U.S. FOREST SERVICE

AVIATION SAFETY MANAGEMENT SYSTEMS

FY 2016 AVIATION SAFETY SUMMARY

Table of Contents

How to interpret data within this report

Note: Formulas Used: Industry Standard “Per 100,000 Hours Flown”

Accident Rate = Number of accidents divided by the number of hours flown multiplied by 100,000.

Fatal Accident Rate = Number of fatal accidents divided by the number of hours flown multiplied by 100,000.

Fatality Rate = Number of fatalities divided by the number of hours flown multiplied by 100,000.

This report has more information.

Aircraft Category Definitions:

- USFS Owned and Operated (O&O) includes a total of 39 aircraft; 25 fleet aircraft (20 fixed-wing, 2 airtankers and 3 helicopters) and 14 leased fixed-wing aircraft.

- Fixed-Wing Aircraft this includes all contract fixed-wing, excluding all airtankers.

- Helicopters includes all contract helicopters, including tanked helicopters.

- Airtankers include all contract multi-engine/jet large and very large airtankers and scoopers.

- SEAT's are Single Engine Airtankers. The USFS only has one on contract through DOI-OAS, however the hours are obtained from DOI-OAS for all SEAT's that flew on USFS missions.

Mishap Definitions:

- Aircraft Accident: An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and the time all such persons have disembarked, and in which any person suffers death or serious injury or in which the aircraft receives substantial damage. During a jump sequence, a Forest Service smokejumper is considered to have safely disembarked the aircraft after detaching from the static line from the parachute deployment system and when the parachute canopy has successfully deployed. (Refer to 14 CFR NTSB 830 for definition of reportable accidents)

- Aircraft Incident with Potential: An "in-flight incident" that narrowly misses being an accident by NTSB definition and circumstances may involve some aircraft damage, property damage, or minor injury to crew or passengers. Classification of Incidents with Potential is determined by the US Forest Service, Branch Chief, Aviation Safety Management Systems.

Operational Control is defined as the exercise of authority over initiating, conducting, or terminating a flight (14 CFR Part 1.1). This includes direct management oversight, supervision and accountability for a specific task, mission or assignment.

- Forest Service fleet aircraft or aircraft on contract to the USFS that have a mishap while under operational control of another agency (ie BLM, NPS, State, etc.) are not USFS reportable mishaps but that of the agency with operational control.

- Cooperator aircraft (fleet and contract) under operational control of the USFS that have a mishap are USFS reportable mishaps and are included in these statistics.

- Military aircraft remain under the operational control of the military even while supporting USFS operations.

Executive Summary

The Forest Service Aviation Risk Management program is based on the philosophy that all aircraft mishaps are preventable and that mishap prevention is an inherent function of management.

The Forest Service had one Incident with Potential (IWP) in 2016, an upset in one of our leased Lead Planes on a fire in Wyoming. There were no accidents.

The USFS flew 65,071 hours in FY 2016 which is slightly below the 10-year average of 67,407 flight hours. The primary mission of Forest Service Aviation is to support natural resource programs through a variety of means, including, but not limited to:

- Aerial delivery of firefighters by parachute, rappel rope, or on site landing
- Air tactical command and control
- Surveillance, reconnaissance, and intelligence gathering
- Infrared detection & mapping
- Aerial delivery of fire retardant and water
- Passenger transport for firefighting and resource missions
- Administrative flights
- Research
- Forest rehabilitation
- Forest Health Protection (aerial surveys, application and photography)
- Law enforcement
- Aerial photography
- Emergency Medical Assistance

Approximately 300 employees at the Washington Office, Regional Offices and Forest levels administer the Forest Service aviation program. The national staff is located in Washington D.C. and at the National Interagency Fire Center in Boise, Idaho. The vast majority of aviation personnel are located throughout the forests, with local forest and regional staff providing day-to-day operational oversight and program guidance.

The Forest Service utilized approximately 615 aircraft in FY 2016. These include government owned and leased, but primarily contracted aircraft.

Numerous state agencies and county municipalities operate Forest Service owned aircraft under the Federal Excess Personal Property (FEPP) program. These aircraft are not included in these statistics or mishap data.

Safety Management System

A Safety Management System (SMS) is essentially a quality management approach to controlling risk. It provides the organizational framework to construct and support a sound safety culture that actively controls its risk exposure. With increased aviation activity and decreased resources, the SMS pushes the limits of current safety strategies and practices by developing and implementing a structured management system to control risk and meet legal responsibilities in aviation operations.

Our goal is to develop a safety culture that achieves and maintains a zero accident rate. A highly successful safety culture understands that every person in the organization accepts that safety is a conscious and ongoing mindset as opposed to simply a box to be checked. We understand that safety is a dynamic non-event. Consequently, we need to maintain the capability to continuously seek out and eliminate latent defects within our systems and culture. By being proactive in this area we eliminate potential causal factors that could lead to future accidents.

There are four components comprising the Agency's safety management system; each component is an essential piece of a comprehensive safety-oriented management system.

✈ **Policy** is management commitment, responsibility and accountability for the program and the appointment of key safety personnel. Forest Service manuals are being revised using principle centered management for guidance of aviation operations.

✈ **Risk Management** identifies hazards and applies risk assessment and mitigation processes.

✈ **Assurance** is the process of monitoring controls that also includes safety and compliance audits, aviation accident prevention, review and analysis of historical data, accident investigation, error analysis, and corrective action plans.

✈ **Promotion** includes training for pilots, crews, managers, support personnel and end-users. Other communications, awards and lessons learned help to maintain safety awareness.

Accomplishments in aviation safety in FY 2016 include the following:

Policy:

- ✈ Revised the Safety Management System (SMS) Guide, distributed and posted online
- ✈ Continued to participate in the FSM 5700 rewrite
- ✈ Provided input to several Interagency guides and handbooks
- ✈ Participated in the development of the HC-130H Operations Plan
- ✈ Participated in the development of the Sherpa Operations Plan

Risk Management:

- ✈ Instructed multiple risk management sessions nationally
- ✈ Continued to provide Safety Officer oversight to the HC-130 airtanker program
- ✈ Inclusion of SMS requirements into Type 3 Helicopter, Next Generation Airtanker, and Light Fixed-wing Contracts
- ✈ Conducted a Subject Matter Expert session to evaluate the Desoto Helicopter Accident recommendations submitted to the NTSB. A current list of recommendations were given to the Learning Review Board for their consideration

Assurance:

- ✈ Coordinated investigations for Incidents With Potential (IWP), Incidents and other Lessons Learned Reviews.
- ✈ Assisted Region 9 with at SMS review of their Aviation Program
- ✈ Participated in contract technical evaluation board proposals
- ✈ Participated in various quality assurance reviews

Safety Promotion:

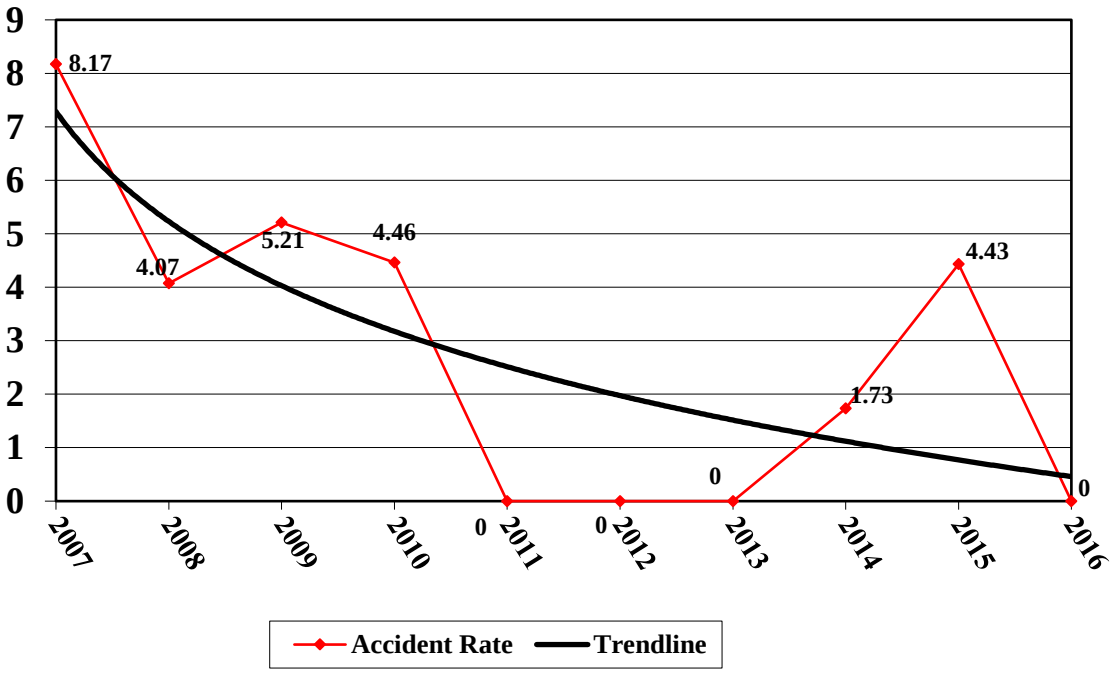
- ✈ Published Annual Aviation Safety Report
- ✈ Published Annual Aviation Safety Briefing and presented at Helicopter Association International (HAI), several Regional Aviation and Safety meetings, Helicopter Crewmember, Helicopter Manager and Helibase Manager Courses
- ✈ Provided administration and review to all USFS and State SAFECOMs and management of WO, Vendor and some State SAFECOMs
- ✈ Published a combined total of 23 Safety Alerts, Technical Bulletins, Lessons Learned, Accident Prevention Bulletins and Information Bulletins
- ✈ Presented A-200 Aviation Mishap Reviews at HAI, several Regional Aviation and Safety

meetings, Helicopter Crewmember, Helicopter Manager and Helibase Manager Courses

- ✈ Supported nine employees that received a Career Certificate in Aviation Safety Management Systems and the Federal Aviation Safety Officer Certificate.
- ✈ Twenty-five employees applied for and received scholarship funding to take courses in Aviation Safety Management Systems from institutes of higher education.
- ✈ USFS students completed a total of 11,655 Interagency Aviation Training (IAT) modules. These were completed through Classroom (2,930 modules), Webinars (249 modules) and on-line learning (8,476 modules)

Statistical Summary

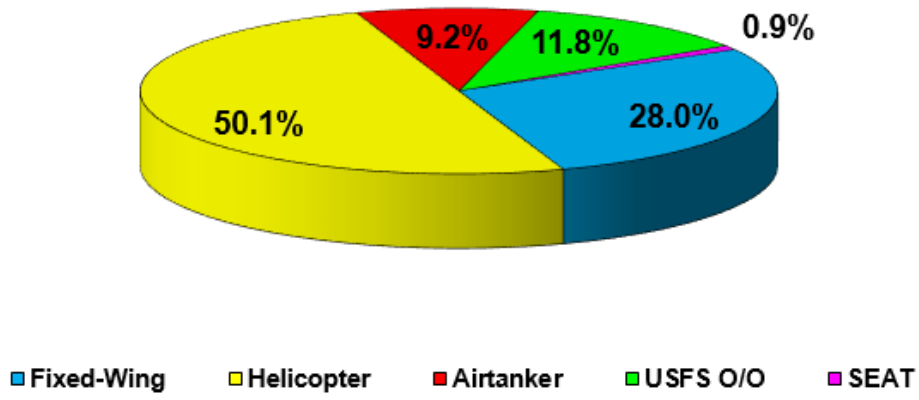
USFS Aircraft Accident Rates 2007-2016



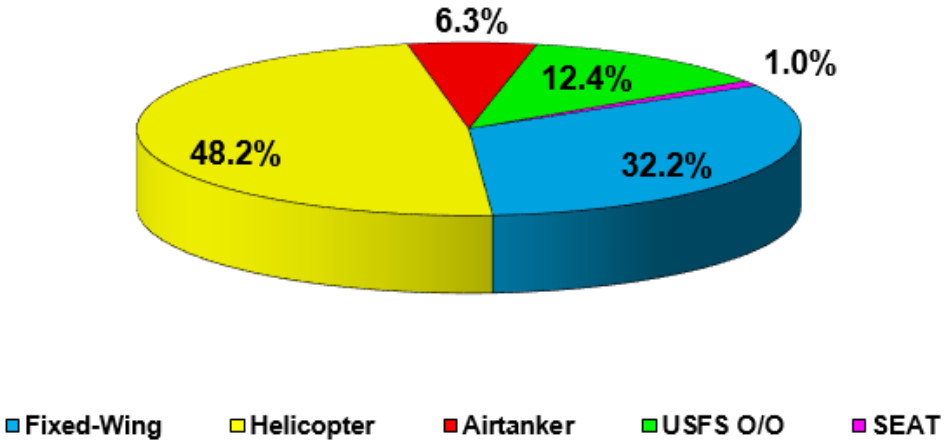
FY 2016 Accident Statistics

Aircraft Type	Hours	Number of Accidents	Accident Rate	Number of Fatalities	Fatality Rate
Fixed-Wing	18,238	0	0	0	0
Helicopter	32,594	0	0	0	0
Airtanker	5,997	0	0	0	0
Single Engine Airtanker (SEAT)	558	0	0	0	0
USFS Owned and/or Operated (USFS O/O)	7,684	0	0	0	0
Total	65,071	0	0	0	0

