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Addressing COVID-19 Pandemic Impacts on Civil Aviation Operations

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SUMMARY

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Addressing COVID-19 Pandemic Impacts on Civil Aviation Operations

The COVID-19 pandemic has had a large impact on civil aviation, particularly commercial passenger airline operations. The combination of travel restrictions; state and local mandates to stay at home, shelter-in-place, and self-quarantine after travel from certain areas; and public concerns over the risk of contracting COVID-19 from travel-related activities has resulted in a significant decrease in air travel demand since March 2020. Passenger air travel is not expected to return to 2019 levels until 2023 at the earliest.

The COVID-19 outbreak is the first major global pandemic having widespread impact on passenger jet air travel, and the federal government lacked a comprehensive plan for responding to communicable disease outbreaks across the aviation system despite considerable efforts to study the risks and develop airport-specific response plans. Initial federal response to the COVID-19 outbreak focused on international travel restrictions from countries experiencing outbreaks starting in late January 2020 with restrictions on travelers from China. Restrictions were later expanded to include travelers from Iran, Europe, and later from Brazil. Additionally, the Department of State had issued a global health advisory, urging U.S. citizens to avoid all international travel. The European Union also imposed restrictions on travelers from the United States which remains in effect even through restrictions on travel to Europe from certain other countries have been eased.

The United States has not limited domestic air travel. Nevertheless, domestic travel has been impacted significantly by state and local restrictions and public trepidation about COVID-19 transmission within the aviation system and at popular travel destinations. As a result passenger activity at U.S. airports since March 2020 is down about 75% compared to 2019 levels.

In July 2020, the Department of Transportation, in coordination with other federal agencies, developed a framework for responding to the public health risks of COVID-19 in the aviation sector. The framework emphasizes the implementation of voluntary mitigation measures and shared responsibilities, but some in the aviation industry and in Congress have advocated for specific federal mandates for certain measures, such as requiring face masks while traveling in the aviation system, something the Centers for Disease Control and Prevention recommends but does not require. A number of voluntary measures have been implemented at airports, aboard aircraft, and at air traffic control facilities to mitigate COVID-19 transmission, including signage and other public education efforts; social distancing cues; shields and barriers at ticketing counters, TSA checkpoints, and gates; stepped-up cleaning and disinfection of high-touch surfaces; increased airflow and filtration; and protocols to identify and isolate ill passengers and aviation workers. Additional precautions, such as pre-board health screenings and temperature checks are being debated but remain controversial. While actions taken have resulted in some recovery in air travel demand, airline ridership remains well below historical levels and will likely remain low until COVID-19 is well contained and flyers have sustained confidence in effective contagious disease mitigation measures implemented for air travel.

In response to the significant downtown in air travel, U.S. airlines have received federal aid including loan guarantees and payroll assistance grants authorized through provisions in the Coronavirus Aid, Relief, and Economic Security (CARES) Act (P.L. 116-136) which was enacted on March 27, 2020. Workforce protections implemented as a condition of accepting these funds are set to expire at the end of September 2020, prompting airlines to plan for and announce large-scale airline furloughs, layoffs, and early retirement offers. Airlines have already taken steps to idle large portions of their fleets and accelerate plans to retire aging and outmoded aircraft in an effort to downsize amid growing financial debt. These actions are anticipated to result in both near-term and long-lasting impacts on the industry and could severely hamper airlines' ability to attract and hire qualified pilots and mechanics in the future and to acquire new aircraft to meet passenger demand, particularly if there is a surge in travel demand once COVID-19 is effectively contained. The Transportation Security Administration, which has historically struggled with high screener turnover, may face similar challenges to appropriately reduce screener staffing levels to reflect suppressed passenger levels in the near-term while having the ability to attract, hire, and train screeners to adequately staff checkpoints to meet future airline passenger demand.

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Introduction

The COVID-19 pandemic has had a large impact on civil aviation, particularly commercial passenger airline operations. While the pandemic and the response to the pandemic continues to evolve,[1] the aviation industry and related federal agencies face a broad array of challenges to keep airline employees and passengers safe, mitigate the spread of the disease, and respond to dramatic shifts in demand for air travel.

The combination of travel restrictions; state and local mandates to stay at home, shelter in place, and self-quarantine after travel from certain areas; and public concerns over the risk of contracting COVID-19 from travel-related activities has had a significant impact on air travel demand since March 2020. Throughout March 2020, the number of passengers passing through TSA checkpoints throughout the United States dropped precipitously (see **Figure 1**). At its lowest point in mid-April, passenger volume experienced a drop of more than 95% compared to one year ago. Passenger numbers hovered at or below about 100,000 daily passengers throughout much of April 2020, compared to more than 2 million daily passengers during comparable days in 2019. As states in the Northeast began to ease COVID-19 restrictions, passenger numbers increased to about 700,000 per day by the end of July 2020, still showing a significant decline from past summer passenger volumes of about 2.6 million daily passengers. Potential resurgences in COVID-19 cases could further suppress airline ridership in the coming months.

It is likely that passenger airline travel will not return to pre-March 2020 levels until a highly effective prophylactic treatment or a vaccine to protect against COVID-19 can be developed and made widely available, a prospect that most infectious disease experts expect will take at least 12 to 18 months based on historical experience with vaccine development, testing, and approvals processes.[2] An International Air Transport Association survey found that a majority of individuals indicated that they would hold off 6 to 12 months following COVID-19 containment before returning to air travel.[3] Therefore, air travel demand will not likely recover substantially until late 2021 or 2022 at the earliest, and passenger demand is not expected to reach 2019 levels internationally until 2023 or later.[4] Airlines have cautioned that once demand for air travel recovers, it will take years for operations to be restored to pre-pandemic levels.[5] If a spike in demand for air travel ensues following an end to the global pandemic, the airline industry may be hard-pressed to quickly rebuild their workforces, particularly in safety-critical occupations, and to marshal sufficient aircraft and equipment to expand capacity.

[1] For a general overview of the U.S. response to COVID-19 see CRS Report R46219, *Overview of U.S. Domestic Response to Coronavirus Disease 2019 (COVID-19)*, coordinated by Sarah A. Lister and Kavya Sekar.

[2] "Can a Vaccine for Covid-19 Be Developed in Record Time?, A Discussion Moderated by Siddhartha Mukherjee," *New York Times Magazine*, June 9, 2020, at https://www.nytimes.com/interactive/2020/06/09/magazine/covid-vaccine.html; "Vaccine Development, Testing, and Regulation," *The History of Vaccines*, The College of Physicians of Philadelphia, at https://www.historyofvaccines.org/content/articles/vaccine-development-testing-and-regulation.

