

Aircraft Fleet Trends

The aircraft fleet based and utilized in Minnesota ranges from the smallest single-engine airplanes used by general aviation pilots to the largest wide-body aircraft used for long haul domestic and international commercial travel. Wide-body aircraft are large enough to accommodate two passenger aisles with seven to ten seats across the aircraft. National and global trends are affecting the way airlines, corporations, and private pilots purchase and utilize their aircraft. This paper provides insight into aircraft fleet trends.

Every year the FAA evaluates how the economy impacts aviation by forecasting changes in the aircraft fleet, including all types of aircraft from large commercial service aircraft to single-seat general aviation airplanes and drones. The 20-year forecasts also evaluate how many hours pilots are flying, how many passengers are taking commercial flights, and the demand for cargo flights. The results are published annually in the FAA Aerospace Forecasts.

General Aviation Fleet

The total active general aviation fleet was in decline between 2008 and 2013.¹ Beginning in 2014, deliveries of general aviation aircraft fleet began to gradually increase. In 2017, the FAA forecasts stated the active general aviation fleet would increase by an average annual rate of 0.1 percent over the 21-year forecast period.

There are three categories of aircraft included in the general aviation fleet: piston powered aircraft, turbine powered aircraft, and light sport aircraft.

Piston aircraft have piston powered engines connected to propellers on aircraft which allow the aircraft to move through the air and on the ground. Piston aircraft fly at lower altitudes than turbine powered aircraft. A piston powered aircraft typically seats one to six passengers and flies relatively short distances (300 – 400 miles).

Piston powered airplanes are the most common used aircraft by general aviation pilots and aircraft owners. The recession of 2008 caused the greatest reduction of sales for this type of aircraft, and so far, the market has yet to recover to the heights it once saw in the early 2000's. The forecast decline in the piston fleet, is attributed to the declining number of recreational pilots, increases in the cost of aircraft ownership, and the aging aircraft fleet increasing faster than new aircraft are being manufactured. Even though sales have decreased, the total number of piston engine airplanes manufactured increased 3.8 percent from 2016 to 2017¹. In 2017, the top five piston-engine manufacturers were Cirrus (based in Minnesota), Textron Aviation (Cessna Aircraft), TECNAM Aircraft, Diamond Aircraft, and Piper Aircraft, Inc.

Turbine powered aircraft, including helicopters, are expected to grow at an average annual rate of 1.9 percent with 2.3 percent annual growth in the turbojet fleet. According to the General Aviation Manufacturers Association (GAMA) 2017 Year End Report, new business jet shipments have increased 1.3 percent over the previous year.² It is common in corporate air travel to utilize charter companies. Charter companies operate under a special set of federal flight regulations, known as Part 135. Part 135 hours flown have steadily increased – approximately 16 percent from 2006 to 2015 as companies chose to hire charter companies to help with their transportation needs instead of owning their own aircraft or as they enter the market of using general aviation aircraft. This contributes to the increased shipments in business jets.

¹ [FAA Aerospace Forecasts FY 2017](#)

² [GAMA - Quarterly Shipments and Billings \(2017\)](#)

The category of light sport aircraft was created in 2005. This type of aircraft is less expensive to fly and pilots are not required to have a FAA medical examination. The pilot can carry a driver's license as proof of medical competence. This category of aircraft is forecast to increase at an average annual rate of 4.1 percent.³ This will result in the light sport fleet nearly doubling in size from 2015 to 2037. GAMA reports when the light sport category was created there were approximately 170 light aircraft in the country. However, when mandatory registration was required for light sport aircraft in 2007, the numbers increased significantly to 6,066 aircraft. GAMA does not forecast the average annual growth rate of light sport aircraft, however, in 2016 the total number documented was 6,942 aircraft.

Commercial Aircraft Fleet

The commercial fleet is forecasted to increase at an average annual growth rate of 0.8 percent a year as demand for commercial passenger travel and air cargo are forecast to increase.⁴ Older, less fuel efficient aircraft are expected to be removed from the fleet and replaced with those that are more fuel efficient.