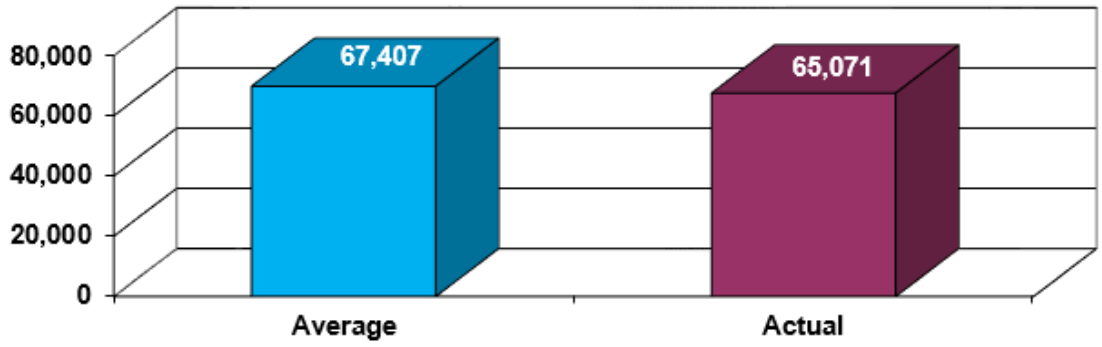
FY 2016 Flight Hour Percentages



10-Year Average of Flight Hour Percentages 2007-2016



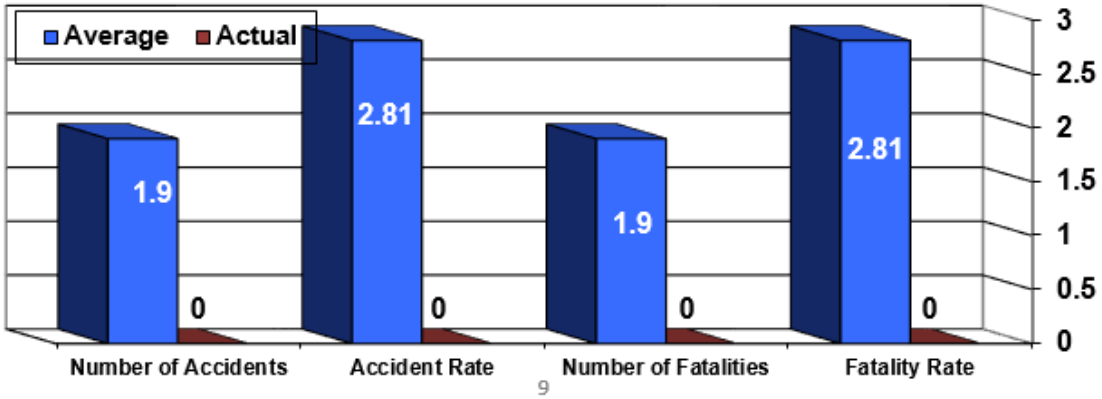
Average vs Actual Hours Flown for FY 2016



Comparison of Average vs 2016

	10 Year Average	2016	Comparison
Hours flown	67,407	65,071	-2,336
Number of Accidents	1.9	0	-1.9
Number of Fatalities	1.9	0	-1.9
Accident Rate	2.81	0	-2.81
Fatality Rate	2.81	0	-2.81

Average vs Actual for 2016



10-Year Accident Data by Aircraft Category

Aircraft Category	Fixed-Wing	Helicopter	Airtanker	SEAT	USFS O&O	TOTAL
Number of Accidents	5	9	3	2	0	19
Number of Fatal Accidents	1	4	1	0	0	6
Number of fatalities	3	13	3	0	0	19

Flight Hour Statistics

Year	Fixed-Wing	Helicopter	Airtanker	SEAT	USFS O&O	Total
2016	18,238	32,594	5,997	558	7,684	65,071
10-Year Totals	217,008	324,715	42,198	6,586	83,560	674,067
10-Year Average	21,701	32,472	4,220	659	8,356	67,407

Accident Rates

Year	# of Accidents	Accident Rate	Fixed-Wing	Helicopter	Airtanker	SEAT	USFS O&O
2016	0	0	0	0	0	0	0
10-Year Average	1.9	2.81	2.3	2.77	7.1	30.36	0

Accident Rate = Number of accidents divided by the number of hours flown multiplied by 100,000.

Fatal Accident and Fatality Rates

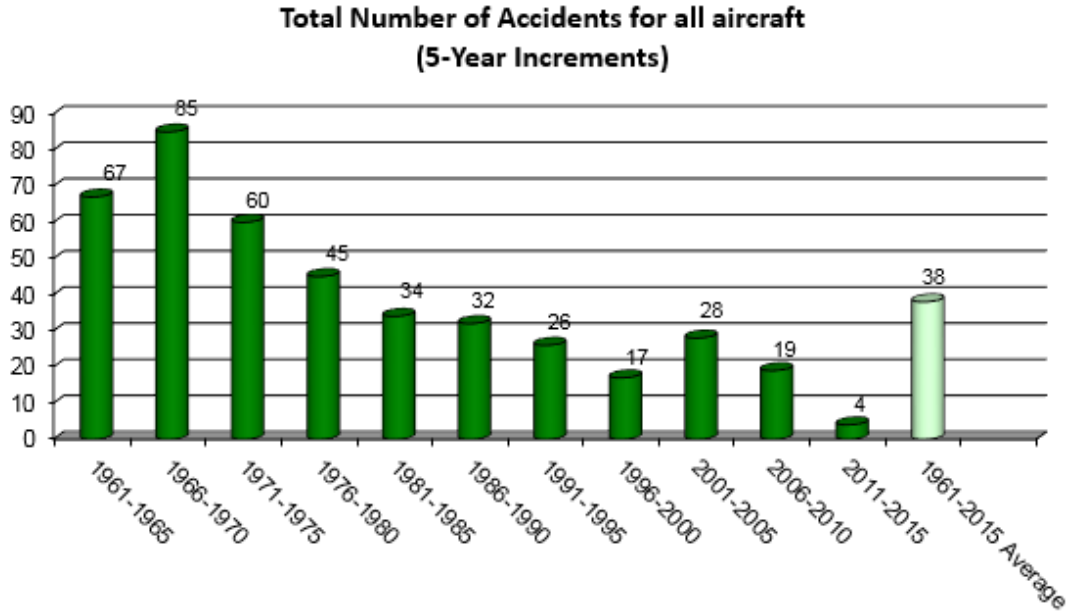
Year	Fatal Accidents	Fatal Accident Rate	Number of Fatalities	Fatality Rate
2016	0	0	0	0
10-Year Average	.6	.89	1.9	2.81

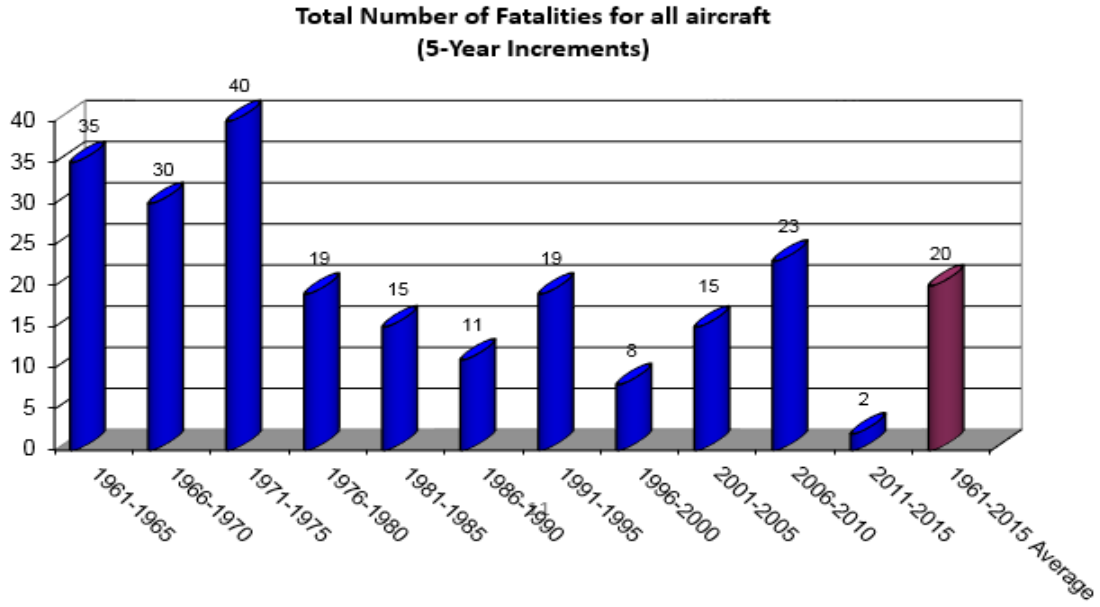
Fatal Accident Rate = Number of fatal accidents divided by the number of hours flown multiplied by 100,000.

