

SECTION 3: AIRCRAFT CAPACITY AND UTILIZATION FACTORS

3.1 INTRODUCTION

Aircraft capacity and utilization factors apply primarily to the evaluation of FAA investment and regulatory programs that affect time spent in air transportation, system capacity, and aircraft utilization. The utilization of available capacity affects the benefits and costs that accrue directly to aircraft operators and indirectly to users and society.

3.1.1 Regulatory Structure

Title 14 of the Code of Federal Regulations (CFR) covers Aeronautics and Space. The type of regulation in Title 14 with direct applicability to this report is aircraft operations regulations.

Standards for conducting civilian flights in the United States are contained in several parts of Title 14:¹

- **Part 91** contains general regulations for the operation of powered aircraft (excluding ultralights). Part 91 regulations are sometimes referred to as “General Aviation” operations. It is the least restrictive category of operation for such aircraft. Operations that do not include activities that are regulated under one of the other parts operate by default under Part 91.
- **Part 121** contains standards applicable to the domestic and flag operations of the holders of air carrier or operating certificates under Part 119. Domestic and flag operations involve common carriage, the transportation of people or goods for compensation, in aircraft with more than nine passenger seats or a cargo capacity of more than 7,500 pounds. This is the structure under which most scheduled passenger and all-cargo airlines operate.
- **Part 125** regulates non-commercial operations conducted with fixed-wing aircraft with 20 or more seats, which do not fit into Parts 121, 129, 135 or 137. Part 125 applies when common carriage is not involved.
- **Part 129** regulates foreign air carriers who operate in the U.S. or who operate U.S.-registered aircraft outside the U.S.
- **Part 133** governs the operation of any rotary wing aircraft carrying an external load.
- **Part 135** covers commuter (using aircraft of nine seats or less and a maximum payload of 7,500 pounds or less) or on-demand operations by holders of air carrier or other operating certificates, which are required for certain activities: transportation of mail, certain sightseeing or air tour flights, air taxi (on-demand) flights, and commuter flights. Scheduled passenger carrying operations with turbojet aircraft must be conducted under Part 121.

¹ In order to conduct operations on a commercial basis, an operator must have an air carrier or other operating certificate, issued under Part 119, Certification: Air Carriers and Commercial Operators.

- **Part 137** applies to all operations involving the aerial application of substances. This application may be in support of agriculture, firefighting, public health sprayings or cloud seeding.

3.1.2 User Group Concept and Definitions

The economic values user groups are largely based on the regulatory structure described in Section 3.1.1 because most regulations affecting aircraft operators are based on the Title 14 parts.

In this report, data are presented for five user groups together with the sub-groupings shown below.² The air carrier sub-groupings are based on whether the aircraft is configured for passenger or all-cargo operations (aircraft that are configured for both passenger and cargo are included with the passenger air carriers). Some carriers operate split fleets, with some aircraft configured for passenger operations and some aircraft configured for all-cargo operations. In these cases, the carrier’s data was reported based on the aircraft configuration, such that some of the carrier’s data was reported as passenger and some as all-cargo.

User Groups	
Group 1:	Part 121 air carrier operations A: Passenger air carriers B: All-cargo air carriers
Group 2:	Part 135 commuter air carrier operations A: Passenger air carriers B: All-cargo air carriers
Group 3:	General aviation aircraft by the Federal Aviation Regulation (FAR) that the activity was conducted under: A: General aviation only B: Air taxi only
Group 4:	Unmanned aircraft systems (UAS)
Group 5:	Military aircraft

3.1.3 Aircraft Categories

Aircraft were placed into categories likely to be relevant to conducting regulatory analyses. Categories are discussed in the following sections and detailed in the tables. User profiles are constructed for selected user groupings.

The factors in Table 3-1 are reported for air carrier, general aviation, UAS, and military user types, respectively, with differences based on data limitations.

² In some cases, more disaggregate data are presented.

Table 3-1: Factors Presented by User Type

Factor	Air Carrier	General Aviation	Unmanned Aircraft Systems	Military
Aircraft seating capacity	x	x	-	-
Number of crew (including flight attendants)	x	-	-	-
Cargo capacity	x	-	-	-
Passenger load factor	x	x	-	-
Cargo load factor	x	-	-	-
Aircraft utilization	x (day)	x (year)	x (year)	x (hours)
Average speed	x	-	-	-
Average gross weight	-	x	-	-

General aviation capacity data are also divided into a number of subgroups depending on the type of operation. In this section, GA aircraft and activity are also categorized by the parts of aircraft certification and operating regulations that the activity falls under.

For the first time, this section includes data on unmanned aircraft systems (UAS) based on summary data obtained from the FAA’s 2023 Survey of UAS Operators. Data collection regarding UAS is rapidly evolving along with the industry; the current document represents an initial effort to include some UAS data in this section, recognizing that it is not as complete as for other user groups.

Information on capacity and utilization factors for military aircraft is also presented in this section. From a regulatory or system investment standpoint, FAA actions will primarily affect military flight time; the costs of military operations are covered in Section 4.

Data limitations do not allow for complete analysis of each capacity and utilization factor for each aircraft type or classification. The most complete data are available for the large Part 121 air carriers, while small Part 135 commuter air carriers report less detailed data, and general aviation and UAS activity data are somewhat limited. There is minimal activity data available for military users. The individual tables show specific definitions for each data element.

3.2 AIR CARRIER AIRCRAFT

Aircraft capacity and utilization factors for the year ended (YE) June 2023 were obtained from the Bureau of Transportation Statistics (BTS) T2: U.S. Air Carrier Traffic and Capacity Statistics by Aircraft Type table. The T2 table summarizes the Schedule T-100 traffic data reported by U.S. air carriers. Not all carriers reported all data elements in the T2 table because of differing regulatory reporting requirements. For instance, some Part 135 commuter carriers are not required to report fuel data because they are not required to under 14 CFR Part 298, while most Part 121 carriers are required to report fuel data under 14 CFR Part 241.

FAA analyzed the T2 data at the carrier, aircraft type, aircraft configuration, and reported time period (quarter) level of detail to ensure that the data were reasonable. Unreasonable data were excluded from the tables in this section. Examples of unreasonable data included aircraft utilization greater than 24 hours per day, zero available seat miles reported for aircraft in passenger configuration, and unrealistically high fuel consumption. Data were independently evaluated for reasonableness for each economic values factor. For example, fuel consumption may have been unreasonable and thus excluded from this section for a specific carrier, aircraft type, aircraft configuration, and reported time period while the daily utilization was reasonable for the same carrier, aircraft type, aircraft configuration, and reported time period and thus included in this section.

3.2.1 Aircraft Categories

One of the objectives for this report update was to align the air carrier aircraft categories more closely with the drivers of aircraft capacity and utilization factors and to the drivers of aircraft operating costs. Analysis of the data for passenger air carrier aircraft revealed that aircraft weight was more closely correlated with aircraft operating costs than aircraft seating configuration, which had been used to define aircraft categories in the previous version of this report. Furthermore, different air carriers may configure a specific aircraft type with a different number of seats than other air carriers, which could skew the calculation of average economic values factors because the same aircraft type could be placed in different economic values aircraft categories for different air carriers. Therefore, widebody and narrowbody aircraft were categorized based on maximum takeoff weight (MTOW). Regional jets and turboprops continued to use the number of seats as categorization criteria because there is a regulatory distinction between aircraft with more than 60 seats and those with 60 seats or fewer.

Table 3-2 shows the passenger air carrier aircraft categories used in this report, and how they relate to the categories used in the prior economic values report.

Table 3-2: Passenger Air Carrier Aircraft Categories

2021	2024
Widebody more than 300 seats	Widebody 580k pounds or more MTOW
Widebody 300 seats and below	Widebody less than 580k pounds MTOW
Narrowbody more than 160 seats	Narrowbody 165k pounds or more MTOW
Narrowbody 160 seats and below	Narrowbody less than 165k pounds MTOW
Regional jet more than 60 seats	Regional jet 61-99 seats
Regional jet 60 seats and below	Regional jet less than 61 seats
Turboprop more than 60 seats	Turboprop more than 60 seats
Turboprop 20-60 seats	Turboprop 20-60 seats
Turboprop under 20 seats (Part 25)	Turboprop under 20 seats
Turboprop under 20 seats (Part 23)	Piston
Piston engine (Part 25)	Helicopter
Piston engine (Part 23)	

Table 3-3 shows the all-cargo air carrier aircraft categories used in this report, and how they relate to the categories used in the prior economic values report. The widebody category continued to use the number of aircraft engines to categorize aircraft because that metric is more closely correlated with aircraft operating costs than aircraft weight.