The mainline carrier fleet (airline companies that provide service with aircraft containing 90 or more passenger seats) is expected to grow as the narrow body (single aisle) and wide body (double aisle) jet fleets all experience growth. Significant fleet growth – 67 percent – is expected for wide body aircraft.⁵ Demand for new aircraft is driven by network expansion, which requires more narrow-bodied aircraft like the Boeing 737 or Airbus 321. Carriers are looking for more fuel efficient aircraft which also contributes to increased aircraft demand.⁶

Regional airlines typically operate short to medium range aircraft, such as the Embraer E-170 or Bombardier CRJ200, with. Regional airline flights serve as feeder routes to the mainline carriers. Fewer flight crew requirements and increased fuel efficiency lead to lower operating costs than their wide-body counterparts typically operated by major airlines. This allows regional and commuter airlines to serve smaller, low-traffic airports while still connecting to major national hubs. The fleet of aircraft operated by regional carriers is expected to decline as the less fuel efficient 50-seat jets are replaced with larger 70-90 seat jets. The shift to jets with larger seating capacity will increase profitability potential for airlines however it will add pressure on smaller communities to fill those aircraft.

Unmanned Aircraft Systems (UAS)

The unmanned aircraft systems (UAS) segment of the fleet has been quickly evolving and growing in recent years. UAS are used for both hobby/recreational as well as commercial uses. Commercial uses continue to grow. Industry use of commercial UAS is depicted in **Figure 1**.

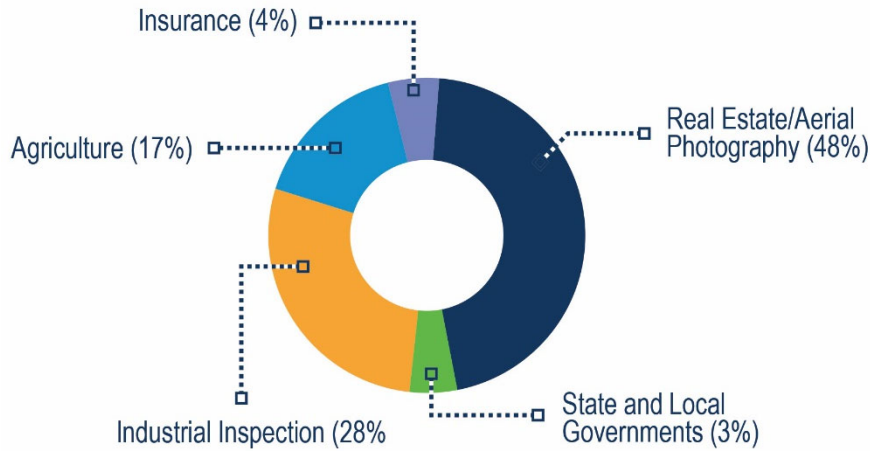
³ FAA Aerospace Forecasts FY 2017

⁴ [FAA Aerospace Forecasts FY 2017](#)

⁵ [FAA Aerospace Forecasts FY 2017](#)

