



Study of Operators Regulated Under Part 135

FAA Modernization and Reform Act of
2012,
Public Law 112-95,
Section 409

April 2016

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Definition of Terms

Authorized Aircraft – Aircraft that are certified on a part 135 certificate and are available for part 135 operations. These aircraft can appear on more than one certificate.

Cargo Operators/Operations – Any operation for compensation or hire that is other than a passenger-carrying operation.

Certificate Holder – a person who holds or is required to hold an air carrier certificate or operating certificate issued under part 119 14 CFR.

Commercial Air Tour – A flight conducted for compensation or hire in an airplane or helicopter where a purpose of the flight is sightseeing. The FAA may consider the following factors in determining whether a flight is a commercial air tour: (1) Whether there was a holding out to the public of willingness to conduct a sightseeing flight for compensation or hire; (2) Whether the person offering the flight provided a narrative that referred to areas or points of interest on the surface below the route of the flight; (3) The area of operation; (4) How often the person offering the flight conducts such flights; (5) The route of flight; (6) The inclusion of sightseeing flights as part of any travel arrangement package; (7) Whether the flight in question would have been canceled based on poor visibility of the surface below the route of the flight; and (8) Any other factors that the FAA considers appropriate.

Commercial Operator – A person who, for compensation or hire, engages in the carriage by aircraft in air commerce of persons or property, other than as an air carrier or foreign air carrier or under the authority of part 375 of this title. Where it is doubtful that an operation is for "compensation or hire", the test applied is whether the carriage by air is merely incidental to the person's other business or is, in itself, a major enterprise for profit.

Common Carriage – A company that holds itself out or to a segment of the public, as willing to furnish transportation within the limits of its facilities to any person who wants it. There are four elements in defining a common carrier; (1) a holding out of a willingness to (2) transport persons or property (3) from place to place (4) for compensation.

Commuter Operator – Any scheduled operation conducted by any person operating airplanes, other than turbojet powered airplanes, having a maximum passenger-seat configuration of 9 seats or less, excluding each crewmember seat, and a maximum payload capacity of 7,500 pounds or less or rotorcraft with a frequency of operations of at least five round trips per week on at least one route between two or more points according to the published flight.

Establishment – A place of business together with its employees, merchandise, equipment, etc.

FAA Region – Administrative groupings of states that house representatives of FAA organizations.

Fractional Ownership Program –System of aircraft ownership and exchange operated under part 91, Subpart K, that consists of the provision for fractional ownership program management services by a single fractional ownership program manager on behalf of the fractional owners; two or more airworthy aircraft; one or more fractional owners per program aircraft; possession of at least a minimum fractional ownership interest in one or more program aircraft by each fractional owner; a dry-lease aircraft exchange arrangement among all of the fractional owners; and multi-year program agreements.

On-Demand Operators/Operations – Any operation for compensation or hire that is one of the following:

(1) Passenger-carrying operations conducted as a public charter under part 380 of this chapter or any operations in which the departure time, departure location, and arrival location are specifically negotiated with the customer or the customer's representative that are any of the following types of operations: (a) Common carriage operations conducted with airplanes, including turbojet-powered airplanes, having a passenger-seat configuration of 30 seats or fewer, excluding each crewmember seat, and a payload capacity of 7,500 pounds or less, except that operations using a specific airplane that is also used in domestic or flag operations and that is so listed in the operations specifications as required by Sec. 119.49(a)(4) of this chapter for those operations are considered supplemental operations; (b) Noncommon or private carriage operations conducted with airplanes having a passenger-seat configuration of less than 20 seats, excluding each crewmember seat, and a payload capacity of less than 6,000 pounds; or (c) Any rotorcraft operation.

(2) Scheduled passenger-carrying operations conducted with one of the following types of aircraft with a frequency of operations of less than five round trips per week on at least one route between two or more points according to the published flight schedules: (a) Airplanes, other than turbojet powered airplanes, having a maximum passenger-seat configuration of 9 seats or less, excluding each crewmember seat, and a maximum payload capacity of 7,500 pounds or less; or (b) Rotorcraft.

(3) All-cargo operations conducted with airplanes having a payload capacity of 7,500 pounds or less, or with rotorcraft.

Operator – Person who uses, causes to use or authorizes to use aircraft, for the purpose (except as provided in 14 CFR § 91.13) of air navigation including the piloting of aircraft, with or without the right of legal control (as owner, lessee, or otherwise).

Part 91 Operations—general flight rules applicable to all aircraft operations in the U.S.

Part 121 Operators--The domestic, flag, and supplemental operations of each person who holds or is required to hold an Air Carrier Certificate or Operating Certificate under 14 CFR part 119.

Part 135 Operators – All firms providing services under 14 CFR part 135, including scheduled, on-demand and all cargo operations.

Person – An individual, firm, partnership, corporation, company, association, joint-stock association, or governmental entity. It includes a trustee, receiver, assignee, or similar representative of any of them.

Scheduled Service Operators/Operations – Any common carriage passenger-carrying operation for compensation or hire conducted by an air carrier or commercial operator for which the certificate holder or its representative offers in advance the departure location, departure time, and arrival location. Aircraft used in scheduled service may also be used in on-demand operations.

Sightseeing Operations – Non-stop flight in an airplane or helicopter having a standard airworthiness certificate and passenger-seat configuration of 30 seats or fewer and a maximum payload capacity of 7,500 pounds or less that begin and end at the same airport, and are conducted within a 25-statute mile radius of that airport, in compliance with the Letter of Authorization issued under 14 CFR § 91.147.

Abbreviations and Acronyms

AAS	Airport Activity Survey
AIP	Airport Improvement Program
ATADS	Air Traffic Activity Data System
ATSBM	Air Traffic Services Business Model
BTS	Bureau of Transportation Statistics
DOT	United States Department of Transportation
ETMS	Enhanced Traffic Management System
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FY	Fiscal Year
GAMA	General Aviation Manufacturers Association
GA Survey	General Aviation and Part 135 Activity Survey
GPS	Global Positioning System
HAI	Helicopter Association International
IFR	Instrument Flight Rules
ILS	Instrument Landing System
NVIS	National Vital Information Subsystem
NAICS	North American Industrial Classification System
NAS	National Airspace System
NATA	National Air Transportation Association
NBAA	National Business Aviation Association
NPIAS	National Plan of Integrated Airport Systems
NTSB	National Transportation Safety Board
OAG	Official Airline Guide
OPSS	Operations Safety System
Schedule T-100	Air Carrier Traffic and Capacity Data by Non-Stop Segment and On-Flight Market
TAF	Terminal Area Forecast
TCAS	Traffic Collision Avoidance System
VFR	Visual Flight Rules

Executive Summary

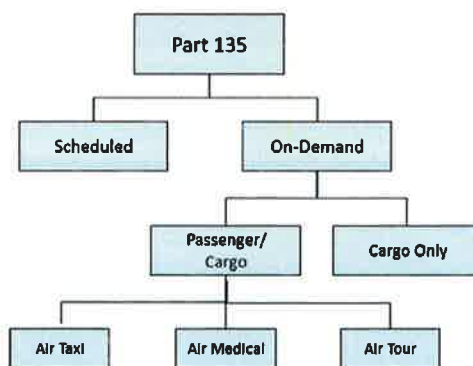
Background

This part 135 Operators report was prepared by the Federal Aviation Administration (FAA) to address Section 409 of the FAA Modernization and Reform Act of 2012, which mandated a study of operators regulated under Title 14 of the Code of Federal Regulations (14 CFR) part 135. The requirement further stated that the study was to be conducted in consultation with interested parties. Section 409 mandated analyses of various aspects of the part 135 fleet, including the size and type of aircraft, the equipment and hours flown and utilization, safety record, sales revenue and the number of airports and passengers served.

A number of FAA, National Transportation Safety Board (NTSB) and industry databases have been used to develop profiles of part 135 operators. Where appropriate, differences in reporting and other conventions are noted because there is no single source of integrated data on the industry. One could aggregate data based on all activities of part 135 operators, irrespective of the regulation (e.g., part 135 or part 91) under which a flight operated. Alternatively, one could aggregate data based on the rule under which specific flights operated.¹ And, the NTSB classifies accidents by the regulation under which the flight operated.

The part 135 industry is composed of scheduled and on-demand operators as depicted in Figure ES-1. Scheduled operators regulated under part 135 fly propeller-driven airplanes with nine passenger seats or less. On-demand operators operating under part 135 fly aircraft for hire with 30 passenger seats or less and a payload capacity of 7,500 pounds or less (when holding out services to the public) or 20 passenger seats or less and a payload capacity of less than 6,000 pounds (if not holding out services to the public). On-demand part 135 operators provide either passenger and cargo operations or cargo only operations. Passenger and cargo operations are further categorized as air taxi, air medical or air tour operations.

Figure ES- 1: Part 135 Industry Structure



¹ Some activities with the same aircraft and certificate holder are operated under part 135 or part 91 depending on the purpose of the flight. For example, a charter flight carrying passengers for compensation or hire must be operated under part 135, while a flight to take an empty aircraft and position it for such an operation can be operated under part 91.

Some data comes from sources that are specific only to the scheduled part 135 or the on-demand part 135 industry. For example, the General Aviation and Part 135 Activity Surveys provides data for only on-demand operations under part 135. Thus, there is no companion dataset for the scheduled part 135 industry on some data gathered in the GA Survey, such as that for avionics equipage.

Findings

In October 2012, 2,155 operators were approved for part 135 operations and 10,655 total aircraft were authorized on part 135 certificates.² Approximately 72 percent of the aircraft were fixed-wing airplanes and 28 percent were rotorcraft. While many types of aircraft are used in part 135 services, the most frequently used aircraft type is a fixed-wing turbojet airplane, with over 3,300 aircraft approved in 2012.

Most on-demand part 135 aircraft are equipped with navigation equipment, transponders, communications equipment and approach equipment. Many higher-performance fixed-wing airplanes (including multi-engine piston, multi-engine turbo-prop and turbojet aircraft) are also equipped with more sophisticated avionics such as traffic collision avoidance and weather equipment.

On-demand part 135 aircraft flew approximately 3.1 million hours in 2010, with the air taxi segment accounting for 71 percent of total on-demand part 135 flight hours. The average on-demand part 135 aircraft flew 377 hours in 2010, with the average number of hours per aircraft being higher for rotorcraft (541 hours) than fixed-wing airplanes (310 hours).

From 1992 to 2011, as reported by NTSB in its 2011 annual aviation statistics summary, the total number of accidents for on-demand part 135 operations has fallen from an average of 78 per year during the first ten years of the period to an average of 56 per year during the most recent ten years of the period. The average number of fatal accidents per year declined from 21 to 14 over the two ten-year periods. The average number of fatalities per year declined from 54 to 36 over the two ten-year periods, but the number of fatalities per fatal accident remained constant at 2.6. Total and fatal accident rates also declined between the two ten-year periods.

Part 135 operators do not report revenue data to FAA or DOT. FAA tabulated data from the 2007 Economic Census conducted by the U.S. Department of Commerce for the non-scheduled air transportation industry (to inform this analysis, as a surrogate for part 135 operators) in terms of the number of firms and establishments (a location where a firm conducts business) and the revenue levels of these firms. Most of the firms and establishments have less than \$2.5 million in annual revenues. There are a number of larger firms with annual revenues in excess of \$10 million, but they represent a small share of the numbers of non-scheduled air transportation firms or establishments.

² An aircraft can be approved for operations under part 135 even if the aircraft is also used for other purposes. Part 135 operators often will contract with aircraft owners to utilize an aircraft under their certificate. In addition, most fractional aircraft program managers under part 91 also hold part 135 certificates, and their aircraft are eligible to operate under either certificate.