Table 3-3: All-Cargo Air Carrier Categories

2021	2024
Four-engine widebody	Four-engine widebody
Three-engine widebody	Three-engine widebody
Two-engine widebody	Two-engine widebody
Narrowbody more than 160 seats equivalent	Narrowbody 165k pounds or more MTOW
Narrowbody 160 seats equivalent and below	Narrowbody less than 165k pounds MTOW
Regional jet more than 60 seats equivalent	Regional jet 61-99 seats equivalent
Regional jet 60 seats equivalent and below	Regional jet less than 61 seats equivalent
Turboprop more than 60 seats equivalent	Turboprop more than 60 seats equivalent
Turboprop 20-60 seats equivalent	Turboprop 20-60 seats equivalent
Turboprop under 20 seats equivalent (Part 25)	Turboprop under 20 seats equivalent
Turboprop under 20 seats equivalent (Part 23)	Piston
Piston engine (Part 25)	Helicopter
Piston engine (Part 23)	

3.2.2 User Sub-Groups

The previous version of this report used two sub-groups for air carriers: those filing aircraft operating costs using Form 41, Schedule P-5.2 and those using Form 41, Schedule P-5.1. The size of the carrier (measured by revenue) determined which Schedule a carrier filed. In the 2021 report, only Part 121 carriers that filed one of the operating cost schedules for the time period used in the previous version of this report were included in Section 3 or Section 4 of the report.

In this version of the report, all carriers with reported T2 data were included in Section 3 and Section 4 of the report, to the extent that data were available and reasonable (as defined in the previous section). This methodology resulted in more carriers being included in Sections 3 and 4, including Part 135 commuter carriers. To align the air carrier sub-groups with the

regulatory structure, results were reported separately for Part 121 and Part 135 commuter carriers.

Table 3-4 provides a summary of block hour³ activity for all air carriers considered in this study for which at least one economic value factor was produced. The number of block hours used to produce specific economic value factors are shown in Tables 3-6 through 3-17. Data are summarized by aircraft category and for the total fleet.

Table 3-4: Block Hours by Aircraft Certification and Reporting Group

Aircraft Category	Part 121 Air Carriers		Part 135 Scheduled Air Carriers		Total	
	Passenger	All-Cargo	Passenger	All-Cargo	Passenger	All-Cargo
Widebody 580k lbs or more MTOW	762,527		0		762,527	
Widebody less than 580k lbs MTOW	1,434,355		0		1,434,355	
Four-engine widebody		468,377		0		468,377
Three-engine widebody		194,409		0		194,409
Two-engine widebody		1,047,090		0		1,047,090
Narrowbody 165k lbs or more MTOW	10,651,537	243,524	0	0	10,651,537	243,524
Narrowbody less than 165k lbs MTOW	3,361,519	49,577	0	0	3,361,519	49,577
Regional jet 61-99 seats	2,818,485	0	0	0	2,818,485	0
Regional jet less than 61 seats	749,425	4,458	0	0	759,425	4,458
Turboprop more than 60 seats	32,065	19,572	0	0	32,065	19,572
Turboprop 20-60 seats	33,499	7,441	0	0	33,499	7,441
Turboprop under 20 seats	14,988	107,647	242,503	17,718	257,491	125,365
Piston	10,616	0	149,236	39,814	159,852	39,814
Helicopter	0	0	6,480	0	6,480	0
Total	19,879,016	2,142,095	398,219	57,532	20,277,235	2,199,627

Sources: Year ended June 2023 T2 U.S. Air Carrier Traffic and Capacity Statistics by Aircraft Type
Only includes observations from which at least one metric was produced.

3.2.3 Air Carrier Capacity and Utilization Factors

A number of capacity and utilization factors useful for understanding the air carrier industry were calculated using T-2 data. Table 3-5 provides an overview of how the various factors were derived.

³ “Block hours” is the common terminology for the “aircraft hours, ramp-to-ramp” data element in the T2 table. The data element is defined as “The aircraft hours computed from the moment the aircraft first moves under its own power for purposes of flight, until it comes to rest at the next point of landing.”

Table 3-5: Air Carrier Capacity and Utilization Factors

Factor	Derivation
Number of Aircraft	“Aircraft Days Assigned to Service” divided by 365
Departures	“Revenue Aircraft Departures Performed”
Passenger Capacity*	“Available Seat Miles” divided by “Revenue Aircraft Miles Flown”
Passenger Load Factor*	“Revenue Passenger Miles” divided by “Available Seat Miles”
Capacity (tons)	“Available Ton Miles” divided by “Revenue Aircraft Miles Flown”
Capacity Load Factor	“Revenue Ton Miles” divided by “Available Ton Miles”
Crew Size	Flight deck crew size from FAA Type Certificate Data Sheets (TCDS) database; Flight attendants estimated as one per 50 passenger seats (for aircraft with more than 9 seats)
Block Hours	“Aircraft Hours, Ramp to Ramp”
Average Block Speed (MPH)	“Revenue Aircraft Miles Flown” divided by “Aircraft Hours, Ramp to Ramp”
Daily Utilization (hours)	“Aircraft hours, Ramp to Ramp” divided by “Aircraft Days Assigned to Service”
Fuel Burn per Hour (gallons)	“Aircraft Fuel” divided by “Aircraft Hours, Ramp to Ramp”

*Calculated only for passenger air carriers

Factors related to Part 121 passenger air carriers are shown in Table 3-6. The carriers accounted for 19.9 million block hours and 8.0 million departures in the YE June 2023. The average capacity was 169 passenger seats, with an average passenger load factor of 84 percent. The average cargo capacity was 24 tons, with an average cargo load factor of 64 percent.

Table 3-6: Part 121 Passenger Air Carriers Capacity and Utilization Factors

Aircraft Category	Block Hours	Departures	Passenger Capacity	Passenger Load Factor	Cargo Capacity (tons)	Cargo Load Factor	Crew Size	Average Block Speed (MPH)
Widebody 580k lbs or more MTOW	762,527	95,392	301	81%	54	59%	8	488
Widebody less than 580k lbs MTOW	1,434,355	181,610	250	83%	46	56%	8	481
Narrowbody 165k lbs or more MTOW	10,651,537	3,785,669	177	85%	22	68%	6	382
Narrowbody less than 165k lbs MTOW	3,361,519	1,702,154	133	82%	17	66%	5	343
Regional jet 61-99 seats	2,818,485	1,607,055	74	81%	19	59%	4	283
Regional jet less than 61 seats	759,425	519,280	48	80%	6	61%	3	241
Turboprop more than 60 seats	32,065	24,938	74	75%	9	65%	4	201
Turboprop 20-60 seats	33,499	28,755	39	65%	5	54%	3	192
Turboprop under 20 seats	14,988	16,715	12	58%	2	36%	2	179
Piston	10,616	22,441	10	59%	1	54%	6	88
All Aircraft	19,879,016	7,984,009	169	84%	24	64%	6	366

Sources: Year Ended June 2023 T2 U.S. Carrier Traffic and Capacity Statistics by Aircraft Type and FAA Type Certificate Data Sheets Database

Unreasonable observations excluded from this table

The average crew size of 6 crew members includes both flight deck crew and cabin crew. The number of flight deck crew for the aircraft in each grouping was identified using the FAA Type Certificate Data Sheets (TCDS) database. The number of cabin crew was estimated as one flight attendant per 50 passenger seats.⁴ The actual number of flight attendants varies based on the size of the aircraft and staffing policy of individual carriers.

⁴ FAR 121.391(a) generally requires a minimum of one flight attendant for each 50 installed seats for aircraft with more than 9 seats.

There was an average of 6,380 in-service aircraft reported for Part 121 passenger carriers. These aircraft were utilized for 8.5 hours per day on average as shown in Table 3-7.

Table 3-7: Part 121 Passenger Air Carriers Fleet Size and Daily Utilization

Aircraft Category	Block Hours For Number of Aircraft	Number of Aircraft	Block Hours For Daily Utilization	Daily Utilization (hours)
Widebody 580k lbs or more MTOW	762,372	198	762,372	10.6
Widebody less than 580k lbs MTOW	1,434,319	341	1,434,319	11.5
Narrowbody 165k lbs or more MTOW	10,636,844	2,955	10,636,844	9.9
Narrowbody less than 165k lbs MTOW	3,333,407	1,056	3,333,407	8.6
Regional jet 61-99 seats	2,793,995	1,304	2,793,995	5.9
Regional jet less than 61 seats	744,990	503	725,854	4.0
Turboprop more than 60 seats	32,065	17	32,065	5.1
Turboprop 20-60 seats	16,726	7	16,726	6.5
All Aircraft	19,754,718	6,380	19,735,582	8.5

Source: Year Ended June 2023 T2 U.S. Carrier Traffic and Capacity Statistics by Aircraft Type
Unreasonable observations excluded from this table

Average fuel burn (gallons of fuel consumed divided by block hours) for Part 121 passenger carriers was 861 gallons per hour as shown in Table 3-8.