⁶ <https://www.transparencymarketresearch.com/commercial-aircraft-market.html>

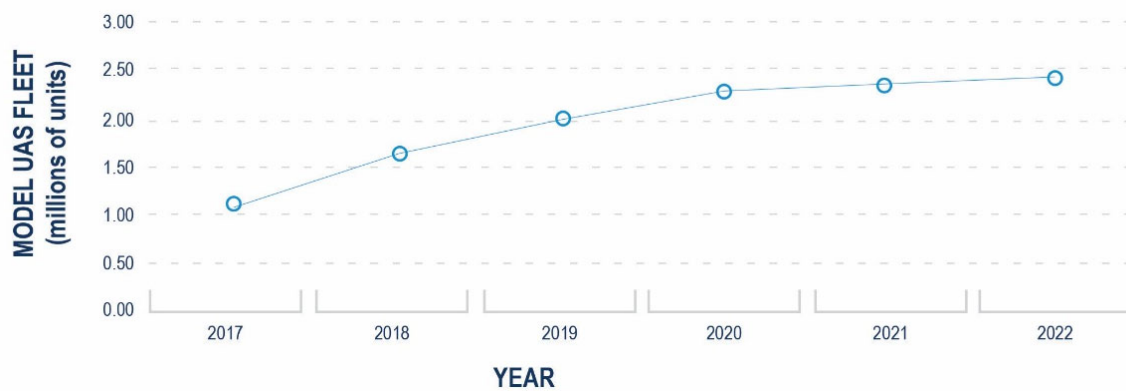
Figure 1 Commercial UAS Uses



Model Aircraft and Hobbyist Forecasts

Beginning in December 2015, FAA requires all UAS weighing more than 0.55 pounds and less than 55 pounds to be registered. Hobbyists can register once with FAA and apply the registration number to any UAS owned by that hobbyist. Within one year of the registration requirement, 626,245 hobbyists had registered with FAA.⁷ The FAA estimates there are around 1.1 million UAS units that can be identified as hobbyist or model aircraft. This UAS fleet is anticipated to triple in the next 5 years; however, rates have slowed in the last couple years.⁸ These growth rates are attributed to the low cost to entry into the UAS market, falling prices, and improved UAS technology. The forecasted growth in the model UAS fleet is shown in **Figure 2**.

Figure 2 Model UAS Fleet Forecasted Growth



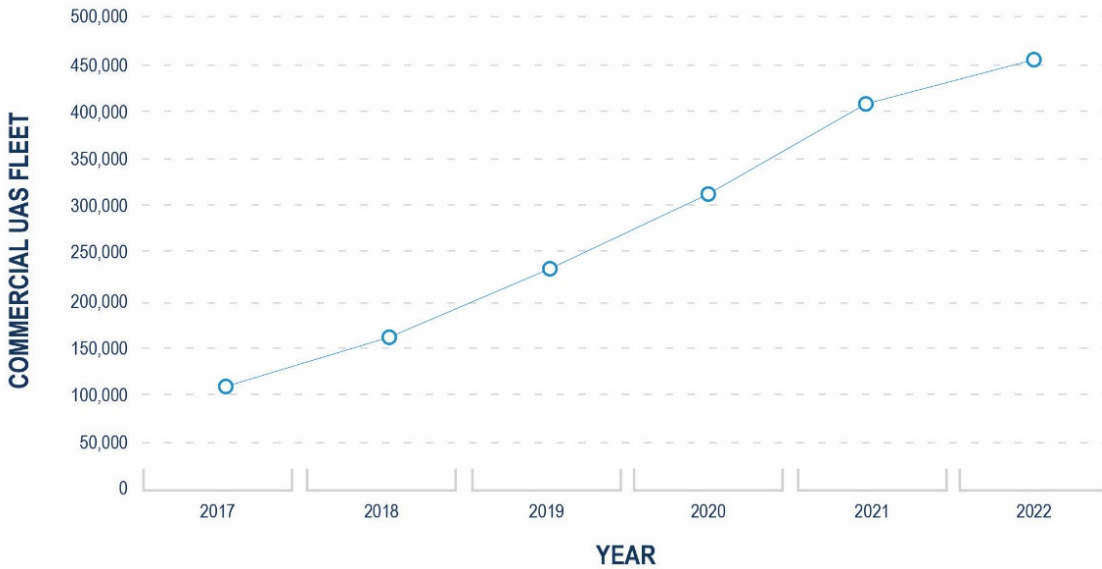
⁷ FAA Aerospace Forecasts FY 2017

⁸ [FAA Aerospace Forecasts FY 2017](#)

Commercial Small UAS Forecasts

On average, 1,000 commercial UAS units are registered each week with the FAA, and growth is expected to accelerate over the next few years as commercial UAS uses continue to grow.⁹ Current uses include, but are not limited to insurance, emergency services, agriculture, construction, industrial, real estate, and aerial photography. The FAA anticipates the commercial small UAS fleet to grow tenfold in the next 5 years (420,000 in 2021 compared to 42,000, in 2016).¹⁰ Of the commercial small UAS fleet, it is estimated that over 95 percent are consumer grade off-the-shelf aircraft.

Figure 3 Commercial UAS Fleet Forecasted Growth



⁹ FAA Aerospace Forecasts FY 2017

¹⁰ [FAA Aerospace Forecasts FY 2017](#)