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Secondary Cockpit Barriers for Airline Aircraft

For the past two decades, there has been continuing policy interest in enhancing airline in-flight security with secondary cockpit barriers. A secondary cockpit barrier, also known as an installed physical secondary barrier (IPSB), typically consists of a lockable gate constructed of metal rods, bars, and cables or similar intrusion-resistant materials that retracts when not in use. A suitable barrier is designed to be positioned between the aircraft cabin and the cockpit; occupy sufficient space so that it cannot be circumvented by going over, under, or around it; and be resistant to intrusion, including forceful attempts to pull it open or down or push through it. An IPSB primarily serves as a means to prevent or deter access to the aircraft cockpit when a cockpit door is briefly opened, for example, when a pilot exits the cockpit to use the lavatory, when the flight crew are served food, or during shift changes on long-haul flights.

Historical Context

Following the September 11, 2001 (9/11), terrorist attacks, the Federal Aviation Administration (FAA) mandated hardened cockpit doors that are resistant to forcible intrusion and small firearms on most passenger airline aircraft and large, all-cargo airplanes operated in the United States. Regulations generally require those doors to remain closed and locked for the entire duration of a flight with few exceptions, and special procedural measures must be taken in those rare instances when a door is opened to deter potential attempts to breach a cockpit. However, security concerns over potential flight deck breaches by terrorists or unruly passengers have prompted continued interest in secondary cockpit barriers.

The investigation of the National Commission on Terrorist Attacks Upon the United States (the 9/11 Commission) did not find conclusive evidence as to how the 9/11 hijackers gained access to the aircraft flight decks in those attacks, but did find evidence of the terrorists making specific inquiries and plotting to exploit opportunities when cockpit doors were opened. The pre-9/11 industry-wide common strategy of cooperating with hijackers and avoiding direct confrontation would have rendered physical barriers, such as hardened cockpit doors and secondary barriers, largely irrelevant. After the 9/11 attacks, the installation of hardened cockpit doors and implementation of procedures to defend the cockpit against any intrusions have prompted reviews of potential vulnerabilities, including during times when cockpit doors are opened in flight.

In 2004, United Airlines and Northwest Airlines (Northwest later merged with Delta) equipped some widebody jets with secondary cockpit barriers; other airlines did not follow suit. In 2007, the Air Line Pilots Association (ALPA) published a position paper urging government action to mandate secondary cockpit barriers by 2010; the issue has remained a top priority for the organization since. In 2011, RTCA, Inc., an independent standards development organization for aviation, developed guidance on the design and operational procedures for aircraft secondary barrier systems. In 2015, FAA issued an advisory recognizing the RTCA guidance on secondary barriers as a means to block access to the flight deck using an IPSB as an acceptable alternative to commonly employed methods that rely on cabin crew monitoring and impeding access to the flight deck with galley carts or other aircraft equipment.

Congressional Action

Since the 108th Congress in 2004 (see H.R. 4801), various legislative proposals have been introduced seeking action to require secondary cockpit barriers on certain commercial aircraft. In the 113th Congress, the Saracini Aviation Safety Act of 2013 (H.R. 1775, S. 1495) was introduced. The bill, named after Captain Victor J. Saracini, whose hijacked airplane was flown into the South Tower of the World Trade Center in New York City in the 9/11 attacks, would have mandated the installation and use of secondary cockpit barriers on all aircraft that are required by regulation to have hardened cockpit doors. This generally includes all airliners with 20 or more passenger seats and any all-cargo aircraft with a payload capacity greater than 7,500 pounds. Similar legislation offered in the 114th Congress (H.R. 911, S. 911) and 115th Congress (H.R. 911) would have mandated secondary cockpit barriers on commercial aircraft with more than 75 passenger seats or with a maximum gross takeoff weight of 75,000 pounds. Section 336 of the FAA Reauthorization Act of 2018 (P.L. 115-254), titled the Saracini Aviation Safety Act of 2018, mandated an FAA order by October 5, 2019, requiring installation of a secondary flight deck barrier on all newly manufactured aircraft delivered to U.S. passenger airlines.

Regulatory Action

In response to the statutory mandate in the FAA Reauthorization Act of 2018, FAA convened an Aviation Rulemaking Advisory Committee Working Group on flight deck secondary barriers in March 2019. The working group's February 2020 report to the FAA contained cost estimates and recommendations regarding the engineering and design of IPSBs, including loads and forces to withstand, placement in aircraft cabins, crew training, and operational procedures. It advised against expanding the requirement to include all-cargo aircraft and suggested that ISPBs may be unnecessary on smaller aircraft that operate strictly on short-haul flights, and may be procedurally impractical on flights staffed by one cabin crewmember. In August 2022, FAA published proposed rulemaking, and in June 2023 it issued a final rule that would require installation of secondary cockpit barriers on newly delivered airline aircraft, and would require those barriers

to be closed and locked whenever the flight deck door is opened. The regulation would generally impose new design requirements for delivered aircraft placed in service with U.S. air carriers that are currently required by FAA to have a hardened cockpit door. It would not apply to any all-cargo airplanes or to foreign passenger airliners operated to and from the United States. The rule is to apply to all new aircraft placed in service with U.S. air carriers beginning in the summer of 2025.