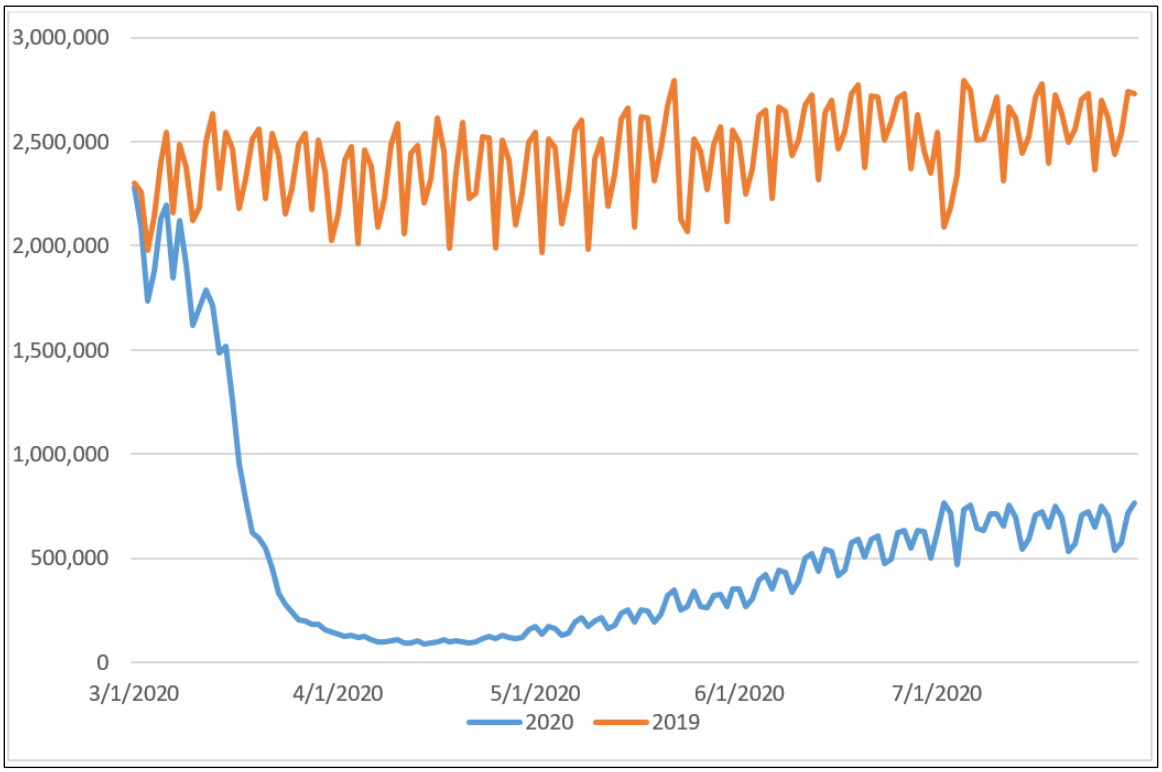
[3] International Air Transport Association (IATA), *Air Passenger Market Analysis, May 2020*, at https://www.iata.org/en/iata-repository/publications/economic-reports/air-passenger-monthly-analysis—may-2020/.

[4] Ibid.

[5] Airlines for America, *Tracking the Impacts of COVID-19*, at https://www.airlines.org/dataset/impact-of-covid19-data-updates/#.

Figure 1. Daily Passengers Passing Through TSA Screening Checkpoints

March-July 2020 vs. 2019



Source: Transportation Security Administration.

Notes: Dates provided are for 2020. Data for 2019 are matched to corresponding weekday of the 2020 date.

Historical Overview

The COVID-19 outbreak represents the first major global pandemic in the age of passenger jet air transportation which began in the late 1950s, well after the notorious 1918 influenza pandemic.[6] While smaller-scale flu pandemics in 1957 and 1958[7] and between 1968 and 1970[8] were each responsible for more than 1 million deaths worldwide and more than 100,000 in the United States, they appear to have had little impact on commercial air travel in part because air travel, especially international air travel, was not as widely used as it is today.

The 2003 Severe Acute Respiratory Syndrome (SARS) Outbreak

In 2003, the global airline industry, still recovering from a considerable downturn in air travel following the 9/11 terrorist attacks in September 2001, was significantly but briefly impacted by

[6] Centers for Disease Control and Prevention, *1918 Pandemic (H1N1 virus)*, at https://www.cdc.gov/flu/pandemic-resources/1918-pandemic-h1n1.html. For a complete list of past pandemics see https://www.cdc.gov/flu/pandemic-resources/basics/past-pandemics.html.

[7] Centers for Disease Control and Prevention, *1957-1958 Pandemic (H2N2 virus)*, at https://www.cdc.gov/flu/pandemic-resources/1957-1958-pandemic.html.

[8] Centers for Disease Control and Prevention, *1968 Pandemic (H3N2 virus)*, at https://www.cdc.gov/flu/pandemic-resources/1968-pandemic.html.

the outbreak of Severe Acute Respiratory Syndrome (SARS), caused by a novel coronavirus (SARS-CoV-1) believed to have originated in the Guangdong province of China. While fewer than 10,000 cases and fewer than 1,000 deaths worldwide were attributed to SARS in 2003, the outbreak triggered widespread concerns over potential spread from international travel. Although the outbreak was quickly contained, it was estimated that annual total air travel in 2003 declined by 8% among air carriers in the Asia-Pacific region and by about 3.7% among U.S. air carriers. Airlines worldwide lost an estimated $7 billion of revenue, including $1 billion among U.S. airlines.[9] The SARS outbreak, coupled with an intense focus on homeland security preparedness following the 9/11 terrorist attacks, prompted considerable federal and industry attention to communicable disease transmission through the commercial air transport system.

In September 2007, the National Academies of Sciences, Engineering, and Medicine sponsored a workshop bringing together federal agency officials and aviation industry leaders to collaborate on plans for addressing pandemic outbreaks.[10] Discussion revealed that while the U.S. government had developed a strategic plan to prevent pandemic events originating overseas from spreading to the United States and to contain disease spread domestically while limiting economic impacts, these goals presented conflicting challenges for the aviation industry. Experts noted that minimizing the spread of disease through air travel would involve collaborative efforts to carry out risk-based screening at airports, impose in-flight measures to protect passengers and crew, and to support medical response and effective cleaning and disinfecting of aircraft and airport facilities. At the same time, it was recognized that airlines and airports could face considerable challenges to preserve air service, maintain critical transportation infrastructure, and address workforce absenteeism and attrition during a pandemic event. Suggested next steps centered on additional research, planning, communication, and coordination to prepare for pandemics. Most other recent contagious diseases outbreaks, including the 2009 H1N1 influenza pandemic, had little impact on air travel.