The numbers of airports and people served by on-demand part 135 operators are critical to understanding the part 135 industry, but there is no single source of data which reports these statistics at the airport level³. FAA reviewed a number of datasets to examine both the number of flights and the number of enplanements⁴ by on-demand part 135 operators.⁵ The largest number of airports served by on-demand part 135 passenger operators can be identified using the Air Traffic Services Business Model (ATSBM), which tracks all instrument flight rules (IFR) flights in the national airspace system (NAS). It shows that there were over 3,000 airports that had one or more IFR flights by an on-demand part 135 passenger operator (the ATSBM also provides estimates of enplanements).⁶ In comparison, only 681 airports had scheduled passenger service according to the Official Airline Guide (OAG). Two other datasets also report part 135 enplanements by airport. The first, the airport activity survey (AAS), is comprised of enplanement reports filed on a voluntary basis by on-demand part 135 operators. This shows that approximately 1,100 airports had enplanements reported by on-demand part 135 operators. In addition, U.S. Department of Transportation (DOT) reporting by scheduled carriers through Schedule T-100 (T-100) shows that 407 airports were served by scheduled part 135 passenger operators.

The ATSBM estimated that there were nearly six million enplanements by on-demand part 135 operators in FY 2012, while the AAS reported approximately 800,000 enplanements in 2011. According to T-100 data, scheduled part 135 operators enplaned nearly 1.9 million passengers in 2012. While scheduled and on-demand part 135 operators do not serve a large share of total U.S. enplanements, they are the only commercial air transportation service available at a large number of airports in remote areas. Between 66 percent and 83 percent of airports with on-demand part 135 enplanements (depending on source) did not have any scheduled passenger service as shown in Figure ES-2.

Figure ES- 2: Passengers Enplaned and Airports Served by On-Demand Part 135 Operators

Source	On-Demand Part 135 Enplanements	Airports with On-Demand Part 135 Enplanements	
		Total	Without Scheduled Passenger Service
AAS	806,472	1,107	66%
ATSBM	5,998,256	3,290	83%

³ Section 1.5 contains a list of datasets reviewed.

⁴ Enplanements are the numbers of passengers boarding aircraft.

⁵ Scheduled part 135 operators are required to report passenger and cargo enplanements on DOT Schedule T-100.

⁶ The ATSBM on-demand part 135 passenger operator group does not include operators with aircraft authorized for both part 135 and part 91K operations in OPSS (Operations Safety System). It is assumed that the primary use of these aircraft is for fractional ownership programs.

Section 1: Introduction

1.1 Legislative Requirement

Section 409 of the FAA Modernization and Reform Act of 2012⁷ mandated a study of the operators regulated under part 135. The legislation specified the following requirements for the study:

- **Study**— The Administrator of the Federal Aviation Administration, in consultation with interested parties, shall conduct a study of operators regulated under part 135 of title 14, Code of Federal Regulations.
- **Contents**— In conducting the study, the Administrator shall analyze the part 135 fleet in the United States, which shall include analysis of the:
 1. size and type of aircraft in the fleet
 2. equipment utilized by the fleet
 3. hours flown each year by the fleet
 4. utilization rates with respect to the fleet
 5. safety record of various categories of use and aircraft types with respect to the fleet, through a review of the database of the National Transportation Safety Board
 6. sales revenues of the fleet; and
 7. number of passengers and airports served by the fleet
- **Report to Congress**— Not later than 18 months after the date of enactment of this Act, the Administrator shall submit to the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on the results of the study conducted.

1.2 Study Scope

Title 14 CFR part 135 prescribes operating requirements for commuter and on-demand operations and rules governing persons on board such aircraft. In general, operators subject to part 135 include both scheduled carriers flying aircraft with fewer than ten passenger seats and on-demand passenger or cargo services. Figure 1-1 diagrams the various factors that determine if an operation is regulated by part 135.⁸ First, it is determined whether the operator is engaged in common carriage or non-common carriage. The operator is engaged in common carriage if the operator “holds out”⁹ to the public, or to a segment of the public, a willingness to transport

⁷ *FAA Modernization and Reform Act of 2012*. Public Law 112-95, February 14, 2012.

⁸ Federal Aviation Administration. “Air Carrier Commercial Operator Certificate Determinations, Types of Certificates, and Applicable Rules.” In *FAA Order 8900.1 Flight Standards Information Management System (FSIMS)*, Volume 2, Chapter 2, Section 2. Washington, DC: FAA, September 2007.

⁹ To indicate/advertise to the public a willingness to transport people or goods.

persons or property from place to place for compensation. The operator is engaged in non-common carriage if the operator transports persons or property for compensation or hire but there is no holding out. There are a number of specific exceptions from the operating rules of part 135, including fractional ownership, student instruction, certain sightseeing flights and other types of flights that do not require air carrier or commercial operator certification.

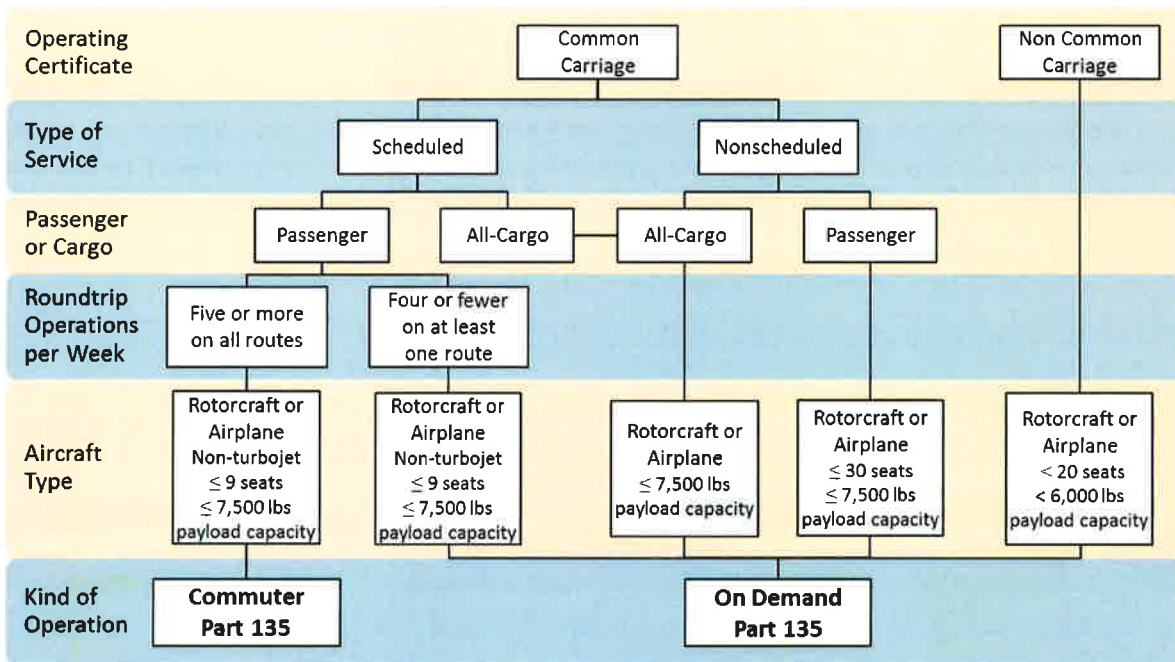
1.3 Part 135 Regulatory Structure

Operators engaged in common carriage offer scheduled or nonscheduled flights. All-cargo operations are always classified as on-demand operations. If the operator offers scheduled passenger service on a non-turbojet airplane with nine or fewer seats and 7,500 pounds or less payload capacity or on any rotorcraft that operates with a frequency of five or more round trips a week on at least one route, then the operation is classified as commuter part 135. If the operator offers scheduled passenger service on an airplane (excluding turbojet-powered airplanes) with nine or fewer seats and 7,500 pounds or less payload capacity or any rotorcraft that operates with a frequency of less than five round trips a week on at least one route, then the operation is classified as on-demand part 135.

Also included in the on-demand category are operations involving public charters under 14 CFR part 380. These operations may also include frequencies of five or more round trips per week on a city pair segment using aircraft with 30 or fewer seats, including turbojet aircraft. Such operations would generally require part 121 scheduled authority or part 135 commuter authority, depending on the type and size of the aircraft. However, under the regulatory definitions in § 110.2, these operations are specifically excluded from the definition of a scheduled operation and specifically included in the definition for on-demand operations. Public charter operations are a small but growing segment of on-demand operations.

As shown in Figure 1-1, all nonscheduled operations using aircraft meeting the listed criteria and all operators engaged in non-common carriage using aircraft meeting the listed criteria are classified as on-demand part 135.

Figure 1- 1: Part 135 Operating Rules



This diagram does not depict slight differences in rules for aircraft engaged in nonscheduled intrastate common carriage operations.

FAA describes types of operations with precise definitions of commuter part 135 and on-demand part 135. These definitions differ from those used by DOT when it issues economic authority for air carriers. DOT defines a commuter air carrier as a company that operates airplanes designed to have no more than 60 passenger seats and that provides scheduled passenger service of five or more round-trip flights per week on at least one route. DOT defines an air taxi operator as a company that operates aircraft originally designed to have no more than 60 passenger seats or a cargo payload of 18,000 pounds and carries cargo or mail on either a scheduled or charter basis, and/or carries passengers on an on-demand basis or limited scheduled basis only.

For simplicity and to avoid confusion between FAA and DOT definitions, this report uses the terms “scheduled part 135” and “on-demand part 135” to describe two distinct segments of the part 135 industry. Scheduled part 135, as used in the report, is also known as commuter part 135 as shown in Figure 1-1. Also consistent with Figure 1-1, we will use the phrase on-demand part 135 to classify on-demand part 135 operations.

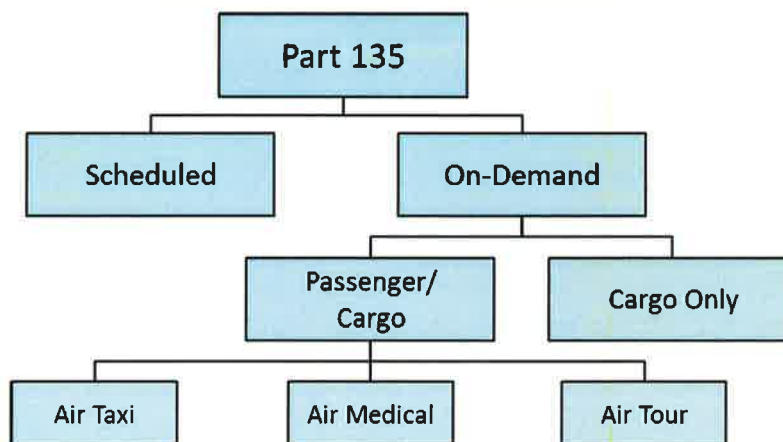
There is a category of operators authorized to conduct operations under both part 135 and part 121. FAA’s Operations Safety System (OPSS) lists 13 such “split certificate” operators. Because their operations combine elements of both the on-demand and scheduled carrier industries, and because the firms tend to be larger, they are significantly different from other part 135-only operators. In addition, it is not possible to separate their part 121 operations from their part 135 operations in ATSBM flight records. For these reasons, the split certificate operators are excluded from the activity and other counts reported in this study.

Some data comes from sources that are specific only to the scheduled part 135 or the on-demand part 135 industry. For example, the General Aviation and Part 135 Activity Surveys provides data for only on-demand operations under part 135. Thus, there is no companion dataset for the scheduled part 135 industry on some data gathered in the GA Survey, such as that for avionics equipment.

1.4 Part 135 Use Categories

This part 135 Operators report presents both aggregated data and data by part 135 use category, to provide additional information on the industry. Figure 1-2 provides a diagram of the part 135 use categories. The main categories are scheduled and on-demand; the on-demand category is sub-divided into passenger/cargo operations and cargo only operations. The three categories of passenger/cargo operations are air taxi, air medical and air tour.