Airline Fleet Composition

According to FAA data for 2022, U.S. mainline passenger air carrier fleets included a total of 3,915 jets, and regional carriers operated another 2,002 aircraft, including 1,623 jets. Airlines operated another 935 all-cargo jet aircraft. In total, about 6,800 aircraft were operated by U.S. air carriers, of which about 5,900 were engaged in passenger-carrying operations. FAA expects the passenger air carrier fleet to grow at an average annual rate of 1.7%, the regional air carrier fleet to grow at an average rate of 1.0% per year, and the all-cargo fleet to grow 3.7% per year on average over the next 20 years. Additionally, FAA estimates a fleet retirement rate of 3.57% among U.S. air carriers, which would result in replacements of about 240 to 250 aircraft per year in the United States. In total, over the next several years, about 350 new aircraft are expected to enter air carrier service annually, of which about 300 would be placed in passenger airline service. At that rate, it would take roughly 28 years before most aircraft in passenger airline service would have secondary cockpit barriers installed, although FAA assumes most of the passenger airline fleet would be equipped in 25 years, by 2047.

Cost Estimates and Anticipated Security Benefits

In 2017, the Congressional Budget Office (CBO) estimated the industry-wide cost of IPSBs on new aircraft delivered to passenger airlines would be under $15 million annually, based on a per airplane cost between $5,000 and $12,000. In contrast, FAA estimated present value annualized costs of $16 million to $17 million through 2047 based on higher per airplane costs of $35,000 for purchase, installation, and training. FAA also assumes additional costs in the total airplane lifecycle, bringing total annualized costs to the airline industry to roughly $20 million to $29 million per year from 2023 through 2072.

In considering the potential costs of a major terrorist event, as demonstrated by the 9/11 attacks, and the potential benefits of disrupting or deterring such an occurrence, it is difficult to gauge the probability of a large-scale attack or to independently assess the degree to which a single measure, like a secondary cockpit barrier, might disrupt such an attack amid a complex and multilayered approach to aviation security. Nonetheless, FAA concluded that, if secondary cockpit barriers are completely effective at thwarting attacks, installing them would be cost effective, assuming the probability of an attempted terrorist attack is at least 0.66% per year, or approximately one attempt of that scale every 150 years.

Further Considerations for Congress

Congress may seek to expand the number of aircraft subject to secondary cockpit barrier requirements. The Saracini Enhanced Aviation Safety Act of 2023 (H.R. 911, S. 911) would mandate installation of secondary cockpit barriers on all U.S. passenger airliners. A provision in the Securing Growth and Robust Leadership in American Aviation Act (H.R. 3935) would instead direct FAA to convene a rulemaking committee to make recommendations regarding additional mandates for other airline aircraft not included in the current regulation. If the entire passenger airline fleet of roughly 5,900 aircraft were to fall under such requirements, the total fleetwide cost to comply would be approximately $71 million under the CBO assumption of a top per aircraft cost of $12,000, or $207 million if the per aircraft cost is $35,000 as FAA expects. These amounts might be somewhat higher, however, since retrofit installations might cost more than installations on brand-new aircraft.

FAA estimated that about 828 million passengers flew in 2022, and it forecasts that annual passenger enplanements will surpass 900 million in 2023 and 1 billion within a decade. Based on future average annual enplanements of 950 million, the barriers would need to remain in service for about 8 years to bring the cost per passenger enplanement to below one cent if the cost per airplane is $12,000. If the cost per airplane is $35,000, then the barriers would need to remain in service for about 22 years to bring the per passenger cost down to one cent, which would be slightly less than FAA estimates of a typical airplane lifecycle of 25 years. So, for newer aircraft, per-passenger costs over the lifespan could be less than one cent across the airplane's service life and would likely be a few cents per passenger on average. Per-passenger costs would be somewhat higher if airlines were required to equip older aircraft close to the end of service with secondary barriers because those barriers would be in service for a shorter time. Airlines would also incur the additional costs to equip replacement aircraft with secondary barriers. So, total costs and per-passenger costs would vary across the industry, with somewhat lower costs incurred by airlines with relatively newer aircraft fleets and higher costs incurred by airlines with older fleets. In general, the longer the aircraft and the secondary cockpit barriers remain in service without the need for major repair or replacement, the lower the per-aircraft and per-passenger costs of installing and maintaining the barriers will be.

Given that it will take over two decades to achieve widespread proliferation of secondary cockpit barriers under the current regulation that only applies to newly delivered passenger aircraft, Congress may choose to weigh the potential security benefits and associated monetary costs in assessing whether to require secondary cockpit barriers on the existing fleet of passenger aircraft currently operated by U.S. airlines. In addition, Congress might also contemplate the installation of secondary cockpit barriers on foreign flights operated to and from the United States as well as onboard all-cargo aircraft, to more broadly address potential security risks from hijackings.

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