Table 3-8: Part 121 Passenger Air Carriers Fuel Burn

Aircraft Category	Block Hours	Fuel Burn per Hour (gallons)
Widebody 580k lbs or more MTOW	762,372	2,261
Widebody less than 580k lbs MTOW	1,434,319	1,709
Narrowbody 165k lbs or more MTOW	10,636,844	822
Narrowbody less than 165k lbs MTOW	3,351,331	728
Regional jet 61-99 seats	2,617,321	476
Regional jet less than 61 seats	709,176	356
Turboprop more than 60 seats	32,065	277
Turboprop 20-60 seats	31,059	180
Turboprop under 20 seats	5,875	132
Piston	1,664	42
All Aircraft	19,582,026	861

Source: Year Ended June 2023 T2 U.S. Carrier Traffic and Capacity Statistics by Aircraft Type
Unreasonable observations excluded from this table

Factors related to Part 121 all-cargo air carriers are shown in Table 3-9. These carriers accounted for 2.1 million block hours and 733 thousand departures, with an average cargo capacity of 93 tons and 48% cargo load factor. The number of flight deck crew for the aircraft in each grouping was identified using the FAA TCDS database, with an average of 2 crew members required per aircraft.

Table 3-9: Part 121 All-Cargo Air Carriers Capacity and Utilization Factors

Aircraft Category	Block Hours	Departures	Cargo Capacity (tons)	Cargo Load Factor	Crew Size	Average Block Speed (MPH)
Four-engine widebody	468,377	69,645	157	49%	2	461
Three-engine widebody	194,409	59,225	95	48%	2	420
Two-engine widebody	1,047,090	343,888	81	49%	2	409
Narrowbody 165k lbs or more MTOW	243,514	118,205	32	42%	2	368
Narrowbody less than 165k lbs MTOW	49,577	34,784	19	33%	2	316
Regional jet less than 61 seats equivalent	4,458	2,385	5	29%	2	361
Turboprop more than 60 seats equivalent	19,572	10,608	15	40%	2	241
Turboprop 20-60 seats equivalent	7,441	6,151	7	44%	2	214
Turboprop under 20 seats equivalent	107,647	88,419	2	36%	1	150
All Aircraft	2,142,095	733,310	93	48%	2	399

Sources: Year Ended June 2023 T2 U.S. Carrier Traffic and Capacity Statistics by Aircraft Type and FAA Type Certificate Data Sheets Database

Unreasonable observations excluded from this table

There was an average of 1,208 in-service aircraft reported for Part 121 all-cargo carriers. These aircraft were utilized for 4.6 hours per day on average as shown in Table 3-10.

Table 3-10: Part 121 All-Cargo Air Carriers Fleet Size and Daily Utilization

Aircraft Category	Block Hours for Number of Aircraft	Number of Aircraft	Block Hours for Daily Utilization	Daily Utilization (hours)
Four-engine widebody	447,810	125	447,810	9.8
Three-engine widebody	194,409	110	194,409	4.8
Two-engine widebody	1,027,664	462	1,016,463	6.0
Narrowbody 165k lbs or more MTOW	233,345	219	233,345	2.9
Narrowbody less than 165k lbs MTOW	23,603	22	23,603	2.9
Regional jet less than 61 seats equivalent	4,458	9	4,458	1.4
Turboprop more than 60 seats equivalent	10,393	13	10,393	2.2
Turboprop 20-60 seats equivalent	3,614	10	3,614	1.0
Turboprop under 20 seats equivalent	84,544	238	84,544	1.0
All Aircraft	2,029,840	1,208	2,018,639	4.6

Sources: Year Ended June 2023 T2 U.S. Carrier Traffic and Capacity Statistics by Aircraft Type

Unreasonable observations excluded from this table

Average fuel burn (gallons of fuel consumed divided by block hours) for Part 121 all-cargo carriers was 1,921 gallons per hour as shown in Table 3-11.

Table 3-11: Part 121 All-Cargo Air Carriers Fuel Burn

Aircraft Category	Block Hours	Fuel Burn per Hour (gallons)
Four-engine widebody	467,692	3,157
Three-engine widebody	194,409	2,163
Two-engine widebody	970,757	1,615
Narrowbody 165k lbs or more MTOW	233,345	938
Narrowbody less than 165k lbs MTOW	26,036	830
Regional jet less than 61 seats equivalent	3,740	379
Turboprop more than 60 seats equivalent	11,004	530
Turboprop 20-60 seats equivalent	4,669	333
Turboprop under 20 seats equivalent	23,103	145
All Aircraft	1,934,755	1,921

Sources: Year Ended June 2023 T2 U.S. Carrier Traffic and Capacity Statistics by Aircraft Type
Unreasonable observations excluded from this table

Factors related to Part 135 commuter passenger air carriers are shown in Table 3-12. The crew size includes both flight deck crew and cabin crew. The number of flight deck crew for the aircraft in each grouping was identified using the FAA TCDS database. 14 CFR Part 135.107 requires one cabin crew member for aircraft with more than 19 seats that are operated under Part 135 commuter regulations. The actual number of flight attendants varies based on the size of the aircraft and staffing policy of individual carriers.

Table 3-12: Part 135 Commuter Passenger Air Carriers Capacity and Utilization Factors

Aircraft Category	Block Hours	Departures	Passenger Capacity	Passenger Load Factor	Cargo Capacity (tons)	Cargo Load Factor	Crew Size	Average Block Speed (MPH)
Turboprop under 20 seats	242,503	285,731	8	53%	1	37%	1	134
Piston	149,236	253,114	8	48%	1	48%	1	107
Helicopter	6,480	11,259	6	20%	3	7%	1	82
All Aircraft	398,219	550,104	8	51%	1	38%	1	123

Sources: Year Ended June 2023 T2 U.S. Carrier Traffic and Capacity Statistics by Aircraft Type and FAA Type Certificate Data Sheets Database
Unreasonable observations excluded from this table

The Part 135 commuter passenger carriers accounted for 398 thousand block hours and 550 thousand departures in the YE June 2023. They had an average capacity of eight passenger seats, with an average passenger load factor of 51 percent. The average cargo capacity was one ton, with an average cargo load factor of 38 percent.

There was an average of six in-service aircraft reported for Part 135 commuter passenger carriers. These aircraft were utilized for 2.8 hours per day on average as shown in Table 3-13.

Table 3-13: Part 135 Commuter Passenger Air Carriers Fleet Size and Daily Utilization

Aircraft Category	Block Hours	Number of Aircraft	Daily Utilization (hours)
Turboprop under 20 seats	6,077	6	2.8
All Aircraft	6,077	6	2.8

Sources: Year Ended June 2023 T2 U.S. Carrier Traffic and Capacity Statistics by Aircraft Type
Unreasonable observations excluded from this table

Average fuel burn (gallons of fuel consumed divided by block hours) for Part 135 commuter passenger carriers was 52 gallons per hour as shown in Table 3-14.

Table 3-14: Part 135 Commuter Passenger Air Carriers Fuel Burn

Aircraft Category	Block Hours	Fuel Burn per Hour (gallons)
Turboprop under 20 seats	103,568	70
Piston	62,505	22
Helicopter	4,549	70
All Aircraft	170,622	52

Sources: Year Ended June 2023 T2 U.S. Carrier Traffic and Capacity Statistics by Aircraft Type
Unreasonable observations excluded from this table

Factors related to Part 135 commuter all-cargo air carriers are shown in Table 3-15. These carriers accounted for 58,000 block hours and 52,000 departures, with an average cargo capacity of six tons and 36 percent cargo load factor. The number of flight deck crew for the aircraft in each grouping was identified using the FAA TCDS database, with an average of one crew member required per aircraft.

Table 3-15: Part 135 Commuter All-Cargo Air Carriers Capacity and Utilization Factors

Aircraft Category	Block Hours	Departures	Cargo Capacity (tons)	Cargo Load Factor	Crew Size	Average Block Speed (MPH)
Turboprop under 20 seat equivalent	17,718	19,687	2	35%	1	123
Piston	39,814	32,112	8	36%	1	202
All Aircraft	57,532	51,799	6	36%	1	177

Sources: YE June 2023 T2 U.S. Carrier Traffic and Capacity Statistics by Aircraft Type and FAA Type Certificate Data Sheets Database
Unreasonable observations excluded from this table

There was an average of 114 in-service aircraft reported for Part 135 commuter all-cargo carriers. These aircraft were utilized for 0.9 hours per day on average as shown in Table 3-16.

Table 3-16: Part 135 Commuter All-Cargo Air Carriers Fleet Size and Daily Utilization

Aircraft Category	Block Hours	Number of Aircraft	Daily Utilization (hours)
Piston	36,444	114	0.9
All Aircraft	36,444	114	0.9

Sources: Year Ended June 2023 T2 U.S. Carrier Traffic and Capacity Statistics by Aircraft Type
Unreasonable observations excluded from this table

Average fuel burn (gallons of fuel consumed divided by block hours) for Part 135 commuter all-cargo carriers was 89 gallons per hour as shown in Table 3-17.