Fatality Rate = Number of fatalities divided by the number of hours flown multiplied by 100,000.

Forest Service Aircraft Accident Statistics in 5-Year Increments

The total number of accidents in 5-year increments shows a steady decline, until the 2001-2005 period. The total number of fatalities in 5-year increments shows a major decline from the 60's to the mid 70's. There was a spike in the early 2000's, however; the last 5 years shows a dramatic decrease in the number of both accidents and fatalities.

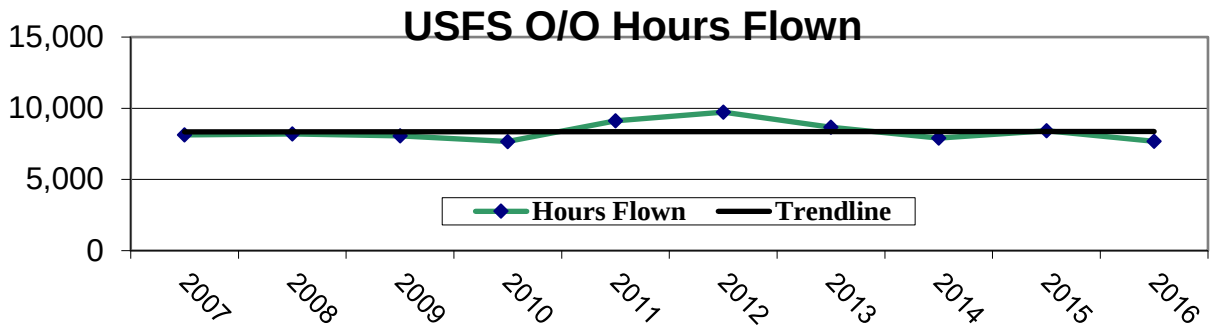




USFS Owned and/or Operated (O&O) Aircraft Statistics

This includes the 25 Forest Service owned fleet aircraft (20 fixed-wing, 3 helicopter and 2 airtankers) and 14 leased Forest Service operated aerial supervision aircraft. The Forest Service owned aircraft accounted for 4,220 flight hours and the 14 leased aerial supervision aircraft flew 3,464 hours in FY 2016. This was 11.8% of the total flight hours, which is below the average of 12.4%. There have not been any accidents in the past 12 years and no fatal accidents for 21 years in USFS O/O aircraft.

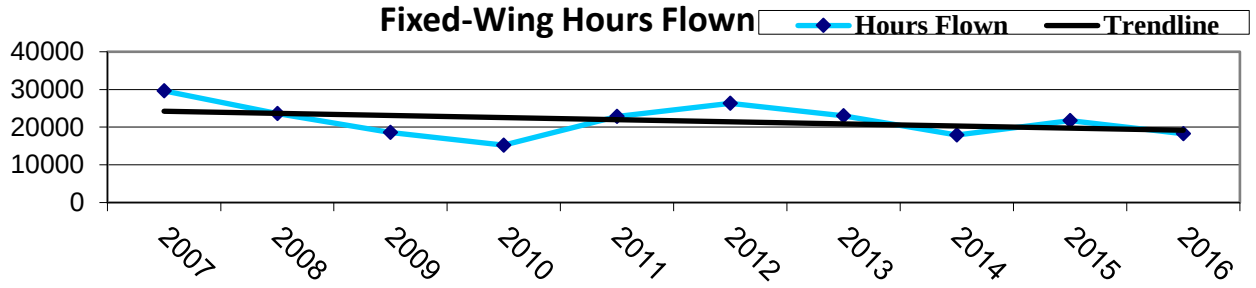
Fiscal Year	Hours Flown	# of Accidents	Accident Rate	Fatal Accidents	Fatal Accident Rate	Fatalities	Fatality Rate
2016	7,684	0	0.00	0	0.00	0	0.00
10-Year Total	83,560	0		0		0	
10-Year Average	8,356	0	0.00	0	0.00	0	0.00

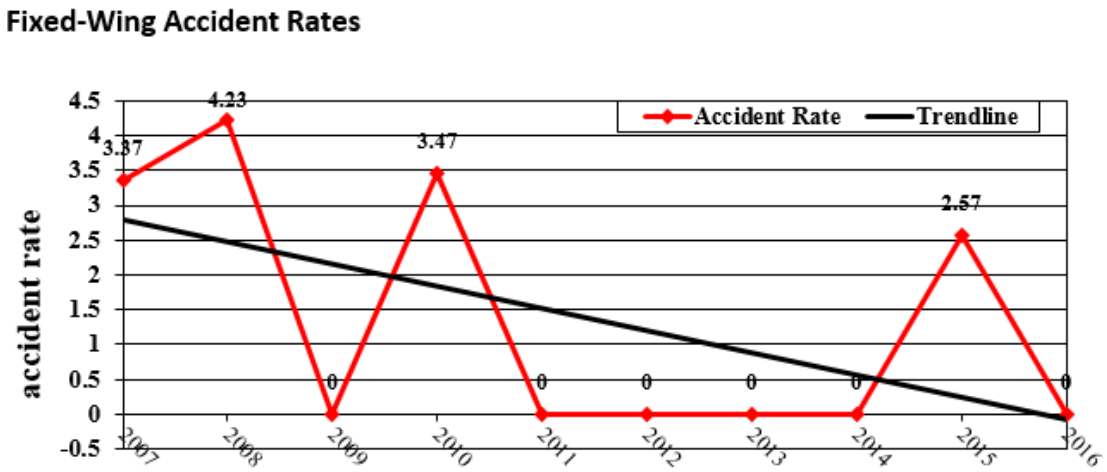


Fixed-Wing Aircraft Statistics

This includes all contract fixed-wing aircraft excluding all airtankers. These aircraft accounted for 28% of the total hours flown; the 10-year average is 32.2%. There were 18,238 hours flown, which is slightly below the 10-year average of 21,701. Five of the past 6 years have been accident free.

Fiscal Year	Hours Flown	# of Accidents	Accident Rate	Fatal Accidents	Fatal Accident Rate	Fatalities	Fatality Rate
2016	18,238	0	0.00	0	0.00	0	0.00
10-Year Total	217,008	5		1		3	
10-Year Average	21,701	0.5	2.3	0.1	0.46	0.3	1.38