The 2014 Ebola Outbreak

Response to the 2014 Ebola outbreak in West Africa focused on preventing disease spread to the United States through air travel using risk-based health screening, targeted measures to isolate and quarantine suspected cases, and contact tracing to identify and monitor exposed individuals.[11] Travelers who had originated in West African nations impacted by the disease underwent enhanced health screenings including questionnaires and temperature checks at U.S. airports of entry. To facilitate these checks, U.S.-bound passengers originating from impacted West African countries were required to enter the United States through one of five designated airports. Another key component of the response to the Ebola outbreak involved providing advisory materials to educate air travelers, particularly those traveling to or from the impacted region. There were no direct flights between the United States and the affected countries, but many

[9] Teresa Cederholm, "Must-know: SARS' impact on the airline industry," *Market Realist,* October 21, 2014, at https://marketrealist.com/2014/10/must-know-sars-impact-airline-industry/; Sherisse Pham, "SARS cost global airlines $7 billion. The coronavirus outbreak will likely be much worse," *CNN Business,* February 5, 2020, at https://www.cnn.com/2020/02/05/business/coronavirus-airline-cost/index.html.

[10] The National Academies of Sciences, Engineering, and Medicine, *Interagency-Aviation Industry Collaboration on Planning for Pandemic Outbreaks: Summary of a Workshop* (Katherine F. Turnbull, Rapporteur), Conference Proceedings 41, 2008, National Academies Press, at https://www.nap.edu/catalog/23266/interagency-aviation-industry-collaboration-on-planning-for-pandemic-outbreaks.

[11] Nicole J. Cohen, MD; Clive M. Brown, MBBS; & Francisco Alvarado-Ramy, MD, et al., Travel and Border Health Measures to Prevent the International Spread of Ebola, *Morbidity and Mortality Weekly Report, Supplement,* July 8, 2016, 65(3), pp. 57-67, at https://www.cdc.gov/mmwr/volumes/65/su/su6503a9.htm.

flights were cancelled as other countries, particularly European nations, imposed travel restrictions. During the outbreak, FAA acknowledged its broad authority to restrict access to U.S. airspace, but cautioned that decisions made on a public health basis would involve coordination with other federal agencies including the Centers for Disease Control and Prevention (CDC), the Department of Homeland Security, the Department of State, and the Department of Transportation (DOT).[12]

Middle East Respiratory Syndrome (MERS)

The 2012 outbreak of Middle East Respiratory Syndrome (MERS), which was mostly contained to the Arabian Peninsula, had minimal impact on air travel. A local outbreak of MERS in South Korea in 2015 was traced to a traveler who had returned from the Arabian Peninsula, but there have only been a couple documented cases of MERS in the United States. While no travel restrictions or special precautions have been put in place in response to MERS, the CDC continues to monitor reports of ill travelers returning from the Arabian Peninsula. The current COVID-19 pandemic poses potential challenges for monitoring MERS as the symptoms of the two diseases are similar.[13] MERS is caused by a different coronavirus than the virus responsible for COVID-19, and about 3 to 4 out of every 10 individuals who have contracted MERS have died as a result.[14]

Research, Planning, and Preparedness

In 2015, citing these global communicable disease threats, the U.S. Government Accountability Office (GAO) advised that a formal national aviation preparedness plan to respond to communicable disease outbreaks would aid in developing a coordinated response, including appropriate employee training, distribution of protective equipment and supplies, and sanitation and disinfection practices.[15] However, as of June 2020, GAO reported that the federal government still had not developed such a plan, despite international obligations to do so.[16] Specifically, the International Civil Aviation Organization (ICAO), the specialized agency of the United Nations for civil aviation matters, expects countries to develop an aviation-related plan to respond to any communicable disease posing a serious public health risk.[17] The U.S. approach to addressing communicable disease risks instead has relied primarily on individual airport plans focused

[12] Federal Aviation Administration (FAA), "FAA Statement on Ebola," press release, Oct. 23, 2014, at https://www.faa.gov/news/press_releases/news_story.cfm?newsId=17375; CRS Report R43809, *Preventing the Introduction and Spread of Ebola in the United States: Frequently Asked Questions*, coordinated by Sarah A. Lister.

[13] Ali Pormohammad, Saied Ghorbani, et al., "Comparison of confirmed COVID-19 with SARS and MERS cases - Clinical characteristics, laboratory findings, radiographic signs and outcomes: A systematic review and meta-analysis," *Reviews in Medical Virology, 30(4)*, July 2020, e2112.

[14] Centers for Disease Control and Prevention, *Information About Middle East Respiratory Syndrome (MERS)*, Revised December 2015, at https://www.cdc.gov/coronavirus/mers/downloads/factsheet-mers_en.pdf.

[15] U.S. Government Accountability Office, *Air Travel and Communicable Diseases: Comprehensive Federal Plan Needed for U.S. Aviation System's Preparedness*, GAO-16-127, December 16, 2015, at https://www.gao.gov/products/GAO-16-127.

[16] U.S. Government Accountability Office, *Air Travel and Communicable Diseases: Status of Research Efforts and Action Still Needed to Develop Federal Preparedness Plan*, GAO-20-655T, June 23, 2020, at https://www.gao.gov/products/GAO-20-655T.

[17] See International Civil Aviation Organization, *Guidelines for States Concerning the Management of Communicable Disease Posing a Serious Public Health Risk*, at https://www.icao.int/safety/aviation-medicine/guidelines/AvInfluenza_guidelines.pdf.

primarily on handling ill travelers entering the United States from overseas rather than on system-wide measures.

In March 2018, the Transportation Research Board of the National Academies sponsored an Airport Cooperative Research Program workshop exploring airport roles in reducing the transmission of communicable diseases.[18] The workshop focused on collaborative efforts between airports and public health service agencies to

- develop, test, evaluate, and revise communicable disease response plans;
- effectively communicate with travelers, airport personnel, and the public at large, including communications through print and broadcast media and social media platforms;
- design and utilize airport infrastructure in a manner that reduces the risk of disease spread;
- engage with various stakeholders at the international, federal, state, and local level to mitigate communicable disease outbreaks before they occur; and
- manage and coordinate preparedness and response to contagious disease outbreaks.

These airport-specific frameworks, along with airline initiatives to address mitigation measures onboard aircraft, have served as the initial means for responding to the COVID-19 pandemic in the U.S. civil aviation system.

U.S. Civil Aviation Response to COVID-19

International Travel Restrictions

On January 31, 2020, President Trump issued restrictions banning foreign travelers who were in China within14 days prior to traveling to the United States. On February 29, 2020, a similar restriction was imposed on travelers from Iran, and on March 11, 2020, restrictions were imposed on travelers from the 26 countries in the Schengen area of the European Union (EU). On March 14, 2020, the European restrictions were expanded to include travelers from the United Kingdom and Ireland. On May 24, 2020, President Trump imposed similar restrictions on travelers entering the United States from Brazil. These restrictions have all remained in effect. On March 31, 2020, the Department of State issued a global level 4 health advisory, urging U.S. citizens to avoid all international travel. That advisory was lifted in early August 2020, but many popular destinations for American travelers have remained off limits because of restrictions on U.S.-based passengers imposed by other nations.[19]

In early July, European Union member countries agreed to begin easing travel restrictions, allowing residents of some countries outside the EU, including Canada, to travel to and from Europe for nonessential reasons. The EU member countries kept restrictions on residents of the United States in place, but indicated that they would review the restrictions every two weeks and

[18] National Academies of Sciences, Engineering, and Medicine, *Airport Roles in Reducing Transmission of Communicable Diseases*, Washington, DC: The National Academies Press, 2019, at https://www.nap.edu/catalog/25367/airport-roles-in-reducing-transmission-of-communicable-diseases.

