition for safe flight.”
- Title 14 CFR 91.407 states, in part, that: “No person may operate any aircraft that has undergone maintenance . . . unless . . . it has been approved for return to service.” Also, “no person may carry any person (other than crewmembers) in an aircraft” that has undergone certain maintenance until the aircraft has received an operational check flight that is logged in the aircraft records.

This NTSB safety alert and others can be accessed from the NTSB’s Safety Alerts web page at <http://www.nts.gov/safety/safety-alerts/Pages/default.aspx> or searched from the NTSB home page at <http://www.nts.gov/Pages/default.aspx>.

²Less-recent fatal accidents that may also be of interest are *CHI05FA038*, *CHI08MA270*, and *DCA03MA002*.

Mastering Mountain Flying

Training is essential for mountain flying safety

The problem

- Pilots with limited or no training in mountain flying can be surprised about their aircraft's different performance at high density altitude, often leading to serious or fatal accidents.
- Wind and other weather phenomena interacting with mountainous terrain often lead unsuspecting pilots into situations that are beyond their capabilities.
- Should a crash occur, a pilot who survives the crash but does not have emergency or survival gear immediately accessible may not survive the harsh environment until rescuers are able to reach the location.

Related accidents

The NTSB has investigated numerous accidents in which limited or no training resulted in accidents in mountainous terrain.

- A pilot and two passengers of a Piper Cherokee 235 were fatally injured when trying to follow an interstate highway over a high mountain pass. Employees of the fixed base operator (FBO) at the departure airport reported that the pilot had asked about routes across the mountains. Based on the conditions at the time of the accident, the airplane's climb rate would have been reduced by more than 90 percent. It is likely that, as the pilot attempted to cross over the mountainous terrain near the pass, he raised the airplane's nose to the point that he exceeded the airplane's critical angle of attack. With the airplane's decreased performance, this led to an aerodynamic stall and loss of control. (CEN14FA328)
- A private pilot and three passengers of a Mooney M20E were fatally injured during takeoff in gusty wind conditions from an airport located at an elevation of 8,380 feet. The pilot had no prior experience flying out of the accident airport and limited experience flying in mountainous terrain. Witnesses reported that the pilot seemed confident about his ability to fly the airplane and he was not concerned with the wind conditions. As the airplane departed, the reported wind was 33 knots, gusting to 47 knots. Later review of weather data showed mountain wave activity in the area. After the airplane lifted from the runway, it crabbed into the wind, and then rose and fell repeatedly as its wings rocked, before coming to rest inverted. (CEN13FA183)
- The pilot and two passengers of a Cessna U206G were fatally injured and two passengers sustained serious injuries when the airplane collided with mountainous terrain. The pilot was transporting the passengers to a remote back country airstrip. As the airplane proceeded on the flight, ridgetops on both sides of the valley became obscured with an overcast cloud layer at 7,000 feet, and ragged clouds with mist were probably present beneath the overcast. Local pilots reported that in these types of weather conditions, numerous drainages can be similar in appearance. Radar data showed that the airplane was well short of the position reported by the pilot. Because of this, the pilot misidentified the drainage he intended to reach and instead turned into a drainage that ended in a box canyon. After impact, all communication, survival, and foul-weather gear aboard the airplane were destroyed in a postimpact fire. Although the pilot's logbook indicated that the pilot had 2,723 hours total flight time, it showed minimal back country or mountain flying experience. (SEA04GA192)

What can pilots and flight instructors do?

Through training, pilots can develop skills and techniques that will allow them to safely fly in mountainous terrain. When planning flights in mountainous terrain, pilots and flight instructors should do the following to enhance safety:

- Flight instructors should encourage their students to attend a quality mountain flying course before attempting flight in mountainous terrain or at high density altitudes.
- Pilots should consult with local flight instructors before planning a flight into mountainous terrain. Even experienced mountain pilots may not be familiar with local conditions and procedures for safe operations.
- Pilots should be aware that weather interacting with mountainous terrain can cause dangerous wind, severe turbulence, and other conditions that may be unsafe for aircraft, especially light GA aircraft.

- Pilots should consider specialized emergency and survival equipment (such as personal locator beacons in addition to a 406 emergency locator transmitter) before flying in mountainous terrain, and develop a plan for immediate access to the equipment in the event of a postaccident fire.
- FBO staff should be alert for customers who appear to be planning flight into mountainous terrain who could benefit from mountain flying instruction.

Interested in more information?

The reports for the accidents referenced in this safety alert are accessible by NTSB accident number from the Accident Database and Synopses web page at <http://www.nts.gov/layouts/ntsb.aviation/index.aspx>. Each accident's public docket is accessible from the NTSB's Docket Management System web page at <http://dms.nts.gov/pubdms/>.

For an overview of mountain flying and techniques, the Federal Aviation Administration (FAA) published *Tips on Mountain Flying* (FAA-P-8740-60). Additionally, the May/June 2012 issue of FAA Safety Briefing contains an article, *Rocky Mountain High: The Zen of Mountain Flying* that discusses both the beauty and dangers of mountain flying. The publications can be accessed from www.faa.gov.

Additionally, the Aircraft Owners and Pilots Association (AOPA) Air Safety Foundation provides a *Mountain Flying safety advisor* that highlights important considerations for mountain flying, *A Pilot's Guide to Mountain Flying* that discusses weather factors and mountain flying techniques, and the *ASF—Mountain Flying resources* web page that lists preferred routes over mountainous terrain in addition to other resources. AOPA also offers a *Mountain Flying* online course. These resources can be accessed from www.aopa.org.

The Colorado Pilots Association provides *mountain flying resources* to assist pilots when flying in Colorado. These include mountain pass locations and names, certified flight instructors, and available training. These can be accessed from <http://coloradopilots.org/>.

This NTSB safety alert and others can be accessed from the NTSB's Safety Alerts web page at <http://www.nts.gov/safety/safety-alerts/Pages/default.aspx> or searched from the NTSB home page at <http://www.nts.gov/Pages/default.aspx>.

NTSB Safety Alert, NATIONAL TRANSPORTATION SAFETY BOARD

Understanding Flight Experience

A rating alone cannot ensure safety: Training is key

The problem

- Aircraft have different flight characteristics, performance, and systems.
- Pilots may have many hours of experience, but their experience specific to the aircraft make/model and/or equipment they are flying may be limited.
- Although Federal Aviation Administration (FAA) regulations allow pilots to operate aircraft that are designated by a specific category and class, differences among different types of aircraft within the same category and class can be significant.
- Even if operating a specific type of aircraft is allowed by regulations, it does not mean the practice is safe.

Related accidents

The NTSB has investigated many accidents in which pilots who met the minimum Federal requirements for flight ultimately did not have adequate experience and/or training in the aircraft they were flying to operate it safely or to deal with an inflight emergency. The following accident summaries illustrate some common—and preventable—accident scenarios:

- A 15,150-hour airline transport pilot was fatally injured after losing control of a recently purchased Beechcraft KingAir B200GT airplane shortly after departure. The pilot had previously flown another similar model airplane and obtained about 5,075 hours, but the airplane was slightly older and had a different avionics package; the accident airplane's avionics and flight management system were new to the pilot. During a ferry flight just before the accident, a passenger who was also a pilot was pointing out the avionics features of the new airplane. Due to the pilot's unfamiliarity with the avionics, he allowed the airplane to slow and then descend into a house during departure. (CEN13FA326)

- A 16,000-hour airline transport pilot was conducting the Phase I flight test of the experimental Mustang II tailwheel airplane and lost directional control. He had 2,130 hours in single-engine airplanes, and 10 hours in the make and model airplane. He had accrued 6 hours in tailwheel-configured airplanes in the 3 months before the accident. Although the pilot had thousands of flight hours, his lack of experience in the accident airplane made him more susceptible to losing control of the airplane. (CEN10LA255)
- During a water landing in a Quest Aircraft Company Kodiak 100, a 1,650-hour commercial pilot, with 550 hours in seaplanes and 232 hours in the accident airplane lost directional control. The pilot had completed one 180-degree step turn during her initial training, but she had not performed any during her inter-agency pilot evaluation/qualification check even though it was required. If the pilot had received thorough training in performing step turns in the accident make and model airplane, she would have been less likely to lose control of the airplane. (ANC12GA114)
- A private pilot was fatally injured following a loss of engine power from a Cessna P337H airplane's rear engine. The pilot had obtained a private pilot certificate in 1998 and, over the next 15 years, accrued minimal flight experience, with a total flight time leading up to the accident of 118 hours. About 1 month before the accident, he obtained a multiengine rating. His total multiengine time was 40 hours, with 18 hours in the accident airplane; only 3 hours were acting as pilot-in-command. The pilot's extended absence from flying, minimal total flight time, and limited experience in high-performance multiengine airplanes made him more vulnerable to errors when addressing the loss of engine power. (WPR13FA289)

What can pilots do?

- Obtain the necessary training from a flight instructor experienced in the aircraft that you plan to fly so that you understand the flight characteristics and emergency procedures for that aircraft. Meeting the minimum requirements does not mean that you are proficient.
- Obtain refresher training if you have not flown for a long period; long periods of no flying, even for high-time pilots, can have an adverse impact on your ability to respond to unusual situations and emergencies.
- Seek out a qualified test pilot to assist in flight testing homebuilt aircraft you are not familiar with.
- Seek out instruction for advanced avionics and systems. Identical make-and-model aircraft can have considerably different cockpit panels.

Interested in more information?

The reports for the accidents referenced in this safety alert are accessible by NTSB accident number from the NTSB's Accident Database & Synopses web page at http://www.ntsb.gov/_layouts/ntsb.aviation/index.aspx. Each accident's public docket is accessible from the NTSB's Docket Management System web page at <http://dms.ntsb.gov/pubdms/>.

The Aircraft Owners and Pilots Association (AOPA) Air Safety Institute, a division of AOPA Foundation, offers an online educational course, *Transitioning to Other Airplanes*, that provides information about transitioning to different airplanes and avionics. This course and other safety resources can be accessed from <https://www.aopa.org/Pilot-Resources/Air-Safety-Institute>. (Course access requires creation of a free account.)

A *Personal Minimums Checklist* can be a helpful tool in assessing your capabilities and determining your readiness for flight. This information can be accessed through the FAA's website at www.faa.gov.

"*Beyond the Buttons: Mastering Our Marvelous Flying Machines*" published by *FAA Aviation News* (March/April 2007), contains valuable resources and information related to the multiple considerations pilots must take into account when moving to glass cockpit displays. This information can also be accessed through the FAA's website at www.faa.gov.

In 2012, the NTSB published a study titled, *The Safety Of Experimental Amateur-Built Aircraft*, that led to recommendations related to flight testing experience and using a second qualified pilot during aircraft testing. Additionally, the NTSB published a study in 2010 titled, *Introduction of Glass Cockpit Avionics into Light Aircraft*, that led to recommendations related to pilot knowledge of aircraft equipment operations and malfunctions. These studies can also be accessed through the NTSB's website at <http://www.ntsb.gov/safety/safety-studies/Pages/SafetyStudies.aspx>.

This NTSB safety alert and others can be accessed from the NTSB's Safety Alerts web page at <http://www.ntsb.gov/safety/safety-alerts/Pages/default.aspx> or searched from the NTSB home page at <http://www.ntsb.gov/Pages/default.aspx>.

Senator AYOTTE. Thank you very much, Mr. Hart.

And now I would like to call on Captain Chesley Sullenberger. Captain Sullenberger is an aviation safety expert and was captain of Flight 1549 who was able to land on the Hudson. And so, we're happy to have you here, Captain.

**STATEMENT OF CHESLEY B. "SULLY" SULLENBERGER III,
AVIATION SAFETY EXPERT AND CAPTAIN OF FLIGHT 1549,
THE LANDING ON THE HUDSON**

Captain SULLENBERGER. Chairman Ayotte, Ranking Member Cantwell, other members of the Committee, it's my great honor to appear before this subcommittee.

As the airline pilot, as the professional pilot here, I'm someone who has had 20,000 hours of flying time, much of that as Part 121 jet captain time. Along with my first officer, Jeff Skiles, who is also here, I was in the cockpit of an airliner when we faced, suddenly, an ultimate challenge. I'm uniquely qualified to tell you exactly how important pilot experience is, and why we must not compromise it.

I deeply understand what's at stake in questions of aviation safety. As you consider this FAA reauthorization bill, I want to say it's critical that you maintain the requirements, and that you not weaken them, that you not give further credits for beyond what has already been allowed. Because, you see, I've seen firsthand the real costs, the human costs, of not having adequate levels of safety. And no one knows better than that than the families of the victims of the Continental connection Colgan Air Flight 3407 crash in Buffalo, New York, on February 12, 2009, killing all 49 people aboard and one person on the ground. It was a terrible tragedy that resulted from the performance of the crew and safety deficiencies. But, even more concerning, the National Transportation Safety Board investigation into this crash revealed that these deficiencies reflected a systemic problem among regional carriers. It confirmed that the airline industry has a two-class system, where major airlines reflect the gold standard, while some regional airlines take shortcuts to save money wherever they can, often potentially negatively impacting safety in their seemingly endless race to the bottom.

These families have advocated for improved safety measures. And, in the 111th Congress, in the passage of the Airline Safety and Federal Aviation Administration Extension Act of 2010, Congress got it right. One of the most important elements of this Act was the establishment of the AT&P—ATP as a 1,500-hour standard for airline pilots. And yet, just 2 years since the safety standard went into effect, airline lobbyists are trying to weaken the provision, because they consider it to be inconvenient.

Let me correct the historical record. Let me correct some of the misstatements that have recently been made. It has only been in recent years that we have done something different in the airline industry, or parts of it, than we have done for the half-century prior to that. For much of the history of commercial aviation, pilot applicants often had several thousand hours of flying time before

being considered to be an airline pilot. It has only been more recently that airlines, in their race to the bottom, have begun to recruit pilots with near the minimum experience.

It's also important to note that there isn't a pilot shortage. So, let me say that again. There is no pilot shortage in this country. What there is, is a shortage of sufficient working conditions and wages at certain carriers to attract the most qualified applicants in the large numbers that they sometimes need.

We have heard some of the others on the other side talk about how the pilot licensing statistics have changed. What we are seeing is statistics uncorrelated in a basis of fact. What we're seeing are people talking about changes in pilot applications, and not making a differentiation between recreational pilots and professional pilots.

We also hear people talking about loss of air service to certain areas of the country. Again, let me give those here a history lesson on the history of the airline industry. Over the years, public companies, for a variety of business reasons totally unrelated to pilot supply, have changed levels of service around the country. Let me give you just a few examples from my own personal experience.

American Airlines has reduced service to Raleigh-Durham, to Nashville; Northwest reduced service to Memphis; Delta reduced service to Cincinnati; United reduced service to Cleveland. All these business decisions had nothing to do with pilot supply.

And even if there are some carriers who are having a hard time recruiting sufficient numbers of experienced pilots that they need, let me give you an analogy. If, for example, in parts of the country, we were having a hard time recruiting enough physicians to serve rural areas, would we then advocate having a 1-year or 2-year medical degree? Of course we would not.

Those who say that we must have quality or quantity are posing a false dichotomy. Of course, we must, we can, we need to have both. Every pilot who sits in a pilot seat needs to be a fully qualified pilot, not an apprentice, not someone undergoing on-the-job training. They must be capable, at a moment's notice, of being the absolute master of every part of the airplane in every possible situation.

So, I'd ask you, please do not allow those who are calling for concessions to enable them to continue to try to use an obviously broken economic model. Hold fast. There are no shortcuts to pilot experience. There are no shortcuts to safety. The flying public demands nothing less.

Thank you.

[The prepared statement of Captain Sullenberger follows:]

PREPARED STATEMENT OF CHESLEY B. "SULLY" SULLENBERGER III

Thank you, Chairman Thune, Ranking Member Nelson, Chair Ayotte, Ranking Member Cantwell, and other members of the Committee. It is my great honor to appear today before the Subcommittee on Aviation Operations, Safety, and Security.

I have dedicated my entire adult life to aviation safety. I have served as a pilot for more than 40 years, logging more than 20,000 hours of flight experience. In fact, just last month marked the 48th anniversary of my first flying lesson. I have served as an airline check airman (flight instructor) and accident investigator, and continue to serve as an aviation safety expert.

And on January 15, 2009, I was the Captain on U.S. Airways Flight 1549, which has been called the "Miracle on the Hudson." On that flight, multiple bird strikes caused both engines to fail and, in concert with my crew, including of course our

First Officer Jeffrey Skiles, I conducted an emergency landing on the Hudson River saving the lives of all 155 people aboard. And Jeff is with us today in the hearing room. Jeff, I could not have had a better colleague that day or since.

I saw the birds just 100 seconds after takeoff, about two seconds before we hit them. We were traveling at 316 feet per second, and there was not enough time or distance to maneuver a jet airliner away from them. When they struck and damaged both engines, we had just 208 seconds to do something we had never trained for, and get it right the first time.

The fact that we landed a commercial airliner on the Hudson River with no engines and no fatalities was not a miracle, however. It was the result of teamwork, skill, in-depth knowledge, and the kind of judgment that comes only from experience.

As a result of all of this, I deeply understand what is at stake in questions of aviation safety; and I am uniquely qualified to talk about what works, what doesn't, and why it is so important that we get these rules right. The traveling public, whose lives we literally hold in our hands, deserves and expects nothing less.

I appear before you today knowing that the airline industry has their lobbyists and trade associations, but the traveling public does not. I consider it my professional responsibility and my personal duty to be an advocate for the safety of all air travelers. And as you consider the FAA Reauthorization Bill, I want to say it is critical that you maintain the requirement that newly hired commercial pilots—at both major and regional airlines—have an Airline Transport Pilot (ATP) certificate and a minimum of 1,500 hours of flight experience, as Congress has mandated in Public Law. Public safety absolutely demands it.

There are some who seek to roll back this requirement. They want to weaken it by allowing more credits for some non-flying activities or hours spent in flight school simulation to be counted as a substitute for real-world experience. They also claim that this safety standard is causing a pilot shortage among regional carriers and restricting flights to smaller cities.

They could not be more wrong. There are no shortcuts to experience. There is no shortcut to safety. The standards are the standards because they are necessary.

There are some in the industry who look upon safety improvements as a burden and a cost when they should be looking at them as the only way to keep their promise to do the very best they can to keep their passengers safe.

As airline professionals, aviation regulators, and legislators, we must have the integrity and courage to reject the merely expedient and the barely adequate as not good enough. We must not allow profit motives to undermine our clear obligation to do what is right to ensure public safety. And I assure you that public safety demands that every newly hired pilot have a minimum of 1,500 hours of flying experience before they are entrusted with protecting the lives of the traveling public.

I have seen first-hand the real costs—the human costs—of having inadequate levels of safety. These are costs that no family should ever have to bear. And no one knows this better than the families here with us today. These are some of the families of the victims of Continental Connection/Colgan Air Flight 3407, a regional flight from Newark, NJ, which crashed on approach to Buffalo, NY, on February 12, 2009, killing all 49 people onboard and one person on the ground.

It was a terrible tragedy that resulted from the performance of the crew and safety deficiencies. But even more concerning, the Federal investigation into this crash revealed that these safety deficiencies reflected a systemic problem among some regional carriers that lacked the robust safety systems of major airlines.

This investigation confirmed what many of us know: that we have a two-class system in the airline industry. Major airlines reflect the gold-standard in best practices, training, and safety management programs while some regional airlines, in a race to the bottom that they seem to be winning, take shortcuts to save money wherever they can, often potentially negatively impacting safety.

Early this year, my wife, Lorrie, and I visited the site of the crash in Buffalo and met with the families of the victims, many of whom—in the wake of these findings, went to Capitol Hill, to advocate for improved safety measures. Knocking on doors at major Federal agencies and meeting with hundreds of people, including President Obama, their goal was to strengthen safety rules on behalf of all members of the traveling public because they didn't want anyone else to ever again pay the terrible price they did for lapses in regional airline safety. Against insurmountable odds, they succeeded—inspiring an overwhelming number of the 111th Congress to pass the Airline Safety and Federal Aviation Administration Extension Act of 2010. Every member of the flying public owes them a debt of gratitude. We also owe you, the members of Congress, our thanks for getting this right.

One of the most important elements of this Act was the establishment of the 1,500-hour standard for airline pilots. Yet just two years since this safety standard

went into effect, airline lobbyists are trying to weaken the provision because they consider it a burden or cost.

With the immediacy of that 2009 tragedy having passed, they also are appealing to new members of Congress and staffers who may not remember the Buffalo crash. Putting self-interest over public safety, they are trying to gain your support in rolling back the essential progress that has been made for airline safety.

