



**Testimony of Mr. Brad Thress  
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**Before the House of Representatives  
Subcommittee on Aviation**

**Hearing on FAA Reauthorization: Examining the Current and Future Challenges Facing  
the Aerospace Workforce**

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Chairman Graves, Ranking Member Cohen, Chairman Graves, Ranking Member Larsen, and members of the Subcommittee, on behalf of FlightSafety International and our employees, I thank you for the opportunity to testify today. My name is Brad Thress, and I am the President and CEO of FlightSafety International. As a life-long aviator and former Air Force pilot rated on several commercial and business jet aircraft, I am understandably passionate about this topic.

**Introduction**

FlightSafety International (FSI) is a U.S. company with over 4,900 employees in 36 states. As a leading supplier of advanced, simulator-based training for business, defense, and commercial airline pilots, maintenance technicians, and cabin crew, FSI has had a single focus for over 70 years; increase the safety of aviation through world class training for air crew members and maintainers.

FSI offers initial, recurrent, advanced and special operations pilot training and provides access to cutting-edge simulator technology, specially designed training environments, and the expertise of professional FAA and European Aviation Safety Agency (EASA)-qualified instructors. As a training provider, FSI trains 82,500 people annually, including approximately 52,000 civil pilots and 5,700 military pilots.

Other training provided by FSI includes initial and updated aviation maintenance training for professional technicians, Aircraft Dispatcher, Corporate Scheduler/Dispatcher, and Operations Control Specialist for Helicopter Air Ambulance training. FSI also offers professional drone training with a program built upon experience with UAS training for the military and decades of experience in international corporate aviation.

## Modernizing Aviation Workforce Training

The current multifaceted challenges facing the aviation industry and their impacts to air service have highlighted the need to modernize workforce training programs. FSI designs, manufactures, and installs new simulators, advanced training devices, classrooms, aircraft systems, and crew emergency trainers. FSI is an expert in the design, manufacture, and support of Level D-qualified full flight simulators, advanced flight training devices, visual systems and displays. FSI also develops comprehensive, state of the art interactive courseware, using traditional and virtual technologies, and FSI simulators faithfully replicate the look, feel, and performance of customers' aircraft.

In the last decade, flight training device and simulation technology have made enormous advancements. Training provided in these devices allows greater exposure to the multi-engine, multi-crew airline environment pilots must be able to master. In addition, student pilots can experience emergency situations, weather, and other events in a realistic, but virtual setting. These are experiences they cannot gain flying solo in a small, single-engine aircraft.

The following are some of the advancements in-flight training device and simulation technology that FSI has achieved:

- Image generation products that bring training to life with seamless, powerful, and realistic training scenarios.
- Advanced simulations, including sensor simulation and a wide variety of high-fidelity weather systems and effects, with up to 64,000 atmospheric layers.
- Physics-based weather models, including:
  - Atmospheric scattering;
  - 3D clouds, including storm clouds with volumetric and in-cloud effects, rain shafts and correlated radar profiles;
  - 2D and 3D oceans, including two swell states, ocean wave and spray effects, and geo-specific littoral ocean water coloring;
  - Runway, taxiway, and area geo-specific contaminants; and
  - Dynamic precipitation, such as physics-based rain, snow with accurate density and motion, and bouncing hail.
- A wide variety of animation types and controls featuring outstanding visibility attenuation, weather, physics-based lighting, and special effects.
- A variety of animation controls that can be combined and chained together to create numerous complex effects, including:
  - Particle-based simulations such as dust clouds, brown outs, whiteout, obscuration effects, smoke, downwash, and more; and
  - A variety of sensor trigger-based animations.
- An extensive library of airports, photorealistic moving models, and high-detail areas with urban culture and vegetative density.
- Glass mirror displays with superior optical performance, sharper image clarity, and significant advances in fidelity and field of view. Displays fill the entire aircraft window, with the largest field-of-view on motion of up to 300 degrees horizontal and 60 degrees vertical.

## **Full flight simulators**

Full flight simulators are certified to accurately recreate the experience of actual flight operations. They consist of an exact duplicate of a full cockpit, high-definition visual system, and motion base. The average commercial simulator costs approximately \$12 million. They produce exact simulations of operations anywhere in the world and in all weather conditions. They also enable flight crews to experience all possible aircraft malfunctions and operational scenarios safely and realistically. FlightSafety engineers and manufactures our own simulators in Broken Arrow, Oklahoma. We operate 386 simulators in 16 states and 6 countries.

## **Enhancing Aviation Safety**

Simulator based flight training is an integral part of the safety improvements achieved by the aviation industry over the last several decades. Experience gained in flight simulators empowers aviators to safely handle situations from routine to the most critical emergencies. This training is proven to lower risk and save lives. Because of its powerful impact on safety, simulator-based flight training has become a regulatory requirement around the world. It is also required by aviation insurers for complex aircraft. Globally there are over 1,500 civil simulators in operation

Most critical training elements are impractical to reproduce in the aircraft because it is unsafe and can damage expensive system components. During the last three years eleven percent of accidents occurred during training flights. To mitigate these risks, in-aircraft training is limited to partially accurate scenarios practiced in unrealistic environments.