[19] Tariro Mzezewa, "The U.S. Lifted Its Advisory Against Traveling Abroad. What Does That Mean?," *New York Times*, August 6, 2020, at https://www.nytimes.com/2020/08/06/travel/USA-Travel-State-Department-warnings.html.

make determinations based on current epidemiologic data. U.S. citizens also face restrictions, including outright bans, quarantine, and COVID-19 testing requirements imposed by many other destinations including Canada, the Bahamas, Australia, and most countries in Asia.[20]

As the pandemic continues, additional restrictions on international travel to and from the United States may be imposed depending on local conditions in various countries. Since these restrictions may be unpredictable, flyers may cancel or hold off on international travel plans altogether, even if restrictions are eased, potentially suppressing the number of passengers flying overseas. Therefore, impacts on airline passenger demand for international travel may last for some time even after restrictions are eased or lifted.

Domestic Air Travel

The United States has not limited domestic air travel. Nonetheless, domestic travel has been affected by state and local restrictions such as quarantine orders imposed by some states, territories, and the District of Columbia as well as many municipalities. Many of these restrictions require individuals arriving from certain areas to self-isolate for up to 14 days, although there are various exceptions for essential travel purposes such as emergency response, maintaining critical infrastructure, and medical treatment. In general, tourism is discouraged if not outright forbidden by many of these orders. For example, Hawaii, a popular tourist destination, imposed a mandatory 14-day self-quarantine for passengers arriving from other states on March 26. On April 1, Hawaii's self-quarantine requirement was expanded to include interisland travel within the state. As a consequence, passenger air travel to Hawaii in 2020 is down 95% compared to 2019 levels.[21] Other states have also imposed broadly applicable stay-at-home or shelter-in-place orders which may also restrict travelers from engaging in activities at their travel destinations.

Additionally, the CDC has advised that travel increases the risk of COVID-19 disease transmission.[22] The CDC cautions that while most viruses do not spread easily on flights because of how air circulates and is filtered on airplanes, social distancing is difficult on crowded flights, and individuals may be seated closer to others than the recommended 6 feet of distance, sometimes for several hours. Moreover, CDC notes that air travel involves spending time in airport terminals and at security checkpoints which may involve close contact with other individuals and frequently touched surfaces, thus increasing the risk of exposure to the virus that causes COVID-19. Addressing the risks, many businesses have cancelled nonessential travel for their employees, and many individuals have decided to avoid air travel during the pandemic.

COVID-19 Response Framework for U.S. Civil Aviation

In July 2020, the Departments of Transportation, Homeland Security, and Health and Human Services jointly published a framework for mitigating the public health risks of COVID-19 in the aviation sector. That document, titled *Runway to Recovery*, outlines a national strategy for restoring the air transportation system. It emphasized greater consistency in public health mitigation measures implemented by airports and airlines and the shared responsibilities for

[20] Geoff Whitmore, "August 2020 Update on Coronavirus Travel Restrictions," August 6, 2020, *Forbes,* at https://www.forbes.com/sites/geoffwhitmore/2020/08/06/august-2020-update-on-coronavirus-travel-restrictions/#429e54ae290d.

[21] Airlines for America, *Tracking the Impacts of COVID-19,* at https://www.airlines.org/dataset/impact-of-covid19-data-updates/#.

[22] See Centers for Disease Control and Prevention, *Considerations for Travelers – Coronavirus in the US,* at https://www.cdc.gov/coronavirus/2019-ncov/travelers/travel-in-the-us.html.

implementing these measures, as well as effective coordination and communication.[23] The framework identifies a number of measures for airports and airlines that are recommended but not mandated, including

- requiring masks or face coverings throughout the air transportation environment;
- promoting social distancing;
- enhancing cleaning and disinfecting;
- conducting health assessments of passengers and workers;
- collecting passenger information to facilitate contact tracing;
- minimizing the touching of shared objects, documents, and surfaces;
- reporting daily on public health risk mitigation efforts;
- enhancing exposure reduction initiatives at security checkpoints;
- educating and communicating with passengers and employees; and
- using new technologies to support mitigation measures.

The framework also highlights aviation as a key driver of economic recovery because of its key role in efficiently and safely transporting people and goods. It emphasizes that innovation, creative solutions, flexibility, and rapid deployment of new technologies are needed to respond to and recover from the COVID-19 public health emergency.

Measures to Protect Flyers and Aviation Workers

A number of voluntary measures have been implemented at airports, aboard aircraft, and at air traffic control facilities to mitigate COVID-19 transmission, including signage and other public education efforts; social distancing cues; shields and barriers at ticketing counters, TSA checkpoints, and gates; stepped-up cleaning and disinfection of high-touch surfaces; increased airflow and filtration; airline requirements that passengers wear masks aboard aircraft; and protocols to identify and isolate ill passengers and aviation workers.

The CDC is authorized to conduct public health measures related to interstate travel including at U.S. airports using noninvasive procedures to detect the presence of communicable diseases.[24] This could include measures such as pre-board health questionnaires and temperature checks. As part of these measures, the CDC has the authority to require traveling individuals to provide contact information to aid in contact tracing efforts.

Masks and Facial Coverings

The CDC recommends, but does not require, masks or cloth face coverings at all times while traveling in the passenger air transportation system, including at airports and on board aircraft. Many airlines, including all major U.S. air carriers have imposed requirements for passengers to wear masks or facial coverings while on board aircraft. Exceptions are made for individuals with medical conditions or disabilities that would make compliance challenging or could interfere with the individual's ability to remove the mask if needed, for example to access supplemental oxygen

[23] U.S. Department of Transportation, U.S. Department of Homeland Security, and U.S. Department of Health and Human Services, *Runway to Recovery: The United States Framework for Airlines and Airports to Mitigate the Public Health Risks of Coronavirus*, July 2020, at https://www.transportation.gov/sites/dot.gov/files/2020-07/Runway_to_Recovery_07022020.pdf.

[24] See 42 C.F.R. §70.10.

in the case of cabin depressurization. The Health and Economic Recovery Omnibus Emergency Solutions Act (HEROES) Act (H.R. 6800), passed by the House on May 15, 2020, would mandate all U.S. passenger airlines to require passengers and cabin crew to wear a mask or face covering whenever they are onboard aircraft. The legislation would require flight crews to wear masks whenever they are on board aircraft and outside the flight deck. It would direct FAA to study the safety implications of allowing pilots to wear masks on board the flight deck, a practice that could prove challenging because pilots must be able to quickly access and don oxygen masks in the event of a rapid depressurization or smoke in the cockpit.