Some lobbyists would like you to significantly roll back the 1,500-hour minimum. Short of that, they want the FAA to allow simulator and academic training hours to count toward meeting the 1,500-hour minimum. They see this as an easier, more convenient, less expensive path to getting young pilots into regional airline cockpits.

But there are no shortcuts to experience. There is no shortcut to safety. The standards are the standards because they are necessary.

Throughout the entire 112-year history of powered flight, one thing has been true. The most important safety device in any airliner is a well-trained, experienced pilot. That is even more true today, especially as we transition from my generation of pilots to the next. We must make sure that each generation of pilots has the same well learned, deeply internalized fundamental flying skills, the in-depth knowledge, experience, and judgment. And that is why pilot preparation, qualifications, screening, training—and experience—are so important.

On behalf of traveling Americans, I want to thank you for the Airline Safety and Federal Aviation Administration Extension Act of 2010. You got it right, and I urge you and all members of this committee to continue to uphold these essential safety standards now and reject the claims of those who would urge you to put profits over the safety of the American people. We must all behave as if the victims of the Continental Connection/Colgan Air Flight 3407 crash are watching and judging our integrity and courage this very moment—as their families are.

I now want to more specifically address the arguments that some have made for undercutting these essential safety regulations—and why each one is wrong, dead wrong.

First, lobbyists are seeking to roll back the experience requirement that Congress wisely mandated in 2010 to protect the safety of the traveling public. This is preposterous.

Let me tell you why we cannot have pilots with less than the required experience flying passengers. Pilots with less than the required experience may only have seen one cycle of the seasons of the year as a pilot—one season of thunderstorms, one winter of ice and snow. He or she may never have had a plane de-iced before, may never have landed with a gusty crosswind exceeding 30 knots, and may never have had to land on a rainy night when the glare off a wet surface makes it difficult to tell exactly where you are. And if they received all their flight training in a warm dry climate, they may never even have flown in a cloud before! I would not want my family members in a plane operated by someone with as little experience as that, and I don't think you would either.

Some of these lobbyists go on to say there is nothing magical about the 1,500-hour standard because, to earn the hours, pilots waste their time, merely drag banners by the beach. This is a catchy sound bite but it is a big lie. In the whole country, perhaps a few hundred pilots fly banners; it is a miniscule percentage of the commercial aviation industry. There are, and always have been, good and valuable pathways to develop the experience required to fly a commercial airliner under a variety of conditions, such as flight instruction, charter and cargo operation, and corporate flying.

Those who argue to reduce the flight hours required of newly hired pilots also imply that First Officers do not need to have the same level of competence as the Captain. But it has been 80 years since the airline industry has had apprentices in the right seat of airliners. For all that time, we have had qualified pilots in both seats, and we absolutely must continue to do so. The safety systems that the industry has developed and implemented over the last twenty years are based on the assumption of two fully trained, capable and experienced pilots in the cockpit, with each pilot able to be the absolute master of the aircraft in every possible situation at every moment. The value of these practices cannot be questioned. The last fatal accident of a U.S. carrier fully adopting these practices was in November 2001. We have had fourteen years of perfect safety from major carriers employing two fully trained and most importantly, experienced, pilots. The intent of the 2010 safety language was to raise the level of safety in the regional airline industry by requiring the adoption of proven safety systems. Raising the basic requirement for pilot experience was central to this effort.

I can tell you that U.S. Airways Flight 1549 would have had a very different ending had my First Officer Jeff Skiles been a less experienced pilot. Like me, Jeff had more than 20,000 hours of flying experience when we lost the engines on that flight.

His extensive experience is what enabled him to intuitively know what he needed to do in that emergency, when the work load and time pressure were so extreme that we did not have time to talk about what had just happened and what we needed to do about it, or for me to direct his every action. If he were a relatively inexperienced pilot, we could not have had the same outcome and people likely would have died. Experience is what made the difference between death for some and life for all.

Recent events have also made tragically clear why it is so important that newly hired pilots have a minimum of 1,500 hours of flying experience. The First Officer on the Germanwings flight that crashed in the Alps last month had only about 600 hours of flying time. Under existing standards, he would not have qualified as an Air Carrier pilot in the United States and would not have been in a position to accomplish his dark and heinous act. By requiring more experience there is an opportunity to evaluate a prospective candidate over time and in many cases among several employers.

The point is this: Any reduction in today's standard reduces the time a pilot can be observed as a competent, reliable, and trustworthy person before being entrusted with the controls of a commercial airliner full of passengers. With a 1,500-hour standard, employers are able to know more about new pilots, able to have more people screening and observing them over a longer period of time, and able to make a more informed decision about whether they have proven themselves worthy of the public's trust.

When I served as a check airman (an instructor responsible for evaluating pilots) sometimes their performance would be just at the threshold of acceptable. In those cases, I would ask myself this question: When he or she is in the 14th hour of his or her duty day, flying at night in bad weather into an airport he or she has never seen before, would I want my family on that airplane? If the answer was yes, then he or she met the standard. If the answer was no, he or she did not. Those are the kinds of judgments that can only be made when there is adequate time to observe someone in an operational environment. And that is the kind of judgment that Congress made in mandating the ATP with 1,500 hours.

A second tactic lobbyists are using to try to weaken the standard is by suggesting that more non-flying training count toward the 1,500 hours in place of actual flying experience. Here's what's wrong with this line of thinking: Training experiences are highly scripted, highly supervised, and sterile environments where you know what is coming. Real world experiences are not. They are messy and ambiguous and you don't have anyone holding your hand every step of the way. To propose that training situations are a substitute for real world experience is like saying that studying driving in a classroom is the same as having driven on a busy highway in inclement weather. There is just no substitute for real world experience.

Third, lobbyists who want to weaken today's safety standards say that they are creating a pilot shortage because regional carriers cannot find enough qualified applicants. They also say that the 1,500-hour requirement is threatening air service to small communities and imposing an economic hardship. The implication is that you should reduce the safety requirement so that they can hire less qualified applicants.

This flies in the face of logic. Would we allow some airlines to buy jet fuel that is below specification because it was too inconvenient or costly to buy jet fuel that fully met all the critical safety standards? Would we allow some airlines to under-insure because they didn't want to pay so much for insurance? If there were not enough doctors to serve rural areas, would we advocate a two-year medical degree? Why would we ever allow less qualified pilots to serve small communities? Are the lives of those from rural areas worth less than passengers in large cities?

People traveling to small communities deserve to be no less safe than people traveling to large cities. They must not be forced to entrust their lives to less experienced pilots, or airlines that make smaller investments in training or safety management programs than those serving metropolitan areas.

What is really going on is this: There is not a pilot shortage, but there is a shortage of pilots willing to enter, or continue employment in, the airline industry under the current economic model. The standard for entry to the airline cockpit is rightly a high bar and requires significant personal and financial investment to achieve the standards necessary to serve and protect the safety of the traveling public. Currently the rewards of an airline career don't match the investment required. This in turn makes other careers—in and outside of aviation—more attractive, exacerbating airline pilot recruitment.

Worse yet, this untenable economic model turns away the best and brightest at the door when they are first considering a career in aviation. Like doctors, pilots make a significant financial investment in their education and training, in some

cases upwards of \$200,000; and like doctors, they should see a career path worthy of that investment.

A doctors, however, only hold one life in their hands at any given moment. As the tragedy of the Germanwings accident shows, pilots hold the responsibility for many more. Passengers entrust their lives to pilots. Why would they not expect the same training and professional experience from their pilot as they would from their surgeon? The First Officer of the ill-fated Continental Connection/Colgan Air Flight 3407 earned \$16,400 a year before taxes, clearly an unbelievably low salary for someone who literally holds the lives of their passengers in their hands.

Traditionally an airline career has attracted applicants with experience well in excess of even today's minimum required hours. In fact, pilots applying for a job with a commercial airline would typically have had several thousand hours of flight experience. Only recently have some regional carriers lowered their experience requirements to meet the dictates of an unsustainable economic model. As Gordon Bethune, former CEO of Continental Airlines said, "You can make a pizza so cheap, nobody will eat it. You can make an airline so cheap, nobody will fly it."

Since the regional airline industry has insisted on trying to use this broken economic model, they have created their own problems. We must not lower the required standards to enable them to continue to do so.

It is not in anyone's best interest—not regional airlines, not major airlines, and certainly not the traveling public—to have the aviation industry lower commonsense safety requirements to meet an unsupportable business model.

Regional carriers often compete on the basis of cost to be the affiliate of major airlines. Let me tell you what that means to you as a passenger: It means you are flying on the lowest bidder. Would you want your surgeon to be the lowest bidder? But there is no shortcut to safety. That is what FAA minimums have been designed to ensure. And since many operators have lowered their standards to the FAA minimum, we must make sure that those minimum standards are genuinely adequate to protect our passengers.

Quality vs. quantity is a false dichotomy. When it comes to airline safety, we need not and must not choose between quality and quantity, because we can and must have both. There are existing methods for pilots to get the requisite experience. There always have been. And since the 1,500-hour standard has been put in effect, flight schools, regional airlines and major airlines have been working together to create a true career path that benefits the industry and most importantly, the traveling public. This is being accomplished by creating partnerships between aviation training academies and regional carriers such as the career program at the aptly named ATP Flight School where a beginning pilot is interviewed and provisionally hired by a regional carrier early in their career. Once an airline makes an offer of employment the pilot continues on at the flight school as a flight instructor building time and experience while training the next generation of pilots to enter the field. The regional carrier even contributes financially to the pilot's education, and most importantly, the prospective airline pilot can be observed, evaluated, and nurtured while they attain the required flight time necessary for a restricted ATP.

The second piece of the pathway is Flow Through agreements between regional carriers and major airlines allowing pilots from the regional to matriculate upwards to a major airline cockpit. Today a person considering a career in aviation can see a defined path forward worthy of the necessary personal and financial investment.

The industry has created these healthy pathways—not in spite of the 1,500-hour standard—but because of it. It allows airlines the time to make good judgments regarding the skills and temperament of a pilot that are good for both pilots' career and for the safety of the traveling public.

Finally, as aviation has become safer, some people seem to think that being a pilot has become an easier job, requiring less skill, knowledge, training, experience, and judgment. Nothing could be further from the truth.

In spite of how commonplace air travel is today, we must never forget that what we are actually doing is pushing a tube filled with people through the upper atmosphere, seven or eight miles above the earth, traveling at 80 percent of the speed of sound, in a hostile environment with outside air pressure one-quarter that on the ground, and outside temperatures to 70 degrees below zero; and we must return it safely to the surface every time.

Professional pilots make it look easy but it's not. It's hard. If it were easy, anyone, everyone could do it. And that is just not the case. It takes deeply internalized well-learned fundamental skills, in-depth knowledge, and the kind of judgment that comes only from experience.

When pilots enter this noble profession that I consider a calling, they make a tacit promise to all their future passengers that they will keep them safe. And every air-

line executive, every aviation regulator, every legislator who oversees aviation should feel the same obligation and keep that same promise.

Honoring that promise requires us to acknowledge that there are no shortcuts to experience. There is no shortcut to safety. The standards are the standards because they are necessary. And, the traveling public deserves and expects one level of safety: not one level for major airlines, and another for regional airlines.

I urge you to stand with me in showing the right judgment by upholding the 1,500-hour standard for the safety of all Americans.

Thank you.

Senator AYOTTE. Thank you, Captain.

And I would now like to call on Ms. Faye Malarkey Black. Miss Black is the Interim President of the Regional Airline Association. Ms. Black?

**STATEMENT OF FAYE MALARKEY BLACK, INTERIM
PRESIDENT, REGIONAL AIRLINE ASSOCIATION**

Ms. BLACK. Thank you, Chair Ayotte, Ranking Member Cantwell, and members of the Subcommittee.

Regional airlines safely carried about 157 million passengers last year, operating just under half the Nation's passenger flights. We serve 623 airports; and, at 394 of those, we provide the only source of scheduled air service. Regional airlines have made continuing voluntary advancements in safety, and have implemented or enhanced important safety programs that, in fact, are now universal across the major regional airline sector. These include gold-standard Safety Management Systems, like FOQA, AQP, and the Aviation Safety Action Program, to name a few. In fact, the most holistic safety innovation has been the ongoing implementation of SMS, which, as Ms. Gilligan reflects, ultimately focuses in an organization's entire culture around safety. This defines the modern regional airline.

As this committee knows well, Federal regulations enacted in the past 6 years have brought about additional improvements. Among these is the First Officer Qualification Rule requiring airline first officers to hold an ATP. To be clear, this rule has provided a framework to introduce enhanced training and knowledge for pilots. It has carried many safety benefits. However, we do continue to express concern over the narrow provision requiring airline first officers to amass 1,500 hours in flight before flying in Part 121. Historically, regional airlines hired qualified pilots upon completion of an academic aviation program, or shortly thereafter. Now there is a gap in the path of pilot development, with pilots forced to suspend their training at a critical juncture to spend time building hours.

Most pilots build this time in unstructured environments. This is generally not time spent flying under instrument flight rules. This is not time spent in inclement weather conditions. It's not time spent managing complex avionics or learning to work as part of a team of professional crewmembers.

In fact, airlines are discovering that pilots with these backgrounds face great difficulty adapting to structured airline operations. Since the rule was implemented, airlines have needed to screen far more applicants just to find pilots who met their—who meet their own strict internal criteria. One of our airlines, for ex-

ample, seeking to hire 800 pilots, successfully attracted 2,700 applicants. Of those, just 400 met the airline's own internal criteria.

Overall, carriers report a diminishing quality of applicants, given the forced time-building culture, with skills deteriorating over time. One airline put it this way, "We waste a lot of time in training breaking bad habits pilots acquire while trying to quickly get to 1,500 hours."

A University of North Dakota study, paper under review, highlighted these concerns, comparing pilots hired before the rule with those hired after. The results show pilots hired after the rule had a significantly higher number of total flight hours, but were more likely to need additional training and less likely to successfully complete training than those hired before the rule. Far from wishing to weaken these important safety measures, our objective is to strengthen first-officer qualifications and provide for even better pilot training.

Regional airlines will continue to do our part. We've already offered wage increases, signing bonuses, enhanced flowthroughs, and bridge programs. Airlines will continue adjusting training programs and expending additional resources to ensure that all new-hire pilots have the skills to move from training into the ranks of qualified and competent line pilots.

We can prevent the unintended consequences that have developed by placing pilots from accredited and structured training programs into the professional ranks sooner, in a thoughtful and intentional way. We are committed to enhancing the post-hire environment in a way that ensures the highest level of safety.

In addition to the unintended hiring consequences we're seeing, airlines are reporting new constraints on flying. Without pilots to operate all equipment, airlines will be forced to up-gauge while parking smaller aircraft. As this committee knows well, smaller aircraft are needed for smaller communities. The impacts already seen are just the beginning.

Before I close, I'd like to discuss compensation. The marketplace, and, to a great extent, collective bargaining, determine pilot pay. We are seeing the marketplace react with significant signing bonuses for new-hires that are increasing compensation throughout the sector. However, most regional airline wages are governed by collective bargaining agreements. These determine how existing salary resources are allocated among senior and entry-level pilots.

Overall, regional airline wages have been increasing, but the problem with the availability and the quality of new pilot candidates persists. We are proud that regional airlines have contributed in important and in central ways to the extraordinarily safe industry that we are today. We're grateful for the steady oversight of this committee toward that end, and all of its members. And I thank you for the opportunity to participate today.

Thank you.

[The prepared statement of Ms. Black follows:]

PREPARED STATEMENT OF FAYE MALARKEY BLACK, INTERIM PRESIDENT,
REGIONAL AIRLINE ASSOCIATION**Opening statement**

Good afternoon, Chairwoman Ayotte, Ranking member Cantwell and Members of the Subcommittee. Thank you for the invitation to testify at this hearing. I'm Faye Malarkey Black, Interim President of the Regional Airline Association (RAA).

Regional airlines carried about 157 million passengers and served 623 U.S. airports last year. At 394 airports, 223 in the 48 contiguous states, regional airlines provide the only source of scheduled air service. Regional airlines operate 46 percent of the Nation's passenger flights. I am proud that the safety of passengers and employees is the number one priority of the RAA's member airlines—every day, and on every single flight. The RAA's member airlines are constantly working to evolve and advance safety.

Regional Airline Safety Commitment

Safety has progressed significantly for all airlines in the past decade, and regional airlines have remained on the leading edge in this effort. Much of the advancement in safety has been associated with the continued implementation of specific programs and the proactive implementation of safety management systems (SMS) in advance of FAA rulemaking. All of the RAA's part 121 member airlines have fully implemented Aviation Safety Action Programs (ASAP) safety reporting programs, which are designed to bring forward information to allow airlines to learn from incidents or errors in an effort to prevent occurrence or reoccurrence. Flight data monitoring and analysis programs, referred to as FOQA, are also in place at nearly all the RAA member airlines, and provide a powerful window into flight operations through aircraft data.

The most important aspect of these programs is that the collected data is used in a meaningful and proactive manner to manage risk. To facilitate use of the data, there are sophisticated systems in place that promote the sharing of this safety information for the purpose of continuously improving aviation safety. Programs like the Aviation Safety Information Analysis and Sharing (ASIAS) system enable participants to understand and incorporate the lessons learned through numerous voluntary programs, creating an enriched, industry-wide safety culture supported by statistically significant data. This extensive repository of information collected from airline voluntary safety programs allows airlines to monitor and collaborate on known risk, evaluate the effectiveness of risk mitigation efforts, and detect emerging hazards. Today, regional airlines represent over 40 percent of the ASIAS participants and provide nearly 50 percent of the data analyzed.

Moreover, many regional airlines have implemented Advanced Qualification Programs (AQP) that further enhance safety. With the goal of achieving the highest possible standard of individual and crew performance, these programs rely on multiple data sources, including ASAP and FOQA, to tailor airline training to be responsive to changes in aircraft technology, operations, and mitigations of any identified hazards. The RAA member airlines are also represented on the Commercial Aviation Safety Team (CAST) and implement the comprehensive Safety Enhancements developed to continue reducing the commercial aviation fatality rate in the United States. Additionally, the RAA's members successfully complete a number of independent safety audits that are designed to evaluate the operational management and control systems of an airline. In conjunction with internal evaluations, rigorous independent safety audits are an element of safety management which subjects airline operations to a systematic, critical evaluation. These audits determine whether system processes comply with regulatory requirements, whether they are implemented effectively, and whether they are suitable to achieve expected results.

Perhaps the most holistic safety innovation has been the ongoing implementation of SMS, which combines numerous safety elements into a cohesive company-wide system to proactively manage risk. While it includes such programs already mentioned, like ASAP and FOQA, SMS is far broader. SMS ultimately focuses an organization's culture around safety. Policies, processes, systems, and culture combine to instill safety and the objective to minimize risk as a core business value. This, SMS, defines the modern regional airline. Most of the RAA members proactively implemented SMS as part of a voluntary FAA pilot program in advance of the new rule, putting the regional sector in a safety leadership role.

There are many other specific areas of focus for regional airlines, including studies and programs to address pilot fatigue, innovations to reduce the risks during approach and landing, and a host of other initiatives. For example, the regional airline industry has provided key support and funding for an independent, four-phased study, conducted by Washington State University, on the topic of pilot fatigue.

While the science supporting duty start time is well established, there was a void in the science with respect to the type of multi-segment operations typical to regional airlines. Seeking to fill that science gap, the RAA and WSU launched the Fatigue Study by comparing fatigue experienced by pilots in a duty day with multiple take-offs and landings against a duty day of equal duration with a single take-off and landing.

Each of these programs and initiatives independently, as well as how they function together as a single enterprise system that governs all operational areas, illustrates the tremendous progress and continuous improvement the industry has made toward advancing airline safety. These programs are the fundamental reason the United States enjoys the safest air transportation system in the world.

Impact of First Officer Qualification (FOQ) regulations on Pilot Workforce and Training

As this Committee knows well, Federal regulations enacted in the past six years, alongside industry initiatives, have brought about additional, important improvements in aviation safety. In 2010, President Obama signed into law the Airline Safety and FAA Extension Act, which contained a number of provisions of which this committee is well aware. One of the notable rulemakings involved the requirement for airline first officers to possess an Airline Transport Pilot (ATP) certificate, and 1500 hours in flight, with some credit awarded to military and academic structured training, in order to fly in FAR Part 121 operations. Formerly, the ATP requirement only applied to airline captains.

The RAA believes that rulemaking, implemented in 2013, has provided a framework to introduce enhanced knowledge and training for pilots entering the cockpits of our airliners. The RAA agrees with the safety enhancing rationale behind the rule, and strongly support changes such as requiring pilots to undergo training in specific airline conditions, like high-altitude and severe-weather operations, and a requirement that a pilot spend 50 hours “in class of airplane” time. The RAA also supported the requirement that first officers in 121 operations hold an aircraft type rating. These are just some of the examples of the ways this rule has meaningfully advanced safety.