Figure 1- 2: Part 135 Use Categories



1.5 Methodology

A number of data sources were used to develop a profile of the part 135 industry, consistent with the statutory mandate for this study. The principal data set used to identify operators was taken from the FAA's OPSS,¹⁰ which is a real-time data system that tracks operators registered with FAA that have filed the required insurance information with the U.S. Department of Transportation. The following databases were used in the study:

➔ **FAA Databases:**

- Operations Safety System (OPSS), maintained by FAA Air Transportation Division (AFS-260) (Information Collection Request [ICR] #201210-2120-001
- National Vital Information Subsystem (NVIS), maintained by FAA Regulatory Support Division (AFS-620) No ICR#. National Flight Standard Automation Subsystem (NFSAS) is the mainframe subsystem which retains the Flight Standards Automation Subsystem (FSAS) data uploaded from all FSDOs, such as inspection and safety data, ranging from certifications to routine inspections.

¹⁰ The data from OPSS were extracted on October 3, 2012.

NVIS is a subsystem of FSAS, which allows users to view or print all records and reports concerning reference data on air operators, air agencies, airmen, aircraft, and facilities.

- Airport Activity Survey (AAS), conducted by FAA Office of Airport Planning and Programming (APP-410) (ICR# 201402-2120-002)
- Terminal Area Forecast (TAF), maintained by FAA Office of Aviation Policy and Plans (APO-100) ICR# 201107-2138-003
- National Plan of Integrated Airport Systems (NPIAS), maintained by FAA Office of Airports (APP-410) No ICR#. The data for the NPIAS are primarily obtained from airport master plans and system plans prepared by planning and engineering firms for state and local agencies and concurred in by the FAA. Each of the FAA's nine Airports Regional Offices is responsible for maintaining its portion of the national database. Specifically, Regional Airports Division Managers are responsible, within national program policy parameters and program guidance, for making all decisions with respect to entry and development inputs and revisions to the NPIAS.
- Airport Master Records, obtained from FAA National Flight Data Center (Form 5010) (ICR# 201207-2120-005)
- 2010 General Aviation and Part 135 Activity Survey (GA Survey), conducted for the Aviation Safety Information Analysis and Sharing Division of the FAA Office of Accident Investigation and Prevention (AVP) and FAA Office of Aviation Policy and Plans (APO-110)¹¹ (ICR# 201402-2120-004)
- Aircraft Registration Database, maintained by the FAA Civil Aviation Registry (AFS-750) (ICR# 201108-2120-004)
- Enhanced Traffic Management System data (ETMS) taken from the Air Traffic Services Business Model (ATSBM), maintained by the NAS Quality Assurance and Performance Group, ATO Technical Operations, and APO-100 ICR# 201203-2138-001 (ETMS is the underlying database and communications system for traffic management. ETMS produces demand data, applies control times to the data, processes user substitutions, and generates user reports.)

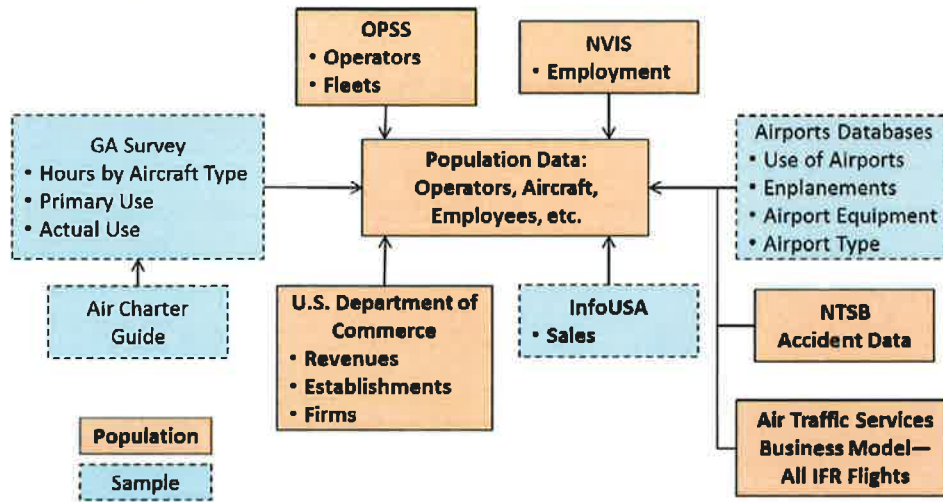
→ Non-FAA Databases:

- National Transportation Safety Board (NTSB) Aviation Accident Database and Synopses
- Air Charter Guide, an industry reference source about the charter industry
- U.S. Department of Commerce Census Bureau 2007 Economic Census

The number of part 135 operators and the number and type of aircraft were defined by OPSS. Other data were used to characterize this population in terms of hours flown, the airports used and avionics equipment, and to provide information on the safety record of part 135 operations. Figure 1-3 shows a schematic of the main databases and how they were organized to provide data for this study. It notes which data sources are available for the population of relevant operators and which data are available only for a sample of them.

¹¹ This study uses a database of de-identified individual survey responses, not the FAA publication, to enable special data tabulations to be made.

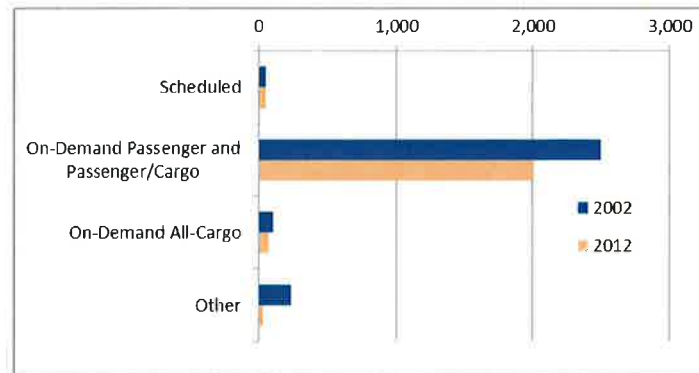
Figure 1- 3: Main Datasets for Part 135 Operators Study



The OPSS database contains data on all operators and aircraft approved for on-demand operations under part 135 and represents the relevant population of interest in this study. It is focused on operators that hold various types of certificates and the aircraft authorized to operate on each certificate. A certificate holder may have multiple types of certificates (e.g., part 121 and part 135) and some aircraft may be on multiple certificates. For example, most fractional aircraft programs approved under Subpart K of part 91 also hold a part 135 certificate, and the same aircraft are approved to operate on both certificates. OPSS does not provide any distribution of activities among the two certificate types held by the operator and does not report the Code of Federal Aviation Regulations under which individual flights are flown.

Figure 1-4 shows the change in the number of part 135 operators from 2002 to 2012. The total number of part 135 operators declined from 2,891 in 2002 to 2,155 in 2012. In 2012, most of the part 135 operators (2,007 operators, or 93 percent) conducted passenger or passenger and cargo operations. Small numbers of part 135 operators conducted on-demand all-cargo operations (71 operators, or three percent) or scheduled operations (48 operators or two percent), while the type of operations for the remaining operators was unknown.

Figure 1-4: Change in Number of Part 135 Operators by Operation Type



The GA Survey¹² collects data on part 135 operations including active aircraft data by type, flight hours by primary and actual use, operations under various types of flight plans and weather conditions, and avionics equipment, among other information. The GA survey is focused on aircraft, not operators. Its sample is drawn from the aircraft registry, and the results are extrapolated to represent the population of aircraft. In 2004, the survey was enhanced to include 100 percent sampling for turbine-powered aircraft, rotorcraft, on-demand part 135 aircraft and Alaska-based aircraft. The GA Survey only provides general information on where aircraft operate based on the principal state and FAA region of the aircraft operations.

The AAS contains airport activity information collected through a voluntary survey of part 135 on-demand operators. It reports the number of passengers enplaned by the operator at individual airports, to include part 135 services. The AAS likely understates enplanements and the numbers of airports served by part 135 on-demand operators, because not all operators respond to the survey, so it cannot capture 100 percent of operator activity. The survey is not extrapolated to a population of operators.

Data from the ATSBM uses flight-level data from the ETMS to provide information on all IFR flights.¹³ Because it records data for individual flights, the ATSBM provides part 135 operator activity at the origin and destination airport level, which also allows the identification of international aircraft operations. The ATSBM also estimates cargo and passenger enplanements at the airport level based on aircraft type, capacity and load factor. In the ATSBM, aircraft operators have been organized into a structure by operator and aircraft type, which allows identification of on-demand part 135 operators using OPSS and other data. Scheduled part 135 operations are grouped differently in the ATSBM and are within regional airline groups that also include part 121 operators. Scheduled part 135 activity data are derived from T-100 data in this report. The flight-level data are classified by the operator category, and not whether a particular operator's flight was conducted under part 135 or part 91 (such as a positioning flight). As such, ATSBM passenger and cargo enplanements estimates likely overstate actual enplanements to the extent they include part 91 flight segments for a part 135 operator. The ATSBM also tracks VFR activity by airport, but it does not have the same user identification details as does the IFR flight data. The ATSBM was adapted to support FAA's most recent reauthorization and has been used in the "Asset" study conducted by the FAA Office of Airports.¹⁴

The NTSB records accidents and provides estimated accident rates for part 135. It classifies accidents based on the operating rules under which the flight was conducted. NTSB also records if the operator of the accident flight held a specific type of FAA certificate. Thus a part 135 operator could have accidents reported under part 135 or part 91 by NTSB depending on the specific circumstances of that flight. The NTSB also uses the GA Survey and DOT T-100 data in developing flight hour exposure data with which to calculate accident rates.

¹² The 2010 GA Survey, which was the most recently available GA Survey at the time of publication of this report.

¹³ GRA, Incorporated. *Air Traffic Services Business Model: Overview, Model Description and Applications with Supporting Documentation. Final Report.* Washington, DC: FAA, September 2011.

¹⁴ Federal Aviation Administration. *General Aviation Airports: A National Asset.* Washington, DC: FAA, 2012.

1.6 Consultation with Interested Parties

A number of organizations contacted during the study provided valuable input to FAA, including:

- ➔ American Association of Airport Executives (AAAE)
- ➔ Alaska Air Carriers Association (AACA)
- ➔ Alaska DOT and Public Facilities (PF)
- ➔ Association of Air Medical Services (AAMS)
- ➔ FAA Office of Airports
- ➔ FAA Aviation Safety Organization
 - Alaskan Region Safety Analysis and Evaluation Branch
 - Aviation Safety Information Analysis and Sharing (ASIAS) Division
 - Flight Standards Service General Aviation and Commercial Division
- ➔ General Aviation Manufacturers Association (GAMA)
- ➔ Helicopter Association International (HAI)
- ➔ Medallion Foundation
- ➔ National Air Transportation Association (NATA)
- ➔ National Business Aviation Association (NBAA)
- ➔ NTSB

1.7 Report Organization

This report is organized in accordance with the study contents mandated by Section 409 and includes the following sections:

- ➔ Section 2: Size and Type of Aircraft
- ➔ Section 3: Equipment Utilized
- ➔ Section 4: Hours Flown Each Year
- ➔ Section 5: Utilization Rates
- ➔ Section 6: Safety Record
- ➔ Section 7: Sales Revenues
- ➔ Section 8: Number of Passengers and Airports Served

Section 2: Size and Type of Aircraft

2.1 Introduction

Data on the aircraft owned and/or operated by part 135 operators were taken from OPSS. These data show that part 135 operators have 10,655 aircraft on their certificates.¹⁵ Aircraft in OPSS are listed by N-number but are described as generic kinds (such as single-engine land or multi-engine sea). For this study, aircraft were assigned to more descriptive categories based on the detailed aircraft classification system used in the GA Survey. Aircraft found in OPSS were merged with data found in the FAA's Aircraft Registry according to N-number. These aircraft were matched against make-model-series (MMS) data for the population of aircraft.