Social Distancing

Social distancing cues, such as floor markings and signs, have been implemented at several airports, but effective social distancing is difficult to implement in crowded airport terminals. Social distancing is even more difficult on air carrier aircraft where seats are closely spaced. Legislation intended to promote airline passenger safety (S. 4293 and H.R. 7741) would prohibit airlines from filling middle seats of airplanes during the COVID-19 emergency. Airlines argue that such restrictions are not economically viable. In 2019, the break-even load factor (the percent of seats that must be filled with paying travelers to cover operational costs) was 75.9%, but requiring middle seats to remain unfilled would effectively cap load factors at about 66% for typical aircraft economy class configurations.

Airliner Cabin Air Filtration

Airlines have stated that the highly efficient particulate air filters installed on almost all passenger jets operated by major air carriers can effectively capture most viruses, reducing the chances of infection from circulating air.[25] Moreover, increasing the rate at which cabin air is replaced with fresh air can further mitigate risks, rendering airline cabin air cleaner than air in most buildings, according to airlines and aircraft manufacturers. Public health research found that respiratory disease spread by droplets would likely be limited inside an aircraft cabin among seated passengers to one row in front or behind an infected individual, suggesting that filtration systems are relatively effective at trapping viruses even though their primary purpose is to rid the air of harmful chemicals.[26] Nonetheless, further transmission may occur if an infected passenger visits the lavatory during flight, or comes in contact with other passengers and crew during boarding and deplaning.

Researchers are looking into additional measures to help mitigate contagious disease spread in aircraft cabins including ultraviolet lights, self-cleaning lavatories, and redesigned ventilation systems.[27] However, it is not likely that these changes would be implemented anytime soon and there has been no indication so far that FAA will seek to require any of these design changes on current or future aircraft.

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[25] International Air Transport Association, *Briefing Paper: Cabin Air Quality – Risk of Communicable Diseases Transmission,* IATA Corporate Communications, January 2018, at https://www.iata.org/contentassets/f1163430bba94512a583eb6d6b24aa56/cabin-air-quality.pdf.

[26] Michael Laris, "Scientists Know Ways To Help Stop Viruses from Spreading on Airplanes. They're too Late for This Pandemic," *Washington Post,* April 29, 2020, at https://www.washingtonpost.com/local/trafficandcommuting/scientists-think-they-know-ways-to-combat-viruses-on-airplanes-theyre-too-late-for-this-pandemic/2020/04/20/83279318-76ab-11ea-87da-77a8136c1a6d_story.html; Karen Bull, "Cabin Air Filtration: Helping to Protect Occupants from Infectious Diseases," *Travel Medicine and Infectious Disease, 6*(3), May 2008, pp. 142, 144.

[27] Ibid.

Procedures for Responding to Ill Travelers

CDC regulations require airlines to report onboard deaths and illnesses.[28] CDC guidelines stipulate that reportable conditions would include a fever of 100.4 degrees Fahrenheit or higher and other specified symptoms of a communicable disease. In practice, this information would be relayed to the CDC by FAA air traffic controllers or sometimes by airline operations center dispatchers for domestic flights. Airlines already have well established procedures that follow CDC requirements and recommended practices for identifying, isolating, and documenting ill travelers.

The CDC maintains 20 quarantine stations throughout the country, including 16 located at major international airports of entry. These serve as a primary means for identifying, isolating, and tracking passengers with contagious diseases upon arrival at airports of entry.[29] When ill passengers are identified, CDC can implement contact tracing protocols to identify and notify other passengers who may have come in contact with the ill individual. The CDC has the legal authority to deny foreign visitors that are ill entry into the United States, detain and quarantine individuals that may have certain communicable diseases, including COVID-19, or order such individuals to be hospitalized or to self-quarantine and isolate for a certain period of time. However, detection, quarantine, and contact tracing practices have played a limited role in fighting the spread of COVID-19 through international air travel mainly because the international travel restrictions and advisories along with travelers' reluctance to fly, especially on long-haul flights, have reduced international passenger traffic so significantly.

The CDC has also, at times, relied on public health do-not-board and lookout lists to identify passengers with highly infectious diseases that should be denied aircraft boarding.[30] The CDC shares this information with the TSA, which incorporates these identities into its Secure Flight system, the principal tool used to check airline passenger information for suspected terrorists and other individuals that pose a threat to civil aviation. The CDC has used this approach to prevent commercial travel by individuals known to be infected with tuberculosis and measles, but has not used this as a screening tool during the current COVID-19 pandemic. The large numbers of infections and new daily cases would pose significant challenges to utilizing the public health do-not-board list or a similar tool to prevent COVID-19 transmission through airline travel. Moreover, such a tool may only be partially effective if individuals who are asymptomatic or mildly symptomatic but undiagnosed can transmit the disease.

There has been considerable policy discussion surrounding pre-board enhanced health screenings, including asking questions about common COVID-19 symptoms and conducting temperature checks. CDC recommends temperature checks and health assessments for certain other situations, for example, prior to admitting employees arriving for shift work at critical infrastructure facilities, including transportation facilities such as airports and aircraft maintenance facilities.[31] However, proposals to screen airline passengers have been more controversial, as questions

[28] See 42 C.F.R. §§70.4, 70.11, 71.21.

[29] See https://www.cdc.gov/quarantine/quarantine-stations-us.html.

[30] Centers for Disease Control and Prevention, "Federal Air Travel Restrictions for Public Health Purposes—United States, June 2007-May 2008," *Mortality and Morbidity Weekly Report*, September 19, 2008, 57(37), pp. 1009-1012, at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5737a1.htm.

[31] Centers for Disease Control and Prevention, *Implementing Safety Practices for Critical Infrastructure Workers Who May Have Had Exposure to a Person with Suspected or Confirmed COVID-19, Interim Guidance*, Updated April 20, 2020, at https://www.cdc.gov/coronavirus/2019-ncov/community/critical-workers/implementing-safety-practices.html.

remain over who would conduct the screening and how effective the measures would be at detecting ill travelers and preventing the spread of COVID-19.