Moreover, the experience we have obtained since implementation has provided us useful insights into how to evolve FOQ further, focusing on the unintended consequences the regional airlines are experiencing under the rule. As we examine that process, we continue to voice our deep concern over a specific element of the FOQ provision requiring pilots to amass 1500 hours of flight time before FAA recognizes them as being qualified airline first officers. Our job as professionals in this industry is to promote continuous learning and improvement in all aspects of training and operations. Although we believe the rule has carried many benefits, we have identified areas that will benefit from continued enhancements to the rule. In particular, regional airlines are experiencing unintended consequences from a requirement of 1500 hours of flight time for first officers. To be sure this is a contentious issue, but it need not be. We believe we can all agree that the training, knowledge, and skills required under FOQ are beneficial to safety. And we believe, as professionals, that this industry—both airlines and the FAA—have continually approached challenges collaboratively with facts and professional observations. And we have always been willing to adapt to improve safety. Again, to be perfectly clear—the FOQ rule and the opportunity to enhance it is a safety issue for all of us, as is reversing the unintended negative impacts the rule has had on pilot supply.

To that end, I want to discuss our observations related to the unintended consequences of FOQ. And I know that anything labeled “unintended” will not be taken lightly in this room—safety is intentional and anything that is “unintended” must be carefully examined. As we do that, I know that any changes must be well thought-out and part of a package, which, as a whole, further advances safety.

The stated intent of Congress in modifying the requirements for pilots who fly in part 121 operations was to “ensure that all pilots entering air carrier operations have a background of training and experience that will allow them to adapt to a complex, multi-crew environment in a variety of operating conditions.” However, the reality is that the regional airlines are struggling to fill new hire classes with pilots whose experience contains the background consistent with the intended requirement. The FOQ provision has had far-reaching, unintended consequences. Frankly, the FOQ places an emphasis on flight-time that favors candidates who have amassed 1500 hours over candidates who have undertaken academic pathways through their piloting career but have not amassed 1500 hours. This has changed the quality of the candidate pool considerably. Those candidates with 1500 hours may not have a structured training background at all, and those candidates coming from structured training programs are now forced to build “unstructured” hours

after graduating. The process of building hours takes significant time, and that time away from training is noticeable to airlines evaluating new hires' training performance.

Historically, regional airlines hired qualified pilots directly upon completion of an academic aviation program or shortly thereafter. We know that this has changed—such pilots must gain either 1000 or 1250 hours, based on their academic qualifications—and military pilots must gain 750 hours. These provisions of FOO focus on the value of such structured training programs. An unintended consequence of the 1500-hour provision—even with credit for hours from academic credentials—is a substantial gap in the path of pilot development, between graduation and qualification for employment.

Instead, graduates from university programs seeking a career as an airline pilot are now forced to suspend their training at a very critical juncture in order to spend one or more years building hours, potentially at their own, significant expense. Most of these pilots build time in unstructured environments, which do not provide for the development of skills relevant to a commercial airline pilot. For example, a pilot might work as a crop duster or power/pipe line patroller for hundreds of hours. This is generally not time spent flying under instrument flight rules, in inclement weather conditions, managing complex avionics, or learning to work as part of a team of professional crewmembers.

Other pilots seek to build time by working as flight instructors, although, naturally, flight instructor positions will diminish as fewer students enter the pilot pipeline. Nonetheless, flight instructing has been a traditional path for working toward an airline career, offering valuable benefits such as learning leadership and communications skills. However, the new rule has now created an unintended problem with this path. Pilots are now required to work so many additional hours as instructors that the benefits of doing so are outweighed by negative impacts. These negative impacts are neither theoretical nor insignificant. Rather, they go to the heart of a person's development as a professional pilot. In particular, experience has shown that there is a point of diminishing value as flight instructors surpass many hundreds of hours of instruction. Instructors become increasingly removed in time from focusing on their own skill development, have less opportunity to fly, and the flights they make tend to be the same flight repeated hundreds of times.

The growing pilot shortage has implications for the quality of pilot candidates

According to the FAA's U.S. Civil Airman Statistics, between 1978 and 2014, a reduction of 24 percent in active pilot certificates took place. Additionally, fewer students are entering the pipeline. In 1978, student pilot certificates accounted for 26 percent of the total certificates held. But in 2009, this number dropped to just 12 percent. Following an FAA rule lengthening the period of time before student certificates expire, the percent of total increased to 20 percent, without necessarily introducing new student pilots to the mix. Consequently, there have been fewer original certificates issued. From 2009 to 2013, there was a 10 percent reduction in original student pilot certificates issued, a 21 percent reduction in original private certificates issued, and a 28 percent reduction in original commercial pilot certificates issued. When compared to 1990, these reductions are considerably more dramatic with 44 percent fewer original student pilot certificates issued, 62 percent fewer original private certificates issued, and 47 percent fewer original commercial pilot certificates issued. Furthermore, surveys of academic aviation program students indicate that only about half of these certificate holders intend to pursue a career as an airline pilot.

What's more, according to a recently-released RAND Corporation report (Air Transport Pilot Supply and Demand: Current State and Effects of Recent Legislation, March 2015) 45 percent of new Commercial Certificates are issued to foreign students. Finally, Airline qualified pilots are aging: Since 2009, the number of certified pilots (private/commercial/ATP) older than 59 has increased more than 8 percent. Certified pilots aged 20–59 (private/commercial/ATP) are not increasing at the same rate, in fact, conversely to the 60+ group, there are 14.7 percent fewer pilots aged 20–59 in 2014 than in 2009.

The new hours-building element of the first officer requirements contributes further, and significantly, to this growing pilot shortage by dramatically increasing education costs and interrupting the structured path for future airline pilots. Aviation students no longer have a direct path to becoming an airline pilot; they must first overcome years of uncertainty as they work to build hours. This creates a barrier of entry for recent graduates of highly-regarded academic and structured training programs and promotes movement to other industries. This new career uncertainty will undoubtedly discourage potential aviators from pursuing airline pilot ca-

reers. Universities have reported that many pilots are simply leaving the career path before they finish school, seeing no financial way to bridge the gap in flight time to a career with a commercial carrier—regional or otherwise.

Amidst this challenging recruiting environment, airlines are seeing another discouraging trend in newly-hired pilots; fewer and fewer new hires have recent piloting experience as flight instructors, military pilots, pilots for other airlines, or flying in 91/135 operations. A recent survey of the RAA member airlines revealed that the percentage of new hire pilots most recently employed as flight instructors dropped from 40 percent in 2013 to 32 percent in 2015. In April 2015 alone, 38 percent of new hires had recent experience other than the aforementioned (typically most successful in training) occupations. An additional noteworthy outcome from this survey is that 17 percent of pilots hired since January 2013 were most recently employed at other regional airlines. This last point highlights a lack of new pilots in the pipeline.

Although the regional airline industry has redoubled its recruiting efforts, offered substantial signing and retention bonuses, and implemented and strengthened existing pipeline programs with the country's best universities, this fact remains: the number of pilots qualified for hire has shrunk dramatically as airline industry demand for pilots continues to rise. Furthermore, not all of these remaining pilots can meet individual airline hiring requirements or make it through airline training programs.

Demand, coupled with the changed criteria emphasizing 1500 hours of flying time, has also caused different types of candidates to seek employment with regional airlines. These pilots may have flown recreationally for years, with no or limited commercial experience, but they meet the 1500 hour requirement. These candidates are among the roster of ATP holders listed, and some have suggested that these pilots, who meet the flight-hour requirements, should be able to fill pilot vacancies. Experience has shown that this is not often the case.

Unintended Training Outcomes

Airlines are discovering that pilots with backgrounds comprised predominantly by hours of unstructured flying face great difficulty adapting to structured airline operations, and the washout rate, an industry term for the failure of candidates to pass airlines' initial screening processes, has been disappointingly high for these candidates.

The RAA's member airlines are highly selective about the candidates they put through their training programs, which require strong skills and airmanship. Unfortunately, the new rule is limiting access to the best and most proficient aviators. Airlines have observed, since FOQ implementation, a distinct change in the percentage of those applying and interviewed versus those hired for pilot jobs. By this I mean, we are screening far more applicants to find pilots qualified for the job. Of course, we will not change our high standards in the face of these challenges. One of our airlines has shared its story publicly: seeking to hire 800 candidates, the airline successfully attracted 2,700 applicants. Of those applicants, only 400 met the airline's own rigorous requirements.

Airlines' high evaluation standards are also reflected in training failure rates, which have increased, despite enhanced training protocols that regional airlines have put in place since the 1500 hour provision went into effect. One airline reports a three-month period where not one first officer candidate was able to successfully complete training at the airline.

Moreover, carriers report an overall degradation in the quality of applicants, citing the forced time-building culture has offered no merits other than hours in a log book, and noting the very real concern of skills slowly deteriorating over time, with bad habits developing. Some pilots who spent time in unstructured flying environments seem to have regressed in their instrument flying skills. The RAA member airlines have had to expand training in order to bring pilots who have been away from their training "up to speed." One member airline put it this way: "proficiency remains a concern, as pilots are spending more time building low-quality time and have to be re-trained on procedures they learned in the solid aviation program they attended. Our training programs are more than capable of bringing them up to speed, but it does require more effort from the pilots and instructors as valuable proficiency is lost in low-quality flight environments." Another notes, "We waste a lot of time in training breaking bad habits acquired during time spent trying to quickly get the 1,500 hours."

We believe all of this reflects the unintended consequence of the 1,500 hours provision, with its focus on accumulated flight time. Of course, our member airlines have upheld safety despite this additional challenge, and have redoubled efforts to counter this observed regression in proficiency by incorporating additional training

sessions for new hires, and, in some cases expanding initial operating experience with a check pilot.

In addition to these shared stories, our airlines are participating in ongoing data collection and research on pilot sourcing and performance. In order to test whether or not the FOQ ruling improved the quality of first officers flying for part 121 carriers as intended, a University of North Dakota study (paper currently under review) at a regional carrier compared pilots hired prior to the FOQ ruling with those hired after the FOQ ruling. The study compared 232 pilots hired from 2005–2008 with 184 pilots hired from August 2013–November 2014.

The pilots were compared in three areas: Total Flight Hours, Training Completion and Extra Training Events. The results of the study show that, while pilots hired after the FOQ ruling had a significantly higher number of total flight hours, that group was more likely to need additional training and less likely to successfully complete training than those who were hired prior to FOQ. The average total flight hours of a new hire pilot pre-FOQ were 1,654 and post-FOQ were 3,095. Prior to FOQ, nine percent of new hire pilots required extra training events; following the rule, that percentage had more than tripled, with 33 percent of post FOQ new hires requiring extra training. Additionally, prior to the rule, four percent of new hire pilots failed to complete training; and following the rule, ten percent of new hires failed to complete training. Although more research is needed, the study illustrates some of the unintended consequences of the FOQ ruling.

Enhancing the Pathway to Pilot Safety and Proficiency

It is imperative that the traveling public, from the smallest communities to the largest, have confidence that they are flying with a well-trained and proficient crew. It is also important that regional airlines feel confident about our hiring pool so that we can continue to provide safe service to communities large and small. Safety and training experts within the airline industry must continue to innovate and to suggest ways to enhance the training experience for our crews. Our experience since the implementation of the FOQ can inform meaningful dialogue for adaptation and change.

We believe the pathway to becoming a professional aviator works best when it allows for a seamless transition between top-notch professional aviation programs and the rigorous training programs offered by regional airlines. But the building of a professional aviator goes further still. A comprehensive approach to all aspects of a pilot career—from the time he or she first dreams about flying, until a captain's retirement flight—is needed. And mechanisms to ensure quality, promote professionalism, and assess, adapt, and evolve training based on real data will serve us well.

The RAA is working on a number of major initiatives and suggesting others that we believe are needed to ensure that the goal of putting the best possible pilots into the control seats is truly met. These initiatives are mutually dependent and constitute a comprehensive approach to the pilot training pathway. The intent is to strengthen FOQ and provide for even better pilot training. We want to continue to work with this Committee, the FAA, and our industry and employee partners toward solutions that can accomplish all of these goals.

Successful solutions will be multi-faceted and include commitment on many fronts. We need adjustments to eliminate that lapse of time between training and hiring by allowing for addition credits toward the 1500 hours, overcome the notion that all flying time is equally enriching, improve the quality of the new hire candidates at regional airlines, and to allow for alternate civilian pathways to a career as an airline pilot that permit airlines to hire pilots from structured training programs before they begin amassing unstructured hours.

On our part, regional airlines are striving to promote and support the airline pilot profession by showing and encouraging future aviators the career is exciting and rewarding. The RAA, our members and their stakeholders are involved in a number of different ways generating enthusiasm and passion for a career in the sky. We are involved in the Organization of Black Aerospace Professionals, Women in Aviation, the University Aviation Association, and more, and both our Association and individual members are participating in STEM outreach programs in order to help introduce youngsters to the technical fields.

Partnerships between universities and regional airline partners are critical. Those partnership are already strong, but getting stronger every day. Pilots, mechanics and other aviation leaders are visiting campuses each day to talk about their careers and to encourage and mentor young students. Regional airlines readily provide samples of their operational manuals, training curricula and even training devices to schools. By providing airline training curricula, for example, the students can be

taught from day one with the course structure and standards of professional aviators.

The RAA member airlines are also involved in professional development for professors, offering opportunities to serve on their staffs during sabbaticals, lending their own perspectives on enhancing airline training, and gaining valuable experience in the process. The RAA participates in the AABI Industry-Educator Collaboration Committee and is continuing to assist in brokering partnerships between academia and the regional industry. Regional airlines are now heavily plugged into AABI and the collegiate scene, in recruiting, internships, advisory boards, research collaboration and professional development, with regional people speaking at universities and professors spending extended periods of time at airlines.

We believe in the value of accreditation, for it sets standards jointly agreed to by both industry and academia—and it sustains those standards in periodic accreditation visits—holding such programs to a quality level that is enviable worldwide. The RAA sits on the Board of Aviation Accreditation Board International (AABI), which sets and maintains the standards for aviation university programs worldwide. AABI has always been jointly administered by both industry and academia and it has provided superb results for enhancing professional education and technical training. While accreditation is a means by which the quality of collegiate training organizations can be evaluated, providing a way to ensure compliance with appropriate standards and outcomes, we also see the value of other structured training providers working under the provisions of FAR Part 141. They, too, can provide structure, oversight and professionalism to ensure a standardized and qualified pilot who completes training. Such training providers could well be considered for inclusions into the hour-reduction provisions of FAR Part 61.160.

We must continue to define a clear career path so that those already interested in and pursuing the profession see open doors and opportunities. And most importantly, we must continue to work together to ensure that the best, most qualified pilots are flying in airline cockpits today and that airlines can hire from pools of the best, most qualified pilots who have no lapse in their structured training backgrounds and who are prepared to transition into the complex environment of a commercial airline.

Regional airlines will continue to do our part. We have established self-help measures currently in place, such as stepped up recruiting efforts, wage increases, signing bonuses, flow-through and bridge programs. Our member airlines have built ground-breaking professional pathway programs and continue to build others with their mainline partners. The RAA encourages and promotes such pathways, for, like any profession, a defined path goes far in facilitating career entry to aspiring professionals and the families who are contemplating funding their training.

Airlines will have to continue adjusting training programs, extending training footprints, and expending additional resources to ensure that all cadres of new hire pilots have the knowledge, skills, and abilities to move from training into the ranks of qualified, competent, and proficient line pilots. The additional training resources dedicated by airlines today are often to no avail and result in training failures (washouts) when new hire pilots cannot meet the airline's standards. Instead, these resources could be dedicated to an alternate pathway that guarantees the creation of a highly-qualified new pilot.

We would like to work collaboratively with lawmakers, regulators, and stakeholders to develop a comprehensive pilot training pathway that truly enhances safety.

Our job as professionals in aviation is to continue to focus on the best training and the timing of that training. By continuing to refine FOQ and to consider the enhancements we suggest, we can prevent the unintended consequences that have developed in the past few years by placing pilots from accredited and structured programs into the professional ranks sooner, in a very thoughtful and intentional way. And, as we continue to ask for an evaluation of the hour requirement for accredited and structured programs, we want you to know that we are committed, as an industry, to enhancing the post-hiring environment in a way that ensures the highest levels of safety.

An Additional Unintended Consequence is Air Service

Although we wish to speak primarily about unintended training consequences of the 1500 hours provision of the FOQ rule, the Committee has asked us to address another unintended consequence of the rule, which is unfortunately, already becoming well-known by many communities.

The expected wave of pilot retirements at the mainline carriers is formidable, with cumulative retirements projected at more than 16,000 between now and 2022. To offer perspective, the full contingent of pilots in the regional aviation workforce

numbers less than 18,000. (Air Carrier Financial statements recorded by Bureau of Transportation Statistics, Form 41, Schedule P-10, latest available CY2013). The network carriers will continue to find the best and brightest pilots working at regional airlines. This is how the professional pilot pathway is supposed to work and represents a natural career progression. However, given such high industry attrition, if the commercial airline pilot pool remains static and a comprehensive pilot training pathway is not restored, implications for small community air service could be far-reaching.

According to industry analyst Bill Swelbar, Executive Vice President for InterVISTAS Consulting, if the commercial airline pilot pool remains fixed over time, the regional airline industry will shrink to 20 percent of its present-day self within a decade. Swelbar further observes that with 302 70-seat aircraft on order, the industry would need to park about 569 units just to staff this larger equipment. Facing a scarcity of pilots, many regional airlines will be forced to up-gauge to larger equipment in order to ration their flying and stay in business. As this committee knows, these smaller jets and turboprop aircraft predominantly serve small and medium-sized communities. Without sufficient pilots to operate all of an airlines' equipment, smaller communities across the Nation will unquestionably lose air service. This air service represents a key economic driver by providing direct and indirect jobs for Americans as well as ensuring the connectivity needed to remain competitive.

While some stakeholders have referred to this as "tomorrow's problem," here are some examples of the 1500 hours provision playing out on small community air service today, with carriers reporting new constraints on every area of the flying schedules.

- One airline has reduced flights scheduled and block hours year-over-year by approximately 20–25 percent.
- Another airline reports being 15–20 percent short on pilots, leaving revenue flights uncovered every day.
- Other airlines have not yet changed schedules, but have needed to cancel individual flights due to lack of crew.
- One airline reports no ability to cover sick calls or spare aircraft protection, given limited crew resources.
- Many airlines expect peak seasons to present particular difficulty.
- All regional airlines report that recruiting efforts are becoming substantially more difficult.
- Several regional airlines have already collectively grounded more than 100 regional aircraft, and have announced plans to remove many additional aircraft in the next 12–18 months, in part due to insufficient pilot availability that meet their stringent, internal hiring criteria.
- Another airline was formerly serving 64 cities, but today serves just 32—due to an inability to staff their former schedule with qualified pilots.

These examples stretch on; these are just a few. And the consequences are not limited to just the airlines and communities they serve. As industry analysts predict, some airlines have changed their fleet plans to account for fewer pilots already, others are still evaluating long-term fleet plans. Some airlines are simply in "growth hold mode" for now, despite plentiful new service opportunities, because they cannot hire sufficient pilots. Airlines have even begun to pull management and training pilots from their regular duties to fulfill revenue flying, and the cascading effects have impacted training throughput and focus on management initiatives. The effects on small and medium-sized communities across America have been articulated in the statistics, too. It is clear that small-town America is losing its connectivity. In 2004, 862 U.S. airports had scheduled domestic departures. In 2014, only 642 airports had scheduled domestic departures, marking a 25.5 percent reduction in airports served. (T-100 Domestic Segment U.S. Carriers). Overall, since 2004, there has been a 19 percent reduction in domestic passenger departures performed.

And of course, even as pressures mount on small community air service, no new communities may be added to the Essential Air Service roles under the current statute in the event a community loses air service altogether. And, among current EAS communities, the dearth of Air Transport Pilots resulting from the rule change has pushed some existing Essential Air Service communities into single-engine aircraft that are operated in the program only by exemption from a multi-engine requirement—a requirement imposed in EAS statutes because multi-engine aircraft offer redundancy in case of engine failure. Because single-engine aircraft do not require the pilot-in-command to hold an Air Transport Pilot certificate, and multi-engine

aircraft do, the new rule creates an incentive for airlines to down-gauge service from multi-engine to single-engine aircraft.

Pilot Wages

Before I close, I want to discuss pilot compensation. The marketplace and, to a great extent, collective bargaining, determines pilot pay. We are seeing the marketplace react in a number of areas, with significant signing bonuses for new hires that, effectively, are increasing compensation throughout the sector.