2.2 Fleet Size

Figure 2-1 shows the number of authorized aircraft among part 135 operators, distributed by aircraft category and activity type. Among these 10,655 aircraft, 2,601 (24 percent, fixed-wing and rotorcraft) have piston engines, and 8,053 (76 percent, fixed-wing and rotorcraft) have turbine engines, including jets.¹⁶

Figure 2- 1: Authorized Part 135 Aircraft by Aircraft Category and Activity

Aircraft Category		Scheduled Part 135	On-Demand		Not Specified/ Other	Total Authorized Aircraft	
			Passenger and Passenger/ Cargo	Cargo Only		Count	Share
Fixed-Wing Airplane	Single-Engine Piston	181	1,091	20	5	1,297	12%
	Multi-Engine Piston	109	787	191	1	1,088	10%
	Single-Engine Turbo-Prop	119	273	232		624	6%
	Multi-Engine Turbo-Prop	72	982	298	2	1,354	13%
	Turbojet	27	3,249	68	1	3,345	31%
	Total	508	6,382	809	9	7,708	72%
Rotorcraft	Piston	4	210		2	216	2%
	Turbine	45	2,676	9		2,730	26%
	Total	49	2,886	9	2	2,946	28%
Other			1			1	0%
Total		557	9,269	818	11	10,655	100%

Source: 2012 OPSS

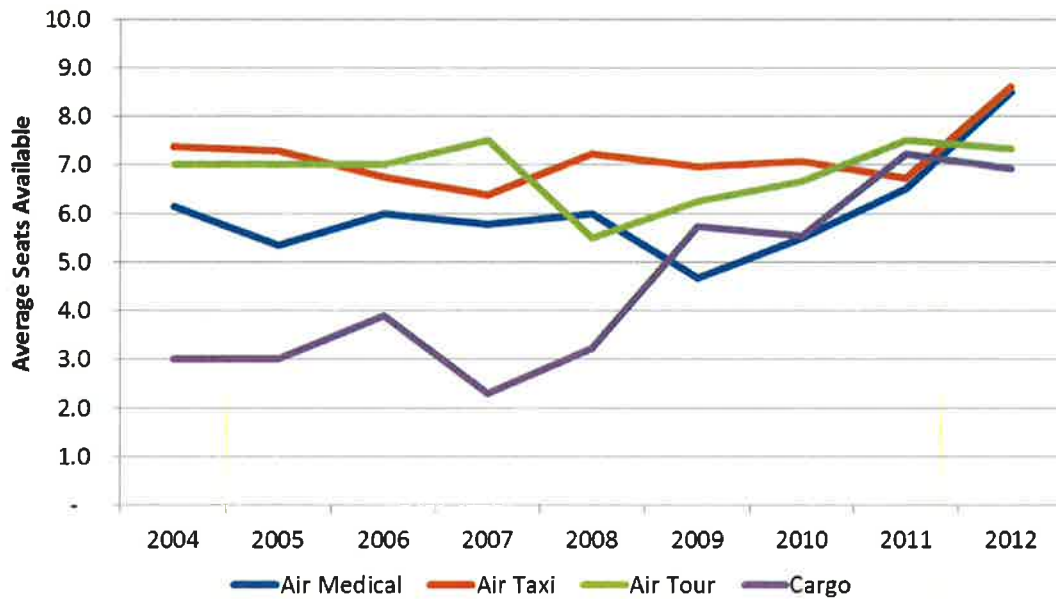
¹⁵ Some aircraft may appear on more than one certificate, for instance, if an aircraft is used in seasonal operations or is co-owned. Of the 10,655 aircraft authorized for part 135 operations, 134 appear on more than one certificate, for a total of 10,521 unique aircraft among part 135 operators. However, for the purposes of this study, the 10,655 aircraft that are approved for part 135 operations are used to describe the part 135 fleet because they represent the effective number of aircraft available for use in part 135 operations. This avoids arbitrarily assigning these aircraft to FAA regions and other groupings for results.

¹⁶ One aircraft's engine type is unknown.

2.3 Seating Capacities

There is limited size data available for the part 135 fleet, but the NTSB accident database can be used to calculate the average seat size of aircraft involved in accidents. This sample may not be representative of the overall part 135 fleet. Figure 2-2 shows the average number of seats available on aircraft involved in accidents that were operating under on-demand part 135 flight rules at the time of the accident by operation type over the nine-year period. The average number of seats available on aircraft involved in accidents in air medical, air taxi and air tour operations was fairly stable within each group from 2004 to 2010, but increased somewhat in 2011 and 2012. Across total accidents, the average number of seats available on aircraft involved in cargo operations increased somewhat during the nine-year period and is now at about seven seats per aircraft.

Figure 2- 2: Average Seats Available on On-Demand Part 135 Aircraft Involved in Total Accidents – 2004-2012



Source: NTSB Accident Database

Section 3: Equipment Utilized

Aircraft avionics information was collected from general aviation and on-demand part 135 aircraft owners in the 2010 GA Survey and is discussed herein. To show trends in avionics equipage in recent years, data from the 2005 GA Survey¹⁷ was also analyzed. The GA Survey classifies aircraft into 18 categories, many of which are differentiated by number of seats or engine type. To facilitate analysis, these categories have been combined into seven groups.¹⁸ The number of respondents and the percentages of aircraft equipped with various types of safety-related avionics are illustrated in Figure 3-1. In general, the on-demand part 135 fleet was equipped with more advanced avionics in 2010 than it was in 2005.¹⁹

Figure 3- 1: Selected Avionics Data for On-Demand Part 135 Aircraft

Aircraft Category		GPS		Transponder		Guidance		Approach		TCAS		Respondents	
		2005	2010	2005	2010	2005	2010	2005	2010	2005	2010	2005	2010
Fixed-Wing Airplane	Single-Engine Piston	86%	85%	83%	82%	30%	48%	71%	70%	5%	9%	117	579
	Multi-Engine Piston	87%	93%	100%	99%	90%	94%	99%	98%	7%	21%	120	560
	Single-Engine Turbo-Prop	100%	88%	100%	70%	88%	64%	100%	64%	52%	38%	17	424
	Multi-Engine Turbo-Prop	98%	98%	100%	99%	100%	93%	100%	99%	32%	58%	58	394
	Turbojet	99%	99%	97%	97%	100%	99%	100%	99%	78%	84%	79	910
Rotorcraft	Piston	100%	83%	100%	96%	0%	18%	33%	12%	0%	2%	2	29
	Turbine	92%	96%	83%	99%	62%	66%	51%	64%	10%	45%	46	1,382
	Other	67%	67%	39%	60%	34%	58%	33%	49%	14%	44%	10	26
Total		88%	93%	86%	93%	66%	76%	79%	80%	20%	44%	449	4,304

Source: 2005 GA Survey and 2010 GA Survey

Global Positioning System (GPS) receivers allow the pilot to pinpoint the aircraft's position through signals from satellites. Some inexpensive units provide few functions and are not approved for use under instrument flight rules (IFR). More complex units show the pilot a moving map of the aircraft's surroundings. The share of aircraft with GPS systems ranges from 67 percent for Other aircraft to 98-99 percent for multi-engine turbo-prop and jet aircraft.

Transponders receive radar signals and reply with an amplified signal, aiding identification of the aircraft by the air traffic control system. Almost all jet- and multi-engine piston aircraft have transponders, as do most aircraft in the other categories. The lowest rate of transponder use is seen for Other aircraft, at 60 percent.

Guidance equipment assists the pilot in keeping the aircraft on course even if his or her attention is diverted elsewhere. This category includes an autopilot as well as a Flight Management System, Flight Director or Electronic Flight Instrument System. Nearly all surveyed jets have guidance equipment (99 percent), as do 93 percent of multi-engine turbo-prop aircraft. In the other aircraft categories, the percentage of aircraft equipped with guidance systems ranges from 18 percent for piston rotorcraft to 94 percent for multi-engine piston aircraft.

¹⁷ 2005 was the first year that detailed avionics equipage data by aircraft type was available.

¹⁸ The "Other" aircraft group consists of gliders, lighter-than-air craft, experimental aircraft and light-sport aircraft.

¹⁹ The sample size of GA Survey recipients that responded to the avionics questions in 2010 was nearly ten times greater than the sample size in the 2005 GA Survey.

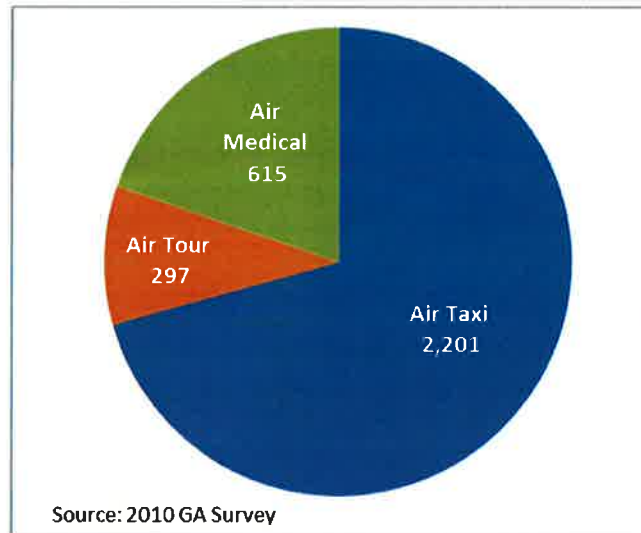
Some airports have one or more runways equipped with Instrument Landing System (ILS) transmitters that provide horizontal and vertical guidance. If the aircraft has equipment to receive the ILS signals, the pilot can tell whether the aircraft is properly aligned to land. An aircraft may also have a GPS-based approach capability. If an approach has been developed and approved, the GPS can be used on any runway and not just those equipped with ILS transmitters. Most aircraft (80 percent) have some type of approach equipment.

A Traffic Collision Avoidance System (TCAS) monitors the airspace around an aircraft for other aircraft equipped with an active transponder, independent of air traffic control, and warns pilots of the presence of other transponder-equipped aircraft which may present a threat of mid-air collision. TCAS units transmit "interrogation" broadcasts to all other units within range, and "responses" to all interrogations they receive. When two units determine that a collision potential exists, they negotiate a mutual avoidance maneuver and deliver instructions to the crews. Most (84 percent) jet and multi-engine turbo-prop (58 percent) aircraft are equipped with a TCAS, as are many turbine rotorcraft (46 percent).

Section 4: Hours Flown Each Year

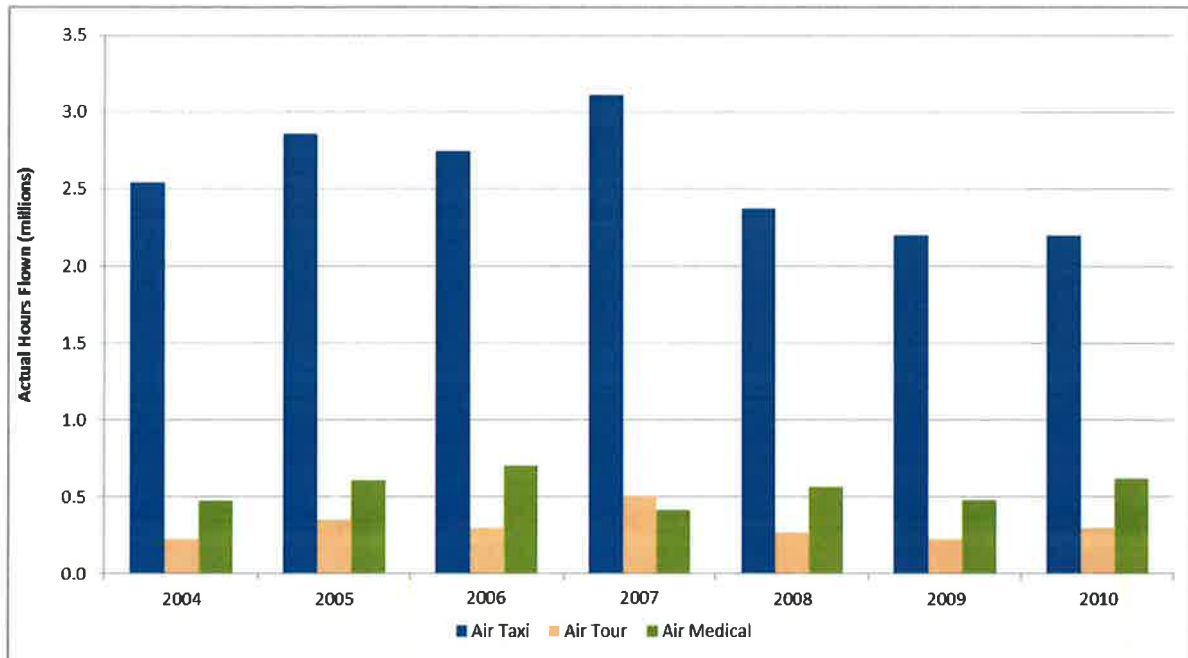
The on-demand part 135 fleet flew 3.1 million hours in 2010 according to the 2010 GA Survey. Figure 4-1 shows the number of hours flown for on-demand part 135 aircraft by actual use in 2010. Part 135 air taxi use was the largest component of the three on-demand part 135 categories with 2.2 million hours flown, which accounted for 71 percent of total on-demand part 135 hours. The air medical and air tour categories accounted for 615,000 hours (20 percent) and 297,000 hours (10 percent) of total on-demand part 135 hours, respectively.