Table 3-17: Part 135 Commuter All-Cargo Air Carriers Fuel Burn

Aircraft Category	Block Hours	Fuel Burn per Hour (gallons)
Turboprop under 20 seats equivalent	5,657	100
Piston	894	18
All Aircraft	6,551	89

Sources: Year Ended June 2023 T2 U.S. Carrier Traffic and Capacity Statistics by Aircraft Type
Unreasonable observations excluded from this table

3.3 GENERAL AVIATION AIRCRAFT

Data from the FAA’s 2022 General Aviation and Part 135 Activity Survey (GA Survey) was used to estimate the number of active aircraft and annual utilization.⁵ The actual sample size for the 2022 GA Survey was 85,013 aircraft.⁶ There were responses representing 31,280 aircraft received,⁷ of which 26,531 indicated that the aircraft was active (flew at least once) during 2022. Using the GA Survey’s weighting methodology, these 26,531 records represent 209,540 U.S.-registered active GA aircraft.

3.3.1 Aircraft Categories

The GA Survey puts each aircraft into one of 18 aircraft types based on criteria such as engine type and number of seats, as shown in Table 3-18. However, an objective of this report is to disaggregate information based on the aircraft certification and operating regulations. For purposes of this report, additional categories were created to align with the aircraft certification regulatory structure, and which consider factors like aircraft weight (for jets and rotorcraft).⁸

Table 3-18: GA Survey Aircraft Classification Groups

GA Survey Group	Aircraft Description
1	Single-Engine Fixed Wing - Piston: 1 - 3 seats
2	Single-Engine Fixed Wing - Piston: 4+ seats
3	Twin-Engine Fixed Wing - Piston: 1 - 6 seats
4	Twin-Engine Fixed Wing - Piston: 7+ seats
6	Single-Engine Fixed Wing - Turboprop
7	Twin-Engine Fixed Wing - Turboprop: 1 - 12 seats
8	Twin-Engine Fixed Wing - Turboprop: 13+ seats
10	Twin-Engine Fixed Wing - Turbojet
12	Piston-Engine Rotorcraft
13	Single-Engine Turbine Rotorcraft
14	Multi-Engine Turbine Rotorcraft
15	Gliders
16	Lighter-than-air
17	Experimental Amateur
18	Experimental Exhibition
19	Experimental Other
20	Light Sport Experimental
21	Light Sport Special

Source: FAA, *General Aviation and Part 135 Activity Survey CY 2022*.
Groups 5, 9 and 11 are no longer used.

⁵ *General Aviation and Part 135 Activity Survey* (Washington, DC: Federal Aviation Administration, 2022).

⁶ Data provided by TetraTech.

⁷ A survey response may be for a single aircraft or a fleet of many aircraft.

⁸ The expansion of the GA Survey sample to groups not included in the original sample design may reduce the level of reliability of some estimates. However, the provision of detailed data by aircraft certification regulation and type of operating authority provides data more relevant to regulatory evaluations. Readers should be cautious when using data from strata with few active aircraft.

The mapping of the GA Survey categories to those used in this report is illustrated in Table 3-19. All aircraft were also grouped into categories based on year of manufacture: pre-1983, and 1983 and later. Piston and turboprop aircraft were grouped into categories based on number of seats and number of engines. Jet aircraft and rotorcraft were grouped into weight categories based on data in various aircraft reference sources.⁹

Table 3-19: Relationship between GA Survey and Economic Values Aircraft Categories

Aircraft Category	GA Survey Groups		
Piston engine airplanes, 1-3 seats	1		
Piston engine airplanes, 4-9 seats one-engine	2		
Piston engine airplanes, 4-9 seats multi-engine	3	4	
Piston engine airplanes 10 or more seats	4		
Turboprop airplanes, 1-9 seats one-engine	6		
Turboprop airplanes, 1-9 seats multi-engine	7		
Turboprop airplanes, 10-19 seats	6	7	8
Turboprop airplanes, 20 or more seats	8		
Turbojet/turbofan airplanes, <= 12,500 lbs	10		
Turbojet/turbofan airplanes, > 12,500 lbs and <= 65,000 lbs	10		
Turbojet/turbofan airplanes, > 65,000 lbs	10		
Rotorcraft piston <= 6,000 lbs	12		
Rotorcraft turbine <= 6,000 lbs	13	14	
Rotorcraft piston > 6,000 lbs	12		
Rotorcraft turbine > 6,000 lbs	13	14	
Other	15	16	
Experimental	17	18	19
Light Sport	20	21	

Source: GRA analysis

The GA Survey aircraft groups, as shown on the right-hand side of Table 3-19, were used to develop the 18 economic values aircraft categories. Some GA Survey categories have aircraft in more than one economic values category. Given that aircraft are assigned on a make-model basis, these are mapped to the relevant economic values category. In addition, some economic values categories encompass more than one GA Survey category.

3.3.2 Flight Hours by Activity Type and Aircraft Age

The GA Survey asked respondents how many total hours the aircraft flew during 2022, and the percentage of hours that were flown in each of 15 activity types. GRA grouped these activity types into the operating regulation parts that cover them to produce the percentage of time each aircraft flew under each part.

⁹ *Jane's All the World's Aircraft* (Couldson, Surrey, UK: Jane's Information Group, various editions); *The Complete Encyclopedia of World Aircraft* (New York: Barnes & Noble, 2002); various on-line sources.

The GA survey activity types were assigned to operating authorities as noted below to develop the following groups:¹⁰

- **Part 91**—Personal, business, instructional, corporate, sightseeing and work
- **Part 125**—Airplanes (not rotorcraft) 20 or more seats and not Part 135 or 137
- **Part 133**—Rotorcraft hours reported as external lift
- **Part 135**—Air taxi, air tours and medical
- **Part 137**—Aerial application in agriculture and forestry and other aerial application

The GA Survey provides a weighting factor for each record, which allows projection of the sample data to the aircraft population. The reported hours flown were multiplied by the weighting factor, and the percentages calculated for each of the above groups to produce the number of hours flown by the population under each operating regulation. In addition to the regulatory structure above, selected aircraft and hours flown information was tabulated from the GA Survey responses, and reported for the following categories:¹¹

- **Fractional Ownership**—Percentage of time the aircraft was operated as part of a Fractional Ownership program
- **Public**—Percentage of time the aircraft was operated in a public use

Table 3-20 shows the active general aviation aircraft by aircraft category. The 209,540 estimated active aircraft performed nearly 27 million flight hours in 2022. The table also shows the number of aircraft that reported air taxi usage as well as those that reported public (fulfilling a government function) usage. There were 12,831 aircraft that reported some air taxi use and over 11,500 reporting some public use in 2022. Also shown are the average annual hours flown for each aircraft category. Overall, general aviation aircraft averaged 129 hours of flight time in 2022. The more sophisticated and larger aircraft had much higher levels of utilization.

General Aviation Flight Hours in this Report

Data from the 2022 General Aviation and Part 135 Activity Survey was made available by agreement with the FAA and following protocols to protect the confidentiality of survey participants. The data include small random noise for records that would otherwise reveal individually identifiable respondents or responding organizations. As a result, weighted estimates of hours flown in this report will not exactly match figures published in the FAA's GA Survey report. The magnitude of the difference for the overall GA and Part 135 fleet is less than 0.05 percent.

¹⁰ All assignments based on reported actual use in GA Survey. While the categories used in the GA Survey do not exactly correspond to the operating regulations, this allows a reasonable estimate of the activity levels under each part.

¹¹ The aircraft or hours reported are not additive with other aircraft data in the GA Survey.

Table 3-20: 2022 Estimated Active General Aviation Aircraft and Hours Flown

	1	2	3	4	5	6
Aircraft Category	All Aircraft	Air Taxi Aircraft	Public Aircraft	Fractionally-Owned Aircraft	GA Survey Total Hours	Average Annual Hours All Aircraft
Piston engine airplanes, 1-3 seats	34,928	413	446	-	3,131,792	90
Piston engine airplanes, 4-9 seats one-engine	97,065	1,839	3,189	-	10,131,878	104
Piston engine airplanes, 4-9 seats multi-engine	11,368	585	371	-	1,385,267	122
Piston engine airplanes 10 or more seats	345	166	63	20	56,001	162
Turboprop airplanes, 1-9 seats one-engine	5,229	164	647	6	1,011,061	193
Turboprop airplanes, 1-9 seats multi-engine	766	63	43	27	89,007	116
Turboprop airplanes, 10-19 seats	5,366	1,769	1,030	346	1,589,563	296
Turboprop airplanes, 20 or more seats	743	447	448	-	291,214	392
Turbojet/turbofan airplanes, <= 12,500 lbs	2,762	233	48	135	471,547	171
Turbojet/turbofan airplanes, >12,500 lbs and <= 65,000 lbs	10,463	4,123	796	1,460	3,721,624	356
Turbojet/turbofan airplanes, >65,000lbs	2,956	1,052	329	215	1,051,284	356
Rotorcraft piston <= 6,000 lbs	2,639	244	235	-	523,420	198
Rotorcraft turbine <= 6,000 lbs	4,374	1,090	2,649	16	1,392,972	318
Rotorcraft piston >6,000 lbs	2	-	-	-	59	25
Rotorcraft turbine >6,000 lbs	2,078	496	1,059	62	589,793	284
Other	4,532	-	4	-	153,361	34
Experimental	17,921	139	137	11	1,015,693	57
Light Sport	6,002	8	19	-	359,930	60
All Aircraft	209,540	12,831	11,514	2,298	26,965,466	129

Source: Analysis of responses to FAA's *General Aviation and Part 135 Activity Survey CY 2022*.