Generally, influences on pilot pay scales include position (captain, first officer), seniority, the revenue potential of the aircraft and market, passenger price sensitivity, structured fee-for-departure agreements with major airline partners, and other external constraints. Notably, most regional airline wages are governed by collective bargaining agreements. Unions negotiate and then ratify these agreements on behalf of all their members, including first officers. Collective bargaining agreements determine how existing salary resources are allocated among senior and entry-level pilots, often favoring higher pay for captains at the expense of lower pay for first officers. For example, in some cases, pilot groups have rejected tentative labor agreements that would have improved first officer wages or enhanced flow-up to a major airline.

It is typical at both regional and network airlines to see wages for first officers in their first year notably lower than subsequent years. At regional airlines, on average, first officer pay increases 32 percent between year one and year two, and on average 52 percent by year five. Additionally, in year one, regional airlines make additional, significant financial investments in a new hires, providing airline systems and safety training, which represents an investment of between \$25,000–35,000 per pilot—during the first year. Notably, this training is portable; the pilot will use it for the duration of his or her career. Finally, elements of total compensation that should not be dismissed include retirement benefits and 401K matching, medical benefits, and profit sharing.

More to the point, most regional airline salaries have already been increasing, and many airlines have offered significant signing bonuses, yet, the problem persists. One regional airline has offered industry-leading wages—wages that are higher than some mainline counterparts—but nonetheless reports difficulty in attracting qualified candidates. Even after instituting these dramatic pay increases, the carrier is not fully filling new hire classes.

The RAA Supports the Swift Implementation of a Comprehensive Pilot Records Database

This Committee has worked hard to drive improvements to pilot recordkeeping, and the RAA thanks the Chair, the Ranking Member, and the Committee for its interest in the pilot records database issue. The RAA strongly supports Section 203 of the Airlines Safety and FAA Extension Act of 2010 (Pub.L. 111–216), which directs the FAA to establish a comprehensive pilot database. The Association urges the Committee to continue its oversight of, and support and encouragement for, the creation of a comprehensive pilot records database.

The RAA has long supported this initiative. In fact, the RAA requested that FAA create a single, integrated database of pilot records in the summer of 2009. The RAA stands ready to assist on this effort and stands as a resource as we urge FAA to safely and swiftly implement this important safety tool.

Conclusion

Regional airlines have continually embraced the industry-wide focus on raising the safety bar and have seen considerable advancement in recent years. We are proud that regional airlines have contributed in important and essential ways to the extraordinarily safe industry we are today. We are grateful for the steady oversight and contributions this Committee has made to partner with us toward that end.

Thank you for the opportunity to testify today.

Senator AYOTTE. Thank you, Ms. Black.

And we will now hear from Mr. Mark Baker, President and CEO of the Aircraft Owners and Pilots Association.

Mr. Baker.

**STATEMENT OF MARK BAKER, PRESIDENT AND CEO,
AIRCRAFT OWNERS AND PILOTS ASSOCIATION**

Mr. BAKER. Thank you, Chairman Ayotte, Ranking Member Cantwell, members of the Subcommittee. And thank you for inviting me here today.

As mentioned, my name is Mark Baker, and I'm President and CEO of the Aircraft Owners and Pilots Association, a not-for-profit individual organization representing over 350,000 general aviation aircraft owners and pilots.

My testimony today will make three key points: first, that general aviation is a national asset which is struggling partly as a result of an overly prescriptive regulatory environment; second, general aviation safety has improved significantly, and can improve further if industry and government work together; and third, general aviation is at a critical juncture where regulatory and certification changes, medical reform, and grassroots efforts can strengthen this important industry.

In 2013, general aviation, or GA, produced \$219 billion in economic output and support of 1.1 million American jobs. But, GA has experienced a significant decline in recent years, losing an average of 6,000 pilots per year. At the same time, the number of single-engine piston aircraft produced in the U.S. has fallen dramatically, from 14,000 in 1978 to just 700 in 2014. AOPA and others are working to reverse this trend, but we need the support of Congress to create an environment that fosters growth.

GA safety has dramatically improved in recent decades. We strongly believe it will continue to improve through education and technology, rather than more stringent government policies and regulations.

Sixty-two percent of GA accidents result from three causes: loss of control, controlled flight into terrain, and engine failures. AOPA, along with the Air Safety Institute and government and industry partners, is working to address these causes. The AOPA Safety Institute provides free education, analysis, and research regarding GA safety.

ASI produces the Nation's premier safety report, the annual Nall Report, and offers more than 300 safety-educated products. In 2014, the ASI educational outreach exceeded 2 million interactions.

AOPA holds a leadership role on the General Aviation Joint Steering Committee, which works to improve safety through data-driven risk-reduction efforts. AOPA co-chaired the Joint Steering Committee's two most recent working groups on loss of control, and developed comprehensive safety enhancements that are being implemented by government and industry.

Changing technology has made integrating UAS drones into the flight environment increasingly important. AOPA has worked closely with the FAA to ensure that the regulations protect pilots, passengers, and bystanders. We appreciate the FAA's current regulatory efforts and, last week, provided formal comments designed to close some gaps in the proposed rulemaking. We look forward to working with FAA to address other types of UAS operations, including providing additional education for recreational UAS operators.

The AOPA and others have also recognized the need to better train and test new GA pilots. Following a multi-year industry and government project, FAA's written tests are now being reworked to ensure they are relevant in addressing knowledge and skills in risk management.

Safety can be further enhanced with better and smarter aircraft. A Cessna 172 manufactured today is, other than avionics, essentially the same airplane that was designed and produced in 1955. For good reason, Ford and Chevy no longer produce 1955 fleets. But, the costs of certification and economies of scale have slowed aircraft advancements.

Since 2008, FAA and Congress and the industry have been working to streamline and simplify Part 23 certification standards, which cover the manufacturing and alteration of aircraft. Because the average age of the general aviation fleet is now 45 years—compare that to a car that was built in 1970, before safety features like airbags and crumple zones—we must also make it easier to bring the new safety equipment into older aircraft. Although change is underway, it's moving very slowly.

General aviation is a critical point, as evidenced by the trends I have presented here. Of the utmost importance to GA's future is third-class medical reform. More than 3 years ago, AOPA and the Experimental Aircraft Association petitioned the FAA to expand a policy used successfully for more than a decade. The fact that it has taken so long for the FAA and DOT to review what is simply a limited expansion of an existing standard highlights the need to reform the FAA's procedures. To date, 100 bipartisan Members of Congress, including many of you, have recognized the need for the reform, and have cosponsored the legislation which would expand FAA's successful sport pilot medical certification standard.

I'd like to say thanks to Senators Inhofe, Manchin, Ayotte, Boozman, Casey, Daines, Donnelly, Heitkamp, King, Kirk, Fischer, Hatch, Heller, Moran, Murkowski, Rand, Roberts, Rounds, Shaheen, Sullivan, Tester, Ward, Wicker, and Wyden.

In summary, GA needs your help. We look forward to working with you on the Pilot's Bill of Rights 2 and the upcoming FAA reauthorization, both of which stand to put our industry in a much needed climb.

Thank you.

[The prepared statement of Mr. Baker follows:]

PREPARED STATEMENT OF MARK BAKER, PRESIDENT AND CEO,
AIRCRAFT OWNERS AND PILOTS ASSOCIATION

Statement Highlights

1. General Aviation (GA), a national asset, has experienced decades of decline. An aging fleet of aircraft coupled with a decreasing pilot population has put the future of GA at risk.
2. GA safety has experienced significant improvements over the past few decades but we must work together to further mitigate the known risks. Industry is leading several initiatives that have the potential to positively transform aviation safety.
3. The future of GA is at a critical juncture. Years of decline can be reversed through a right-sized regulatory environment as well as grassroots programs that lower the cost of participating in general aviation and encourage more people to become involved.

The Aircraft Owners and Pilots Association (AOPA) has more than 350,000 members nationwide. As a not-for-profit individual membership organization, AOPA's mission is to effectively represent the interests of its members as aircraft owners and pilots concerning the economy, safety, utility, and popularity of flight in general aviation (GA) aircraft.

General Aviation, a national asset, has experienced decades of decline

General aviation is a quintessentially American industry that comprises all flying outside of military and airline operations. In 2013, 255,000 full-and part-time workers were directly employed in general aviation. Including indirect, induced, and enabled impacts, general aviation, in total, supported 1.1 million jobs and \$219 billion in output. General aviation activity takes place from 5,200 public-use airports, including 3,380 that are part of the National Plan of Integrated Airport Systems and are eligible to receive Federal funding, as well as some 13,000 privately owned landing facilities.

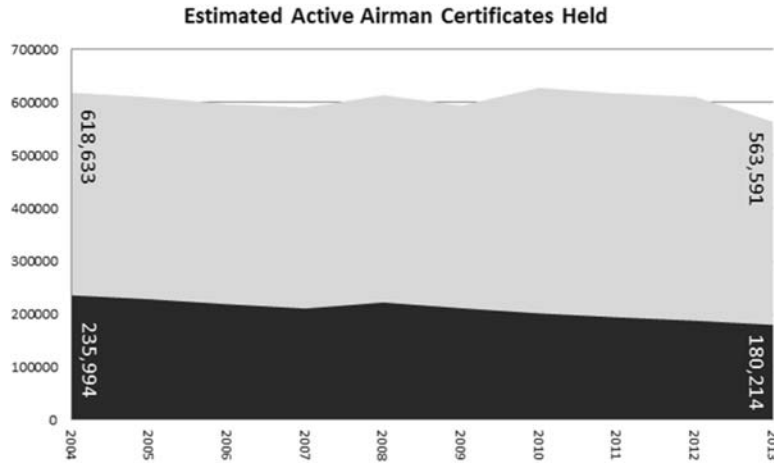
A national asset, GA must be not only protected but encouraged, promoted, and fostered. Yet, far too often, it is viewed as unsafe, only for the Nation's elite, or marred by those who operate well outside the bounds of the existing regulatory structure or even common sense. I'm here to tell you that GA is absolutely something to be enjoyed by all—people of all ages and professions, from every walk of life, background, culture, and location. But I will also tell you that we are at a critical point if we are to ensure the future health of GA.

In a 1995 Notice of Proposed Rulemaking (NPRM), the FAA published a policy statement on General Aviation. In it, the FAA Administrator recognized that the general aviation industry is a critically important part of the Nation's economy and the national transportation system. He went on to state that—

General aviation plays a crucial role in flight training for all segments of aviation and provides unique personal and recreational opportunities. It makes vital contributions to activities ranging from business aviation, to agricultural operations, to Warbird preservation, to glider and balloon flights. Accordingly, it is the policy of the FAA to foster and promote general aviation while continuing to improve its safety record. These goals are neither contradictory nor separable. They are best achieved by cooperating with the aviation community to define mutual concerns and joint efforts to accomplish objectives. We will strive to achieve the goals through voluntary compliance and methods designed to reduce the regulatory burden on general aviation.

But since that statement was made, those goals have been separated and the mandate to foster and promote general aviation no longer exists. We at AOPA and our partners in industry have since taken the baton, but we must acknowledge that the removal of the dual mandate has, inevitably, had negative consequences for our industry.

Over the past decade, the private pilot population has declined at a rate of more than 6,000 pilots per year. In 2004, the FAA estimated that there were 235,994 active private pilots. In 2013, the last year for which we have data, that number had dropped to 180,214, a reduction of more than 23 percent.



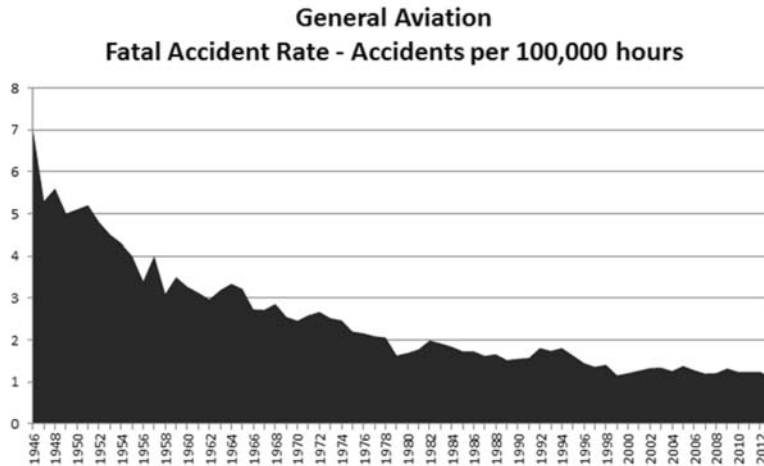
At the same time, the number of new single-engine piston-powered aircraft being produced has fallen dramatically, from 14,398 in 1978 to just 716 in 2014. As the number of new aircraft being produced has declined, the purchase price has risen steeply while the value of the aging fleet has fallen. Today, more than 81,000 of the 188,000 certified piston-powered aircraft on the FAA registry are worth \$40,000 or less, and those aircraft have a weighted average value of \$25,800, yet a new, single-engine airplane will cost a pilot in excess of \$500,000—well outside the reach of most American families.

The numbers speak for themselves but AOPA and others are working hard to turn the tide and once again grow general aviation.

Safety continues to improve

General Aviation safety continues to improve. Our community has made great strides over the past several decades, and we will continue to work collaboratively toward making our already safe system even safer.

Unfortunately, we continue to see accidents resulting from similar causes, many of which are easily preventable. We at AOPA strongly believe that GA safety has and will continue to improve through better education and technology advancements rather than as a result of more stringent government oversight, policies, or regulations.



Starting in 1940, GA had an accident rate of 7.30 fatal accidents for every 100,000 hours flown. Fast forward to 1960 and the rate was cut by more than half to 3.27 fatal accidents per 100,000 hours flown.

Although many state that the GA accident rate is stagnant, even over the past 10 years we've seen marked improvement. In the 2004 Fiscal Year, the FAA put the accident rate at 1.26 with a total of 1,617 accidents, 314 of which were fatal. In FY 2013 those numbers improved to 1.11, one of the lowest rates ever recorded, with a total of 1,299 accidents, 259 of which were fatal.

The majority of GA accidents, 62 percent, have three causes—(1) loss-of-control (LOC), (2) controlled flight into terrain (CFIT), and (3) engine failures. Loss-of-control alone accounts for more than 40 percent of the total accidents and has been a targeted focus of AOPA and our government and industry partners, including the National Transportation Safety Board, for the past several years.

We've made improvements but we must work to prevent similar accidents from occurring in the future.

AOPA's Air Safety Institute

The AOPA Air Safety Institute (ASI) serves as a resource to all pilots—not just AOPA members—by providing free safety education programs, analyzing safety data, offering the premier study of general aviation safety in the form of the annual Nall Report, and conducting safety research.

A trusted and respected resource, no other entity has the breadth and reach of the Air Safety Institute. ASI offers more than 300 online safety education products for free, including courses, videos, quizzes, and reports and works with industry and government partnerships to provide educational materials on critical topics. In 2014, ASI's educational outreach exceeded 2 million interactions with the pilot community worldwide through various channels, including online courses, accident case studies, publications, live seminars, and videos—all of which help pilots take advantage of the collective wisdom of the GA community.

General Aviation Joint Steering Committee

The General Aviation Joint Steering Committee (GAJSC) was launched in 1997 as part of the industry-government Safer Skies initiative to improve aviation safety. The program, which was revitalized in 2011, works to improve general aviation safety through data-driven risk reduction efforts that focus on education, training, and enabling the installation of new equipment in general aviation aircraft.

GAJSC participants include the Federal Aviation Administration and industry stakeholders including pilot organizations, instructors, mechanics, builders and manufacturers.

AOPA has maintained a leadership role in the GAJSC since its inception and co-chaired its two most recent working groups focused on loss-of-control accidents. Using proven and effective data-driven processes, the working groups developed comprehensive safety enhancements that are actively being implemented by both government and industry.

Harmonizing with the recent NTSB focus on loss of control, these safety enhancements have the greatest potential to prevent similar accidents from occurring in the future. Additionally, they represent a partnership between government and industry to focus our limited resources and come to an agreed upon strategy to best mitigate and manage identified risks.

Integrating Unmanned Aircraft into Our Airspace

Unmanned aircraft systems (UAS) or drones have dramatically increased in numbers in recent years. Safely integrating UAS into our airspace in ways that will not compromise manned aircraft is a critical issue now facing our community.

AOPA has worked closely with the FAA to ensure that regulations governing the operation of drones protect pilots and their passengers by adhering to key principals, including see-and-avoid requirements. The FAA's notice of proposed rule-making for small commercial UAS includes important provisions to ensure safety, including limiting aircraft to line-of-sight operations, limitations on altitude and access to airspace, pilot certification and knowledge testing requirements, and aircraft registration requirements.

AOPA appreciates the FAA's current regulatory efforts and last week provided formal comments to the proposed rule that are designed to close gaps in the NPRM. In its comments, AOPA asked the FAA to lower the maximum altitude for small commercial UAS operations from 500 feet to 400 feet to provide a small buffer between manned and unmanned operations. AOPA also asked that UAS be excluded from operating in Class G airspace near airports and that UAS meet certain equipment requirements, such as having an altimeter, in order to help operators comply with restrictions.

Taken together with the rules proposed by the FAA, AOPA believes its recommendations will help minimize the potential for conflicts between manned and unmanned aircraft. At the same time, however, much work remains to be done on the issue of UAS operations. AOPA looks forward to working with FAA to address other types of unmanned aircraft and operations, including providing additional education for the operators of recreational UAS.

Airman Certification System

Although there are many strategies and initiatives in place to better reach, educate, and inform the existing pilot community, AOPA and others recognized the need to better train and test new pilots. Often viewed as a hurdle to get over on the path to a pilot certificate, the FAA knowledge test encouraged rote memorization without a solid understanding of why the material is important and how it contributes to safety.

To act upon an Aviation Rulemaking Committee's recommendations, AOPA and industry leaders embarked on a multi-year, multi-phase project to fundamentally transform the way we train and test future pilots—creating a holistic, integrated system which links the pilot certification standards, guidance, and testing.

As a result of that process, FAA tests are currently being reworked to ensure they are relevant and meaningful to today's aviator and technology. Each new certification standard will incorporate all the knowledge a pilot must have with the skills he or she must demonstrate along with the risk management elements for each task which will give the applicant the critical tools and knowledge needed to safely manage known risks. Future pilots will clearly understand what is expected of them for any certificate or rating.

Part 23 Reform

Although we, as pilots, need to ensure our flying skills are sharp before each and every flight, we must also acknowledge that we can, and must, design and produce better, smarter aircraft. The Cessna 172 being manufactured today is, other than avionics, essentially the same airplane that was designed and produced in 1955. For good reason, Ford and Chevy are no longer producing their 1955 fleets. But the costs of certification and economies of scale have slowed aircraft design advancements and improvements.

Since 2008, the FAA, Congress, and industry have been working to streamline and simplify Part 23 certification standards, which cover the manufacturing and alteration of aircraft. Although change is under way, it is moving slowly. Last year, the FAA announced that it would not meet the deadline set by the Small Airplane Revitalization Act (SARA). SARA requires the FAA to reform and streamline Part 23 by Dec. 15, 2015.

FAA regulations with regard to the manufacture and modification of general aviation aircraft are highly prescriptive and designed to address, in exhaustive detail, very specific situations or circumstances. As a result, they offer little or no flexibility to adapt to evolving technologies and new situations.

To illustrate the complexity of these rules, note that between 1994 and 1996, approximately 800 rule changes to Part 23 were enacted. These changes largely addressed the needs of sophisticated aircraft, but simultaneously added regulatory layers to the compliance process, which increased the cost to certify a simple airplane while limiting the possibility of introducing innovations or new technologies.

In part because of the increasingly complex and expensive regulatory requirements facing manufacturers, the number of single-engine piston-powered aircraft produced in the United States each year has fallen precipitously. In 1978, U.S. manufacturers shipped 14,398 aircraft. In 2014, that number was just 716. By contrast, approximately 1,000 new experimental amateur built aircraft, which do not have to comply with Part 23 regulations, are currently being registered each year.

Because so few new aircraft are being produced each year, the majority of the general aviation fleet does, and will continue to, consist of older, legacy aircraft. In fact, the average general aviation aircraft is now 45 years old. To envision how safety technology has changed, imagine a car built in 1970, long before safety innovations like airbags, crumple zones, and backup cameras were standard equipment. To fully realize the benefits of increased safety and reduced certification costs that Part 23 reform is intended to achieve, the regulations, orders, and policies for retrofitting existing aircraft with new equipment must also be streamlined and transformed. Making modern safety equipment more widely available to the owners and operators of older aircraft will have a significant impact on safety.

While there are upgrade and modernization options available today, most require extensive and lengthy FAA approval for design, production, and installation into certified aircraft. Manufacturers must acquire these approvals for individual makes

and models of aircraft, significantly increasing the cost and reducing the availability to the consumer.