Figure 4- 1: 2010 On-Demand Part 135 Hours Flown by Actual Use (000)



From 2004 to 2010, the total number of hours flown by on-demand part 135 aircraft decreased by four percent, from 3.2 million hours in 2004 to 3.1 million hours in 2010. However, the three components of the on-demand part 135 industry experienced very different changes in activity, as shown in Figure 4-2. Air taxi hours flown decreased by 13 percent, while air tour and air medical hours flown increased by 32 percent and 30 percent, respectively. The total number of air taxi hours peaked in 2007 at 3.1 million hours before declining considerably to 2.2 million hours in 2009.

Figure 4- 2: Hours Flown (Actual Use) by On-Demand Part 135 Aircraft, 2004 – 2010



Section 5: Utilization Rates

The number of hours an aircraft is flown per year varies by type and use. Figure 5-1 shows the number of aircraft and annual utilization for the 8,111 part 135 aircraft with part 135 reported as the primary use in the GA Survey.²⁰ Turbine-engine aircraft have higher levels of utilization than piston-engine aircraft. Single-engine piston aircraft have the lowest levels of utilization, while turbine rotorcraft see the highest levels of utilization. The average part 135 aircraft is flown 377 hours per year.

Figure 5- 1: Annual Utilization of Part 135 Primary Use Aircraft

Aircraft Category		Fleet	Hours Flown	Annual Utilization
Fixed-Wing Airplane	Single-Engine Piston	1,314	345,938	263.3
	Multi-Engine Piston	1,106	305,112	275.8
	Single-Engine Turbo-Prop	571	242,563	424.5
	Multi-Engine Turbo-Prop	831	260,352	313.4
	Turbojet	1,723	562,570	326.5
	Total	5,545	1,716,535	309.5
Rotorcraft	Piston	87	25,505	292.4
	Turbine	2,334	1,284,280	550.3
	Total	2,421	1,309,784	541.0
Other		145	33,065	227.9
Total		8,111	3,059,385	377

Source: 2010 GA Survey

²⁰ There were 10,655 aircraft authorized for part 135 operations in 2012. The difference between the number of authorized part 135 aircraft and the number of aircraft with part 135 as a primary use reflects those aircraft, while authorized for part 135 operations, which are primarily used for purposes other than part 135 operations.

Section 6: Safety Record

6.1 Introduction

Aviation safety is typically measured in terms of accidents, fatalities and injuries. Accident rates are calculated by dividing the incidence of these occurrences by a measure of exposure such as flight hours or departures. NTSB defines an aviation accident as an occurrence that involves a fatality, serious injury, or substantial aircraft damage. The use of safety event and exposure data permits the comparison of safety data across types of aviation activity and over time.

This section reports accidents by the regulation under which a flight was operating at the time of the accident. It is possible for part 135 certificate holders to operate flights under other regulation parts; for instance, a part 135 certificate holder may operate a positioning or training flight under part 91. These types of accidents are not reported in this section.

Data on the safety of part 135 operations were obtained from the NTSB for the period from 1992 through 2012. The first part of this section analyzes summary data for on-demand part 135 operations. The sources for the data and figures in the first part of the section are NTSB's annual aviation statistics reports. The most recently available NTSB annual aviation statistics report covered data through 2011.

The second part focuses on detailed analysis of on-demand part 135 operations. Accident rates are calculated as the number of occurrences per 100,000 annual flight hours.²¹ The exposure data are derived from DOT and FAA sources, including the 2010 GA Survey. The source for the data and figures in the second part of the section is NTSB's aviation accident database, where FAA compiled data about on-demand part 135 accidents from 2004 through 2012.

6.2 Safety Data for On-Demand Part 135 Operations

Figure 6-1 summarizes accident statistics for on-demand part 135 operations from 1992 to 2011, as reported by NTSB in its 2011 annual aviation statistics summary.²² The total number of accidents has fallen from an average of 78 per year during the first ten years of the period to an average of 56 per year during the most recent ten years of the period. The average number of fatal accidents per year declined from 21 to 14 over the two ten-year periods. The average number of fatalities per year declined from 54 to 36 over the two ten-year periods, but the number of fatalities per fatal accident remained constant at 2.6.

²¹ NTSB counts each accident as one occurrence, even if the accident involved multiple aircraft (e.g., mid-air collision).

²² National Transportation Safety Board. *Annual Aviation Statistics for 2011 Released: No Fatalities on U.S. Airlines or Commuters, General Aviation Accidents Increased*. Washington, DC: NTSB Press Release, April 27, 2012.

Figure 6- 1: Summary Safety Data for On-Demand Part 135 Operations – 1992-2011

Year	Accidents		Fatalities		Fatalities per Fatal Accident	Accidents per 100,000 Flight Hours		Flight Hours
	All	Fatal	Total	Aboard		All	Fatal	
1992	76	24	68	65	2.8	2.67	0.84	2,844,000
1993	69	19	42	42	2.2	2.97	0.82	2,324,000
1994	85	26	63	62	2.4	3.45	1.05	2,465,000
1995	75	24	52	52	2.2	3.02	0.97	2,486,000
1996	90	29	63	63	2.2	2.80	0.90	3,220,000
1997	82	15	39	39	2.6	2.65	0.48	3,098,000
1998	77	17	45	41	2.6	2.03	0.45	3,802,000
1999	74	12	38	38	3.2	2.31	0.37	3,204,000
2000	80	22	71	68	3.2	2.04	0.56	3,930,000
2001	72	18	60	59	3.3	2.40	0.60	2,997,000
1992 - 2001	780	206	541	529	2.6	2.57	0.68	30,370,000
2002	60	18	35	35	1.9	2.06	0.62	2,911,000
2003	73	18	42	40	2.3	2.49	0.61	2,927,000
2004	66	23	64	63	2.8	2.04	0.71	3,238,000
2005	65	11	18	16	1.6	1.70	0.29	3,815,000
2006	52	10	16	16	1.6	1.39	0.27	3,742,000
2007	62	14	43	43	3.1	1.54	0.35	4,033,000
2008	58	20	69	69	3.5	1.81	0.62	3,205,000
2009	47	2	17	14	8.5	1.62	0.07	2,901,000
2010	31	6	17	17	2.8	1.00	0.19	3,113,000
2011	50	16	41	41	2.6	1.50	0.48	3,325,000
2002 - 2011	564	138	362	354	2.6	1.70	0.42	33,210,000
1992 - 2011	1,344	344	903	883	2.6	2.11	0.54	63,580,000

Source: NTSB 2011 Annual Aviation Statistics

Note: 2011 data are preliminary

Figure 6-2 illustrates trends in on-demand part 135 accidents from 1992 to 2011. Accidents are classified as fatal and non-fatal; the sum of the two categories equals total accidents. Total accidents generally declined over the period, with a peak of 90 accidents in 1996 and a low of 31 accidents in 2010. Fatal accidents ranged from a peak of 29 in 1996 to a low of two in 2009.

Figure 6- 2: On-Demand Part 135 Accidents – 1992-2011

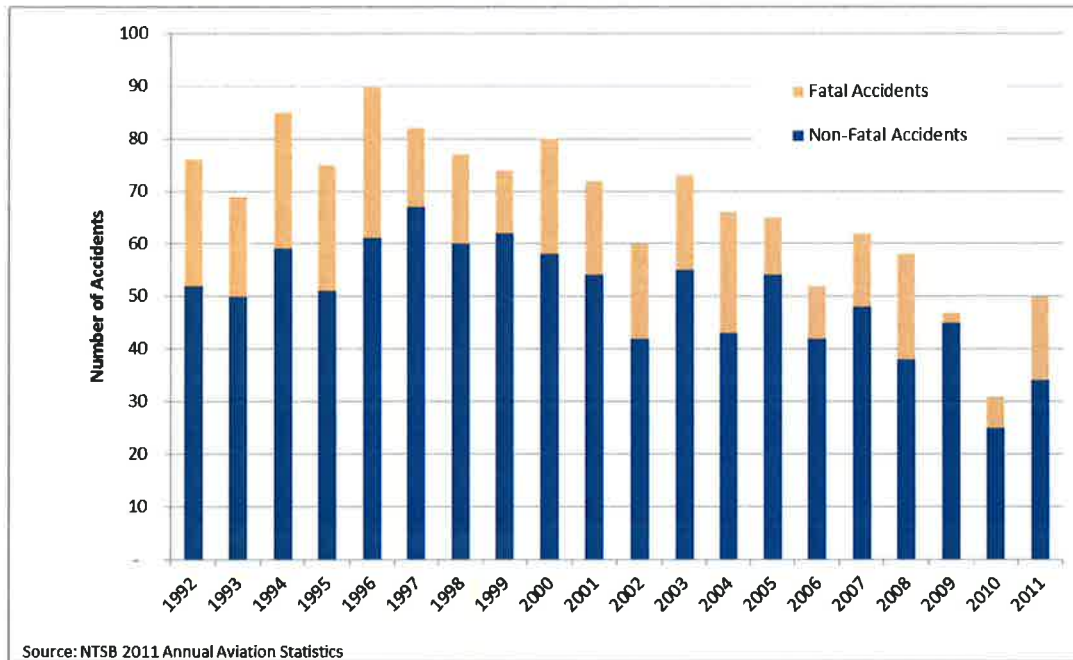
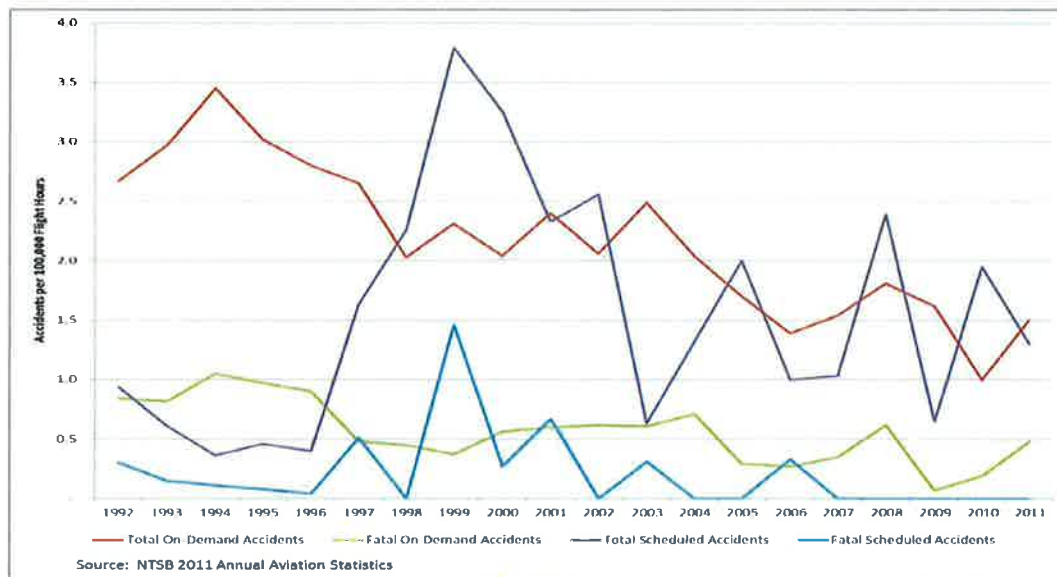


Figure 6-3 illustrates total and fatal accident rates for scheduled and on-demand part 135 accidents per 100,000 flight hours from 1992 to 2011. NTSB uses the flight hours reported by the GA Survey in the calculations for the part 135 accident rates. The rate of part 135 on-demand accidents decreased from 2.67 per 100,000 flight hours in the 1992-2001 time period to 1.5 per 100,000 flight hours in the 2002-2011 period. The rate of fatal part 135 on-demand accidents decreased from 0.84 to 0.48 per 100,000 flight hours over the same time period. For accidents occurring in part 135 scheduled operations for the same time period, the total went from 0.94 to 1.3 accidents per 100,000 flight hours. The rate of fatal part 135 scheduled accidents per 100,000 flight hours decreased from 0.3 to zero²³.