Columns are not additive; aircraft may be used for multiple purposes during a year.

Col 1: Aircraft reported

Col 2: Aircraft for which Air Taxi hours reported. The number of aircraft in this category is significantly higher than the number of aircraft for which air taxi operations are their **primary** use

Col 3: Aircraft for which Public hours reported

Col 4: Aircraft for which Fractional Ownership hours reported

Col 5: Total hours reported

Col 6: Column 5 divided by Column 1

Table 3-21 shows the estimated general aviation hours flown by operating part. As can be seen, over three-quarters of the hours were flown under Part 91, the general flight rules. Activities under Part 135 (air taxi and some types of air tours and air medical services) and Part 137 (aerial application) are the next two most prevalent uses of general aviation aircraft.

Air Taxi vs. Part 135

It is important to note the distinction between the terms “air taxi” and “Part 135,” since they are often used interchangeably. The GA Survey queries aircraft owners on the three types of activity conducted under Part 135:

1. Air Taxi – FAR Part 135 on-demand passenger and all cargo operations (excluding air tours, air medical services, or scheduled passenger service). There were 3.3 million hours flown in 2022.
2. Air Tours – Commercial sight-seeing conducted under FAR Part 135. 182,000 hours flown.
3. Air Medical Services – Air ambulance services, rescue, human organ transportation, and emergency medical services conducted under FAR Part 135. 911,000 hours flown.

All three types of hours are included in Column 5 of Table 3-21, while only air taxi hours are included in Column 4 of Table 3-23. Column 2 of Table 3-20 counts aircraft that have air taxi hours; an aircraft with only air tours or air medical services hours would not be included.

Table 3-21: 2022 GA Hours Flown by Operating Rule and Aircraft Type

	1	2	3	4	5	6	7
Age Increment	Active Aircraft	Hours Flown					
Year of Manufacture		Part 91	Part 125	Part 133	Part 135	Part 137	Total Hours by FAR Part
2018-2022	14,277	2,584,464	152,420	6,581	436,460	85,537	3,265,461
2013-2017	12,789	1,785,209	160,242	6,609	677,076	158,882	2,788,018
2008-2012	13,248	1,637,175	107,278	9,255	660,082	141,947	2,555,737
2003-2007	18,371	2,427,126	89,108	6,191	725,040	92,213	3,339,678
1998-2002	14,115	1,801,752	120,960	11,163	584,158	99,992	2,618,025
1993-1997	7,102	565,287	44,530	12,230	274,003	89,972	986,022
1988-1992	4,521	313,533	18,401	4,866	272,707	81,381	690,887
1983-1987	5,325	537,285	14,483	10,090	156,909	20,030	738,797
1978-1982	23,698	2,603,468	5,678	63,124	292,367	80,587	3,045,224
1973-1977	27,781	2,441,025	6,370	14,328	123,108	81,591	2,666,422
1968-1972	16,772	1,247,555	7,998	5,747	86,148	44,977	1,392,425
1963-1967	19,491	1,197,426	1,469	8,325	45,859	33,453	1,286,532
1962 or earlier	32,051	1,496,456	3,250	10,773	73,959	7,799	1,592,237
All Aircraft	209,540	20,637,763	732,187	169,280	4,407,875	1,018,362	26,965,466

Source: Analysis of responses to FAA's *General Aviation and Part 135 Activity Survey CY 2022*.

Col 1: Aircraft reported

Cols 2 - 6: Hours reported under categories which correspond to Operating Rules shown

Col 7: Sum of hours reported under all categories

Table 3-22 shows the active general aviation aircraft and hours flown distributed by aircraft age. The general line of demarcation is aircraft built before 1983, and those built in 1983 and beyond. In the mid-1980s, most general aviation aircraft production in the United States ceased, especially for piston engine airplanes. It is interesting to note that about 57 percent of the active aircraft were built before 1983. However, the majority of turboprop and jet hours were flown in aircraft produced after 1983.

Table 3-22: 2022 Active Aircraft and Hours Flown by Age Category

Aircraft Category	1	2	3	4	5	6
	Total Hours Flown			Active Aircraft		
	All Aircraft	Aircraft Built Before 1983	Aircraft Built in 1983 and Beyond	All Aircraft	Aircraft Built Before 1983	Aircraft Built in 1983 and Beyond
Piston engine airplanes, 1-3 seats	3,131,792	1,810,831	1,320,961	34,928	24,665	10,262
Piston engine airplanes, 4-9 seats one-engine	10,131,878	5,931,419	4,200,459	97,065	75,254	21,810
Piston engine airplanes, 4-9 seats multi-engine	1,385,267	897,314	487,953	11,368	9,642	1,726
Piston engine airplanes 10 or more seats	56,001	46,294	9,708	345	276	69
Turboprop airplanes, 1-9 seats one-engine	1,011,061	62,763	948,298	5,229	430	4,800
Turboprop airplanes, 1-9 seats multi-engine	89,007	64,307	24,700	766	587	179
Turboprop airplanes, 10-19 seats	1,589,563	263,820	1,325,743	5,366	1,264	4,102
Turboprop airplanes, 20 or more seats	291,214	94,039	197,175	743	276	467
Turbojet/turbofan airplanes, <= 12,500 lbs	471,547	27,685	443,862	2,762	244	2,519
Turbojet/turbofan airplanes, > 12,500 lbs and <= 65,000 lbs	3,721,624	147,767	3,573,857	10,463	681	9,782
Turbojet/turbofan airplanes, > 65,000 lbs	1,051,284	21,137	1,030,147	2,956	37	2,919
Rotorcraft piston <= 6,000 lbs	523,420	39,648	483,772	2,639	566	2,073
Rotorcraft turbine <= 6,000 lbs	1,392,972	261,682	1,131,291	4,374	1,080	3,294
Rotorcraft piston > 6,000 lbs	59	59	0	2	2	0
Rotorcraft turbine > 6,000 lbs	589,793	160,225	429,568	2,078	699	1,378
Other	153,361	36,969	116,392	4,532	1,059	3,473
Experimental	1,015,693	116,881	898,812	17,921	3,030	14,891
Light Sport	359,930	0	359,930	6,002	0	6,002
All Aircraft	26,965,466	9,982,840	16,982,626	209,540	119,792	89,747

Source: Analysis of responses to FAA's General Aviation and Part 135 Activity Survey CY 2022

Individual responses were sorted to classifications and expanded. Totals may not add due to rounding.

Col 1: Total hours reported

Col 2: Total hours reported for aircraft built in 1982 or earlier

Col 3: Total hours reported for aircraft built in 1983 or later

Col 4: Aircraft reported

Col 5: Aircraft reported which were built in 1982 or earlier

Col 6: Aircraft reported which were built in 1983 or later

Table 3-23 shows the number of reported air taxi aircraft and hours flown from the GA Survey. As noted above, there were approximately 12,800 aircraft with at least some air taxi operations, which flew an estimated 3.3 million air taxi flight hours. The relatively few turboprops with 20 or more seats and piston airplanes with 10 or more seats have the highest percentages of air taxi hours flown.

Table 3-23: Estimated Total Active Aircraft and Hours Flown for All Aircraft and Reported Air Taxi Aircraft

	1	2	3	4	5	6	7
Economic Values Category	Active Aircraft	Air Taxi Aircraft	Estimated Total Hours Flown	Estimated Air Taxi Hours Flown	Percent Air Taxi Hours	Estimated Average Hours Total	Estimated Average Hours-Air Taxi
Piston engine airplanes, 1-3 seats	34,928	413	3,131,792	16,742	1%	90	41
Piston engine airplanes, 4-9 seats one-engine	97,065	1,839	10,131,878	158,832	2%	104	86
Piston engine airplanes, 4-9 seats multi-engine	11,368	585	1,385,267	83,012	6%	122	142
Piston engine airplanes 10 or more seats	345	166	56,001	33,200	59%	162	200
Turboprop airplanes, 1-9 seats one-engine	5,229	164	1,011,061	20,062	2%	193	122
Turboprop airplanes, 1-9 seats multi-engine	766	63	89,007	7,771	9%	116	123
Turboprop airplanes, 10-19 seats	5,366	1,769	1,589,563	494,741	31%	296	280
Turboprop airplanes, 20 or more seats	743	447	291,214	139,198	48%	392	311
Turbojet/turbofan airplanes, <= 12,500 lbs	2,762	233	471,547	72,671	15%	171	313
Turbojet/turbofan airplanes, > 12,500 lbs and <= 65,000 lbs	10,463	4,123	3,721,624	1,580,643	42%	356	383
Turbojet/turbofan airplanes, > 65,000 lbs	2,956	1,052	1,051,284	417,672	40%	356	397
Rotorcraft piston <= 6,000 lbs	2,639	244	523,420	17,279	3%	198	71
Rotorcraft turbine <= 6,000 lbs	4,374	1,090	1,392,972	172,847	12%	318	159
Rotorcraft piston > 6,000 lbs	2	0	59	0	0%	25	N/A
Rotorcraft turbine > 6,000 lbs	2,078	496	589,793	53,954	9%	284	109
Other	4,532	0	153,361	0	0%	34	N/A
Experimental	17,921	139	1,015,693	46,500	5%	57	333
Light Sport	6,002	8	359,930	129	0%	60	16
All Aircraft	209,540	12,831	26,965,466	3,315,251	12%	129	258

Source: Analysis of responses to FAA's *General Aviation and Part 135 Activity Survey CY 2022*

Individual responses were sorted to classifications and expanded. Totals may not add due to rounding.