As an example of how regulatory requirements can slow the adoption of safety equipment, consider that it took nearly three years for the FAA to release a recent policy that streamlines the approval of angle of attack (AOA) indicators for existing aircraft. An AOA indicator is an important safety technology that could help reduce the number of accidents caused by loss of control. Retrofit of this technology has been slowed by the high cost, which in turn, has been largely driven by regulations.

General Aviation's Future

General aviation and its future are at a critical point, evidenced by the numbers and trends I have presented to you today. It not only provides real economic value to our Nation but also offers the unique experience of flight—an experience that brings delight to “kids” of all ages.

AOPA is pushing hard on several fronts to turn around the downward trend and, once again, start to grow general aviation.

Of the utmost importance to AOPA, our members and GA's future is third-class medical reform. In 2013, the FAA issued 99,268 third class medical certificates, down from 135,969 in 2004, which cost pilots more than \$23.5 million with little direct benefit to either aviation safety or general health.

That money and time could be better spent in ways that have proven safety benefits, including additional training and installation of safety equipment in existing aircraft. By better educating pilots on how to properly self-assess their medical fitness to fly and fostering open and honest relationships with primary care doctors, third-class medical reform will enhance aviation safety.

Under current rules, private pilots flying recreationally must undergo an exam by an FAA Aviation Medical Examiner (AME) once every five years for pilots under the age of 40 and once every two years if the pilot is 40 or older. Although virtually all medical applications are ultimately granted, thousands of applications are initially deferred for additional review each year. Affected pilots must then go through extensive testing and wait, often for months, for the FAA's Medical Branch to review and approve their applications. This process can cost pilots thousands of dollars in additional medical testing and months of time grounded while they wait. The difficult and costly process deters thousands of pilots who would ultimately be deemed medically fit to fly from even applying for a medical certificate. Many of these pilots stop flying altogether, further eroding the general aviation pilot population and our industry.

Members of Congress, including many of you in this room, recognized the need for reform and introduced legislation in both the House and Senate, known as the Pilot's Bill of Rights 2 (PBR2)—S.571/H.R. 1062—which would, among other things, expand the FAA's successful sport pilot medical certification standard so that more pilots flying more types of aircraft could take advantage of this standard which has been in place for more than a decade.

Many in the aviation community have attested that medical reform has the potential to improve safety by keeping pilots in the airplanes they are most familiar with, giving them tools to assess their fitness to fly, and fostering more honest and open interactions with their primary care physicians.

We at AOPA and our members appreciate the support Congress has given to initiate third class medical reform and we look forward to crossing the finish line together.

In addition to third class medical reform, AOPA has several initiatives to grow the pilot population and increase participation in the fun side of aviation.

We are currently building a program that will launch aircraft and pilots into the skies to carry the message of our “You Can Fly” program. Bright yellow, fully restored Cessna 152s will be piloted throughout the country by AOPA Ambassadors who will help flying clubs and schools obtain the resources they need to build new pilots and keep existing pilots engaged in aviation.

Lastly, in order to help create the next generation of scientists, aeronautical engineers, aircraft designers, and innovators, AOPA is developing a program to introduce an aviation specific science, technology, engineering, and math (STEM) curriculum into our Nation's high schools. With only 16 percent of American high school seniors proficient in mathematics and interested in a STEM career, we are doing our part to present aviation as a viable career choice.

Conclusion

In summary, I have come here today to seek your help and assistance. General Aviation and our industry need your help to right-size the regulatory environment and create one that fosters innovation, encourages participation, and inspires the

next generation of aviators while ensuring that safety remains our top priority. On behalf of the more than 350,000 members of AOPA, we appreciate your leadership and we look forward to working with you on the Pilots Bill of Rights 2, and the upcoming FAA reauthorization,—both of which stand to put our industry into a much needed climb.

Thank you for the opportunity to appear before this subcommittee.

Senator AYOTTE. Thank you, Mr. Baker.

Ms. Gilligan, I wanted to ask you for an update on the progress of the Pilot's Records Database and when that—where the initiative stands and what we can expect, in terms of it moving forward.

Ms. GILLIGAN. Thank you, Senator.

Development of this database has proven to be quite a technical challenge. We have run a proof-of-concept, so we do know, conceptually, what it is we need to do in order to meet the requirements of the bill. What we've run into is that the amount of records that the bill would have us incorporate into the single pilot database is really creating the challenge.

Many records, now and going forward, will be automated records, but the bill calls for the complete history of every pilot who is currently in the commercial system. Many of our pilots have been in the system for quite a long time, and their records are on paper or microfiche, or a number of other media that some of us may even remember, but most young people have never heard of. Figuring out how to merge all of that data has really created a challenge for us. In addition, the cost of the system is going to be something that FAA will have to look at as we go into future budget years, as well.

Having said that, I think we're making good progress on trying to understand what are those challenges. In addition to the mix of records, many of the records have personally identifiable information, which we need to assure we are protecting. Obviously, we want to build the security protections against cyber attack in—for this database. So, as we layer on all of these requirements, it has just been an extreme challenge that we and the technical folks in FAA are grappling with. We expect to have a proposal in executive review, hopefully in the near future.

Senator AYOTTE. Thank you for the update. And we look forward to, as you put that proposal together, you know, sharing what the plans are with the Committee, as well, as we put together the authorization. So—

Ms. GILLIGAN. Thank you, Senator.

Senator AYOTTE.—I appreciate it, thank you.

I wanted to also follow up with you on—you know, one of the things from the hearing we had last week on certification—and this goes to Mr. Hart, as well—one of the things that the certification process allows us to do is to ensure all the technical and procedural steps are taken with the—obviously, the airframes and everything that we need to do to make sure there's aviation safety. At the same time, one of the things we heard from stakeholders is that certification, itself, and potentially long delays of getting new equipment, can actually mean that pilots fly without the latest innovation in safety equipment. So, how—can you comment on this? And how do you approach the need to get our pilots the best tools while still ensuring that we have the adequate review of that

equipment? But, to the extent we can use technology to improve the—what our pilots are using, I think it's important that they have the best technology at their hands.

Ms. GILLIGAN. Yes, Chairman, we agree. I think Mr. Baker really hit on it. For the general aviation community, we are actively pursuing opportunities to introduce current technology into some of these older aircraft. One of the examples is the angle-of-attack indicator. It's a piece of equipment that allows a pilot to have much better situational awareness and, we believe, will dramatically reduce loss-of-control types of accidents. We worked with the community to find a way to assure that it provided the pilot with an appropriate level of safety without having to go back through the extensive certification that some of those systems have historically required. We're looking at the same approach for helicopters and rotocraft, to be able to add what we're calling non-required safety equipment. So, we don't require, by regulation, that it be on the aircraft. We agree that the level of certitude we need to provide is substantially less than we've had for required equipment. And bringing that together, I think we're going to see some good improvements.

Senator AYOTTE. Great. Thank you.

I wanted to follow up on this issue of the pilots and the pilot shortage issue, that there seems to be, obviously, a little bit of a debate here on what's driving the shortage or lack of shortage. And I also serve on the Armed Services Committee, and one of the things we've heard from, for example, the Air Force, is that they're worried that they're going to see a shortage of pilots, going forward, in terms of making sure that we can meet our needs on the military side, as well.

So, I wanted to get your thoughts, Captain, on—How do we ensure—I know many of your counterparts probably came from the military, and then, not all of them, but many of them, have gone from military to commercial, and—so, how do we deal with this issue to make sure that the junior pilots have the right training coming through and the pipeline—it seems to me that what you say on the pay issue, obviously that's something that is an important issue, but, in the interim, we've got this immediate issue that I think needs to be addressed. So, I just wanted to get your thoughts on training, on how we get that new talent pool coming in faster.

Captain SULLENBERGER. Chair, I certainly will address that. May I just say one more thing before I answer?

I have in my hand a letter written by Anthony Foxx, Secretary of Transportation, to the *Buffalo News* on March 12, about safety standards, and are they, or not, creating a pilot shortage. While I acknowledge that some view our pilot training and qualifications rules as the sole or even the principal reason for pilot shortages, I do not. We believe that low wages and the scarcity of certain types of planes are likely the most significant causes, not high safety standards. I just wanted to get that on the record.

There are, and have always been, many pathways to qualified, experienced pilots. And there continues to be. I learned to fly in high school, at the age of 16. I became an Air Force fighter pilot and served for six and a half years, and then became an airline

pilot for 30 years. Of course, that pathway still exists. But, there are fewer military pilots than there used to.

Senator AYOTTE. I'm married to a Air Force pilot, so I understand.

Captain SULLENBERGER. Yes, of course you do.

But, one of the most encouraging things that we've seen since the Airline Safety Act of 2010 was passed, since the enhancements were made, is the partnerships—the effective partnerships that have developed between aviation schools, between regional airlines and their major affiliate carriers. For example, we have guaranteed interviews with regional airlines for graduates of approved schools. We have flowthrough agreements from the regionals to the majors. So, there are clearly defined paths. We just need to make sure that, when we set standards, that they are appropriate.

As I said in my earlier remarks, historically it's quite an aberration for airlines to hire people with only a minimum amount of time. Typically, we've had thousands of hours of experience before you're considered even to be an airline pilot. So, we need to fight this false dichotomy of quality or quantity. We need to have people who have both. And there are existing ways to do that.

Senator AYOTTE. Thank you. My time is up. And I know—so I appreciate it.

Ranking Member Cantwell.

Senator CANTWELL. Thank you, Madam Chair.

And I'm going to continue, Captain Sullenberger. And I want to say, I think that your testimony guided the debate as skillfully as you guided that plane to land in the Hudson, and that is that this issue is about a broken economic model and about whether we're going to pay pilots enough money. I think that's the bottom line of your statement, is that, if you pay them, they will come, and the fact that you hit on so many of the issues that concerns me about the regional carriers who take a brand name from a major corporation, everybody thinks they're meeting the same standards as the brand. They're not. They think that they are meeting the same qualifications. They may not be. And this, to me, I think, is—we're here because some people are suggesting that we take the 1,500-hour requirement that is now required for pilots and for those who want an airline transportation pilot certificate, and reduce that. Prior to Colgan Air, we were at 250 hours. So, if you could maybe talk a little bit about why it's so important to have 1,500 hours, maybe that would help people understand. I think people are trying to say, "You know what? I've got a business model. I've got to, like, drive down my price, so I think the copilot ought to have a lot less hours." So, just tell us why that's wrongheaded.

Captain SULLENBERGER. Again, a history lesson. It has been 80 years since there were apprentices in airline cockpits. For every decade since then, we have had two fully qualified pilots in the cockpit. And let me tell you from very personal experience, for me and my first officer, Jeff Skiles, on that sudden challenge-of-a-lifetime flight to the Hudson River, had Jeff been less qualified, people would have died. Had he not been so highly qualified that, in that intense moment, where there wasn't time, in those 208 seconds we had from the time we lost thrust in the engines until we had landed, to have a conversation about what had just happened and what

we must do. I had to rely upon him, based upon his own long experience, based upon having deeply internalized these well-learned fundamental skills, having developed his own judgment and understanding of our airline system and our machines and our profession, to intuitively and immediately understand this developing situation as I did, and then know what he should do to assist me, with—I didn't have time to direct his every action. So, we were able to do something that, outside the industry, people find hard to understand. We collaborated wordlessly. That's what I'm talking about.

If Air France 447 taught us anything, is that we must have a pilot in each seat throughout the flight who is not a multicrew pilot-licensed pilot, MPL, who's not a cruise pilot, who's able to quickly and effectively intervene when things suddenly go wrong after thousands of hours of them going right. That's the challenge that we faced. How did we—what's the secret sauce? And, as I said, there are no shortcuts here. We must—we know what we must do. We just have to have the integrity and the courage to follow through and make sure that we do it.

When we don't do it, people die. It's—

Senator CANTWELL. Thank you.

Captain SULLENBERGER. It's really that simple.

Senator CANTWELL. Thank you. I don't think I could have said it better. But, I do want to point out, the same situation happened with the Colgan Air flight. A young woman was the copilot from Seattle, very little training, flew all night, I think was even sick, ended up on that flight. And, you're right—

Captain SULLENBERGER. I'll—

Senator CANTWELL.—in a disastrous moment, the pilot has to decide, the copilot has to help, and neither one of them probably were prepared enough to help in that situation.

Captain SULLENBERGER. They were not. And I'll give you specific reasons why. On the cockpit voice recorder, we hear her say that she hadn't been in these kind of icing conditions before. Colgan Air trained them on a flight simulator that was not equipped to replicate an important safety device, the activation of the stick pusher, a device that pushes their controls forward to lower the nose when they approach a stall. That obviously surprised Captain Renslow. He reacted inappropriately.

And, in terms—I wanted to follow up on one more thing, too, that was said earlier about the Regional Airline Association advocating that people with fewer hours get credit and go straight into a regional airline seat so they can continue their education, continue their on-the-job training. The captain on the Colgan Air flight was hired by Gulfstream at 600 hours, bypassing critical vetting processes at other carriers, at other jobs, leading to a career of repeated trained deficiencies and failures, and ultimately, a needless and preventable tragedy.

And, for those who say that these rules in 2010 were the result of a single crash, again, historically, not correct. There was a whole litany of regional crashes—Kirksville, Missouri, in Kentucky, and others—leading up to this. This was just the most recent, most egregious one that finally helped us to achieve the public aware-

ness and the political will to finally act to solve this series of systemic problems.

Senator CANTWELL. Thank you, Captain Sullenberger.

My time is expired, Madam Chair.

Senator AYOTTE. Thank you.

Senator Nelson.

Senator NELSON. Ms. Black, is it true that first officers on regional airlines, for a starting salary, are paid \$16,000 a year?

Ms. BLACK. According to the industry statistics that I have, the first-year first-officer wages are at an average of between \$22,000 and \$24,000 per year.

Senator NELSON. Do any regional airlines pay a starting salary of \$16,000?

Ms. BLACK. I'm not aware that they do.

Senator NELSON. Well, I've been told that they do. And I just wanted to point out that 138 percent of poverty, which makes someone eligible for Medicaid, is just a little over \$16,000 for an individual. And to think that that's who we would be putting into the right seat of the cockpit on a regional airline does not build confidence, in the traveling public.

Madam Chairman, what I want to do is let our members—I just want to ask the Captain. Birds are attracted to water, and many airports are next to water. Why don't we have more accidents with birds, which you have encountered and have become such a hero?

Captain SULLENBERGER. And, of course, Senator, that's especially true in Florida and places like that.

Senator NELSON. Correct.

Captain SULLENBERGER. As populations of birds have grown, and as the numbers of flights has increased, we are seeing increasing numbers of bird strikes. Most bird strikes involve only one or two usually small birds. Of course, what happened to us what an entirely different event. We encountered a large flock of large birds, migrating birds—Canada geese, several dozen. We saw them about 2 and a half or 3 seconds before we struck them, but clearly not enough time to avoid them. And they struck the airplane all across the leading edges of the wings, the nose, and into the center, the core, of both jet engines, damaging them, it turns out, irreparably.

It's a matter of chance, quite frankly. Most of the warnings that we get at airports are general in nature, and not particularly useful. And, of course, migratory birds can essentially be anywhere.

There are things that we can do, though. The good news is that, for resident birds, that when they roost and flock in a specific place, we can discourage them from being near airports. That's by, you know, avoiding food sources, not allowing large bodies of water, marshlands, wetlands to be near an airport, sources of food, that sort of thing.

The problem in this country is that, while we have a national air transportation system, airports typically are owned and administered locally. And so, our entire safety system for wildlife mitigation really is dependent upon local authorities having the ability to stand up to powerful interests, sometimes developers and others, who might want to put incompatible uses near airports. And that's an ongoing issue, and continues to be so, of great concern.

Senator CANTWELL [presiding]. Thank you.

Senator Wicker.

**STATEMENT OF HON. ROGER F. WICKER,
U.S. SENATOR FROM MISSISSIPPI**

Senator WICKER. Well, thank you very much.

Let me follow up on the issue of pilot training requirements. And I realize safety is paramount. But, at—a number of constituent groups out there are asking how much is enough, and how much training is—amounts to a disincentive and a hindrance to the smaller areas.

In 2013, FAA issued a final rule requiring all airline industry pilots and first officers hold Airline Transport Pilot, ATP, certificates. This requires 1,000 hours. Previously, it was 250 hours of flight time.

GAO observed that fewer students are entering pilot training programs and that other opportunities, whether overseas, in the military, or in corporate aviation, may be steering pilots away from positions with the lower-paying regional carriers.

So, Ms. Black, as a representative of the Regional Airline Association, help us understand your perspective there. Of course, realizing that safety is paramount, what types of solutions could the Federal Government, whether the FAA or Congress, implement to increase the number of pilots available for hiring by regional airlines?

Ms. BLACK. Thank you.

What I think we need to focus on is a holistic approach, really providing for the intent of getting the well-trained, proficient first officers into the cockpits of our commercial airliners. And that starts by looking at the kids when they're children, and STEM outreach. And our organization has started to do that. And, as Mr. Sullenberger reflected, some of the other things that are important are bridge programs and flowthrough programs that give a student a career—defined career path with certainty from the beginning, when he first—he or she first dreams of flight, until the retirement flight. But, what's missing right now is a seamless pathway. Certainly, the pilot certificates that the FAA are issuing are declining. There are fewer students entering. There are fewer coming out. And we are seeing that, at the regional airlines.

And now, since the rule—again, this very narrow portion of it that requires 1,500 hours in flight—this has meant that, after pilots graduate from their structured training program, that they've got to go out and build additional time. And they must do so at their own time and their own significant expense. And so, this introduces more uncertainty. And so, we think it has worsened a growing pilot shortage.

So, what we propose is to take the students earlier in their time, after they graduate from these structured training programs and build some time, and put them into the right seat of our commercial airliners.

Now, I want to be clear, this isn't education. We're not teaching them to fly. They come to us knowing how to fly. But training is ongoing. Training is ongoing at both regional airlines and mainlines. Training is constant when you upgrade on equipment. And it's done right, and it's done professionally. And regional airlines

have world-class training programs that rival that of our mainline partners.

So, we look to restore the pipeline—again, from the first flight—to provide more certainty until the pilot is placed into our well-structured airline safety and systems training programs. And we think that that will restore a great deal of career confidence for young people, looking forward.

Now, to be clear, the marketplace has to react. And we've seen that. Pilot wages are increasing. We've got one airline who has first-year signing bonuses and a retention bonus that effectively raises their starting salary to higher than some mainline airlines. And yet, that particular airline is still unable to fill its new-hire classes right now. So, when I hear that this is just an economic model, I think that economics play a role there, and that's part of it, but we need to look beyond that. We need to develop the pilot pipeline, and restore it, and keep it seamless.

Senator WICKER. OK. Well, thank you.

I only have half a minute remaining. Ms. Gilligan, I think I'll just submit a question on the record for you about the Contract Tower Program, and stress that the Senate and the House continue to strongly support the FAA Contract Tower Program on a bipartisan basis, and request you to comment on the record about any recommendations FAA may have for a reauthorization bill to ensure that this program is enhanced and protected.

Thank you, Madam Chair.

Senator AYOTTE [presiding]. Thank you, Senator Wicker. I think, certainly after our hearing last week, it's important. Many members of the Committee share their support for the Contract Tower Program, so I look forward to the answer to Senator Wicker's question. Thank you.

And now I would like to call on Senator Klobuchar.

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

Senator KLOBUCHAR. Well, thank you very much, Madam Chair. A lot of interest in the hearing. I'm pretending those are lines of people trying to get in, that you just heard. But, thank you so much.

And I also wanted to welcome the Colgan Flight 3407 people that are here today, the members of the families. We've worked with you especially on the bill on pilot fatigue.

And, Captain Sullenberger, I thought I would start with that. I want to thank you for your continued attention to improving the fatigue standards. And can you share your perspective on why we should not continue to have two levels of safety regulations for passenger and cargo planes?

Captain SULLENBERGER. Thank you, Senator. I'd be glad to address that.

Just as much as the 2010 airline safety bill was a regulatory success, the cargo carve-out, the exclusion of cargo operators from the improvements in the new fatigue rule, is as much a regulatory failure. And it's one that's hard to understand. It's one that's clearly the result of economic pressures, and not a safety argument.

We have learned, in the last decades, much about the science of fatigue. We know how predictable it is, as predictable as the sunrise and the sunset, obviously. And it results in predictable negative effects on human awareness, attention, short-term memory, performance, and judgment.

It's ironic in the extreme that the pilots who are doing the flying, that require the most protection from fatigue, are the ones who are specifically excluded from the rule. Every night, all night, and much of the day, cargo pilots share the same airspace, the same airports, with commercial passenger flights. They fly all over the whole country, over each of our houses at 2 a.m., 3 a.m., 4 a.m., 5 a.m., looking for the airport. We owe it to every American to right this wrong, to—

Senator KLOBUCHAR. Thank you so much, Captain.