²³ These rates of total and fatal are not additive; the total accidents include fatal accidents, and the difference between the two represents the non-fatal accident rate.

Figure 6- 3: On-Demand Part 135 Accidents per 100,000 Flight Hours – 1992-2011



6.3 Detailed Safety Data for On-Demand Part 135 Operations

Data in this section are derived from the NTSB database of reports on accidents.²⁴ The data are summarized for the nine-year period 2004 to 2012 and include all on-demand part 135 operations, including any international operations. The period examined corresponds to the most recent *Review of U.S. Civil Aviation Accidents* published by NTSB (2004-2010),²⁵ plus data for 2011 and 2012. International activity accounts for a small portion of total activity for on-demand part 135 activity.

In 2004, FAA redesigned the GA Survey to capture additional information that would be useful to the aviation community. One change involved distinguishing on-demand part 135 operations by activity type. This section of this report will follow the GA Survey convention. The NTSB *Review of U.S. Civil Aviation Accidents* also employs the GA Survey convention on defining user types.

6.3.1 Safety Data by Operation Type

Safety data were compared for air medical, air taxi, air tour and cargo on-demand air transportation services conducted under part 135. Figure 6-4 shows accidents by type of operation over the nine-year period between 2004 and 2012. The air taxi category accounted for the highest number of accidents, fatalities and injuries, and it is the largest category of operations under on-demand part 135. The number of fatalities and injuries per accident was significantly

²⁴ NTSB defines an aviation accident as an occurrence associated with the operation of an aircraft that involves a fatality, serious injury, or substantial aircraft damage.

²⁵ National Transportation Safety Board. *Review of U.S. Civil Aviation Accidents. Review of Aircraft Accident Data 2010*. Washington, DC: NTSB, October 2012. (NTSB/ARA-12/01)

lower for cargo operations, which is expected because cargo operations generally require only the presence of the pilot-in-command and, by definition, carry no passengers.

Figure 6- 4: On-Demand Part 135 Accidents by Type of Operation – 2004-2012

Type of Operation	Accidents		Fatalities		Serious and Minor Injuries	Fatalities and Injuries per Accident
	All	Fatal	Total	per Fatal Accident		
Air Medical	45	18	71	3.9	33	2.3
Air Taxi	220	45	139	3.1	198	1.5
Air Tour	45	10	42	4.2	52	2.1
Cargo	162	38	48	1.3	34	0.5
Total	472	111	300	2.7	317	1.3

Source: NTSB Accident Database

More detailed data for each year in this period are found in Figure 6-5. Both passenger and cargo on-demand part 135 operations are included in the air taxi category in Figure 6-5, for consistency with the GA Survey.

Figure 6- 5: On-Demand Part 135 Accidents by Year and Type of Operation

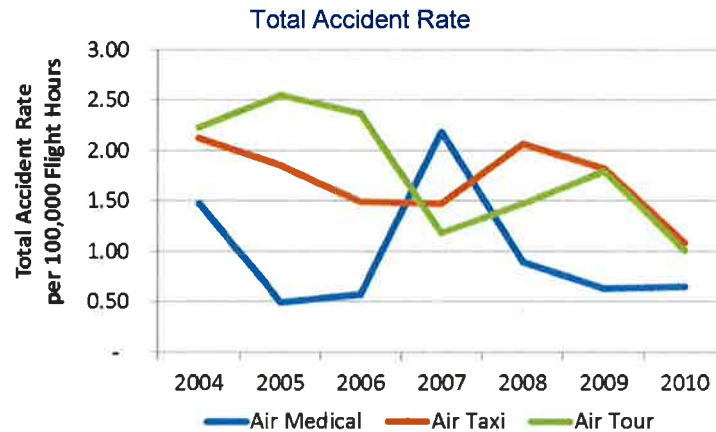
Year	Total Accidents			Fatal Accidents			Fatalities		
	Air Medical	Air Taxi	Air Tour	Air Medical	Air Taxi	Air Tour	Air Medical	Air Taxi	Air Tour
2004	7	54	5	5	18		21	43	
2005	3	53	9	1	9	1	1	14	3
2006	4	41	7	1	9		1	15	
2007	9	46	6	3	7	4	15	13	15
2008	5	49	4	3	15	2	15	49	5
2009	3	40	4		1	1		8	9
2010	4	24	3	2	4		8	9	
2011	4	42	4	2	12	2	7	24	10
2012	6	33	3	1	8		3	12	
2004 - 2012	45	382	45	18	83	10	71	187	42

Source: NTSB Accident Database

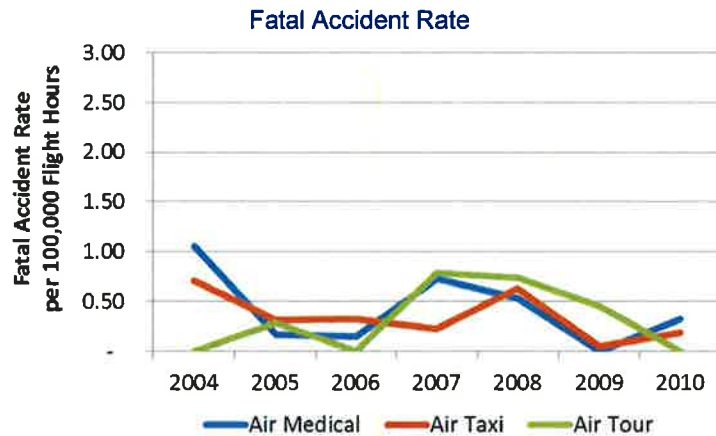
Figure 6-6 shows the number of hours flown in on-demand part 135 air medical, air taxi and air tour operations and the total and fatal accident rates for each year from 2004 to 2010. The number of hours flown by operation type was calculated using data from the 2010 GA Survey, which was the most recently available GA Survey at the time of publication of this report.

The air medical total accident rate was fairly stable during the period, aside from significantly above-average rates in 2004 and 2007. The air taxi total accident rate was fairly stable from 2004 to 2009, when it decreased significantly in 2010. The air tour total accident rates generally declined over the seven-year period, from 2.23 per 100,000 flight hours in 2004 to 1.01 per 100,000 flight hours in 2010.

Figure 6- 6: On-Demand Part 135 Accident Rates



Sources: GA Survey and NTSB Accident Database



Sources: GA Survey and NTSB Accident Database

6.3.2 Safety Data by Aircraft Type

Figure 6-7 contains data for accidents by type of aircraft. Fixed-wing aircraft were involved in 74 of 113 fatal accidents (65 percent) and 349 of 477 total accidents (73 percent) during the nine-year period. Single-engine piston aircraft accounted for the largest number of accidents (131), but turbine rotorcraft accidents resulted in the highest number of fatalities (123). This disparity may be related to the different passenger carrying capacities and/or typical load factor of these two types of aircraft.

Figure 6- 7: On-Demand Part 135 Accidents by Aircraft Type – 2004-2012

Aircraft Category		Accident Aircraft				Fatalities and Injuries		
		All	Share of All Accidents	Fatal	Share of Fatal Accidents	Fatalities	Injuries	Per Accident
Fixed-Wing Airplane	Single-Engine Piston	131	27%	22	19%	46	89	1.0
	Multi-Engine Piston	97	20%	24	21%	52	39	0.9
	Single-Engine Turbo-Prop	27	6%	4	4%	5	21	1.0
	Multi-Engine Turbo-Prop	57	12%	17	15%	33	10	0.8
	Turbojet	37	8%	7	6%	31	35	1.8
	Total	349	73%	74	65%	167	194	1.0
Rotorcraft	Piston	5	1%	1	1%	4	-	0.8
	Turbine	123	26%	38	34%	123	120	2.0
	Total	128	27%	39	35%	127	120	1.9
Total		477	100%	113	100%	294	314	1.3

Source: NTSB Accident Database

Note: One fatality and three serious injuries occurred on the ground in accidents involving On-Demand Part 135 aircraft; these values are not included in this table. Five persons aboard Part 91 aircraft were fatally injured in accidents involving On-Demand Part 135 aircraft; these values are not included in this table

Figure 6-8 shows total accident and fatal accident rates per 100,000 flight hours by aircraft type for 2004-2010. The number of hours flown by aircraft type was calculated using GA Survey data. Fixed-wing airplanes had a higher total accident rate than rotorcraft, but rotorcraft had a slightly higher fatal accident rate. The highest individual total accident rate observed was for piston rotorcraft, but piston rotorcraft activity was very low relative to all other aircraft types. Single-engine piston airplanes had the highest total accident rate (3.30 total accidents per 100,000 flight hours) and turbojet airplanes had the lowest total accident rate (0.52 total accidents per 100,000 flight hours) of the fixed-wing aircraft group.

Figure 6- 8: On-Demand Part 135 Accident Rates by Aircraft Type – 2004-2010

Aircraft Category		Hours Flown	Total Accident Rate per 100,000 Flight Hours	Fatal Accident Rate per 100,000 Flight Hours
Fixed-Wing Airplane	Single-Engine Piston	3,003,476	3.30	0.53
	Multi-Engine Piston	3,370,973	2.37	0.47
	Single-Engine Turbo-Prop	1,700,663	1.12	0.06
	Multi-Engine Turbo-Prop	2,208,157	2.17	0.77
	Turbojet	5,957,948	0.52	0.12
	Total	16,241,217	1.71	0.35
Rotorcraft	Piston	131,373	3.81	0.76
	Turbine	7,482,933	1.36	0.39
	Total	7,614,307	1.41	0.39
Total		23,855,523	1.61	0.36

Sources: GA Survey and NTSB Accident Database

Note: Both aircraft are included in accident rates if applicable for multi-aircraft accidents. This approach is different from NTSB's approach to calculating accident rates.

Section 7: Sales Revenues

7.1 Introduction

Although the FAA collects data on many aspects of the part 135 industry, it does not collect information on the revenues generated by part 135 operations. Therefore an alternative source was necessary to develop estimates of part 135 revenues. The 2007 Economic Census, conducted by the Census Bureau, was used to estimate the sales revenues of the part 135 fleet. The Economic Census does not collect data for part 135 operators specifically. However, careful Census data analysis can provide a general picture of part 135 industry revenues.

7.2 Methodology for Developing Part 135 Revenue Estimates

The Census Bureau conducts the Economic Census of the United States every five years. Data are gathered through surveys and from other Federal agencies. The Census reports revenue data on an establishment basis, defined as “a single physical location at which business is conducted and/or services are provided.” Some data are also available at the firm level, with a firm defined as “a business organization consisting of one or more domestic establishments in the same state and industry that were specified under common ownership or control. The firm and the establishment are the same for single-establishment firms.” Data are reported using the North American Industrial Classification System (NAICS) for industries. Revenues generated by specific business activities within each industry are reported, provided reporting these data will not allow users of the data to identify individual firms within an industry.²⁶

The industries included in this study were chosen based on descriptions of business activities and firms engaged in these industries available in the NAICS Handbook published by the Office of Management and Budget. These industries may include firms conducting operations under other regulations, particularly part 121, in addition to conducting operations under part 135. They may also exclude some firms operating under part 135, particularly in cases where the primary activity at the establishment level is not providing air transportation. The included industries were Nonscheduled Air Transportation (NAICS 48121) and Scenic and Sightseeing Transportation (NAICS 487990).

