

## Forecast Highlights (2023–2043)

Since its deregulation in 1978 and the great recession of 2007-09, the U.S. commercial air carrier industry experienced a series of boom-to-bust cycles. The volatility that was associated with these cycles was thought by many to be a structural feature of an industry that was capital intensive but cash poor. However, the great recession of 2007-09 marked a fundamental change in the operations and finances of U.S. Airlines. Since the end of the recession in 2009 through 2019, U.S. airlines revamped their business models to minimize losses by lowering operating costs, eliminating unprofitable routes, and grounding older, less fuel-efficient aircraft. To increase operating revenues, carriers initiated new services that customers were willing to purchase and started charging separately for services that were historically bundled in the price of a ticket. The industry experienced an unprecedented period of consolidation with three major mergers in five years. The results of these efforts were impressive: 2019 marked the eleventh consecutive year of profitability for the U.S. airline industry.

The outbreak of the COVID-19 pandemic in 2020, however, brought a rapid and cataclysmic end to those boom years. Airline activity and profitability tumbled almost overnight and without the financial and competitive strength built up during the boom, airlines would have faced even greater challenges. As it was, they were able to slash capacity and costs, and then, relying on their balance sheets, credit ratings and value inherent in their brands, to raise capital through borrowing and restructuring fleets allowing them to withstand the period of losses. Although sev-

eral small regional carriers ceased operations in 2020, no mainline carriers did. Cargo activity was one of few bright spots as it surged, boosted by consumers purchasing goods to enhance time spent at home as necessitated by the pandemic, and by surface transportation disruptions caused by worker shortages due to COVID-19 illnesses.

Since 2020, conditions and the outlook have brightened considerably. As vaccines were introduced and local and international travel restrictions were lifted, leisure travel rebounded. Initially concentrated in outdoor recreation spots, whether beach or mountain, the recovery in leisure demand spread first to domestic destinations in 2021 and then expanded to many traditional international vacation destinations and by the summer of 2022, most carriers were reporting leisure demand was exceeding pre-pandemic levels. A rebound in business travel, which had been severely curtailed with the onset of the pandemic, lagged that of leisure demand. However by the end of 2022, U.S. airlines were reporting that business demand had recovered to 70-80% of pre-pandemic levels. Higher fares accompanied the strong rebound in leisure demand leading to positive financial results. For all of CY 2022, the top nine U.S. passenger carriers posted operating profits of \$7.8 billion and net profits of \$1.8 billion.

The business modifications necessitated by the downturn will shape the industry for years to come, long after the recovery is complete. Primarily, airlines will be smaller having retired aircraft and encouraged voluntary employee separations. Fleets, however, be-

come younger and more fuel-efficient as retirements targeted the oldest and the least efficient aircraft. Although U.S. airlines carry high levels of debt, it is unclear to what extent capital spending and investment will be restrained, as evidenced by United’s massive wide-body order for 787’s in December 2022. And even the unbundling of services took a small step backwards as carriers eliminated change fees for all but Basic Economy tickets.

In the medium-term, airlines will be focused on trying to foretell the recovery in demand and position themselves to meet it. To date, that demand recovery has been extremely uneven across markets and population segments, driven by COVID-19 case counts, vaccinations, governmental restrictions and the degree of pent-up demand experienced by consumers and businesses. While leisure traffic has led the recovery, business travel is expected to build on the gains logged in 2022. International activity in some regions has lagged domestic due in part to individual country policies on lifting travel restrictions and will continue to lag over the next few years.

Long-term, the strengths and capabilities developed over during decade between the end of the great recession and the onset of COVID-19 will become evident again. There is confidence that U.S. airlines have finally transformed from a capital intensive, highly cyclical industry to an industry that can generate solid returns on capital and sustained profits.

Fundamentally, over the long-term, aviation demand is driven by economic activity, and a growing U.S. and world economy provides the basis for aviation to grow. The 2023 FAA forecast calls for U.S. carrier domestic pas-

senger growth over the next 20 years to average 2.7 percent per year. This average, however, includes robust growth in 2023, as activity returns to pre-pandemic levels. Following the recovery period, trend rates resume with average growth through the end of the forecast of 2.8 percent. Domestic passengers are forecast to be within 1 percent, on an annual basis, of 2019 levels in 2023.

After averaging \$55 per barrel over the five years ending in 2021, oil prices surged to \$93 per barrel with the Russian invasion of Ukraine in 2022. Prices are forecast to ease somewhat over the next two years before climbing slowly to reach \$113 per barrel at the end of the forecast period.

Just as U.S. economic activity drives domestic demand for air transport, foreign economic activity affects international travel demand. As global economies were recovering from the pandemic in 2022, the demand imbalances and Russia’s invasion of Ukraine sent consumer prices soaring. Central banks moved to restrain inflation by raising interest rates and slowing demand which consequently curtailed GDP growth as well as price increases. In 2023, GDP is expected to slow further to the extent that the U.S. enters a mild recession while Europe sees a sharper downturn. Latin American growth remains solidly positive and China’s economy, which suffered from stringent COVID-19 policies in 2022, rebounds in 2023 supporting the region. Global growth returns close to trend rates in 2024 although some individual countries take longer.