Airlines have advocated for temperature checks and have suggested that TSA would be best equipped and staffed to carry out pre-board screening measures.[32] However, on May 15, 2020, House Homeland Security Committee Chairman Bennie Thompson issued a statement questioning TSA's authority to perform temperature checks of passengers as well as raising questions about the additional health and safety risks to frontline TSA screeners if they were required to perform these checks.[33] Nonetheless, airlines have continued to push for temperature checks at screening checkpoints, arguing that TSA is in the best position to ensure that procedures are standardized and consistent across airports, and vowing to refund tickets if passengers are turned away because of an elevated temperature.[34]

Sanitation and Decontamination of Aircraft

Airlines have stepped up cleaning and disinfection of aircraft between flights and overnight. The HEROES Act (H.R. 6800) would require that aircraft cabins and cockpits be cleaned, disinfected, and sanitized after each flight in accordance with CDC guidance. Thorough disinfection of aircraft interiors between flights, however, could run counter to airline scheduling strategies of minimizing the time aircraft spend at the gate. Thorough cleaning and disinfecting is also more labor intensive than routine cleaning and requires airlines to hire or contract larger numbers of cleaning personnel, who must be trained in properly sanitizing and disinfecting aircraft cabins. For these reasons, some airlines have reportedly started to scale-back back cleaning. For example, it was reported in August 2020 that Southwest Airlines had stopped wiping down arm rests, seat belts, and seats between each flight while continuing to disinfect tray tables and lavatories before new passengers board.[35] Southwest indicates that its practices remain compliant with CDC guidance.[36]

TSA Screening Checkpoints

The CARES Act provided TSA $100 million in additional operational funds to pay for stepped up cleaning and sanitization at checkpoint and in other airport common areas. TSA has stepped up cleaning and disinfecting of checkpoints focusing on high-touch areas and objects such as the plastic bins used to load personal items for security inspection. TSA now instructs passengers to store small personal items such as wallets, keys, and cell phones inside carry-on bags rather than placing them loose in the plastic bins. TSA has also eased its restrictions on liquids and gels,

[32] Airlines for America, "Major U.S. Airlines Pledge to Refund Tickets for Passengers Who Are Denied Access if Federal Authorities Begin Checking Temperatures at Airports," June 25, 2020, at https://www.airlines.org/news/major-u-s-airlines-pledge-to-refund-tickets-for-passengers-who-are-denied-access-if-federal-authorities-begin-checking-temperatures-at-airports/.

[33] Committee on Homeland Security, U.S. House of Representatives, "Thompson Statement on Reports TSA to Check Passenger Temperatures," May 15, 2020, at https://homeland.house.gov/news/press-releases/thompson-statement-on-reports-tsa-to-check-passenger-temperatures.

[34] Airlines for America, "Major U.S. Airlines Pledge to Refund Tickets for Passengers Who Are Denied Access if Federal Authorities Begin Checking Temperatures at Airports," June 25, 2020, at https://www.airlines.org/news/major-u-s-airlines-pledge-to-refund-tickets-for-passengers-who-are-denied-access-if-federal-authorities-begin-checking-temperatures-at-airports/.

[35] Mary Schlangenstein, "Southwest Pulls Back on Jet Cleanup to Save Time Between Flights," *Bloomberg Business*, August 3, 2020, at https://www.bloomberg.com/news/articles/2020-08-03/southwest-air-pulls-back-on-jet-cabin-cleaning-between-flights.

[36] See https://www.southwest.com/Coronavirus/.

allowing passengers to bring up to 12 ounces of liquid hand sanitizer through screening checkpoints.

At airport security checkpoints, TSA screeners are required to wear masks, but passengers are not. Passengers may voluntarily wear masks, but could be asked to briefly remove them in order for document checkers to visually match them to their identification. TSA has erected barrier shields to separate document checkers from travelers and has made procedural changes to minimize contact between document checkers and the public by having travelers scan their own documents.

While social distancing cues, such as markers on the floor, have been installed at some airports to promote social distancing in security lines, long-term solutions to reconfigure security checkpoint queuing areas may be needed. Adding additional space for social distancing could greatly exacerbate existing problems regarding space allocation for screening checkpoints and queues.

Airport Infrastructure Improvements

On June 4, 2020, President Trump signed an executive order[37] that, among other things, directed the Department of Transportation to expedite the delivery of transportation infrastructure projects, including airport infrastructure projects. On July 6, 2020, DOT announced airport safety and infrastructure grant awards totaling almost $800 million, including roughly $690 million in Airport Improvement Program (AIP) grants and an additional $104 million in CARES Act grants that boost federal contributions to 100% of project costs eliminating the caps on federal shares for FY2020 projects.[38] On July 28, 2020, an additional $242 million in AIP grants and $31 million in CARES Act funds were awarded.[39]

These funds are intended primarily for infrastructure projects that will improve the safety and efficiency of flight operations. However, the pandemic has created new infrastructure needs, mostly inside airport terminals. For example, design changes may be needed at ticketing areas, security checkpoints, waiting areas, restrooms, and inter- and intra-terminal transportation systems to better accommodate social distancing and facilitate more frequent cleaning and disinfecting of high-traffic areas.

Such design changes may need to identify and focus on remediation of key areas of potential disease transmission. In restrooms, for example, modifications could include expanded use of touchless plumbing fixtures, entryways without doors, and other modifications that would limit user contact with fomites, the surfaces and objects where viruses may linger. A more challenging proposition would be to increase the number of restrooms, or create partitions to close portions of restrooms on a rolling basis to allow for more thorough cleaning and disinfecting throughout the day. Similar approaches may be conceived to cordon off waiting areas for cleaning and disinfection, but this poses challenges at busy airports where seating is limited and gate down time is minimal.

[37] Executive Order 13927, "Accelerating the Nation's Economic Recovery From the COVID-19 Emergency by Expediting Infrastructure Investments and Other Activities," 85 *Federal Register* 35165-35170, June 4, 2020.

[38] U.S. Department of Transportation, *U.S. Transportation Secretary Elaine L. Chao Announces Nearly $800 Million in Grants to 347 Airports in 46 States and 4 Territories,* July 6, 2020, at https://www.transportation.gov/briefing-room/us-transportation-secretary-elaine-l-chao-announces-nearly-800-million-grants-347.

[39] U.S. Department of Transportation, *U.S. Transportation Secretary Elaine L. Chao Announces Over $273 Million in Grants to 184 Airports in 41 States, 6 Territories,* July 28, 2020, at https://www.transportation.gov/briefing-room/us-transportation-secretary-elaine-l-chao-announces-over-273-million-grants-184.

Historically, the federal role in airport terminal projects has been limited mainly to allowing publicly owned airports to fund terminal improvements with tax-favored municipal bonds. Terminal infrastructure needs were addressed in the context of aviation security following the 9/11 terrorist attacks. Notably, the Aviation Security Capital Fund was established in 2004 and provides $250 million annually to airports for security-related infrastructure improvements such as the installation of in-line baggage screening conveyors and equipment.[40] A similar approach to provide long-term federal funding for airport improvements intended to mitigate contagious disease transmission has not been included in formal legislative proposals offered thus far.

FAA Air Traffic Facilities

Controllers and other personnel at many air traffic facilities have become infected with the novel coronavirus, potentially leaving some facilities with less than their normal staffing at certain times. At the same time, however, a significant reduction in the number of flights has lessened the demand for air traffic control services.