7.3 Part 135 Revenue Estimates

Estimates from the 2007 Economic Census shown in Figure 7-1 indicate that revenues for firms providing part 135 services were \$11.7 billion in 2007 and are \$13.8 billion in 2012 when

²⁶ Census Bureau. *2007 Economic Census*. (Various tables in the Transportation and Warehousing Series). Accessed June 4, 2013, <http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>

adjusted for inflation.²⁷ This estimate excludes revenues from services that do not require a part 135 certificate, including fixed base operator (FBO) sales and service, and miscellaneous services. Charter, air ambulance, and scheduled passenger revenue exceeded \$9 billion in 2007. Revenues from cargo operations are estimated at \$1.9 billion and air tour (including sightseeing) revenues are estimated at \$374 million.

Figure 7- 1: Revenue/Sales Estimates for the Part 135 Industry

2007 Economic Census Category	Revenue, 2007 Dollars (\$000)	Revenue Adjusted for Inflation, 2012 Dollars* (\$000)
Charter, Air Ambulance, Scheduled Passenger	\$ 9,493,246	\$ 11,171,818
Air Cargo	\$ 1,861,433	\$ 2,190,567
Air Tours and Sightseeing	\$ 373,926	\$ 440,043
Total	\$ 11,728,605	\$ 13,802,427

Source: 2007 Economic Census

*Adjusted to 2012 dollars using CPI-U, item Transportation (Series ID CUUR0000SAT)

Operating costs associated with part 135 activity were estimated using the number of unique aircraft, annual part 135 flight hours, and costs per flight hour from the 2007 FAA study *Economic Values for FAA Investment and Regulatory Decisions, A Guide*.²⁸ These costs were estimated in order to provide a comparison to the inflation-adjusted Census estimate of \$13.8 billion in revenue for part 135 operators. Values in Figure 7-2 show that estimated operating costs from part 135 operations totaled \$6.3 billion in 2010. The inflation-adjusted 2012 part 135 revenue estimate, based on the 2007 Census, exceeds part 135 2010 operating costs by \$7.5 billion (\$13.8 less \$6.3), suggesting that the Census estimate is reasonable, since the cost estimate does not include indirect and other costs.

Figure 7- 2: Estimated Operating Costs from Part 135 Activity

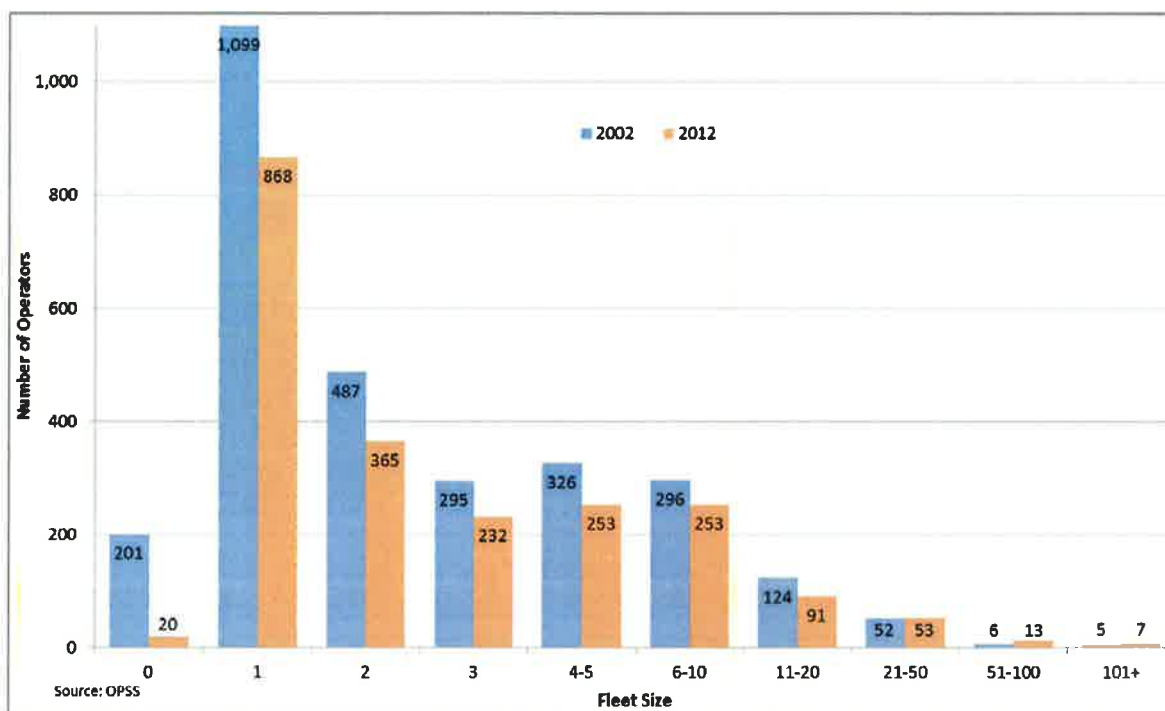
Aircraft Category	GA Survey Sample	Unique Aircraft	Estimated Total Part 135 Hours	Average Hourly Cost	Estimated Part 135 Costs (\$000)
Fixed-Wing Airplane	Single-Engine Piston	811	1,280	232,659	\$195 \$ 45,368
	Multi-Engine Piston	696	1,085	258,054	\$472 \$ 121,801
	Single-Engine Turbo-Prop	547	620	238,042	\$756 \$ 179,960
	Multi-Engine Turbo-Prop	538	1,346	387,167	\$1,631 \$ 631,469
	Turbojet	2,166	3,321	1,311,085	\$2,475 \$ 3,244,936
Rotorcraft	Piston	119	212	68,327	\$584 \$ 39,903
	Turbine	1,901	2,656	1,273,013	\$1,603 \$ 2,040,640
	Other	47	1	183	N/A N/A
Total	6,825	10,521	3,768,529	N/A	\$ 6,304,078

²⁷ The actual data from the 2012 Economic Census were not available at the time of publication of this report.

²⁸ GRA, Incorporated. *Economic Values for FAA Investment and Regulatory Decisions - A Guide*. Washington, DC: FAA, 2007. Table 4-11.

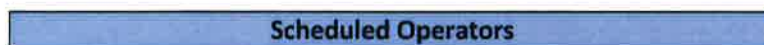
The general economic output of part 135 operators can be inferred by the number of authorized aircraft per operator (fleet size). Figure 7-3 shows the change between 2002 and 2012 in the distribution of operators by fleet size. In both 2002 and 2012, most operators had either one or two aircraft, while less than ten percent of the operators had more than ten aircraft. The number of these operators fell substantially between 2002 and 2012. However, the operators with the largest fleet sizes (51 or more aircraft) increased from 11 in 2002 to 20 in 2012, an increase of 82 percent. About one-half of the 20 largest operators had mostly fixed-wing aircraft fleets while the other half had largely rotorcraft fleets.

Figure 7- 3: Change in Distribution of Part 135 Operators by Fleet Size



As shown in Figure 7-4, the number of employees per operator can also provide an indication of the economic output of part 135 operators. Employment data was gathered from NVIS for each part 135 operator listed in OPSS.²⁹ In 2012, the average part 135 scheduled operator had 37 aviation employees, while the average number for on-demand operators was 19. Over 70% of the scheduled operators (34) had a fleet size of six or more, and 18% (383) of the on-demand operators had a fleet size of 6 or more.

Figure 7-4: Part 135 Operator Employment by Fleet Size



²⁹ NVIS does not include non-aviation personnel employed by operators holding part 135 certificates.

Fleet Size	Operators	Employees	Average Employees per Operator
0	-	-	N/A
1	-	-	N/A
2	-	-	N/A
3	5	49	10
4-5	9	162	18
6-10	17	299	18
11-20	10	490	49
21-50	6	623	104
51-100	1	162	162
101+	-	-	N/A
Total	48	1,785	37

On-Demand Operators			
Fleet Size	Operators	Employees	Average Employees per Operator
0	20	81	4
1	868	2,734	3
2	365	2,276	6
3	227	2,127	9
4-5	244	3,403	14
6-10	236	6,222	26
11-20	81	4,228	52
21-50	47	5,806	124
51-100	12	4,126	344
101+	7	9,774	1,396
Total	2,107	40,777	19

Source: 2012 OPSS and NVIS

Section 8: Number of Passengers and Airports Served

8.1 Review of Multiple Data Sources to Estimate Enplanements by Airport

Because no single source of data exists that contains information on the number of passengers and airports served by the part 135 fleet, multiple data sources were assembled to provide a perspective on the numbers of airports and passengers served by scheduled and on-demand part 135 operators. The FAA's Airport Activity Survey, (AAS), the T-100 produced by the DOT's Bureau of Transportation Statistics (BTS), and the Air Traffic Services Business Model (ATSBM) were the main data sources used to analyze the number of passengers and airports served by the part 135 industry in the United States.

8.1.1 Airport Activity Survey

In order to allocate Airport Improvement Program (AIP) funds, FAA conducts the AAS annually.³⁰ The AAS is mailed to on-demand part 135 operators and is restricted to on-demand operations that are not reported to BTS. The operator reports scheduled and on-demand enplanements by airport in the AAS. Because the AAS is not required by law, it likely under-reports the number of on-demand part 135 enplanements, but it is the only primary reporting source for on-demand part 135 enplanements data. The survey is not designed for data to be extrapolated to the population of operators and airports that they serve.

8.1.2 DOT T-100 Data

14 CFR part 241 prescribes reporting requirements for large certificated air carriers, and 14 CFR part 298 prescribes reporting requirements for commuter air carriers³¹ and small certificated air carriers.³² Large certificated air carriers, commuter air carriers and small certificated air carriers are all required to file Schedule T-100, which summarizes flight segment data and on-flight market data from revenue flights, including enplaned passengers and cargo.

8.1.3 Air Traffic Services Business Model

The ATSBM is the only model that integrates FAA Air Traffic Organization cost data, NAS facility data and ETMS activity data with user costs to provide a comprehensive view of the production and use of NAS services. The ATSBM includes detailed activity information by airport for each IFR flight in the NAS and estimates of VFR flight activity from the Air Traffic Activity Data System (ATADS)³³.

³⁰ Federal Aviation Administration, Airport Activity Survey (by selected carriers), FAA Form 1800-31.

³¹ A commuter air carrier carries passengers on at least five round trips per week on at least one route between two or more points according to its published flight schedules.

³² A small certificated air carrier is an air carrier that provides domestic scheduled passenger service using aircraft having a maximum passenger capacity of 60 seats or less or a maximum payload capacity of 18,000 pounds or less.

³³ ATADS contains the official counts of flight operations at facilities with FAA and contract air traffic control towers. Its user category titled "air taxi" is closer to the DOT definition and thus has many regional jet operations.

The ATSBM assigns each operator to a detailed user group based on ETMS user type, operator identifier (callsign) and other operator information, gathered from a variety of FAA and private sector data sources. The model then assigns all flights by that operator to the same user group because the ETMS source data does not provide information on the regulation part under which a specific flight was operated (e.g., there is no distinction in ETMS between an on-demand part 135 operator conducting a revenue flight under part 135 operating rules or a positioning flight under part 91 operating rules). On-demand part 135 enplanements are estimated for on-demand part 135 operators using the number of seats aboard the aircraft and an estimated load factor. This method likely over-estimates the number of on-demand part 135 enplanements since part 135 operators may sometimes operate under part 91 depending on mission type.

Although the ATSBM data for IFR flights are robust, its information on visual flight rules (VFR) flights is limited. While the ATSBM tracks VFR flights at airports, the model only reports activity by the broad user types tracked in ATADS and does not produce any data with which to estimate the number of enplaned passengers. Thus, this section uses the IFR flight data and passenger enplanement estimates.