Simulator training allows crews to fully experience all possible events even rare ones. Simulators also allow crews to experience a full spectrum of operating environments such as snow, icing, wind shear, and high-altitude airport takeoff and landings. They are used to expose pilots to special operating procedures at specific airports around the world like the special approaches into Washington Reagan. At FlightSafety we construct precise scenarios using actual operating data recorded aboard the aircraft. We create scenarios tailored to improving a specific pilot's performance in areas shown by his or her aircraft data to need improvement. We also aggregate this aircraft data and build training profiles based on current airports and approaches that have higher accident risks.

## **Value of simulator training hours**

Industry and airworthiness authorities around the world recognize the increased safety achieved by training in full flight simulators and flight training devices. For the last ten years U.S. airline first officers have been required to have 1,500 hours of flight time just like airline captains. Because flight time is very expensive, aspiring aviators accomplish most of their hours in more affordable, simple, single-engine aircraft. Training hours performed in certified full flight simulators as well as other flight training devices build much more experience, and are therefore much more valuable, than flying light, single engine piston aircraft in visual conditions.

In addition, the flight experience obtained in light aircraft is not relevant to the type of operation professional pilots experience. It primarily takes place outside of the airspace above 18,000 feet and around busy airports, where the vast majority of commercial operations take place. It is primarily accomplished in the daytime, in clear weather rather than at night or in inclement weather, and it purposely avoids the types of operational complexity that are encountered daily by professional aviators.

### **Increasing flight simulator experience**

Encouraging the richer experience provided by simulators can be accomplished in several ways. Ideally it would be used all along a pilot's journey to become a professional aviator. Allowing credit for simulator training for each rating on the ladder to becoming a professional pilot would make high-quality simulator experience an implicit part of the development of commercial pilots. Another approach would be to allow credit for simulator hours in a larger aggregated amount at the last rung in the ladder, the 1,500 hours required to qualify as an airline first officer. Currently the FAA allows credit for a maximum of 100 hours, seven percent, of simulator training toward the requirement. Increasing the maximum amount of credit for simulator training to a larger portion of a pilot's flight experience would have a significant positive impact on the safety of our industry.

### **Solving the Airline Pilot Shortage by Fully Utilizing Advancements in Pilot Training**

FSI believes a key long-term solution to the pilot shortage is better use of and greater credit for quality training provided by advanced training device and simulation technologies. To this end, the FAA must fully utilize the authority granted it in the *Airline Safety Act of 2010* and provide credit towards the 1,500-flight hours required for an Airline Transport Pilot (ATP) certificate for time spent instructing or training in high-quality flight training and simulation devices. Congress and the FAA already recognize that not all hours in an aircraft have the same value or benefit. This recognition is manifest in the flight hour requirements for the three existing levels of a restricted Air Transport Pilot (R-ATP) rating: 750 hours (Military), 1,000 hours (4-year accredited aviation college program), 1,250 (2-year accredited program).

Expanded use of advanced training devices and simulation technology will significantly improve pilot training, reduce the cost and time required, and allow greater access to airline careers for a more diverse population of aspiring pilots. Most importantly, it will enhance the safety of the National Airspace System (NAS). Pilots will be better trained as the result of greater exposure to challenging conditions, multi-crew environments, and busy airline and airspace scenarios. These are all situations they do not face while accruing hours towards the 1,500-flight hours flying solo in a small aircraft. But pilots will be able to experience these situations virtually in advanced flight training devices and simulators if the limit on allowable flight training simulator hours was increased. In addition, training performed in advanced flight training devices allows both students and instructors to review their performance and repeat it as needed. Students can learn from their mistakes in a safe, but realistic and challenging environment.

## **Conclusion**

The commercial aviation industry would be measurably strengthened by the increased use of flight training devices and full flight simulators, particularly those certified to the highest fidelity levels (see pictures on the next page; including pictures showing a cockpit in a simulator versus a cockpit in a small aircraft typically used for accruing the flight training hours.) Training in these devices is much richer and more valuable than training in an aircraft. This is because it gives pilots the ability to experience malfunctions and flight situations, such as icing and cross winds, that are simply impossible to experience safely in an aircraft. Increasing the amount of flight hour credit given to pilots for time spent instructing or training in flight training devices and full flight simulators would be very powerful both in improving aviation safety and in encouraging this method of high quality, broad-based, and effective virtual learning.

As a U.S. company with over seven decades of experience training pilots and expertise in simulation technology, the Subcommittee should consider FSI a resource as it develops solutions to the pilot and aviation workforce shortages for inclusion in the 2023 Federal Aviation Administration (FAA) Reauthorization.

Thank you for the opportunity to testify today.



Full Flight Simulators



Simulator Interior



Single Engine Piston Cockpit