And, Ms. Gilligan, is there any thought with the FAA of changing this? I know that, basically, that wasn't the case when you looked at this. But, is there any case of reconsidering this after the decision was made to exempt cargo pilots before?

Ms. GILLIGAN. Senator, we actually think there are other ways that we are expecting the cargo carriers to address the risk that's posed by fatigue. The bill itself required that all carriers, including cargo carriers, have a fatigue risk-management plan that required that the carrier look specifically at their schedules and, using the current science that we have for fatigue, determine if any elements of their schedule provided the possibility that the pilots would be fatigued. And they are required, through that plan, to address that risk.

In addition, we now have the requirement for Safety Management Systems, which is also applicable to the cargo carriers. That broader system will require that they identify whatever risks they have—in this case, the risk of fatigue.

Now, because cargo operations are very different from passenger operations and the scheduling is very different, we believe that the Safety Management Systems approach will actually assure a better level of safety for the cargo carriers. They will analyze their schedules. If any of those fall into the red, they will have to address that risk.

Senator KLOBUCHAR. OK, thank you. And, again, we'll continue to pursue this with you.

Mr. Baker, I know you touched on this in your opening statement, and I just want to let you know we—you know, Senator Murkowski and I—did the bill on the Small Airplane Revitalization Act. We're so happy it passed, signed into law. And I'm as frustrated as you are that we don't have the FAA meeting the timeline to get those rules out. They're very important. I have Cirrus in my state, as you know. And we think there are safety benefits. So, I just want you to know that we're continuing to pursue that.

I just actually had one last question that I just sort of came up with after being on a flight recently next to someone who was a little bigger than me. And I know that there has been some issues with some of the planes having smaller spaces. I guess I'd ask you, Ms. Gilligan, about this. And we have rules for space for pets, and we have no rules for space for humans. And, over the past decade, seat pitch has decreased from 34 to 28 inches, as you know. When

the FAA is testing the safety of new aircraft, does the FAA also test for a variety of seat sizes, particularly if it impacts the ability to evacuate an aircraft? And is the FAA or the Department of Transportation taking any action to examine any potential risk from limited seat sizes on commercial aircraft?

Ms. GILLIGAN. We have done research on both seat size and seat pitch. We do it based around what's called "queuing theory," the ability for people to get out quickly. We do set those standards to assure the most even flow of passengers out of the aircraft in the event of an emergency. So, any of the aircraft that are approved do meet those standards.

Senator KLOBUCHAR. And so, has there been any renewed look at this, given that it appears that there are some smaller seat sizes that we're starting to see lately?

Ms. GILLIGAN. I'm not aware that the seat sizes are smaller. Whatever is installed does meet the standards that are required to provide the appropriate level of safety for emergency evacuation. And all of those seat—

Senator KLOBUCHAR. And including the—well, we just—I guess they've changed in the last decade, so—from 34 to 28 inches.

Ms. GILLIGAN. But, each new design must be tested to assure that emergency evacuation can be accomplished.

Senator KLOBUCHAR. All right. Thank you.

Senator AYOTTE. Senator Moran.

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

Senator MORAN. Chairwoman, thank you very much.

Ms. Gilligan, the FAA's 2004 sport pilot rule allows private pilots to fly small aircraft without a third-class medical certificate under certain safety restrictions. The issue I want to explore is altitude. Is there a clearly defined safety benefit for one altitude over another? I think the theory is that pilots maybe can fly lower than the 18,000 feet that's the floor for Class A airspace. What should we know about safety, based upon ability to fly at various altitude levels?

Ms. GILLIGAN. Well, Senator, I think there are a couple of elements to that. And I'm sure Mr. Baker can expand upon it, as well. The one that you point out is that the structure within the airspace tends to separate aircraft based on the technical abilities of the aircraft. Lower airspace is not as conducive to jet operation, for example, or to commercial operations. Higher altitudes allow the aircraft to be more efficient. So, there are some elements of the airspace design that suggest separation of operations by altitude. There's also—

Senator MORAN. My question is, Can we make safety considerations different at lower altitudes because larger commercial aircraft are at—flying at higher altitudes?

Ms. GILLIGAN. Well, of course, all of the commercial aircraft pass through those lower altitudes, at least for departure and arrival. But, there are some differences that we do apply within those different airspaces, depending on exactly what the operations are that are in that environment. Is that helpful?

Senator MORAN. It's helpful, although I guess what I was trying to find is, What difference does it make whether the threshold is 14,000 feet or 18,000 feet or 10,000 feet on these safety considerations for private pilots?

Ms. GILLIGAN. One of the safety considerations is related to 10,000 feet and below, because, at those altitudes, the aircraft does not need to be pressurized. And so, you don't add the added risk that you would lose pressurization and the pilot would lose consciousness. That's separate from the airspace issue that you raised initially.

So, there are some elements of the airspace design that address safety risks, and there are some elements related to altitude that assure the pilot a little more protection from what might be a safety risk.

Senator MORAN. Thank you very much.

Mr. Baker, anything you'd like for me to know about this topic?

Mr. BAKER. Well, to be more clear about it, I think the idea that you need supplemental oxygen above 12,500 for any length of time—and supplemental oxygen can be just cannulas in your nose—to safely fly up to 18,000 feet. And then, above 18,000 feet, you're required to have a pressure mask on so there's full-on oxygen as your supplemental. You can still fly up to 27,000 or 30,000 feet with supplemental oxygen, but it's a different type of mask.

So, I don't see any safety issue, as long as you're doing what's required today, which is supplemental oxygen below 18,000 feet, pressurized or non-pressurized, as a safety issue.

Senator MORAN. OK, thank you.

Let me turn to—I want to go—let me come back to you, Mr. Baker. We're hearing about pilot shortage. What is it that AOPA and others—what can pilot schools—what are we doing to promote—when I was a kid in high school, we had Civil Air Patrol, and all of us kids got interested in Civil Air Patrol. I know it still exists. But, what is it that can be done for another generation to address some of the issues that—that get excited about flying and can address some of the issues about pilot shortage and compensation? How do we make this a career path for additional Americans?

Mr. BAKER. It's a great question. And we're testing a couple of programs now, called the You Can Fly Program, which will be—150/152 Cessnas. If you've ever been around them, that's what most people learned how to fly in—called the J-3—

Senator MORAN. I know those.

Mr. BAKER. Yes. The J-3 of our generation. And we've got a number of those in states right now. We're trying to get people actively involved in joining a flying club. But, even starting a little bit earlier in the game, working with a number of high schools, we have a program that we call STEM-A—you know, Science, Technology, Engineering, Math, and Aviation. And so, we've found some best practices that we're trying to share with educators that gets people involved in education—career decision or, frankly, if it's recreation flying, as well. But, we want to get really involved with the high school training programs and start sharing what we know what works around certain parts of the country, and then remind people that they can afford to fly with these flying clubs. It makes flying very affordable if they just want to do it for recreation, as

well. So, we look at ourselves as a role to try and reenergize general aviation.

Senator MORAN. Well, if you—your organization or others are interested, we'd love—Wichita, Kansas, other places in Kansas—to be a part of that process. If I can help encourage STEM-A and encourage people to have an interest in becoming pilots, professionally or as a hobby, a sport, for personal enjoyment, please include me in it, if there's any way I can be of assistance. And—

Captain SULLENBERGER. Senator, may I quickly add? This is—

Senator MORAN. Yes, I'm sorry.

Captain SULLENBERGER. My first officer on the Hudson flight, Jeff Skiles, and I, for 4 years immediately after our famous flight, were co-chair of the EAA Young Eagles Program, which is a worldwide program to encourage youth to be enthusiastic about flying and, in fact, to get them a first flight with a volunteer pilot, you know, to connect the dream with the reality. So, that's something we're very familiar with, and EAA Young Eagles is a big program that encourages thousands to do just that.

Senator MORAN. Captain, great to know that. And you'd have the standing, the stature that would excite young people today, and I appreciate your—

Captain SULLENBERGER. Thank you.

Senator MORAN.—interest and involvement in that program.

My time is expired.

I would only say, in concluding, Ms. Black, that the issue of reliability of air service by regional companies in my state of Kansas and, I assume, across the country, it's a serious challenge. It's hard for people to make decisions about flying a regional jet. I've been a champion of Essential Air Service since I came to Congress. There was a commitment made to many of my communities in our state, and we go out and fight, here in Congress, for the financial support of Essential Air Service, but, if we have a regional carrier that fails to provide the reliability, the reliable service—people are having a difficult time deciding whether to buy a ticket on some scheduled regional airlines, with the uncertainty of whether or not that flight is actually going to take off. And, you know, the explanation is often that there's a pilot shortage, but it sure makes it difficult for us to continue to advocate for regional service, and Essential Air Service that's a component of that, without that reliability.

Ms. BLACK. I think when we restore—may I respond?

Senator MORAN. Yes, ma'am.

Ms. BLACK. I think when we restore some certainty to the pipeline, and we can get a little bit more stability on pilot supply, a lot of those issues will be resolved. Frankly, we have one major EAS carrier that formerly served 64 communities, and is now serving 32 because it cannot staff all of its flights. That's just one example of the impact of the pilot shortage in those communities.

This is something that we're seeing—it's not just the EAS carriers, but all of our carriers. Every day, carriers are canceling revenue flights because of the pilot shortage. And we know that impacts the reliability. I'm very close to the EAS Program, and a shared advocate. And we think it is really important. We know that that ability to use the service, and to know that the flight is

going to take off when you want it to, for businesses especially, is essential. And so, I think that this is critical—this is a very critical issue for Essential Air Service.

Another issue that we have is, given the pilot supply issues, carriers are unable to even bid on those routes. So you get more and more carriers that are bidding under the Alternate EAS Program. And so, in that case, you now have carriers who aren't even required to meet the ATP regulations, fulfilling this contract flying, because the other carriers who do have to meet the ATP requirements can't fill the flying anymore.

Senator MORAN. Thank you.

Thanks, Chairman.

Senator AYOTTE. Senator Manchin.

**STATEMENT OF HON. JOE MANCHIN,
U.S. SENATOR FROM WEST VIRGINIA**

Senator MANCHIN. Thank you, Madam Chairman.

And thank all of you for being here.

And, to all the family members and those of Flight 3407, thank you for not wavering at all in trying to help us make the skies safer. So, I thank you for being here.

Let me just say this. On the Pilot's Bill of Rights, Senator Inhofe and I have introduced that, and I think, Mr. Baker, you're very familiar with that. We've been working on that for quite some time. And, you know, one of the fundamental problems we tried to fix with the original Pilot's Bill of Rights, was a flawed appeals process. So, I would just ask you, since you've been working on this so hard: are the pilots today getting a fair and unbiased review of the FAA decision in U.S. District Court?

Mr. BAKER. If I understand the question correctly, and as you know, the process of appeals through the NTSB, a number of years ago, was quite a bit worse, but has improved pretty steadily. So, I'm still concerned, and not a lawyer, that there are still some people hung up in the system and there should be some type of circuit breaker, if you will, in how we approach those kinds of legal issues. I think there's still room for more improvement.

Senator MANCHIN. Well, being a pilot, myself, I have 3,000 hours, but, my hours were accumulated, Captain, over 40-some years. So, I would ask, as far as from a safety standpoint, the time, the 1,500 hours, I don't think—I have to agree with you, I—going backward would not be a way for us to—respect for Ms. Black—I'd just agree with the direction you're going on this, from a safety standpoint. I know the decisions I've had to make over the many years, but I'm asking, Does simulator time count? Do they count simulator time toward 1500 hours?

Captain SULLENBERGER. No.

Senator MANCHIN. No simulator at all.

Captain SULLENBERGER. I think there's some credit for university experience, classroom experience.

Senator MANCHIN. OK. Does the 1,500—do you accumulate when you're a co-pilot, flying second seat? Does that accumulate?

Captain SULLENBERGER. It's—

Senator MANCHIN. Is it all pilot in command—1,500 hours pilot in command?

Captain SULLENBERGER. Go ahead.

Ms. GILLIGAN. There are some circumstances where taking the second seat can be counted as that flight time. It depends on how the aircraft is designed and certified. So, if it is certified for a two-man crew, that time does count. If it is certified for a single pilot only, even though they may have a second pilot, that time does not always—

Senator MANCHIN. Is it 1,500 hours—

Ms. GILLIGAN. I'm sorry.

Senator MANCHIN.—in the type they're flying, or just—

Ms. GILLIGAN. No.

Senator MANCHIN.—1,500 hours flying time?

Ms. GILLIGAN. You must have 1,500 hours of flight time before you can apply for the—

Senator MANCHIN. So, I could apply.

Ms. GILLIGAN.—airline transport pilot—

Senator MANCHIN. I could apply, with the hours I have.

Ms. GILLIGAN. Correct.

Senator MANCHIN. OK. I don't think you want me in the left seat right now—

[Laughter.]

Senator MANCHIN.—flying around—

Captain SULLENBERGER. You also—

Senator MANCHIN.—around the country.

Captain SULLENBERGER. You also need a type rating now.

Senator MANCHIN. Yes, a type rating, OK.

The other thing is, Is there any time period? So, a period of time—1,500 hours within what period of time?

Ms. GILLIGAN. No, sir. The rules—the—

Senator MANCHIN. So, again—

Ms. GILLIGAN.—neither the statute—

Senator MANCHIN.—I've got 3—

Ms. GILLIGAN.—nor the rule limit that.

Senator MANCHIN. I've got 3,000 hours. And if I go back and get type rating, I could—

Ms. GILLIGAN. So—the 1,500 hours qualifies you to take the airline transport pilot test, along with some additional specific training in high altitude and—

Senator MANCHIN. I gotcha.

Ms. GILLIGAN.—and weather operations that you must demonstrate that you had, as well. And then you must pass those tests. And then, if you were to be hired by the airline, you'd then receive training on the aircraft type and receive your—

Senator MANCHIN. No problem, I—

Ms. GILLIGAN.—type rating.

Senator MANCHIN.—I understand all that.

To both of you two, and I'll—Captain, I'll go to you first. I know that you're saying that there's no pilot shortage. There's people coming into the system. We'll call it "into the queue," basically. They could be doing that. And you're saying that the regionals are not paying the price to, basically, get those quality of people in there. And I think Ms. Black is saying completely different, because she's not getting the pilots she needs, and she has to lower

that criteria for them to get the pilots. Am I correct in where I heard both of you?

Ms. BLACK. No, we are not—if I could just—

Senator MANCHIN. Real quick, and then we'll—

Ms. BLACK.—recharacterize—

Senator MANCHIN.—have the Captain. OK.

Captain SULLENBERGER. Yes. There are, Senator, 110,000 pilots in this country with the airline transport pilot certificate. There are another 65,000 who could quickly get it. Really, the issue has been, for several years, that there are some companies that just aren't good places to work. And the word has gotten out. And the first officer on the Colgan Air flight was making \$16,400 a year. She was based in Newark, could not afford an apartment, even to share one, where she was based. She was commuting from her parents' home in Seattle, on poverty-level wages, probably qualified for food stamps. That—

Senator MANCHIN. But, was that even—

Captain SULLENBERGER.—that is the—that's the reality of that life.

Senator MANCHIN. OK. Even more disturbing than that is, they put her on a flight where she had known icing conditions, flying in winter weather, and not prepared. I can't—it's unfathomable, for me, to think that—

Captain SULLENBERGER. Well, the—it's—

Senator MANCHIN.—that the—

Captain SULLENBERGER. To the extent that there—

Senator MANCHIN.—that anyone would—regional would put her in that situation, knowing she wasn't—

Captain SULLENBERGER. Right.

Senator MANCHIN.—she even knew she wasn't qualified for that, correct?

Captain SULLENBERGER. She obviously didn't feel comfortable with that.

Senator MANCHIN. Yes, that's tough, because—

Captain SULLENBERGER. And so, the—

Senator MANCHIN.—she was flying a—

Captain SULLENBERGER—to the extent that there's a problem, the—it has been self-inflicted by the industry for paying low wages and having bad working conditions for so many years that there is a perception that, if you want to have a successful career, you might look elsewhere, in the financial world, for example, and not become—

Senator MANCHIN. That's right.

Captain SULLENBERGER,—a pilot.

Senator MANCHIN. Ms. Black, giving you the final on that, if you can.

Ms. BLACK. Thank you.

Senator MANCHIN. Explain to us why—or have they changed their criteria of the quality of the pilot and what they're prepared to fly in, what type of weather?

Ms. BLACK. I'm sorry?

Senator MANCHIN. Do you make determinations—I mean, are you looking at the person's qualifications, how they got the hours, where they accumulated the hours? Did they do it all down in Flor-

ida and not up in the Northeast? Where the weather conditions—I mean——

Ms. BLACK. Well, I think that question really speaks to the heart of the matter. And, first of all, I want to say we do not want to roll back safety. We do not want to move backwards. We're proposing an alternative pathway. And we're doing so, in large part, because we are seeing negative, unintended consequences from the 1,500 hours provision, because flight time does not equal experience. And so, when I hear that you want to hire an experienced pilot, I agree, but I don't agree that 1,500 hours in an unstructured environment, where you're largely flying in fair weather, is going to provide experience. And it actually speaks to the point.

Senator MANCHIN. What makes a difference if it's 1,000 or 1,500 or 500? They're going to get accumulated the same way, quickly as they can.

Ms. BLACK. Well, we're seeing some data emerge that show that, after about 500 hours or so, there is negative learning. So, folks pick up bad habits when they're trying to fly——

Senator MANCHIN. You survive 1,500 hours, you had to make some decisions.

Ms. BLACK. Indeed, you do. Indeed, you do. But, there is no guarantee that that 1,500 hours is actually spent in a scenario-based environment.

Senator MANCHIN. Yes.

Ms. BLACK. They're really—it's not contributing to what you see in a commercial airline cockpit.

Now, that said, what I think we can do is propose an alternate pathway that takes advantage of the scenario-based training that you get through structured training. This certainly does include some flying. But, that flying is done in a structured environment. There is a room for flight instruction. There's a room for the traditional pathway. But, at some point, after around 500 or 750 hours, if you are away from your time in training, you've come out of these great structured training programs, and then we say to you, "Now, you now have to spend a year just building flight time, away from your training" I find it surprising that there is disagreement—certainly seems commonsensical that one would lose skill over time. It seems natural that one would—your skills would deteriorate. And we're seeing that.

Our airlines are seeing a diminished quality of the applicants. This is a very real situation. It gets to the heart of a pilot's professional development. We're prepared to make the investment. The characterization that we are trying to cut costs or don't want to make the investment is just not correct. Safety is an investment we willingly make, but we need to restore a pathway that makes sense, that takes a pilot from structured training, and prepares them, not just, as Ms. Gilligan says, to respond to an emergency, but prevent it in the first place.

Senator MANCHIN. Sure. You can understand if there's a person who's been in the left seat for 20,000 hours telling us one thing, and you're representing an organization, you would think that maybe we might lean a little bit toward the experience?

Ms. BLACK. I would ask you to look at the data.

Senator MANCHIN. I understand that, but, I mean——

Ms. BLACK.—don't take my word for it, look at the data.

Senator MANCHIN.—I'm a pilot, too, so I understand.

Ms. BLACK. Right.

Senator MANCHIN. And as—no disrespect. But, you know, we're going to be leaning in that direction, probably, a little bit more. Sorry.

My time is up. And I'm so sorry, Madam Chairman.

Senator AYOTTE. We might forgive you this time. Thanks, Senator Manchin.

[Laughter.]

Senator AYOTTE. I would like to call on Senator Fischer.

Thank you.

**STATEMENT OF HON. DEB FISCHER,
U.S. SENATOR FROM NEBRASKA**

Senator FISCHER. Thank you, Madam Chairman.

Ms. Gilligan, you noted in your testimony that, between 1998 and 2008, the fatality risk for commercial aviation in the United States fell by 83 percent. And I commend the FAA and the aviation industry for this tremendous accomplishment. Can you provide the Committee details on how the FAA has cooperated with industry and other stakeholders to reach this goal? And what has the role of technology been in reaching this goal?

Ms. GILLIGAN. Thank you, Senator.

We believe that the Commercial Aviation Safety Team, which is a partnership between FAA, NASA, DOD, and the commercial aviation industry, had a large role to play in the safety improvements that we've seen. It's always very hard to say, as an industry, we implemented X, and, because of that, we saved this many accidents. You can't make that direct correlation. But, we do know that, voluntarily, we and the industry implemented a number of safety enhancements in that time period. And we believe that the record speaks for itself, that that kind of partnership, where you look at the data, you understand where the hazards are, you agree on what will mitigate the risks, and then implement and measure that implementation, is what accounts for the improvements that we've seen. Many of those safety enhancements included technology improvements. Technology does allow the opportunity for the pilot to be better informed, have better situational awareness, and oftentimes provides additional time for the pilot to respond to the hazardous event that's occurring. So, that's been important. But, pilot training, standard operating procedures, all of those pieces of the system have helped to reach that record.