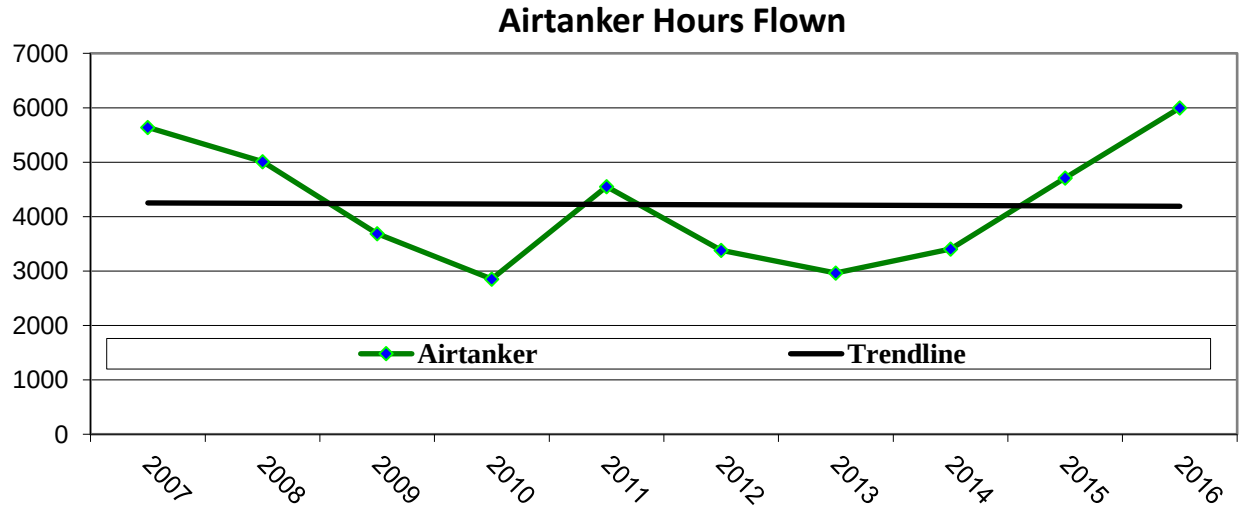


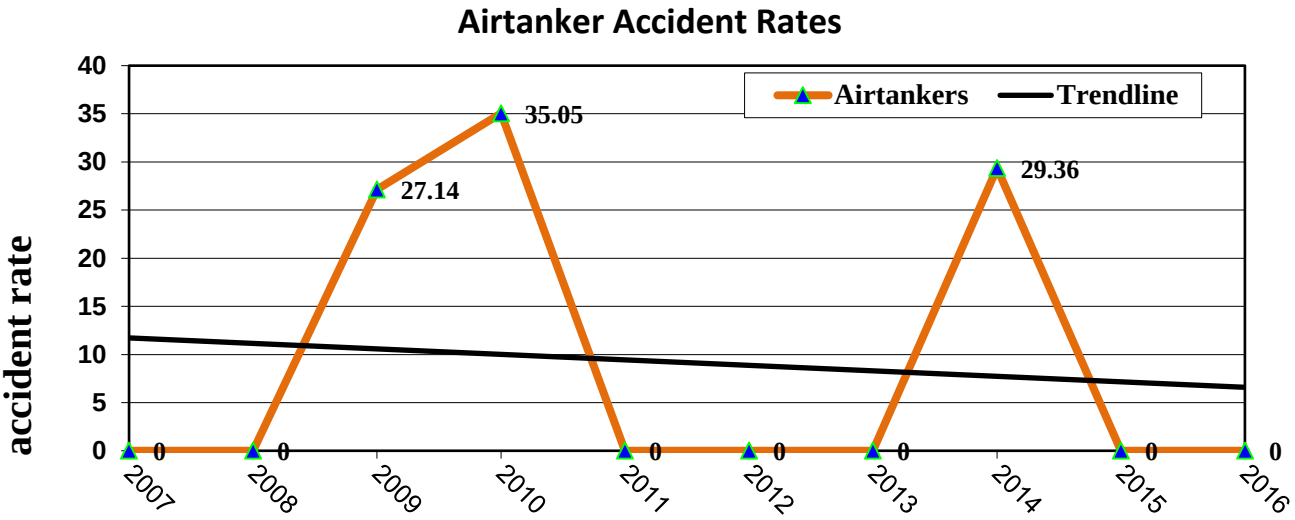


Airtanker Statistics

This includes all contract multi-engine/jet large and very large airtankers and scoopers. These accounted for 9.2% of the total hours flown; well above the 10-year average of 6.3%. We have seen a significant decrease in airtanker accidents and fatalities since the 1960's, however; there have still been 3 accidents with 3 fatalities in the last 10 years.

Fiscal Year	Hours Flown	# of Accidents	Accident Rate	Fatal Accidents	Fatal Accident Rate	Fatalities	Fatality Rate
2016	5,997	0	0.00	0	0.00	0	0.00
10-Year Total	42,198	3		1		3	
10-Year Average	4,220	0.3	7.1	0.1	2.36	0.3	7.1

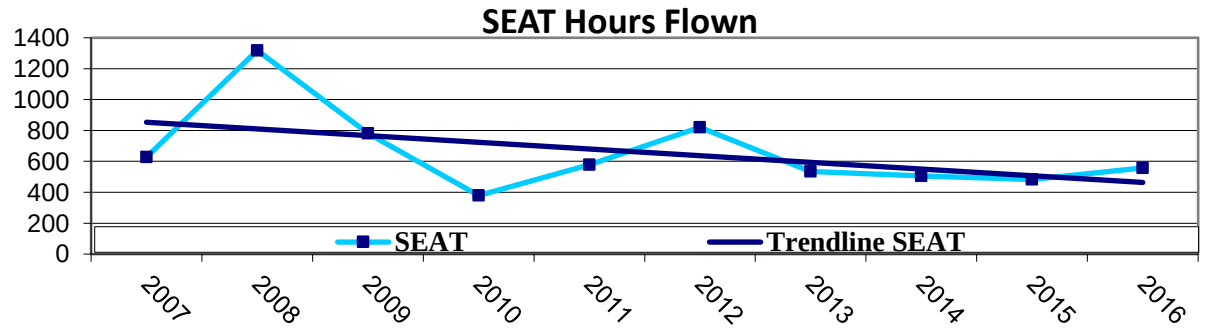


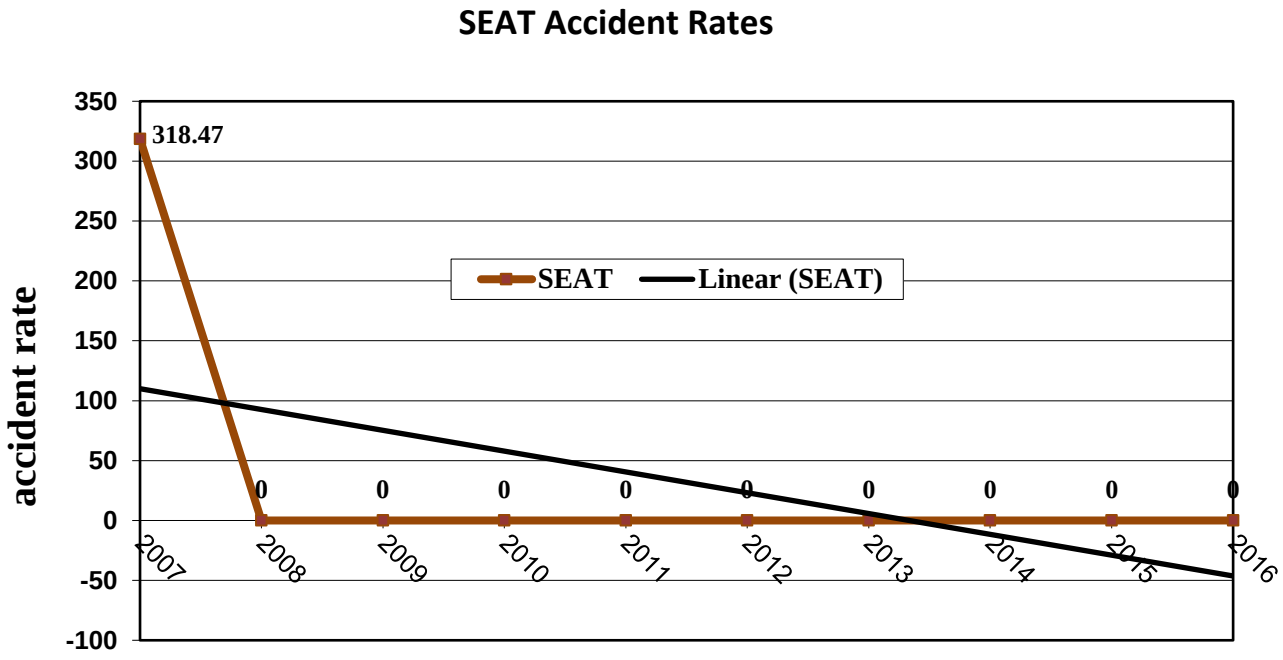


Single Engine Airtanker Statistics

This includes all contract Single Engine Airtankers (SEAT). These only accounted for 0.9% of the flight hours; which is below the average of 1%. There has not been a SEAT accident for 9 years, in 2007 there were 2 accidents. There has never been a fatal SEAT accident under USFS operational control.