Note: N/A indicates that the population for which costs were available was insufficient to provide reliable results.

Col 1: Active aircraft are those flown at least once during the year

Col 2: Active aircraft reporting air taxi use

Col 3: Total hours flown by active aircraft, including air taxi

Col 4: Reported air taxi hours (also included in Column 3). The number of aircraft in this category is significantly higher than the number of aircraft for which air taxi operations are their **primary** use

Col 5: Column 4 divided by Column 3

Col 6: Column 3 divided by Column 1

Col 7: Column 4 divided by Column 2

Table 3-24 shows a distribution by five-year increments of age for the active general aviation aircraft in the fleet and hours flown by operating regulation. As can be seen, many of the aircraft hours flown are by aircraft produced decades ago.

Table 3-24: 2022 Hours Flown Distribution of GA Aircraft by 5-Year Increments of Age

Age Increment Year of Manufacture	Active Aircraft	Hours Flown					Total Hours by FAR Part
		1	2	3	4	5	
		Part 91	Part 125	Part 133	Part 135	Part 137	
2018-2022	14,277	2,584,464	152,420	6,581	436,460	85,537	3,265,461
2013-2017	12,789	1,785,209	160,242	6,609	677,076	158,882	2,788,018
2008-2012	13,248	1,637,175	107,278	9,255	660,082	141,947	2,555,737
2003-2007	18,371	2,427,126	89,108	6,191	725,040	92,213	3,339,678
1998-2002	14,115	1,801,752	120,960	11,163	584,158	99,992	2,618,025
1993-1997	7,102	565,287	44,530	12,230	274,003	89,972	986,022
1988-1992	4,521	313,533	18,401	4,866	272,707	81,381	690,887
1983-1987	5,325	537,285	14,483	10,090	156,909	20,030	738,797
1978-1982	23,698	2,603,468	5,678	63,124	292,367	80,587	3,045,224
1973-1977	27,781	2,441,025	6,370	14,328	123,108	81,591	2,666,422
1968-1972	16,772	1,247,555	7,998	5,747	86,148	44,977	1,392,425
1963-1967	19,491	1,197,426	1,469	8,325	45,859	33,453	1,286,532
1962 or earlier	32,051	1,496,456	3,250	10,773	73,959	7,799	1,592,237
All Aircraft	209,540	20,637,763	732,187	169,280	4,407,875	1,018,362	26,965,466

Source: Analysis of responses to FAA's *General Aviation and Part 135 Activity Survey CY 2022*.

Col 1: Aircraft reported

Cols 2-6: Hours reported under categories which correspond to Operating Rules shown

Col 7: Sum of hours reported under all categories

3.3.3 GA Capacity and Utilization

Table 3-25 shows the average capacity (in seats and gross weight) as well as the average percentage of seats occupied for each aircraft group. These data were tabulated from the NTSB accident database for the 2008 to 2023 time period. In this time period, there were 62,299 accidents and incidents with sufficient aircraft characteristic data to assign the aircraft to an economic values aircraft category. This period was selected to provide a large number of observations. The analysis assumes that number of seats, occupants, and gross weight of accident aircraft apply to the population of aircraft within each group. The average GA aircraft had about 3.7 seats and flew about half-full during the period. It should be noted that the “turbojet/turbofan airplanes > 65,000 pounds” category includes airline-type aircraft that were flown under Part 91.

Table 3-25: 2008-2023 GA Capacity and Utilization

	1	2	3	4
Economic Values Category	Average Seats	Average Seats Occupied	Percent of Seats Occupied	Average Gross Weight
Piston engine airplanes, 1-3 seats	1.9	1.4	72.2%	2,292
Piston engine airplanes, 4-9 seats one-engine	4.4	1.9	42.7%	2,819
Piston engine airplanes, 4-9 seats multi-engine	5.7	2.2	38.5%	5,361
Piston engine airplanes 10 or more seats	16.6	4.2	25.3%	16,577
Turboprop airplanes, 1-9 seats one-engine	2.6	1.4	54.9%	7,979
Turboprop airplanes, 1-9 seats multi-engine	6.0	2.3	37.6%	13,442
Turboprop airplanes, 10-19 seats	11.1	4.1	36.8%	11,315
Turboprop airplanes, 20 or more seats	23.9	4.7	19.8%	15,269
Turbojet/turbofan airplanes, <= 12,500 lbs	6.1	2.8	45.6%	9,997
Turbojet/turbofan airplanes, > 12,500 lbs and <= 65,000 lbs	9.3	4.0	42.9%	23,025
Turbojet/turbofan airplanes, > 65,000 lbs	31.2	6.2	19.9%	154,297
Rotorcraft piston <= 6,000 lbs	2.8	1.7	61.8%	2,017
Rotorcraft turbine <= 6,000 lbs	4.8	2.1	44.0%	3,838
Rotorcraft piston > 6,000 lbs	3.9	1.7	43.5%	17,195
Rotorcraft turbine > 6,000 lbs	7.2	3.3	46.4%	11,070
Other	N/A	N/A	N/A	N/A
Experimental	N/A	N/A	N/A	N/A
Light Sport	2.0	1.5	72.7%	1,298
All Aircraft	3.7	1.9	51.3%	3,595

Source: GRA analysis of NTSB accident and incident data for the 2008 to 2023 time period

Only data reported for accidents/incidents that were operating under Part 91, 125, 133, 135, and 137 are included

Col 1: Average (weighted) number of seats for aircraft in NTSB accident and incident data from 2008 to 2023

Col 3: Number of seats divided by number of passengers

Col 4: Weighted average gross weight (pounds)

3.3.4 Alternate Estimate of Air Taxi Hours

Table 3-26 shows an alternative estimate of air taxi hours flown using FAA data that report the number of aircraft that are authorized to conduct on-demand operations under Part 135 and the activity data for aircraft with Part 135 hours from the 2022 GA Survey. Using this method produces an estimate of 2.8 million hours for on-demand Part 135 operations. This can be contrasted with the 3.3 million “air taxi” or 4.4 million Part 135 hours tabulated from the GA Survey. The difference in hours is driven by the difference in aircraft; there are approximately 10,900 aircraft certificated to conduct on-demand operations, but over 12,800 (based on weighted survey responses) indicating some air taxi use. There is clearly uncertainty about the actual levels of on-demand Part 135 activity.

Table 3-26: 2022 Alternate Estimate of Air Taxi Hours Flown

	1	2	3	4	5
Aircraft Type	Unique Aircraft	Average Annual Total Hours	Estimated Annual Total Hours	Average Annual Air Taxi Hours	Estimated Annual Air Taxi Hours
Single-Engine Piston	1,084	176	191,138	78	84,540
Multiengine Piston	695	246	171,197	155	107,546
Turboprop	2,188	469	1,026,841	271	592,696
Jet	4,235	547	2,316,261	383	1,621,787
Rotorcraft Piston	213	491	104,497	71	15,084
Rotorcraft Turbine	2,520	396	997,812	143	360,365
All Aircraft	10,935	N/A	4,807,745	N/A	2,782,019

Source: Unique aircraft from FAA Operating Specification Subsystem (data as of March 2022);

average total and air taxi hours from 2022 GA Survey

Col 1: Total unique Part 135 aircraft in FAA Operating Specification Subsystem, by aircraft type.

Col 2: Average annual hours from GA Survey

Col 3: Column 1 multiplied by column 2

Col 4: Average annual air taxi hours from GA Survey, by aircraft type

Col 5: Column 1 multiplied with column 4

3.4 UNMANNED AIRCRAFT SYSTEMS (UAS)

Table 3-27 summarizes the findings of FAA’s 2023 UAS survey regarding the breakdown of the commercial UAS fleet by industry. In 2023, the commercial UAS market was primarily driven by the general photography and real estate sectors, which accounted for approximately 82 percent of total commercial UAS fleet. This significant share is attributed to the widespread use of drones for aerial imaging in these industries. Agriculture and construction follow, utilizing UAS to enhance efficiency in monitoring and data collection activities, contributing to their growing presence in the market. The energy sector, while holding a smaller share at approximately three percent, employs UAS for specialized infrastructure inspections. Emerging applications such as drone delivery and communications, though representing less than one percent of the market, indicate potential for future expansion as technological advancements continue and regulatory frameworks evolve.