Senator FISCHER. OK, thank you.

Mr. Baker, in your written testimony, you mentioned that one of the major causes of general aviation accidents is loss of control, which represents nearly 40 percent of all general aviation accidents. So, how is the general aviation community—how are you working to address the loss-of-control accidents? And what specific challenges would you face in that?

Mr. BAKER. Well, as Ms. Gilligan mentioned early on, one of the great devices, I would call it kind of the first test device on how we're going to make sure we move through the pathway, is angle of attack. Angle of attack is a very simple device that tells you if

you're about to lose control of the aircraft. While it has never been required in light GA aircraft, they've now developed a product, for a couple thousand dollars, that you can put into an airplane—that can give you indications—if you're getting close to the stall, either electronically or physically. So, it's a device that we've been waiting for a long time. And then, we believe our role is also continued training and reminding people that stall training is really important, and fundamental to aviation. And we've, as I mentioned before, had over 2 million, call it, "hits" on our site to make sure that we're really at the forefront of training pilots and reminding them that that's the number one issue.

Senator FISCHER. OK, thank you.

Ms. Black, we've heard about the challenges for regional airlines in recruiting pilots. I hear that all the time from my airports in Nebraska. And what are some of the ways that the regional airlines are working to recruit and retain pilots who are returning from military service? Have you focused on that at all? Are you looking at trying to bring those military people into jobs within the industry?

Ms. BLACK. We have. And the first step toward that—

Senator FISCHER. And what—I guess I would ask you, you know, if you're doing it, what do we need to do, and how Congress can help, and maybe what changes need to happen within the FAA on that, as well?

Ms. BLACK. Well, certainly the rule and Congress reflects the—you know, the importance and the great structure of military training, by giving military training the 750 hours credit. And so, I think that that has been helpful. Unfortunately, there are fewer military pilots coming out. I think there are more of those who are there that are staying in the military for longer, and just fewer military pilot operations, in general. So, we're seeing that.

In terms of our efforts as an industry looking at ways to get more military pilots, the first step is really identifying where our carriers are hiring the pilots. And so, we're in that process now. And so, we'll reach back out to you as we get a little further along.

Again, I think, with all pathways, to have certainty for it, just so the aviator knows, coming out of a structured training program, that they can go into the right seat of an airline and flow through is going to be very important. We talked earlier just a little bit about some of the flowthrough programs that we have. We're proud of them. They're effective. But, we need a little bit more help with the pathway.

Senator FISCHER. OK. I hope you'll be in contact with my office and let us know if we can help you in any way in getting the former military personnel into that.

Thank you.

Ms. BLACK. We certainly will.

Senator FISCHER. Thank you, Madam Chair.

Senator AYOTTE. Thank you.

Senator Daines.

**STATEMENT OF HON. STEVE DAINES,
U.S. SENATOR FROM MONTANA**

Senator DAINES. Thank you, Madam Chair.

Mr. Baker, I'm a sponsor of the Pilot's Bill of Rights 2. I do believe that a third-class medical reform will help reverse this trend of a declining general aviation pilot population while also maintaining the appropriate level of safety for pilots who are flying for both private and recreational purposes.

Your testimony mentions that medical reform has the potential to improve safety by keeping pilots in the airplanes they're most familiar with. Could you expand on that a little further?

Mr. BAKER. Yes. The FAA, about a dozen years ago, started down this path with testing what we call light sport aircraft, aircraft that are designed to be flown at under 1,320 pounds. And, in many cases, some old airplanes, like the J-3 Cub of the 1930s, qualifies as a light sport aircraft. And then it evolved into a large number of aircraft that were built with that purpose in mind, just to be under 1,300 pounds. In many cases, those airplanes are fine and they do well, but, in bigger wind—and you get wind in Montana, I know—it's a little harder to control those aircraft. So, we're forcing a pilot population with the number-one most popular airplane, a 172—if a person chooses not to go down the medical path and get it done, they move downstream into a light sport aircraft, in an aircraft they're not as familiar with, potentially, and not as capable of an airplane to fly in conditions.

Senator DAINES. That helps.

Do you think this will help prevent the decline of a pilot population, which I believe is averaging about 6,000 pilots per year?

Mr. BAKER. I do. You know, there are over 350,000 pilots under age 75 that are on the sidelines today. And there are a number of reasons. Could be economic, could be family, could be all kinds of—we believe a significant percentage of them would stay in the game and play in the game longer if they weren't burdened with this outdated regulatory issue.

Senator DAINES. Thanks, Mr. Baker.

Ms. Gilligan, I want to shift gears now and go out to eastern Montana. We had Administrator Huerta here recently, and we were discussing the ongoing safety concerns from our general aviation pilots relating to the expansion of the Powder River Training Complex in eastern Montana, the MOA, that's a part of Ellsworth Air Force Base. As the Administrator in charge of safety of the FAA, I'd like to discuss the safety of the airspace surrounding the Baker Airport in Montana. I think when this idea was originally launched years ago, Baker was a pretty sleepy little part of south-east Montana. Well, it has been waking up with the energy boom, the Keystone Pipeline routes right through the middle of it. The Baker on-ramp, which will be 100,000 barrels a day of oil, is right there near the Baker Airport. The FAA said they would take an adaptive management approach to the implementation of this airspace. Could you describe what "adaptive management" means? Maybe that's something that's described at the FAA. What does "adaptive management" look like?

Ms. GILLIGAN. Well, sir, I'm not fully familiar with all of the details of this particular project. And we certainly can provide that to you and your staff, to make sure that you have a full understanding of it.

Ms. GILLIGAN. But, what we are looking at is how we can best manage the airspace to accommodate both growth and assure the appropriate levels of safety at the same time. Growth is a risk factor. And so, we need to understand how the airspace—air traffic, whatever—can manage that growth to assure an appropriate level of safety. And the Air Traffic organization does its safety risk analysis to be sure that that's being properly handled.

Senator DAINES. Yes, that Baker Airport has over 7,000 annual operations and I think that's the concern, where it's all headed, with the growth. Would radar coverage, real time communication between air traffic control military and civilian aircraft, help reduce some of the risk, as I think about this adaptive management approach?

Ms. GILLIGAN. It may well, sir. That's what the safety risk analysis would have to address. I believe a safety risk analysis either has been completed or is underway for that particular project. And, through that, we'll identify if risks or hazards are being introduced, and what the mitigations would be required to address them.

Senator DAINES. Along the lines, your testimony highlights the FAA's proactive nature in identifying and addressing risks to prevent accidents. As part of the flying public, I thank you for that.

Specifically, the successful Commercial Aviation Safety Team, the CAST model, which uses data to develop an understanding of the best actions or interventions to prevent accidents, do you know, and this may be getting in the weeds, here, with the Power River MOA, but, do you know if the CAST model has been used in active military operation areas, MOAs?

Ms. GILLIGAN. Well, the Department of Defense is a member of the Commercial Aviation Safety Team. But, again, sir, we tend, at that group, to look at systemic, broader issues that perhaps individual members of the team can't really address on their own.

Senator DAINES. Would they—

Ms. GILLIGAN. So, that particular issue is not something that the Commercial Aviation Safety Team has taken on.

Senator DAINES. They're not necessarily taking that methodology and using that with MOAs, that you know of?

Ms. GILLIGAN. I'm not aware that they are.

Senator DAINES. OK. All right. Thank you.

I'm out of time.

Senator AYOTTE. Thank you.

Senator—

Captain SULLENBERGER. May I quickly add? I used to fly F-4 Phantoms out of the Nellis Air Force Base range complex. And, while it was often restricted areas, as well as MOAs, I think that realtime traffic that was provided, the realtime use statistics of the airspace often made it available to civilians. I think the Nellis Air Force Base range complex would be a model that you might want to consider taking a look at.

Senator DAINES. Thank you for that.

By the way, I texted my son. I said I was in a hearing with you. And he texted me back and said, "A true American hero."

Captain SULLENBERGER. Thank you. Thank you.

Senator DAINES. That's saying something from a son I'm very proud of. Thank you, Captain.

Senator AYOTTE. Senator Sullivan.

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

Senator SULLIVAN. Thank you, Madam Chair.

And I would echo Senator Daines' comments. This is actually a great panel. So, really, really appreciate everybody's testimony. Very, very informative. It just—wide variety of views. I really appreciate what you're doing. I think that we're all in agreement on the importance of safety for our citizens, for the flying public. You've made some very important contributions already.

I want to talk about the issue of regulations with regard to how we do this in a way that's most effective. And, Ms. Gilligan, I want to start with you. We had a hearing last week with regard to infrastructure, in terms of aviation. And, as you know, a key part of safety is aviation infrastructure, whether it's updates to runways and things. One of the things that has been, I think, for many Americans, many Members of Congress, a frustration, is just how long infrastructure projects now take. We had the manager of the Seattle-Tacoma Airport testifying last week, it took 15 years to permit an additional runway at that airport, not the building—took 3 years to build it—15 years to permit it, simply permit it. Do you think that the aviation infrastructure delivery process needs reform, particularly on the upfront regulatory side? And would you be willing to work with this committee on suggested streamlining, particularly of infrastructure projects that relate to aviation? We need those out there. And yet, we have a system that pretty much inhibits the ability to do that.

Ms. GILLIGAN. Well, sir, as you're aware, we have an Office of Airports, which is responsible for setting those design and safety standards. But, I can assure you that the FAA is willing to work with this committee and with your staff on any initiatives that you believe are important to consider in the reauthorization proposal. So, I am not as familiar with what some of those safety and design standards are, as—

Senator SULLIVAN. Right.

Ms. GILLIGAN.—are airports organization. But, certainly we'll be willing to work with the Committee on those kinds of questions.

Senator SULLIVAN. Great. Thank you.

I had a follow-up question for you and Mr. Baker. It is relating to the ADSB plan. And, you know, that is something, particularly—in many ways, was pioneered in Alaska and, right now, leaves approximately one-third of Alaska without coverage with regard to altitudes that our general aviation pilots fly. I know it's not practical to have full coverage. But, do you believe that there is a minimum operational network that we could have with regard to ADSB coverage in the state that is something that would provide safety but also a target to shoot for, given, again, how important safety is, but also, obviously, how large the state of Alaska is? I'd welcome comments from either of you.

Mr. BAKER. Senator Sullivan, I've flown in Alaska a number of times, myself, in small airplanes, and I've seen the advantages of ADSB, where it works, and the traffic, and other things, and the weather that you can now see. So, I'm a big supporter of ADSB.

We want to get down the path. And we've now started to encourage our members to start equipping in the Lower 48. But, we also want to work with the FAA on pockets and places as we go down the line—

Senator SULLIVAN. Right.

Mr. BAKER.—that really need attention. But, we're fully on board with supporting the growth of ADSB; and whatever it takes to fill in the last pieces, we're going to be pushing for that.

Senator SULLIVAN. Great. And do you think that there is—I mean, that we could get to a minimum operational network in a place like Alaska, where obviously you're not going to have a—you're not going to have coverage over the entire State, but shooting for that kind of minimum that's helpful, in terms of safety?

Ms. GILLIGAN. Well, Senator, as you point out, Alaska has been a leader in ADSB and other technologies to enhance the level of safety in those very difficult environments, like Alaska. I don't know that we've committed to a particular level of network service. And we certainly can provide that information back to the Committee.

Again, we're always willing to work with any initiatives that will enhance safety and make the system more efficient.

Senator SULLIVAN. Good. We would like to work on that and—with our pilots on that initiative.

Finally, Mr. Baker, you mention in your testimony a lot—you talk a lot about the importance and success of the industry, working with the FAA to address many of the safety issues. One of the things that struck me is that you're doing that in a way that I think is very useful, but also doesn't go through the rather formal and cumbersome rule process that can take—again, back to my original question—years. Can you highlight some of the examples where we—you've been working on a more informal basis with the FAA to make progress on some of the safety issues that get proper input from industry?

Mr. BAKER. I think we've worked together well on a number of issues including the angle of attack indicator, which we've pretty much covered here today, as a device that will show if you're near or close to a stall of your aircraft, and we are excited about that technology. But, now, when you think forward, you know, we've got over 40,000—almost 20 percent—of our total airplanes that were built before 1965.

Senator SULLIVAN. Wow.

Mr. BAKER. And so, we need to think further ahead about safety devices, like inexpensive autopilots, that should be part of the thinking as we go down the line. You know, iPads have changed the way we think about navigation situational awareness. And how we're using them today in the cockpits, it's completely changed, you know, the old way of unfolding maps. So, as we work through the future, we've got to think about the inventory of these airplanes out there that are very important transportation devices, in many cases, and certainly important recreation. So, we've got a number of meetings set up to determine how do we equip, further down the line, after we get past ADSB.

Senator SULLIVAN. Right.

Thank you, Madam Chair.

And I want to thank the panel again for your excellent testimony. Thank you.

Senator AYOTTE. Thank you.

I'm going to call on Senator Cantwell, who has an additional question.

Senator CANTWELL. Thank you, Madam Chair.

I know we're trying to wrap up, here. And I just wanted to get in a few things I wanted to be clear on.

Mr. Hart, you believe that we should close this loophole as it relates to cargo pilots on the sleep rule. Is that correct?

Mr. HART. That's correct. Medical fitness for duty is one of our Most Wanted items, and a huge part of medical fitness is fatigue. Fatigue applies to everybody who's operating complex equipment.

Senator CANTWELL. And, Miss Gilligan, did the FAA make this recommendation before? And then it didn't get through the process at OMB, or something of that nature?

Ms. GILLIGAN. The notice of proposed rulemaking in the change to flight duty and rest rules did include the cargo community. As we completed the process for that rule, it was determined that we could not justify that requirement. But, as I've pointed out, we do believe that there are other ways that that risk is being fully addressed. Our inspectors are working with the cargo carriers to make sure that, through their safety management systems, the cargo carriers are looking at their schedules to determine whether, in fact, fatigue is an element of risk, and, if so, that they address—

Senator CANTWELL. But, the FAA made the recommendation before, right? So, it's just a matter of—we have NTSB, who has made the recommendation, believes that we should make all pilots under the same fatigue rules, and the FAA, you're saying, is looking at this—had previously looked at closing this loophole.

Ms. GILLIGAN. We had proposed it that way, but, as I said, we could not sustain that proposal through the final rule. Again, Safety Management Systems require that the carrier look for risk. They have to identify if they have any part of their operation where there's a hazard. When they find that, they must address it. They'll do that—

Senator CANTWELL. And what are we—

Ms. GILLIGAN.—in conjunction with our inspectors.

Senator CANTWELL. And what are we supposed to think about this issue that popped up in Seattle? A man falling asleep in the—you know, the issue of outsourcing maintenance and possibly, you know, saving dollars or something of that nature, and finding somebody who falls asleep in the cargo hold. Should we be looking at the entire maintenance crew and their operations and their systems?

Ms. GILLIGAN. Again, through the safety—

Senator CANTWELL. Mr. Hart?

Ms. GILLIGAN. Oh, I'm sorry, ma'am.

Senator CANTWELL. Mr. Hart?

Mr. HART. Our fatigue recommendations are broad in their application. It's not only pilots. It's maintenance, it's air traffic controllers, it's everybody in the system.

Senator CANTWELL. OK. Thank you.

Ms. Gilligan, sorry, did you want to add something?

Ms. GILLIGAN. I'm sorry.

But, again, with the safety management system, the new rule that we have that's going into place, the carriers will have that responsibility. They need to analyze where they have hazards in their system, whether it's a specific rule or it is some operating procedure or process that they have which is introducing a hazard. So, if there is fatigue in how they're scheduling their maintenance workers or how the maintenance work is completed, they will need to analyze that and correct it.

Senator CANTWELL. Well, it's certainly a wake-up call. And people—I think we need to ask these questions. And FAA just recently said to United Airlines, "We have concerns about what you're doing." So, I think we've got to make sure that everybody is complying with what we believe are the best conditions for flying.

Captain Sullenberger, did you want to add a comment to that?

Captain SULLENBERGER. I certainly do. SMS and fatigue risk management systems are important, but they are additional layers, additional safeguards. What we need to do is close the loophole, solve the fundamental problem, ensure that the cargo carriers have to build schedules that comply with Federal Aviation regulation 117, which is the fatigue rule that the passenger airlines have to comply with, and not try to fix it later with, quite frankly, a band-aid approach. We need to solve the problem. Fatigue is fatigue, whether you're carrying passengers or packages.

Senator CANTWELL. And maintenance?

Captain SULLENBERGER. And maintenance.

Senator CANTWELL. OK, thank you.

Captain SULLENBERGER. Thank you.

Senator CANTWELL. Thank you, Madam Chair.

Senator AYOTTE. Thank you.

I would like to call on Senator Peters.

**STATEMENT OF HON. GARY PETERS,
U.S. SENATOR FROM MICHIGAN**

Senator PETERS. Thank you, Madam Chair. And thank you, Ranking Member Cantwell, for holding this hearing. And certainly it has been a fascinating hearing, and I enjoyed the conversation from our panelists.

I know there has been quite a bit of discussion on the required hours and pilot experience prior to being a co-pilot. So, I wanted to explore that a little bit further, if I may.

Ms. Black, you talked about the pay structure of regional airlines in the \$22,000 to \$24,000 starting salary. How does that compare to one of our major airlines? What do they pay their pilots?

Ms. BLACK. I'm not as familiar with the mainline pay scales. I can say that I have one airline that is paying more than some mainline counterparts. But, at both regionals and mainlines, that first-year pay is often lower. It jumps, in both cases, by—or at least in the regional case, by about 32 percent by year 2, and then about 50 percent by year 5.

Senator PETERS. Now, for most of these folks who are coming out—because, as we've talked about earlier, we don't have as many military pilots as we once had, which was a source of pilots with

significant hours—we now have folks who are basically training themselves, in the fact that they have to seek out training and pay for it on their own dime. Do you have any numbers as to the amount of debt the average student has when they come out after they've completed training?

Ms. BLACK. I don't, but I know that our university partners do. And so, I'd like to get that back to you.

[The information referred to follows:]

REGIONAL AIRLINE ASSOCIATION

Hon. GARY PETERS,
United States Senate,
Washington, DC.

Dear Senator Peters,

On April 28, during the Senate Commerce Committee, Subcommittee on Aviation Operations, Safety, and Security hearing entitled "FAA Reauthorization: Aviation Safety and General Aviation," you inquired into the costs of flight training and the average debt a student carries when they have completed training.

While the Regional Airline Association (RAA) does not collect this information, during that hearing I offered to get the information from the University Aviation Association. Unfortunately, the University Aviation Association does not collect this information either, so we extrapolated some cost estimates on our own.

Based on an examination of four year programs at six public and six private Aviation Accreditation Board International (AABI) accredited universities meeting the requirements of 14 CFR § 61.160, we determined a total cost of \$220,557 for private universities and, assuming out-of-state tuition, \$176,328 for public universities. These totals include four years of room and board rates and do not reflect financial aid or scholarships.¹ The above totals also include the flight fees at these universities, which equate to an average of \$56,917 at private universities and \$58,809 at public universities.

We hope that these estimates are helpful, and we are happy to answer any follow-up questions concerning methodology or otherwise.

Sincerely,

FAYE MALARKEY BLACK,
Interim President,
Regional Airline Association.

cc: The Honorable John Thune, Chairman
Senate Committee on Commerce, Science, and Transportation
United States Senate

The Honorable Bill Nelson, Ranking Member
Senate Committee on Commerce, Science, and Transportation
United States Senate

Senator PETERS. Well, I'd like to know that.

Captain Sullenberger, you've had a long history in the airlines. Do you have any idea the differential in pay between a regional airline and somebody coming into one of the majors?

Captain SULLENBERGER. I would imagine at least 50 percent.

Senator PETERS. A minimum of 50 percent—

Captain SULLENBERGER. Yes.

Senator PETERS.—coming in.

Captain SULLENBERGER. And I would add that this widespread perception that jobs—entry-level jobs at the regional carriers are

¹Assumptions & Notes: Only 4 year AABI accredited bachelor's programs meeting § 61.160(b) included; 6 public and 6 private universities included; Half of the universities include CFI, half do not; When universities provided ranges as estimates, the high end of the estimates is assumed; Assumed no prior flight experience, all certificates and ratings earned at university; For public institutions, assumed out-of-state tuition; Included room & board rates for 4 years (8 semesters); Some universities include FAA examination fees in tuition, others do not; Assumed no financial aid (scholarship or otherwise).

not good ones is deserved. And it's become more widely known. And I think, to the extent that there are people who are making other life choices for themselves and for their families, it's because of that. This is something that they've done to themselves, and it's easily reconcilable if they simply offer starting wages and working conditions that will attract qualified candidates, which are out there, but who are currently doing other things.