Fiscal Year	Hours Flown	# of Accidents	Accident Rate	Fatal Accidents	Fatal Accident Rate	Fatalities	Fatality Rate
2016	558	0	0.00	0	0.00	0	0.00
10-Year Total	6,586	2		0		0	
10-Year Average	659	0.2	30.36	0	0.00	0	0.00

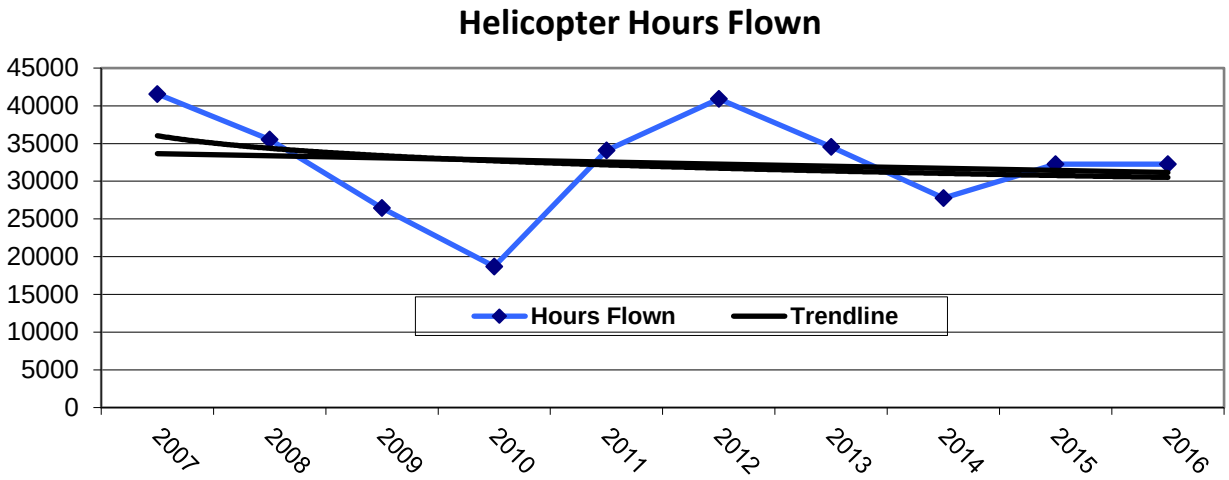


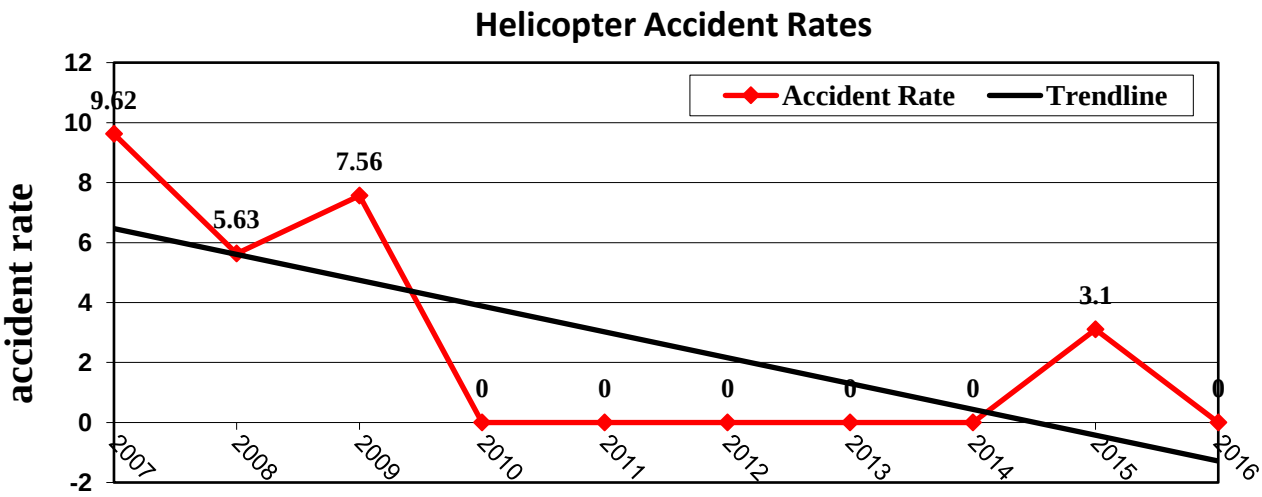


Helicopter Statistics

This includes all contract helicopters. These accounted for 50.1% of the flight hours, which is above the 10-year average of 48.2%. There were no accidents this year. Since 2010 (7 years) there has only been one helicopter accident, sadly with two fatalities. Between 1961 and 2009 (48 years) there were only two years there wasn't a helicopter accident, 1983 and 1995, there were 226 helicopter accidents, an average of 4.7 a year and 73 fatalities, an average of 1.5 per year.

Fiscal Year	Hours Flown	# of Accidents	Accident Rate	Fatal Accidents	Fatal Accident Rate	Fatalities	Fatality Rate
2016	32,594	0	0	0	0	0	0
10-Year Total	324,715	9		4		13	
10-Year Average	32,472	0.9	2.77	0.4	1.23	1.3	4





USFS SAFECOM Summary

The SAFECOM system satisfies Federal Aviation Regulation requirements for incident reporting, but more importantly, it provides management and front line supervisors with near real time accident prevention information. Armed with data on emerging safety and effectiveness challenges, management can take appropriate actions before a mishap occurs.

The following charts trend the Forest Service SAFECOM data submitted to the Interagency SAFECOM database online at https://www.safecom.gov/. In FY 2016 there were 508 Forest Service SAFECOMs submitted, which is very close to the 10-year average of 503.

USFS O&O aircraft are not separated in the SAFECOM data (except in the table below), they are reported under the actual type of aircraft; fixed-wing, airtanker or helicopter.

There were a total of 1,016 SAFECOMs (508 Forest Service, 424 DOI, 81 State and 3 Other/Unknown/Military/Vendor) submitted to the Interagency SAFECOM database in FY 2016.

The 10 most reported USFS SAFECOMs in FY2016 were: Maintenance - Engine (48), Incident - Precautionary Landing (45), Mishap Prevention – Kudos (41), Hazard Communications (40), Airspace – Intrusion (35), Maintenance - Electrical (22), Management – Internal (19), Incident – Dropped Load (18), Maintenance - Fuel (17), and Incident – Dragged Loads (16).