Table 3-27: 2023 Commercial UAS Fleet by Industry

Industry	Units	Percentage
General Photography/Real Estate	600,300	81.88%
Agriculture	43,000	5.86%
Construction	29,000	3.96%
Energy	22,220	3.03%
Entertainment	20,000	2.73%
Insurance	10,250	1.40%
Other Industrial Inspection	7,600	1.04%
Delivery	500	0.07%
Communications	300	0.04%
Estimated Total	733,170	100%

Source: FAA 2023 Survey Preliminary Results¹²

Table 3-28 presents the usage patterns of UAS across different use categories based on the FAA’s 2023 UAS survey. Commercial UAS show the highest utilization with nearly 163 flights per operator, and with an average ownership of 4.8 aircraft per operator and the longest average flight duration (nearly 29 minutes). The emergency response and public safety use category, while having slightly fewer flights per operator and shorter average flight duration, has the highest average ownership of 8.3 aircraft per operator. Recreational UAS have the lowest average number of flights per operator and shortest average flight duration, with an average ownership of 1.7 aircraft per drone operator and 12.2 per model operator.

Table 3-28: 2023 UAS Utilization by Use Category

Category (Usage)	Average Annual Flights per Operator	Average Flight Duration (minutes)	Average Number of Aircraft Operated
Commercial	162.9	28.9	4.8
Emergency Response/Public Safety/Law Enforcement	142.9	24.1	8.3
Other Government (Non-Emergency)	151.8	22.3	3.8
University/Research Institution/Non-Profit	109.7	20.5	4.1
Recreational	54.9	14.0	1.7 (Drone operator)
			12.2 (Model operator)

Source: FAA 2023 Survey and Preliminary Results

¹² Updated estimates may be available from the most recent version of the FAA Aerospace Forecasts.

3.5 MILITARY AIRCRAFT

Military aircraft can impact FAA investment decisions because they utilize the resources in the national airspace system. The data for the U.S. military aircraft fleet came from FlightGlobal's World Air Forces 2023. The fleet counts were adjusted to reflect only those aircraft types reported in Department of Defense (DOD) reimbursement rate data from FY2023 and for which there was a source of utilization data. Data on annual hours flown by aircraft type were obtained primarily from a Government Accountability Office (GAO) study, or other sources such as the U.S. Air Force Safety Center or a Congressional Budget Office (CBO) report.

Aircraft were assigned to the same categories as were used in the prior economic values publication. As shown in Table 3-29, the total military fleet (adjusted as described above) contained almost 12,000 aircraft in 2023. These aircraft averaged almost 300 hours a year in flight time. The largest aircraft category was the rotary wing aircraft. The aircraft types with the largest number of average annual hours flown were unmanned aerial vehicles (UAV) followed by turbojet and turboprop aircraft with three or more engines. These typically were transport, tanker, or surveillance aircraft. There was limited data available for piston-engine, UAV, and glider aircraft.

Table 3-29: Military Fleet and Utilization Levels

Aircraft Category	1	2	3
	Total Fleet	Average Flight Hours	Total Estimated Flight Hours
Turbojet/fan 3+ Engine	795	428	339,974
Turbojet/fan Attack/Fighter	3,275	232	759,174
Turbojet/fan Other	1,116	352	392,698
Turboprop	1,462	357	521,309
Piston	25	273	6,825
Rotary Wing Aircraft	5,276	175	923,241
UAV	346	884	305,960
Glider	N/A	N/A	N/A
All Aircraft	11,924	272	3,249,181

This table includes aircraft data for which there were utilization data from the GAO report or other sources (such as the US Air Force Safety Center or CBO report) and DOD reimbursement rate data.

Sources: Fleet data are from FlightGlobal's World Air Forces 2023.¹³ Number of aircraft is based on aircraft types in DOD reimbursement rate data FY2023 and with an available source of utilization data.¹⁴ Estimated Flight Hours were primarily derived from FY2020 utilization calculations from a Government Accountability Office (GAO) study.¹⁵ In several cases where aircraft-specific data for U.S. Air Force aircraft were not available from the GAO study, utilization calculations were based on the Air Force Safety Center's published flight hours in FY2021,¹⁶ combined with fleet data from Flightglobal 2021.¹⁷ In cases where aircraft-specific data were not available from either the GAO study or Air Force Safety Center data, average utilization data by broad aircraft category for FY2019 from a Congressional Budget Office (CBO) report¹⁸ were also used for Air Force and Navy/Marine aircraft. (The CBO report did not include utilization data for U.S. Army aircraft.) In all cases, the estimated utilization figures were then applied to the 2023 fleet to obtain estimated flight hours for 2023.

- For aircraft without utilization data from the GAO study or Air Force Safety Center, average utilization data from the CBO report was used for the Air Force and Navy (including Marines) aircraft, broken down by all aircraft, fighter/attack aircraft, rotorcraft, and fixed wing trainers.
- When FlightGlobal 2023 reports aircraft numbers without separating by variant, and the DOD data provides separate cost data for these variants, values from the GAO report FY2020 or FlightGlobal 2021 were used to estimate the composition of variants.
- This table includes only those aircraft for which DOD operating cost data and a source of aircraft utilization data are available.

Col 1: Total number of aircraft (by aircraft category) in military service in 2023

Col 2: Average annual flight hours for the aircraft category, based on total estimated 2023 flight hours divided by 2023 fleet (Col 3 divided by Col 1)

Col 3: Total Estimated Flight Hours estimated based on 2020 (or 2019, or 2021, depending on the data source) utilizations by aircraft category and 2023 fleet

¹³ <https://www.flightglobal.com/download?ac=90688>

¹⁴ https://comptroller.defense.gov/Portals/45/documents/rates/fy2023/2023_b_c.pdf

¹⁵ <https://www.gao.gov/assets/gao-23-106217.pdf>

¹⁶ <https://www.safety.af.mil/Divisions/Aviation-Safety-Division/Aviation-Statistics/>

¹⁷ <https://www.flightglobal.com/download?ac=75345>

¹⁸ <https://www.cbo.gov/publication/57713>

3.6 APPENDIX

As described in Section 3.1.3, aircraft were placed into categories likely to be relevant to conducting regulatory analyses. The air carrier sub-groupings for passenger and all-cargo are defined by aircraft configuration. The average number of seats per aircraft in YE June 2023 (calculated using data reported to BTS by carriers) and average MTOW was used to assign air carrier aircraft to aircraft categories used in this report.

Table 3-30 shows the aircraft types assigned to the narrowbody and widebody aircraft categories. The BTS code (a unique code for each aircraft type) is shown to facilitate reproduction of tables in this report. As discussed in Section 3.2, the widebody aircraft categories are different for aircraft used in passenger versus all-cargo operations.

Table 3-30: Widebody and Narrowbody Aircraft Types by Aircraft Category

BTS Code	Aircraft Type	YE June 2023 Average Seats	Passenger Aircraft Category	All-Cargo Aircraft Category
614	737-800	170	Narrowbody 165k lbs or more MTOW	Narrowbody 165k lbs or more MTOW
622	757-200	182	Narrowbody 165k lbs or more MTOW	Narrowbody 165k lbs or more MTOW
623	757-300	234	Narrowbody 165k lbs or more MTOW	Narrowbody 165k lbs or more MTOW
634	737-900	178	Narrowbody 165k lbs or more MTOW	Narrowbody 165k lbs or more MTOW
694	A320	164	Narrowbody 165k lbs or more MTOW	Narrowbody 165k lbs or more MTOW
699	A321	187	Narrowbody 165k lbs or more MTOW	Narrowbody 165k lbs or more MTOW
715	727-200	134	Narrowbody 165k lbs or more MTOW	Narrowbody 165k lbs or more MTOW
721	A321neo	193	Narrowbody 165k lbs or more MTOW	Narrowbody 165k lbs or more MTOW
722	A320neo	184	Narrowbody 165k lbs or more MTOW	Narrowbody 165k lbs or more MTOW
838	737 MAX 8	172	Narrowbody 165k lbs or more MTOW	Narrowbody 165k lbs or more MTOW
839	737 MAX 9	179	Narrowbody 165k lbs or more MTOW	Narrowbody 165k lbs or more MTOW
888	737-900ER	179	Narrowbody 165k lbs or more MTOW	Narrowbody 165k lbs or more MTOW
608	717-200	112	Narrowbody less than 165k lbs MTOW	Narrowbody less than 165k lbs MTOW
612	737-700	141	Narrowbody less than 165k lbs MTOW	Narrowbody less than 165k lbs MTOW
616	737-500	99	Narrowbody less than 165k lbs MTOW	Narrowbody less than 165k lbs MTOW
617	737-400	154	Narrowbody less than 165k lbs MTOW	Narrowbody less than 165k lbs MTOW
619	737-300	149	Narrowbody less than 165k lbs MTOW	Narrowbody less than 165k lbs MTOW
620	737-100	60	Narrowbody less than 165k lbs MTOW	Narrowbody less than 165k lbs MTOW
635	DC-9-15F	43	Narrowbody less than 165k lbs MTOW	Narrowbody less than 165k lbs MTOW
640	DC-9-30	67	Narrowbody less than 165k lbs MTOW	Narrowbody less than 165k lbs MTOW
655	MD-80	155	Narrowbody less than 165k lbs MTOW	Narrowbody less than 165k lbs MTOW
678	E190	100	Narrowbody less than 165k lbs MTOW	Narrowbody less than 165k lbs MTOW
698	A319	132	Narrowbody less than 165k lbs MTOW	Narrowbody less than 165k lbs MTOW
723	A220-100	109	Narrowbody less than 165k lbs MTOW	Narrowbody less than 165k lbs MTOW
724	A-220-300	134	Narrowbody less than 165k lbs MTOW	Narrowbody less than 165k lbs MTOW
748	E195	120	Narrowbody less than 165k lbs MTOW	Narrowbody less than 165k lbs MTOW