In April 2020, FAA shortened the operating hours at about 100 air traffic control towers in response to the significant reduction in flights during evening and nighttime hours. On July 6, 2020, FAA published a safety alert providing instructions for pilots conducting operations at airports where the tower may be closed or in airspace that is uncontrolled due to staffing shortages or unplanned facility shutdowns due to COVID-19.[41]

The alert largely builds upon existing regulations and procedures for operating in uncontrolled airspace and at airports without an operating control tower. Operators are advised to ensure that the aircraft's traffic alerting and collision avoidance systems are in working order and pilots are instructed to review procedures in the event that they are unable to visually identify the runway or land due to poor weather or other factors. In some cases, certain minimum descent altitudes and more precise approach procedures that require air traffic control weather reporting and flight monitoring may not be available, slightly increasing the chances that a flight may be unable to land at its intended destination in poor weather. Similarly, some high density operations, such as closely spaced approaches to parallel runways, are not authorized when those operations are not monitored by air traffic control raising the possibility of flight delays during busy periods at FAA facilities significantly impacted by COVID-19.

Economic Relief for Airlines

The CARES Act made up to $25 billion available in the form of loans to industries related to passenger air travel and an additional $4 billion to cargo airlines. The Secretary of the Treasury may require that borrowers issue the government warrants or nonvoting shares of company stock in return for the federal assistance. In addition, the law provided up to $32 billion to airlines that agree not to reduce employees' wages and benefits and not to involuntarily furlough or terminate workers through September 30, 2020. The act also stipulated that airlines must maintain a certain

[40] See 49 U.S.C. §44923.

[41] Federal Aviation Administration, *Safety Alert for Operators (SAFO): Continuation of Air Carrier and Other Operations in Terminal Airspace when an Air Traffic Control (ATC) Facility with Responsibility for That Controlled Airspace Closes Unexpectedly,* SAFO 20012, July 6, 2020, at https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo/all_safos/media/2020/SAFO20012.pdf.

level of service to airports where scheduled service existed prior to the pandemic, preventing airlines from completely eliminating service, particularly to smaller communities.[42]

The CARES Act also suspended payments of passenger ticket taxes, cargo waybill fees, and airline fuel taxes through the end of calendar year 2020. These taxes and fees fund the Airport and Airway Trust Fund (AATF) which pays for civil aviation programs including federal grants for airport projects, FAA facilities and equipment, and part of FAA's budget for air traffic operations. The AATF had a cash balance of roughly $18 billion at the beginning of the COVID-19 pandemic.[43] However, annual revenues that have ranged between roughly $14 billion and $16 billion in recent years will largely be forgone in calendar year 2020 due to a combination of reduced passenger travel and the temporary suspension of aviation taxes and fees.

Despite the economic relief measures implemented under the CARES Act, the airline industry anticipates that the economic impacts of the COVID-19 public health crisis will last for several years. Airlines for America, a trade organization representing several major U.S. air carriers, expects that passenger volumes may not return to 2019 levels until 2023.

Changes to Airline Fleets

With passenger demand significantly reduced, available airline seat capacity has continued to exceed demand despite the temporary grounding or retirement of many aircraft. In mid-May 2020, about 52% of the U.S. air carrier fleet, or over 3,100 planes, had been idled, compared to only about 5% of the fleet at the end of February 2020.[44] By the end of July 2020, the number of idle aircraft had been reduced somewhat as passenger volumes increased, but about 1 in every 3 aircraft in the U.S. air carrier fleet still remained idle. On average, passenger flights were less than half full throughout June and July 2020. During the same period in 2019, close to 90% of available seats were filled.

Moreover, the fleet impact of COVID-19 has been quite uneven. Use of large aircraft that fly mostly on long-haul international routes has been significantly curtailed as a result of international flight restrictions. In some cases, smaller aircraft operating short-haul flights, often operated by regional partners of major airlines, have been idled as passengers have opted to drive instead of fly, leading carriers to cancel flights.

Many airlines have opted to accelerate the complete retirement of older, less efficient aircraft, and in some cases to streamline fleets by reducing the numbers of different aircraft types. American Airlines announced that it is retiring about 80 aircraft, including all its Airbus A330-300s, Boeing 757s and Boeing 767s, as well as its Embraer E190 and Bombardier CRJ200 regional jets.[45] Delta Airlines accelerated its planned retirement of the McDonnell Douglas MD88 and MD90 aircraft and has also retired its fleet of 18 Boeing 777 widebody jets, accelerating plans to simplify and modernize its widebody fleet.[46] Whereas Delta is shifting toward greater reliance on Airbus

[42] For additional details see CRS Report R46329, *Treasury and Federal Reserve Financial Assistance in Title IV of the CARES Act (P.L. 116-136)*, coordinated by Andrew P. Scott.

[43] See Federal Aviation Administration, *Airport and Airway Trust Fund (AATF) Fact Sheet*, at https://www.faa.gov/about/budget/aatf/media/AATF_Fact_Sheet.pdf.

[44] Airlines for America, *Tracking the Impacts of COVID-19*, at https://www.airlines.org/dataset/impact-of-covid19-data-updates/#.

[45] American Airlines, "A Fond Farewell to Five Fantastic Fleets," April 30, 2020, at http://news.aa.com/news/news-details/2020/A-fond-farewell-to-five-fantastic-fleets-FLT-04/default.aspx.

[46] Delta Airlines, "Delta's 777 aircraft to retire by end of 2020, simplifying widebody fleet amid COVID-19," May 14,

aircraft, Alaska Airlines announced plans to retire its Airbus A320 fleet in order to accelerate plans to return to a mainline fleet comprised of Boeing 737s.[47] In addition, a large number of 50-seat regional jets, mostly operated by regional partners to the major airlines, will be phased out in the coming months.[48]

Airlines have also cancelled or deferred orders for new aircraft in the expectation that it may take several years for passenger traffic to return to pre-pandemic levels. This has been particularly significant for the Boeing Company; Boeing has a considerable order book for its 737 MAX, which has remained grounded pending an FAA certification review following deadly crashes in 2018 and 2019, but many airlines have now cancelled or reduced their orders for the aircraft or sought to defer deliveries.[49] Without orders in the pipeline, manufacturers are slowing production.[50] Moreover, airlines and aircraft leasing companies may face future challenges raising capital to acquire jets to meet a potential rise in air traffic demand once the pandemic abates.

Aviation Workforce Challenges

Safety-Critical Airline Jobs

The reduction in the number of flights and shrinkage of airline fleets are likely to have considerable impacts on the aviation workforce. Many safety-critical aviation workers, including pilots and flight attendants, must be qualified to operate specific aircraft types, and aircraft mechanics and technicians are trained to service particular aircraft, engines, or electronic systems. Not only are airlines likely to need fewer workers over the next few years, but they will need to align the skills and qualifications of their workforces with the changing composition of their fleets.