10-Year SAFECOM Data

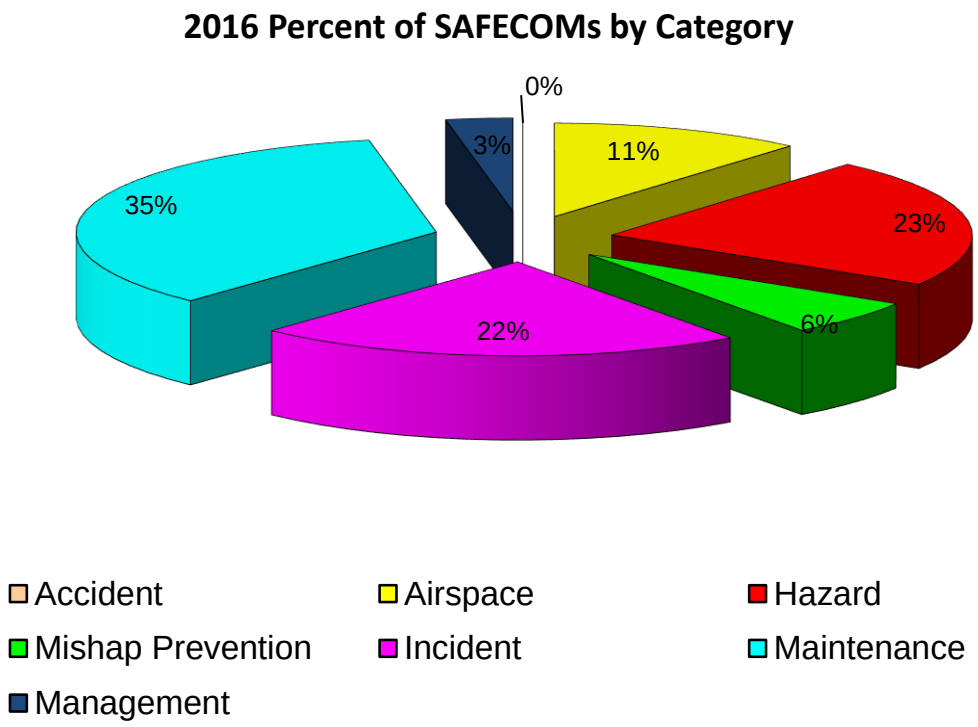
Year	Number of SAFECOM's
2016	508
10-Year Total	5,025
10-Year Average	503

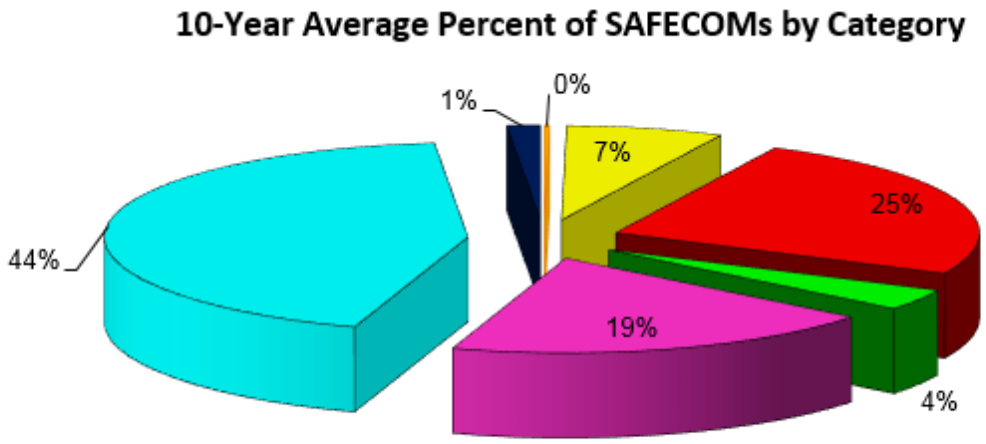
2016 SAFECOM's by Aircraft Type

Aircraft Type	Number
Fixed Wing	107
Helicopter	279
Airtanker	52
N/A	7
SEAT	11
UAS	19
USFS Owned/Operated	33
Total	508

USFS SAFECOM's by Category

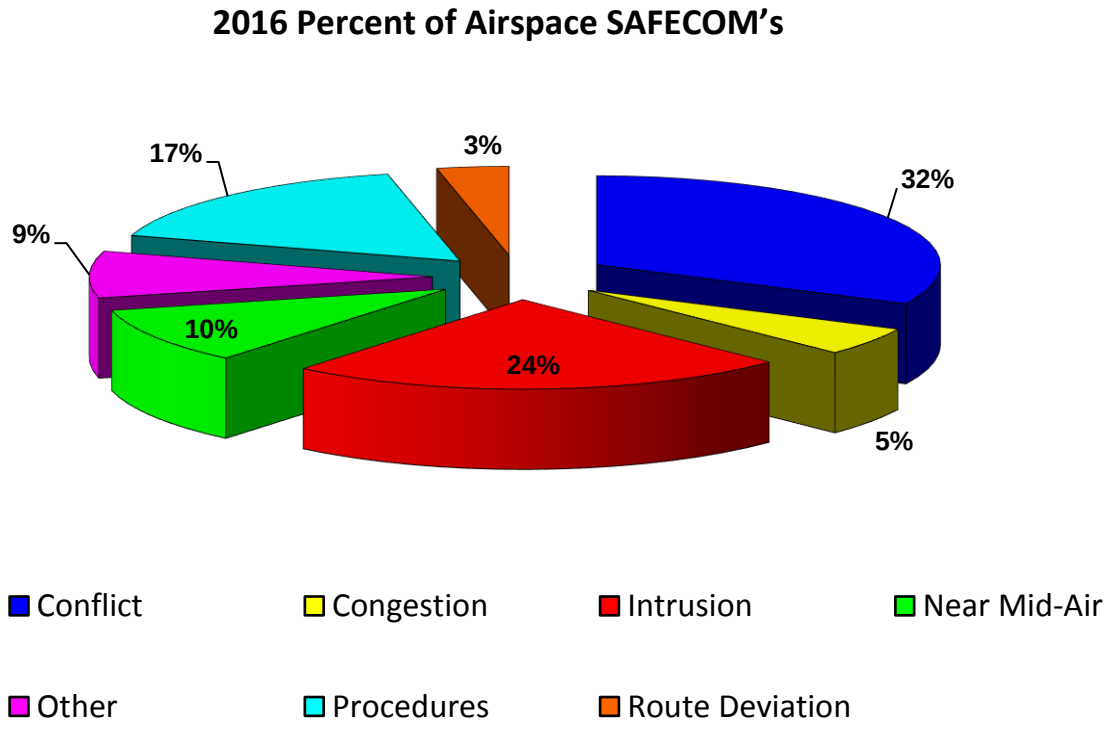
The numbers of SAFECOMs by category will be more than the total number of SAFECOMs reported as each SAFECOM may have more than one category assigned to it. For example several Incident and Hazard SAFECOMs also have Maintenance SAFECOMs associated with them.



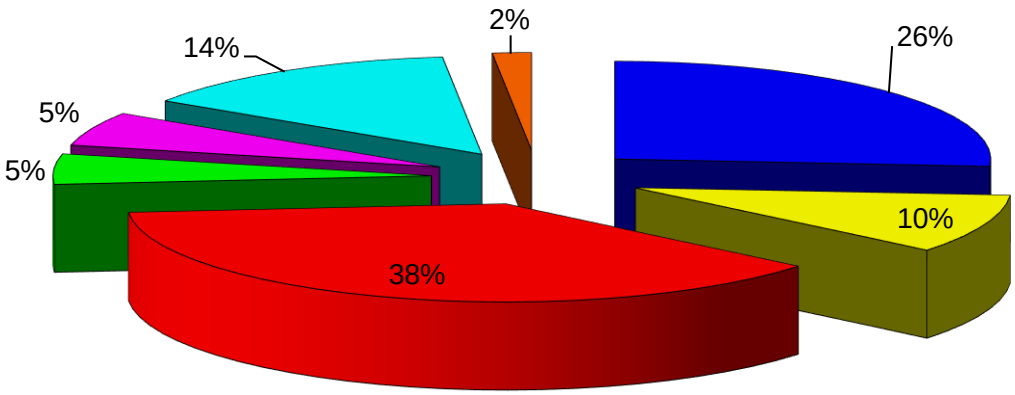


USFS Airspace SAFECOM's by sub-category

There were a total of 72 Airspace SAFECOM's reported in 2016, above the average of 45. There were four near mid-air events which is well above the average 2.4 and one of them was with a UAS. There were 35 intrusions in which 5 involved UAS.