Senator PETERS. Ms. Black, it looks like you want to respond.

Ms. BLACK. Yes, if I may. Regional airlines are part of the natural career progression. I think that's a natural fact. First-year first officer wages, in particular, are lower, for a number of reasons. First of all, the marketplace; second, as you know, in many cases, they are collectively bargained. I have to point out, when we talk about wages, we have several examples of regional airlines who attempted to unilaterally raise first-year first entrant pay, and they were rejected by the union. So, when we talk about pay—and I think we should—we do need our labor partners to acknowledge that they share a role in that process, too. We agree that it's important to raise those salaries.

The good news is, we have raised the salaries. The marketplace is reacting naturally, I think. And so, as part of the natural career progression, pay jumps again and again. And it's a—meant to be a seamless progression from regionals to mainlines.

Senator PETERS. But, still, I mean, with—the reason why a young person's going to question whether or not to go into the career, it's not because they don't love flying, because it's a—I would have loved to have been a pilot, myself, but I wear glasses; it was difficult to do, as a young man. It's changed, I think, now. But, it's because of the economics. That is—very expensive process. You have to pay for the structured flight training. And what is the number of hours you come out of structured training?

Ms. BLACK. Yes, between about 350 and 550.

Senator PETERS. So, then you need to get—

Ms. BLACK. I mean, you—

Senator PETERS.—another 1,000 hours of—

Ms. BLACK. That's—

Senator PETERS.—flying time. And if you—

Ms. BLACK. That's true.

Senator PETERS.—and if you are flying, you're probably—well, different aircraft; you're not going to be flying a jet, you're probably going to be an instructor and—does that impact—Captain Sullenberger, does that impact—even though someone may have 1500 hours, you know, if they're paying for it on their own dime and they know they've got to minimize their cost because they're not going to make a lot of money when they first come out, does that alter the aircraft choice or the job opportunities for them? And is that really adequate training when you step into the cockpit of a jet?

Captain SULLENBERGER. There are several things I want to make clear here. First is that pilot passion will only carry you so far, the same as passion for any profession will. At some point, like everyone else, like all of us, we are going to want to be able to buy a car or have a family or eventually buy a house and have a life. And we need to have career path that's going to enable us to do that.

That's why the regional airlines have had so much trouble, because they've been offering, for so many years, a substandard set of wages and working conditions to try to continue to make fit in the real world a broken economic model. So, simply by correcting that, the—all that follows from it will be much better.

Let me also set the record straight. A lot has been talked about structured versus unstructured training. They make it seem that there are two things out there that exist that really don't. And one thing that doesn't exist, it doesn't matter. First of all, the regional airlines, as compared to the majors, in spite of the improvements that they've made that have been essentially forced on them by the Airline Safety Act of 2010, still are not up to the same level as the large major airlines, in terms of their training. They just don't have the same kind of environment that the majors do.

The majors also depend upon having pilots show up who have the qualifications. Again, it's important that everyone who gets in the first officer's seat of a regional airliner or a major airline as a pilot is fully qualified from the outset.

The other thing I want to clear up is that there's somehow something wrong with having other flying jobs and having real-world experience. Let me explain to you the difference between the structured, you know, hand-holding training environment and the often ambiguous and messy real world of operational flying. In the real world of operational flying, you have to develop the judgment, you have to have the skills, you have to have the knowledge to do the job. And that is something that's built over a period of time. That's as important as having the training environment, which is really a much more sterile environment. And when you—you aren't as able to make those judgments, aren't as able to develop that skill.

So, both are important. Again, we're back to the false dichotomy that they're trying to impose on this debate of quality versus quantity. And, of course, we need, we must, we can have both.

Senator PETERS. Right. Thank you.

I think my time is expired. Thank you.

Senator AYOTTE. Senator Blumenthal.

**STATEMENT OF HON. RICHARD BLUMENTHAL,
U.S. SENATOR FROM CONNECTICUT**

Senator BLUMENTHAL. Thank you.

I appreciated your comment just now, Captain Sullenberger, about the difference between the real world and the training environment and the qualities that are necessary to deal with the real world, as there are in many endeavors and challenges, which are different from what can be experienced in the artificial environment in training. And you mentioned those skills and experience and the passion for flying. And I think, you know, one quality that sort of pervades all of them is mental health. And I don't know whether you have given thought—and I would invite the rest of the panelists, as well—to whether there should be better screening for mental health periodically, just as we do for physical health, because mental health can impact those qualities of readiness and skill and even fatigue. We're here today, in part, because, in 2009, the tragic crash of Flight 3407 in Buffalo was the result of, in part, fatigue. But, fatigue often masks mental health issues.

So, my sort of open-ended question to you—and, by the way, I appreciate that Beverly Eckert's sister is—Nancy—is here today from—Beverly Eckert, of Stamford, perished in that crash.

My question to you and maybe the other panelists, if they wish to answer, is whether mental health should be a subject of screening, whether it should be not only an issue that's put to the pilot or co-pilot, but also to his fellow pilots and co-pilots, because they're the ones who are likely to get to know him or her and see whether that person continues to have a passion for his or her work, a focus and concentration, a real ability to function in those demanding circumstances when the challenges are greatest.

So, I invite you to address that topic.

Captain SULLENBERGER. Senator, thank you. I'd be glad to.

This obviously is something I have not only thought about, but I've recently written about. In fact, the Germanwings crash—a shocking, horrific event that's unimaginable to professional pilots; it flies in the face of everything that we stand for, everything that we believe—is illustrative in several ways. First of all, this particular pilot, who had just over 600 hours, I believe, probably an MPL pilot, could not, under current standards, have been an airline pilot in the United States. Didn't have the requisite experience. And the downside of not having had the requisite experience is that he wasn't vetted repeatedly by a series of different employers in a series of different flying jobs. He wasn't observed for a longer period of time. And the 149 people on that airplane paid a horrific price for those failures.

It's also important that we realize that, in any domain—and we've known now for 40 years, in having a history of using aviation safety self-reporting systems, that there is some critical safety information that can only be gleaned by self-reporting, and from no other source.

So, whatever choices we make, whatever improvements we suggest, based upon whatever the findings are, ultimately, of this crash, we need to be careful that we do not decrease self-reporting. Because my understanding of medical knowledge is that it doesn't quite yet enable us to predict when some one person may have a break. In spite of the fact that we do screening, we have regular medical examinations, and we're required, on a regular basis, as part of our recurrent training, to demonstrate our knowledge, our skill, our judgment. And, in spite of how close the working relationship is in a cockpit, where you're literally elbow's length from each other, you spend sometimes 14 or more hours per day locked in this little cockpit closet, where no interaction goes unnoticed, it's really difficult to know exactly who that other person is. In spite of the fact that we have professional standards committees at our pilots unions, or we can go to our peers, who are trained to intervene in cases like this, we can go the official route, go to the chief pilot, the FAA can pull someone in for a special evaluation, really self-reporting is one of the most powerful ways, whether it's another pilot or it's a family member or whether it's the person, themselves.

Senator BLUMENTHAL. So, self-reporting really has to be preserved and encouraged. The——

Captain SULLENBERGER. Yes. So——

Senator BLUMENTHAL.—consequences for self-reporting, should not deter self-reporting.

Captain SULLENBERGER. Yes, sir. Yes, Senator. So, what that means is, we have to create and maintain a just culture, and not a punitive one. There needs to be a clear pathway for the pilot to say, “I need help,” to get the help they need; when the condition is resolved, that then be able to get recertified and eventually come back to work. But, pilots who are not fit to fly should not fly.

Senator BLUMENTHAL. Thank you.

Senator AYOTTE. Thank you, Senator Blumenthal.

And thank you, to the panel’s witnesses, for being here today. We appreciate it very much.

The record will stay open for 2 weeks. My colleagues are free to submit written questions, and we hope you’ll comply in answering them in that time period. I know I plan to submit a couple to the FAA and Mr. Hart.

So, again, thank you, to all the witnesses. I know you’ll continue to follow our work on this issue.

We’re adjourned.

[Whereupon, at 4:30 p.m., the hearing was adjourned.]

A P P E N D I X

PREPARED STATEMENT OF THOMAS L. HENDRICKS, PRESIDENT AND CEO, NATIONAL AIR TRANSPORTATION ASSOCIATION

Chair Ayotte, Ranking Member Cantwell, members of the Aviation Subcommittee, thank you for the opportunity to submit comments on the Subcommittee's review of aviation safety and general aviation. My name is Thomas L. Hendricks and I serve as President and CEO of the National Air Transportation Association (NATA).

NATA represents the interests of the general aviation business community before the Congress as well as federal, state and local government agencies. Representing nearly 2,300 aviation businesses, NATA's member companies provide a broad range of services to general aviation, the airlines and the military. Our members range in size from large companies with international presence to smaller, single-location operators that depend exclusively on general aviation for their livelihood. Smaller companies account for the majority of NATA's membership and most of our members have fewer than 40 employees and are designated as small businesses by the U.S. Small Business Administration.

As a result of the last FAA reauthorization bill, NATA member companies have been able to confidently proceed with their own investment plans, but that confidence to invest will be undermined by a protracted reauthorization process.

FAA Structure/Funding

We understand the major reauthorization issue the Subcommittee will consider this year is whether and how we might alter the FAA's organization and funding stream. This is certainly an appropriate discussion to have in light of the recent sequesters, government shutdown and criticisms of the FAA's modernization plans.

NATA urges lawmakers to build on its work that began in the last reauthorization and continue to assist the agency toward a more efficient operating structure. However, changes in the relationship between the agency's air traffic control operation and its safety regulatory component should be carefully viewed in terms of the problem to be addressed, and whether the solution will continue to maintain a stable, safe and efficient system that protects access for all users of our system.

While NATA supports the injection of more private sector practices into the FAA, there is no safer air traffic control system in the world or more efficient means of general aviation taxation than that already in place. As Administrator Huerta has observed, we need to ensure there are no unintended consequences from moving too quickly. NATA cannot support any de facto "leap of faith" proposals that would put general aviation's fate in the hands of undefined management structures or leave unresolved its contribution to the system.

Consistency of regulatory interpretation

NATA appreciates the Subcommittee's review last week of certification issues and hopes its reauthorization legislation will also consider the impacts to aviation businesses created by the inconsistent interpretation of FAA regulations. Aviation businesses are constantly confronted by the varying requirements of eight FAA regions, 10 aircraft certification offices, and 80 flight standards district offices, each of which issues individual approvals for a wide range of maintenance and operational requests. When the FAA grants approval for a certificate or process to one aircraft operator or maintenance facility without giving the same approval to a similar business in another area of the country, it directly affects the competitiveness of companies. The 2012 FAA reauthorization created an FAA/Industry Committee, the "Consistency of Regulatory Interpretation Aviation Rulemaking Committee (CRI ARC)" to address this issue. It is important the panel's recommendations, particularly the creation of a Master Source Guidance System, be implemented as quickly as possible.

Maximizing use of existing FAA resources in support of aviation business

Regardless of the resolution of the debate about the FAA's current organizational structure and funding discussed above, it is unlikely the regulatory functions of the agency can expect to see dramatic increase to its funding. As a result, the agency must maximize the use of its existing resources.

For example, the FAA uses Certificate Management Units (CMUs) and Certificate Management Offices (CMOs) to provide a comprehensive certificate management structure for monitoring airline operations. The FAA should establish policy defining the criteria under which this concept will apply to repair stations and other certificate holders. In addition, Part 135 on-demand air carriers now face difficulty in securing FAA inspectors to certify pilots. Expanded use of delegation authority would better meet the needs of aviation businesses and free up resources. Realigning the Flight Standards Service regional offices to specialized areas of aviation safety oversight and technical expertise, similar to the Aircraft Certification Service, would be better aligned with the policy organizations in Washington D.C., and provide for a more direct, streamlined flow of communication regarding policy implementation.

Pro-Aviation Business Tax Policy

Finally, while not strictly within the Committee's direct purview, there are issues of tax policy that also impact aviation businesses that we offer for your consideration.

Clarify the Status of Aircraft Management Services—In March of 2012, an IRS Chief Counsel opinion concluded that aircraft owners employing aircraft management services that allow the use of the aircraft for occasional charter operations should be assessing the 7.5 percent commercial ticket tax on amounts paid for those management services. Aircraft management services typically include hiring, training, and scheduling pilots and other personnel; fueling the aircraft; conducting weather and flight planning; and overseeing key safety standards. The IRS interpretation is unprecedented as all aviation taxes are movement based. If an owner is using an aircraft for personal reasons, the fuel tax is assessed. The same aircraft, used by a management company for charter services, assesses the commercial ticket tax (*i.e.*, Federal excise tax (FET)) on the charter customer.

After a significant number of operators successfully appealed audit findings assessing the FET to aircraft management services, in May of 2013 the IRS suspended assessment collections based on that opinion. Since then NATA has been in constructive dialogue with Treasury and IRS and the issue has been placed on the agency's priority guidance list for a second consecutive year. However, the Treasury/IRS is not committing itself to a timeline for resolution and though the IRS has put audit assessments on hold, these small businesses are still vulnerable to potentially enormous assessments. Last Congress, Senators Brown and Portman and Representative Tiberi introduced legislation to address the issue and will reintroduce the legislation later this year. We urge Subcommittee members to join Senators Brown and Portman's efforts by becoming original cosponsors of this important legislation.

Cease Aviation Trust Fund Diversions

Since 2005, the tax rate applied to nearly all jet fuel sales is at the highway fuel tax rate of 24.4c per gallon and all collected funds are deposited into the Highway Trust Fund instead of the Airport and Airway Trust Fund (AATF). The change was based on a suspicion of fraud due to a slightly lower aviation fuel tax rate compared to the highway tax and a belief that jet fuel could be used in diesel trucks. This policy has increased Highway Trust Fund revenues at the expense of those in the Airport and Airway Trust Fund.

The IRS provides no avenue for a noncommercial general aviation end-user to apply for the refund. A fuel vendor may apply for refunds, but only after completing an arduous IRS registration process and then managing the substantial administrative burden to maintain records for the IRS. There is no requirement for fuel vendors to register with the IRS; it is purely voluntary and most fuel vendors are not participating due to the additional workload. Thus the AATF receives no revenue from the majority of non-airline jet fuel sales because noncommercial end users are not permitted to apply for the refund themselves. NATA believes the premises that led to enactment of this provision should be reviewed as a precursor to its repeal.

Investment Policy—NATA recently provided Senate Finance Committee Chairman Orrin Hatch (R-UT) and Ranking Member Ron Wyden (D-OR) with views on how to best stimulate aviation business investment. We urge lawmakers to develop legislation that includes the full and immediate expensing of capital investments.

NATA is one of the leading supporters of permanently extending bonus depreciation and Section 179 expensing for small businesses at a level of \$500,000 and supports the ongoing efforts of the House of Representatives to make these two pro-growth provisions permanent. However, comprehensive tax reform legislation provides the opportunity to go even farther. Many economists support NATA's belief that while accelerated depreciation is helpful to investment and the overall economy, the ultimate goal should be to fully write-off business investment expenses immediately.

Thank you for your consideration of our views. While maintaining the status quo risks our Nation's supremacy in aviation, it is equally true that radical change to the FAA's management structure and funding poses equal risks, including to the safe and stable nature of the world's best air traffic control system. We look forward to working with the Subcommittee and agency toward continuing to operate the world's safest and most efficient aviation system.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. ROGER F. WICKER TO
MARGARET GILLIGAN

Question. Ms. Gilligan, as you know, both the Senate and House continue to strongly support the FAA contract tower program on a bipartisan basis. This support stems from the belief that this program is a cost-effective and proven way to enhance air traffic safety at over 250 smaller airports across the country, including seven in my state.

Members of Congress and the industry consistently point to this program as one of FAA's most successful government/industry partnership programs.

Given the program's successful track record, will the FAA have any recommendations for the reauthorization bill to ensure this program is protected and enhanced?

Answer. The FAA remains committed to the Federal Contract Tower (FCT) Program as an important component of how we deliver safety and efficiency in the NAS. There is a general consensus that the program has been successful and it has created measurable efficiencies in the system for both commercial and general aviation operators, while delivering safety benefits to the traveling public. As such, the FAA does not have any specific recommendations for the reauthorization bill regarding the FCT Program.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. MARCO RUBIO TO
MARGARET GILLIGAN

Question. Florida state law permits businesses and other entities where food allergens may be present to possess and allow trained staff to administer epinephrine auto-injectors to treat potentially fatal anaphylactic reactions. Since food allergens are present frequently on commercial airline flights, and an estimated 15 million Americans have food allergies, would the FAA be open to exploring the inclusion of epinephrine auto-injectors in airborne emergency medical kits?

Answer. Since 1986, all major passenger carrying air carriers have been required to carry epinephrine in on-board Emergency Medical Kits. Part 121, appendix A, required two quantities of epinephrine (1:1000) in "single dose ampule or equivalent."

The FAA also requires that crewmembers must be trained regarding location and use of the emergency medical equipment. However, we do not require that air carriers or crewmembers provide medical assistance to passengers. The emergency medical equipment and training requirements provide air carriers the option of limited in-flight medical assistance. The FAA does not have the authority, nor are the FAA regulations intended, to mandate or regulate health care on board commercial air carriers.

Additionally, in December 2002, the FAA published Advisory Circular (AC) 121-36, "Management of Passengers Who May be Sensitive to Allergens. In the AC, we discuss the use of epinephrine to mitigate the effects of an allergic reaction. The AC may be found here: http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC121-36.pdf

However, there is no regulation that would prevent air carriers from voluntarily carrying an epinephrine auto-injector on each flight as part of the emergency medical kit. Additionally, there is no regulation that would prevent an air carrier or its agents from voluntarily choosing to provide care to passengers.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. STEVE DAINES TO
MARGARET GILLIGAN

Question. Ms. Gilligan, in a previous hearing I discussed with Federal Aviation Administration (FAA) Administrator Michael Huerta steps the FAA is taking to address rural airports' safety concerns surrounding the expansion of the Powder River Training Complex (PRTC) in eastern Montana. This has included a commitment by the FAA to remain engaged with local general aviation stakeholders and to provide the appropriate communications and radar equipment necessary to ensure a high level of aviation safety. The term "adaptive management" continues to be used by the FAA. Would you please define "adaptive management" and explain how it will be implemented in the airspace around PRTC?

Answer. The FAA remains committed to the Federal Contract Tower (FCT) Program as an important component of how we deliver safety and efficiency in the NAS. There is a general consensus that the program has been successful and it has created measurable efficiencies in the system for both commercial and general aviation operators, while delivering safety benefits to the traveling public. As such, the FAA does not have any specific recommendations for the reauthorization bill regarding the FCT Program.

Adaptive Management for PRTC is managed by the U.S.A.F. and is not an FAA initiative. The FAA is not responsible for the development or implementation of the "Adaptive Management" program.

Background:

The Air Force is adopting an "adaptive management" approach for the mitigation of airspace issues, which includes provisions for determining the success of mitigation measures, as well as procedures for making necessary adaptations to those measures. As part of this approach, the Air Force would develop a process for communicating, at least annually, with requesting agencies and organizations, including those involved with airport operations (state aeronautical commissions, local airport authorities, and fixed base operators); aviation, energy and agro-business (e.g., air ambulance operations, energy and pipeline operations, cloud seeding, aerial application and crop dusting, ranching, flight training); and other activities (e.g., local units of government, real estate organizations, tourism organizations, and educational institutions). According to the Air Force's environmental documentation the Air Force would "strive to negotiate agreements that include the flexibility to adapt to changing situations" and "collaborate with key aviation interests in the region to establish professional lines of communication to minimize impact and balance the needs of commerce and military readiness."

The mitigations will be assessed as a part of the normal and regular base outreach program. Ellsworth Air Force Base is the using agency of the existing Powder River A & B Military Operations Area (MOA). The base uses established practices of outreach to communities and ranching operations to identify critical times and locations of events that would be disrupted by overflights, such as existing steps to avoid locations of branding, calving and weaning. The base will post informational flyers and posters at public airports underlying the airspace with annual updates by the safety office as a part of the Mid-Air Collision Avoidance Program. For Large Force Exercises (LFE) the base will publish scheduling and other information 30 days prior to the exercise. The base's practices would also include establishment of avoidance areas as necessary for airports, airfields, and communities under the proposed airspace. These efforts encourage community involvement to identify concerns, wherein the base adjusts the flight operations procedures based on the results of these interactions. Members of the affected communities can provide feedback to the base at any time.

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