Labor agreements in the airline industry pose a considerable challenge to carrying out orderly changes in fleet composition and workforce staffing because they are built on principles of seniority. The most senior airline captains typically fly the largest aircraft, which are most frequently used on transatlantic and transpacific flights. International travel restrictions imposed in response to the pandemic have significantly curtailed these flights in particular. Under most labor agreements, captains no longer needed to fly these routes because of reduced demand could displace captains flying domestic routes, who might, in turn, displace first officers. This shuffling of pilots is likely to trigger significant training needs to ensure that pilots meet FAA requirements to operate the aircraft they are assigned to. Similar shuffling based on seniority will create the need to retrain flight attendants as well. Early retirements, furloughs, and layoffs would likely add to these training needs at airlines as personnel are reassigned to different aircraft to fill vacancies and adjust to fleet changes.

2020, at https://news.delta.com/deltas-777-aircraft-retire-end-2020-simplifying-widebody-fleet-amid-covid-19.

[47] Edward Russell, "U.S. Airlines May Have to Retire 1,000 Jets. These Are the Ones that Could End Up in the Boneyard," *The Points Guy,* June 5, 2020, at https://thepointsguy.com/news/us-airlines-fleet-retirements-cowen-analyst/.

[48] Ibid.

[49] Dominic Gates, "Boeing Has Lost More Than 800 Orders for the 737 MAX This Year," *Seattle Times,* July 14, 2020, at https://www.seattletimes.com/business/boeing-aerospace/boeing-has-lost-more-than-800-orders-for-the-737-max-this-year/.

[50] Peggy Hollinger, "How Coronavirus Brought Aerospace Down to Earth," *Financial Times,* April 20, 2020, at https://www.ft.com/content/3fe8a876-7d7c-11ea-8fdb-7ec06edeef84.

In addition, both pilots and flight attendants must maintain currency and proficiency as a condition of operating revenue flights. This is typically accomplished through recurrent training and observation flights conducted in simulators or onboard aircraft. FAA has temporarily waived some of these training and currency requirements during the COVID-19 pandemic. Many of those blanket waivers for air carriers were initially set to expire at the end of May 2020, but have been extended multiple times. Most of the waivers are now set to expire in October and November 2020. Further extending them could raise flight safety concerns.

Significant airline furloughs and layoffs may occur in the fall of 2020, when airlines' obligations under the CARES Act to maintain employment end. In July 2020, United Airlines sent notices mandated under the Worker Adjustment and Retraining Notification (WARN) Act of 1988 (P.L. 100-379) to about 36,000 employees, including 2,250 pilots and 15,000 flight attendants, warning of potential furloughs in October 2020. It has been reported that Delta similarly has given advance notice of potential furloughs to about 2,500 pilots.[51] Delta is also negotiating terms for voluntary early retirements but anticipates there will not be enough retirements to achieve its workforce-reduction goals. The HEROES Act (H.R. 6800) would extend CARES Act job protections until the payroll support funds accepted by the respective airlines are completely exhausted.

Large-scale furloughs and layoffs could pose an obstacle to increasing service should demand for air travel increase faster than airlines anticipate. Employees furloughed for extended periods could see their currency and proficiency requirements expire and might need to be retrained after recall before they could work aboard revenue flights.

Implications for the Future Aviation Workforce

The airline industry was concerned about maintaining an adequate supply of pilots, aircraft mechanics, and technicians before the COVID-19 pandemic.[52] While the reduction in flights has eliminated immediate concerns about labor shortage, in the long term the pandemic could undermine airlines' ability to attract highly skilled workers. This is particularly an issue with respect to pilots, who frequently must make substantial personal investments to obtain the training and flight hours necessary to be hired by a commercial air carrier.

Airlines had also projected future shortages of mechanics prior to the COVID-19 pandemic, suggesting that industry practices of outsourcing heavy aircraft maintenance to overseas facilities could further expand if the supply of certified aircraft mechanics in the United States dwindles. The aviation maintenance field has faced continuing recruitment and retention challenges because the technical skills required are readily transferrable to other industries providing higher wages and better working conditions. Furloughs and layoffs attributable to the COVID-19 pandemic could make aviation maintenance work a less attractive alternative for younger workers.

Security Screener Staffing

The pandemic could also significantly impact TSA's ability to attract and retain screening personnel. Even before the pandemic, TSA struggled with high attrition rates among its

[51] Alison Sider, "Delta Warns Pilots of Possible Furloughs," *Wall Street Journal,* June 26, 2020, at https://www.wsj.com/articles/delta-warns-pilots-of-possible-furloughs-11593226550.

[52] Brianne Eby and Paul Lewis, *Aviation Workforce Challenges in the United States and the United Kingdom,* March 2019, Eno Center for Transportation, at https://www.enotrans.org/wp-content/uploads/2019/03/3.26-US-UK-Aviation-Workforce_final.pdf.

screeners.[53] Concerns about workplace safety and possible COVID-19 exposure at work along with enduring uncertainty about job security due to decreased travel demand could influence future attrition rates.

Like the airlines, TSA may face considerable training challenges if it furloughs or lays off large numbers of screeners and later recalls them or has to replace them with new hires as travel demand picks back up. For TSA, the prospect that individuals will not return as screeners once let go appears greater than for other aviation sector jobs because screener pay is comparatively lower. The DHS Office of Inspector General (OIG) found in 2019 that TSA pay at some airports was as much as 31% below local per capita income and that workers at nearby retail stores and sandwich shops earned as much as or more than entry-level screeners.[54] Of screeners who left TSA during FY2017, the DHS OIG found, about 24% were employed for less than six months. The cost of hiring and training those screeners who spent less than six months working for TSA was about $16 million.

In July 2020, TSA announced voluntary early retirement offers available to certain eligible employees. However, this approach might have limited impact on the TSA screener workforce.[55] For one, individuals must have at least 20 years of federal service to qualify, but TSA has existed for only 18 years, so only individuals who have held other federal positions qualify. Additionally, the offers would not be available to screeners at certain airports where TSA provides retention incentives to curb attrition. Finally, the early retirements reportedly would not include any separation incentives. It remains unclear whether the early retirement offer will be sufficient to bring the size of TSA's screener workforce into line with air travel demand. TSA has not announced additional plans for reducing its screener workforce.

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[53] Department of Homeland Security, Office of Inspector General, *Testimony of Acting Inspector General John V. Kelly Before the Subcommittee on Transportation and Maritime Security, Committee on Homeland Security, U.S. House of Representatives, "The TSA Workforce Crisis: A Homeland Security Risk,* May 21, 2019, at https://homeland.house.gov/download/testimony-john-kelly.

[54] Department of Homeland Security, Office of Inspector General, *TSA Needs to Improve Efforts to Retain, Hire, and Train Its Transportation Security Officers*, OIG-19-35, March 28, 2019, at https://www.oig.dhs.gov/sites/default/files/assets/2019-04/OIG-19-35-Mar19.pdf.

[55] Eric Katz, "DHS Staffing Shakeups Continue Amid Early Retirement and Reassignment Offers," *Government Executive*, July 8, 2020, at https://www.govexec.com/pay-benefits/2020/07/dhs-staffing-shakeups-continue-amid-early-retirement-and-reassignment-offers/166737/.

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