System traffic in revenue passenger miles (RPMs) is projected to increase by 3.2 percent a year between 2023 and 2043. Domestic RPMs are forecast to grow 3.0 percent a year while International RPMs are forecast to grow faster at 3.7 percent a year,

largely due to the steep declines in 2020 and 2021 that brought RPM to just 31 percent of 2019's level – about half that of domestic RPM. Thus, these figures are boosted by several years of high growth rates during the recovery after which the annual rates return to more moderate long-term trends. The strong growth rates propel system RPM, on an annual basis, to exceed 2019 levels in 2024, with domestic RPM returning a year earlier while international RPM also recovering in 2024. System capacity as measured by available seat miles (ASMs) is forecast to grow somewhat slower than RPM during the recovery period as airlines seek to restore load factors but, subsequently, ASM grow in line with the increases in demand.

After U.S. carriers posted an unexpected profit in CY 2022, the FAA expects U.S. carriers to remain profitable over the next few years as rising demand -- despite higher fares -- more than offsets higher costs for labor and fuel. As carriers return to levels of capacity consistent with their fixed costs, shed excess debt, and yields stabilize, consistent profitability should continue. Over the long term, we see a competitive and profitable aviation industry characterized by increasing demand for air travel and fares growing more slowly than overall inflation, reflecting growing U.S. and global economies.

The general aviation (GA) sector was less affected by the COVID-19 crisis than the airlines and recovered faster. Private aviation became an attractive substitute for wealthier individuals who could afford to pay during the heaviest times of the pandemic. Even though there are recent indicators that with airlines increasing frequency of their scheduled flights, some reversal in this trend is expected, many have continued to fly privately. At the lower end of the industry, new comers to private flying included student, private and

commercial pilots, joining the existing GA pilot population. The long-term outlook for general aviation thus is promising, as growth at the higher-end offsets continuing retirements at the traditional low end, mostly piston-powered part of the sector. The active GA fleet is forecast to increase by 3.5 percent between 2023 and 2043, after declining slightly in 2022 from the year before. The turbine aircraft fleet, including rotorcraft, did not experience a decline between 2019 and 2021, and is estimated to have shown a small increase between 2021 and 2022. The total of piston fleet (single and multi-engine pistons, light-sport aircraft, and piston rotorcraft) declined by 2.0 percent between 2019 and 2021 and is estimated to have fallen by an additional 0.7 percent in 2022. While steady growth in both GDP and corporate profits results in continued growth of the turbine and rotorcraft fleets, the largest segment of the fleet -- fixed wing piston aircraft will continue to shrink over the forecast period, just to be offset by the growing turbine fleet. Despite the minimal growth of the active GA fleet between 2021 and 2043, the number of GA hours flown is projected to increase by 16.6 percent from 2021 to 2043 (an average of 0.7 percent per year), as growth in turbine, rotorcraft, and experimental hours more than offset a decline in fixed wing piston hours.

With robust air travel demand growth between 2023 and 2025, we expect increased activity growth that has the potential to increase controller workload. The recovery in U.S. airline activity from the COVID downturn is the primary driver. The U.S. commercial aviation sector was hit by the pandemic much harder than the non-commercial sector. Operations at FAA and Contract Towers return to pre-COVID levels in 2023, led by strong growth in commercial operations. In

particular, large and medium hubs will continue to see faster increases than small and non-hub airports, largely due to the commercial nature of their operations. Over the entire forecast period, operations at FAA and contract towers are forecast to grow 1.2 percent a year with commercial activity growing at approximately four times the rate of non-commercial (general aviation and military) activity.

Commercial Space launch activity has been steadily growing over the past 5 years. FY2022 actuals were the highest in U.S. history at 74, accounting for 13% of the activity since 1989.

FAA is forecasting launch and re-entry activity to increase from a low-high range of 61-94 in FY2023 to a low-high range of 123-288 by FY2027. Much of this increase is attributable to the lineup of reusable vehicles and the expectation for increased human space exploration.

Drones have been experiencing healthy growth in the United States and around the world over the past decade. The last few years have been no exception despite the profound impact of COVID-19 on the overall economy. The introduction of drones in the NAS has opened up numerous possibilities, especially from a commercial perspective. That introduction has also brought operational challenges including safe and secure integration of drones into the NAS. Despite these challenges, the drone sector holds enormous promise; potential uses range from individuals flying solely for recreational purposes to individual businesses carrying

out focused missions to large companies delivering commercial packages and delivering medical supplies. Public service uses, such as conducting search and rescue support missions following natural disasters, are proving promising as well. The FAA forecasts that the recreational small drone fleet will likely (i.e., base scenario) attain its peak over the next 5 years, from the present 1.69 million units now to approximately 1.82 million units by 2027 thus attaining cumulative annual growth rate of 1.6% during 2022-2027. Based on registration data, the size of the commercial drone fleet (> 0.5 lbs up to 55 lbs) came in around 727,000 aircraft by the end of 2022. As the present base (i.e., the cumulative total) increases, the FAA anticipates the growth rate of the sector will slow down over time, the FAA forecasts that the commercial drone fleet will likely (i.e., base scenario) be at around 955,000 by 2027.

Another sector showing enormous promise is Advanced Air Mobility (AAM). Based on the research performed by numerous others, the FAA believes that AAM will likely enter into services (EIS) sometime around 2025-2026. Starting from limited services to initial launch cities noted earlier, services will be experimental, slow and likely gain a gradual trajectory of growth until 2030. We expect that initial 5 years or so will be required to resolve many outstanding issues including establishing solid AAM business cases. Depending upon the sector's resolving the outstanding issues, this will be followed by a moderate service trajectory during 2030-2040. Beyond that period, we anticipate a sustainable, mature sector on a longer-term growth trajectory