8.1.4 Other Data Sources Examined

The GA Survey primarily reports on-demand part 135 activity in terms of aircraft hours flown. Enplanement data is not collected in the survey, nor is information on activity by airport collected.

8.2 On-Demand Part 135 Airport Activity

The 2011 AAS, FY 2012 ATSBM and 2012 T-100 were used to identify the airports used by the part 135 industry. Since the AAS is a survey of enplanements by on-demand part 135 operators, it by definition includes only airports used by on-demand part 135 passenger operators, rather than all-cargo operators. For a meaningful comparison, the number of airports identified by the ATSBM and T-100 were restricted to passenger operators.

8.2.1 Airports Served by On-Demand Part 135 Operators

Figure 8-1 reports the airports served by on-demand part 135 passenger operators from the AAS, ATSBM and T-100 by FAA region. The 2011 AAS identified 1,107 airports as having on-demand part 135 operations and enplanements. The ATSBM identified 3,290 airports that had at least one flight by an on-demand part 135 passenger operator in FY 2012. Scheduled part 135 passenger operators reported that they performed at least one revenue departure from 407 airports in 2012 in T-100 data. As a point of reference and comparison, the number of airports included in the Official Airline Guide (OAG) (681) is also reported. The OAG includes all airports with scheduled air carrier service of any kind.

Figure 8- 1: Sources of Airport Data for Part 135 Operators

Region	ATSBM	AAS	T-100	OAG
Alaskan	193	44	284	224
Central	302	88	7	34
Eastern	433	205	29	81
Great Lakes	645	218	10	77
Northwest Mountain	315	164	21	76
Southern	600	177	28	78
Southwest	492	117	10	54
Western-Pacific	310	94	18	57
Total	3,290	1,107	407	681

8.2.2 On-Demand Part 135 Enplanements

The AAS for calendar year 2011 and the ATSBM for fiscal year 2012 were used to estimate enplanements for the on-demand part 135 industry. There are important differences between the two sources of data – the AAS is a voluntary, self-reported survey of on-demand part 135 operators so it is likely that passenger enplanements are under-estimated because of non-respondents,³⁴ while the ATSBM may over-estimate passenger enplanements because activity is reported by operator type.³⁵ The ATSBM assumes that all flights by on-demand part 135 passenger operators are revenue flights with passengers onboard, but it is likely that some of these flights are positioning flights with no passengers onboard. Offsetting this potential source of over-estimation is the fact that the ATSBM captures only ETMS flights; the number of passengers for on-demand part 135 passenger VFR operations is not estimated.

Figure 8-2 shows the average number of on-demand part 135 enplanements per airport by FAA region in 2011 from the AAS. It shows that airports in the Western Pacific and Alaskan regions reportedly received many more enplanements on average than airports in other regions. This may be because operators in those two regions were more likely to respond to the AAS. Of the 1,107 airports with on-demand part 135 passenger enplanements, 66 percent did not have scheduled passenger service in 2012.³⁶

³⁴ The AAS is not designed to be extrapolated based on the relationship of the sample of respondents to the overall population of on-demand part 135 operators.

³⁵ The ATSBM does not distinguish between revenue and non-revenue flights because this information is not available in the flight record and all activity by an operator is counted in the applicable user group.

³⁶ Airports that were not listed in OAG and did not have any scheduled part 135 revenue passenger departures.

Figure 8- 2: 2011 On-Demand Part 135 Enplanements per Airport - AAS

Region	Airports	Enplanements	Average Enplanements per Airport
Alaskan	44	139,371	3,168
Central	88	12,540	143
Eastern	205	41,443	202
Great Lakes	218	124,840	573
Northwest Mountain	164	13,733	84
Southern	177	1,777	10
Southwestern	117	1,468	13
Western Pacific	94	471,199	5,013
Total	1,107	806,371	728

Source: 2011 AAS

Figure 8-3 shows the average number of on-demand part 135 enplanements per airport by FAA region in FY 2012 from the ATSBM. Airports in the Western Pacific and Eastern regions were estimated to receive more enplanements on average than airports in other regions. However, on the whole, the average number of enplanements per airport estimated by the ATSBM is more balanced among FAA regions than the average reported enplanements from the AAS. Of the 3,290 airports with on-demand part 135 passenger enplanements, 83 percent did not have scheduled passenger service in 2012.³⁷

Figure 8- 3: FY 2012 On-Demand Part 135 Enplanements per Airport - ATSBM

Region	Airports	Enplanements	Average Enplanements per Airport
Alaskan	193	175,120	907
Central	302	293,852	973
Eastern	433	1,290,204	2,980
Great Lakes	645	872,996	1,353
Northwest Mountain	315	581,289	1,845
Southern	600	1,047,396	1,746
Southwestern	492	652,695	1,327
Western Pacific	310	1,084,704	3,499
Total	3,290	5,998,256	1,823

Source: ATSBM

Figure 8-4 shows the distribution of AAS and ETMS airports by number of enplanements per airport. There were fewer than 100 reported enplanements at the majority (78 percent) of AAS airports. There were fewer than 100 estimated enplanements at nearly half (49 percent) of

³⁷ Airports that were not listed in OAG and did not have any scheduled part 135 revenue passenger departures.

ATSBM airports. Airports with more than 10,000 enplanements represented one percent of total AAS airports and five percent of total ATSBM airports.

Figure 8- 4: Airports by FY 2012 On-Demand Part 135 Enplanements

Number of Enplanements per Airport	AAS Airports ¹		ATSBM Airports ²	
	Airports	Share of Total	Airports	Share of Total
Less than 100	858	78%	1,624	49%
100 to 499	159	14%	711	22%
500 to 999	35	3%	240	7%
1,000 to 4,999	37	3%	429	13%
5,000 to 9,999	7	1%	135	4%
10,000 to 49,999	7	1%	137	4%
50,000 to 99,999	2	0%	12	0%
100,000 or more	2	0%	1	0%
Total	1,107	100%	3,289	100%

¹ Calendar year 2011

² Fiscal year 2012

Although on-demand part 135 operators do not enplane a large number of passengers relative to the number of passengers enplaned by scheduled passenger carriers, they are often the only commercial air transportation service available at many remote airports.

8.3 Scheduled Part 135 Airport Activity

Scheduled part 135 operators are required to file Schedule T-100, which summarizes flight stage data and on-flight market data from revenue flights. Information on the airports served by scheduled part 135 operators and flight activity, passenger enplanements and enplaned cargo data for scheduled part 135 passenger and all-cargo operators were gathered from T-100.

8.3.1 Airports Served by Scheduled Part 135 Operators

In 2012, scheduled part 135 operators served 354 U.S. airports. Figure 8-5 shows the number of airports served by scheduled part 135 operators by U.S. state or territory and type of service. *Passenger* service means that an airport had at least one enplaned passenger, but no enplaned freight or mail. *All-cargo* means that an airport had at least one ton of enplaned freight or mail, but no enplaned passengers. *Both* means that an airport had at least one enplaned passenger and at least one ton of enplaned freight or mail. The majority (71 percent) of airports served by scheduled part 135 operators was in Alaska. Only 16 of the 354 airports had exclusively all-cargo service; most airports also served passengers.

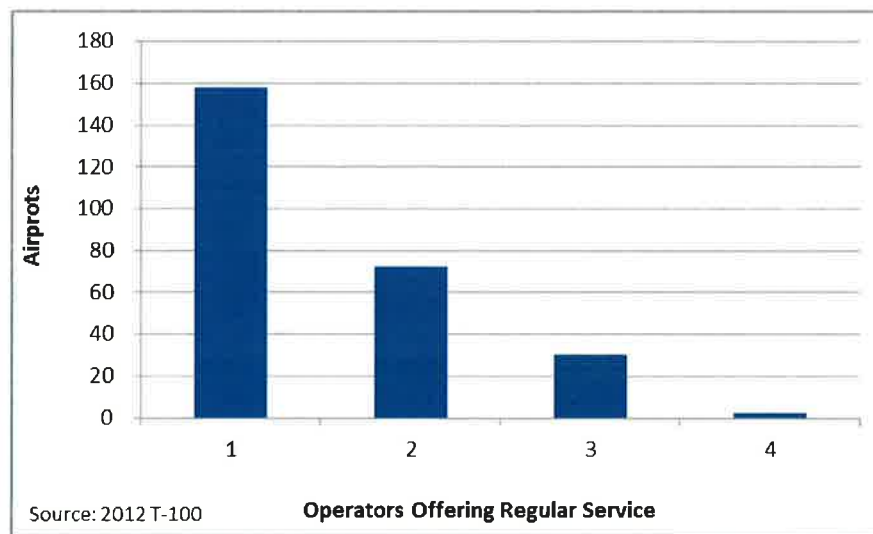
Figure 8- 5: U.S. Airports Served by Scheduled Part 135 Operators

State / Territory	Passenger	All-Cargo	Both	Total
Alaska	67	12	171	250
Arkansas	4			4
Arizona	4			4
Connecticut	1			1
Florida	2			2
Georgia	3			3
Hawaii	9			9
Iowa	1			1
Illinois	4			4
Kansas	1			1
Kentucky	1			1
Massachusetts	4		2	6
Maryland	2			2
Maine	3			3
Minnesota		4		4
Missouri	5			5
New Hampshire	1			1
New Jersey	2			2
New Mexico	3			3
Nevada	1			1
New York	5			5
Oregon	4			4
Pennsylvania	1			1
Puerto Rico	2		4	6
Rhode Island	1		2	3
Tennessee	3			3
U.S. Pacific Trust Territories and Possessions	3			3
Texas	2			2
U.S. Virgin Islands	2			2
Vermont	1			1
Washington	16		1	17
Total	158	16	180	354

Source: 2012 T-100

In 2012, 262 airports had regular scheduled part 135 passenger service, which was defined as two or more departures per week on average by at least one scheduled part 135 passenger operator. Most of these airports were served by only one scheduled part 135 passenger operator, as shown in Figure 8-6. Only 32, or 12 percent, of airports were served by three or more scheduled part 135 passenger operators.

Figure 8- 6: Airports with Regular Scheduled Part 135 Passenger Service by Number of Operators



8.3.2 Scheduled Part 135 Passenger Enplanements

There were nearly 1.9 million scheduled part 135 passenger enplanements in 2012. Most of the enplanements were concentrated at a relatively small number of airports. More than 56 percent of enplanements occurred at the 20 U.S. airports with the largest number of enplanements, as shown in Figure 8-7. These airports tend to be clustered in Alaska, Hawaii, Massachusetts and the Caribbean.

Figure 8- 7: Top 20 U.S. Airports by Scheduled Part 135 Enplanements

Location Identifier	Airport	Enplanements	Location Identifier	Airport	Enplanements
ACK	Nantucket Memorial, MA	135,625	ANC	Ted Stevens Anchorage International, AK	39,937
BOS	General Edward Lawrence Logan International, MA	101,315	MVY	Marthas Vineyard, MA	33,323
HYA	Barnstable Municipal-Boardman/Polando Field, MA	95,499	KOA	Kona International at Keahole, HI	31,410
BET	Bethel, AK	82,667	STT	Cyril E King, St. Thomas, U.S.V.I	30,149
SJU	Luis Munoz Marin International, PR	80,357	JRV	Jose Aponte de la Torre, PR	28,668
VQS	Antonio Rivera Rodriguez, PR	55,678	OTZ	Ralph Wien Memorial, AK	28,034
SPN	Francisco C. Ada Saipan International, Saipan	55,069	ENA	Kenai Municipal, HI	27,755
GUM	Guam International, Guam	54,181	FAI	Fairbanks International, AK	27,711
STL	Lambert-St Louis International, MO	51,729	JNU	Juneau International, AK	26,837
OGG	Kahului, HI	39,940	MKK	Molokai, HI	25,559
Top 20 Airports by Scheduled Part 135 Passenger Enplanements		1,051,443	Total U.S. Airports		1,862,253
All Other U.S. Airports		810,810	Top 20 Airports Share of Total U.S.		56%

Source: 2012 T-100