BTS Code	Aircraft Type	YE June 2023 Average Seats	Passenger Aircraft Category	All-Cargo Aircraft Category
819	747-400	411	Widebody 580k lbs or more MTOW	Four-engine widebody
820	747-4F	312	Widebody 580k lbs or more MTOW	Four-engine widebody
821	747-8	365	Widebody 580k lbs or more MTOW	Four-engine widebody
740	MD-11	301	Widebody 580k lbs or more MTOW	Three-engine widebody
359	A350-900	309	Widebody 580k lbs or more MTOW	Two-engine widebody
627	777-200	287	Widebody 580k lbs or more MTOW	Two-engine widebody
637	777-300	327	Widebody 580k lbs or more MTOW	Two-engine widebody
683	777-F	294	Widebody 580k lbs or more MTOW	Two-engine widebody
732	DC-10-30	341	Widebody less than 580k lbs MTOW	Three-engine widebody
339	A330-900	280	Widebody less than 580k lbs MTOW	Two-engine widebody
624	767-400	235	Widebody less than 580k lbs MTOW	Two-engine widebody
625	767-200	214	Widebody less than 580k lbs MTOW	Two-engine widebody
626	767-300	204	Widebody less than 580k lbs MTOW	Two-engine widebody
687	A330-300	283	Widebody less than 580k lbs MTOW	Two-engine widebody
691	A300-600	267	Widebody less than 580k lbs MTOW	Two-engine widebody
695	A300	9	Widebody less than 580k lbs MTOW	Two-engine widebody
696	A330-200	260	Widebody less than 580k lbs MTOW	Two-engine widebody
837	787-10	318	Widebody less than 580k lbs MTOW	Two-engine widebody
887	787-8	236	Widebody less than 580k lbs MTOW	Two-engine widebody
889	787-9	266	Widebody less than 580k lbs MTOW	Two-engine widebody

Table 3-31 shows the aircraft types assigned to the remaining air carrier aircraft categories. The BTS code (a unique code for each aircraft type) is shown to facilitate reproduction of tables in this report.

Table 3-31: Regional Jet, Turboprop, Piston, and Helicopter Aircraft Types by Aircraft Category

BTS Code	Aircraft Type	YE June 2023 Average Seats	Passenger Aircraft Category	All-Cargo Aircraft Category
317	HU-1H	9	Helicopter	Helicopter
325	A-119	7	Helicopter	Helicopter
340	AS360	6	Helicopter	Helicopter
345	BELL 212	9	Helicopter	Helicopter
355	HUGES-500/530	3	Helicopter	Helicopter
360	R44	3	Helicopter	Helicopter
362	BHT 206 L3	6	Helicopter	Helicopter
364	BHT 206 L4	6	Helicopter	Helicopter
366	BHT 407	6	Helicopter	Helicopter
368	BHT 412	10	Helicopter	Helicopter
370	BO-105	4	Helicopter	Helicopter
390	S-76	6	Helicopter	Helicopter
393	A139	9	Helicopter	Helicopter

BTS Code	Aircraft Type	YE June 2023 Average Seats	Passenger Aircraft Category	All-Cargo Aircraft Category
102	P2012 Traveler	8	Piston	Piston
110	Beech 18	9	Piston	Piston
125	Cessna C-402	9	Piston	Piston
131	BN2/A	9	Piston	Piston
194	PA-31	8	Piston	Piston
026	Gipps Aero GA8 AIR	6	Piston	Piston
030	Cessna 180	3	Piston	Piston
033	Cessna 185	3	Piston	Piston
034	H250	3	Piston	Piston
035	Cessna 206	5	Piston	Piston
036	Cessna 172	3	Piston	Piston
040	DHC2	6	Piston	Piston
042	CHC3	0	Piston	Piston
079	PA-32	5	Piston	Piston
091	FLT/AMPHIB Turbine	6	Piston	Piston
094	LAND-Turbine	6	Piston	Piston

BTS Code	Aircraft Type	YE June 2023 Average Seats	Passenger Aircraft Category	All-Cargo Aircraft Category
515	Challenger 350	9	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
530	CRJ550	50	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
575	LEARJET	9	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
609	Challenger 300	9	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
629	CRJ200	50	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
632	Dornier 328 Jet	31	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
636	Cessna Citation	8	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
639	Citation Jet/CJ	7	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
641	G-IV	13	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
642	Hawker 400XP	7	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
646	Cessna Citation III	8	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
647	Cessna Citation X	8	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
648	G200	9	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
653	Cessna CE-680	8	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
658	BD-700	12	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
665	HS-125	8	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
667	G-V	15	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
669	Challenger 604/605	17	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
671	G450	13	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
674	E135	30	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
675	E145	50	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
681	Falcon	9	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
685	Cessna 510	8	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
688	Global 5000	13	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
750	G650	13	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
751	Global	10	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
770	Falcon 900	14	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
771	Falcon 50	9	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
774	DA 2000	10	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
775	Dassault Falcon 7X	16	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
778	Global 6000	15	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent
833	Legacy 650	13	Regional jet less than 61 seats	Regional jet less than 61 seat equivalent

BTS Code	Aircraft Type	YE June 2023 Average Seats	Passenger Aircraft Category	All-Cargo Aircraft Category
150	Curtiss C46 Series	39	Turboprop 20-60 seats	Turboprop 20-60 seat equivalent
395	DHC-6-400	21	Turboprop 20-60 seats	Turboprop 20-60 seat equivalent
430	Convair CV-580	45	Turboprop 20-60 seats	Turboprop 20-60 seat equivalent
441	ATR-42	46	Turboprop 20-60 seats	Turboprop 20-60 seat equivalent
449	Dornier 328	30	Turboprop 20-60 seats	Turboprop 20-60 seat equivalent
456	Saab 340/B	31	Turboprop 20-60 seats	Turboprop 20-60 seat equivalent
459	Saab 340/A	34	Turboprop 20-60 seats	Turboprop 20-60 seat equivalent
483	DHC8-100	32	Turboprop 20-60 seats	Turboprop 20-60 seat equivalent
484	DHC8-300	50	Turboprop 20-60 seats	Turboprop 20-60 seat equivalent
489	Shorts 360	30	Turboprop 20-60 seats	Turboprop 20-60 seat equivalent
218	DC-6A	76	Turboprop more than 60 seats	Turboprop more than 60 seat equivalent
442	ATR-72	70	Turboprop more than 60 seats	Turboprop more than 60 seat equivalent
482	DHC8-Q400	76	Turboprop more than 60 seats	Turboprop more than 60 seat equivalent
556	L100-30	171	Turboprop more than 60 seats	Turboprop more than 60 seat equivalent
201	BN2A	8	Turboprop under 20 seats	Turboprop under 20 seat equivalent
405	Beech 1900	14	Turboprop under 20 seats	Turboprop under 20 seat equivalent
406	KINGAIR	9	Turboprop under 20 seats	Turboprop under 20 seat equivalent
412	CASA 212	2	Turboprop under 20 seats	Turboprop under 20 seat equivalent
415	Cessna C208B	9	Turboprop under 20 seats	Turboprop under 20 seat equivalent
416	Cessna 208	8	Turboprop under 20 seats	Turboprop under 20 seat equivalent
421	Cessna SkyCourier	2	Turboprop under 20 seats	Turboprop under 20 seat equivalent
431	TBM850	5	Turboprop under 20 seats	Turboprop under 20 seat equivalent
455	METRO 23	10	Turboprop under 20 seats	Turboprop under 20 seat equivalent
458	B-350	9	Turboprop under 20 seats	Turboprop under 20 seat equivalent
479	PC-12	8	Turboprop under 20 seats	Turboprop under 20 seat equivalent
485	DHC 6	15	Turboprop under 20 seats	Turboprop under 20 seat equivalent