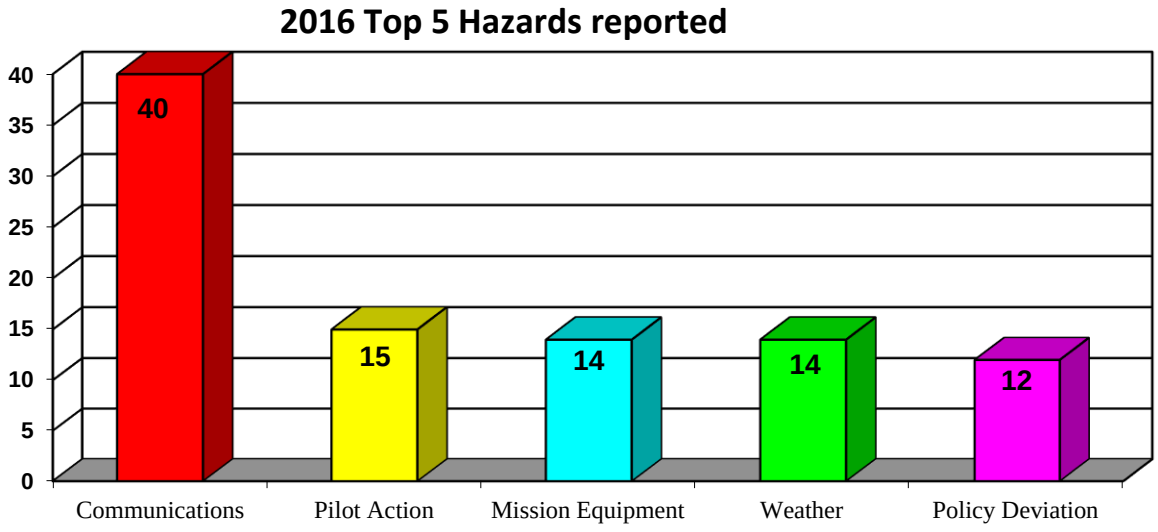


10-Year Average Percent of Airspace SAFECOM's

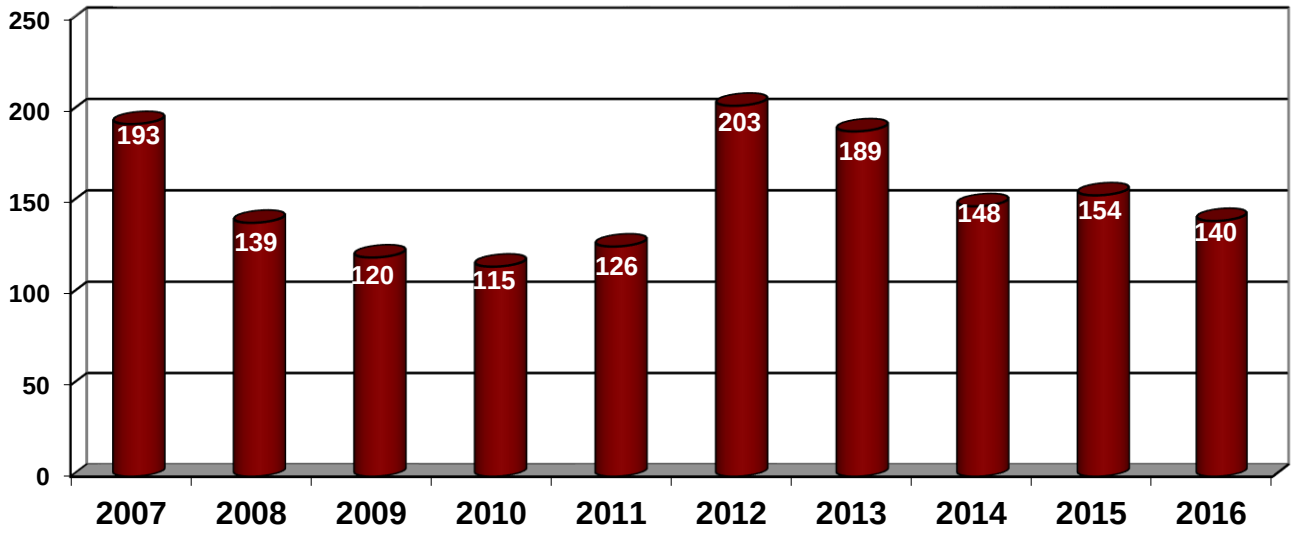


USFS Hazard SAFECOM's by sub-category

There were a total of 140 Hazard SAFECOM's reported. Below are charts indicating the top 5 Hazard SAFECOM's reported and the number of Hazard SAFECOM's for the past 10 years. The "Top 5"are consistent with previous years with the exception of "Weather", which was either preflight action or instructions.

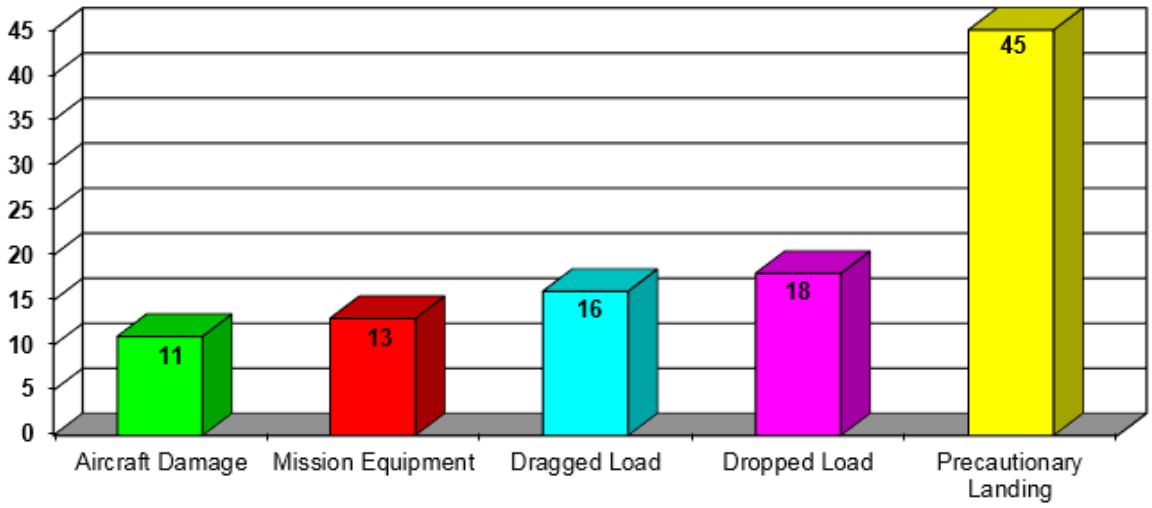


Total number of Hazards reported by year

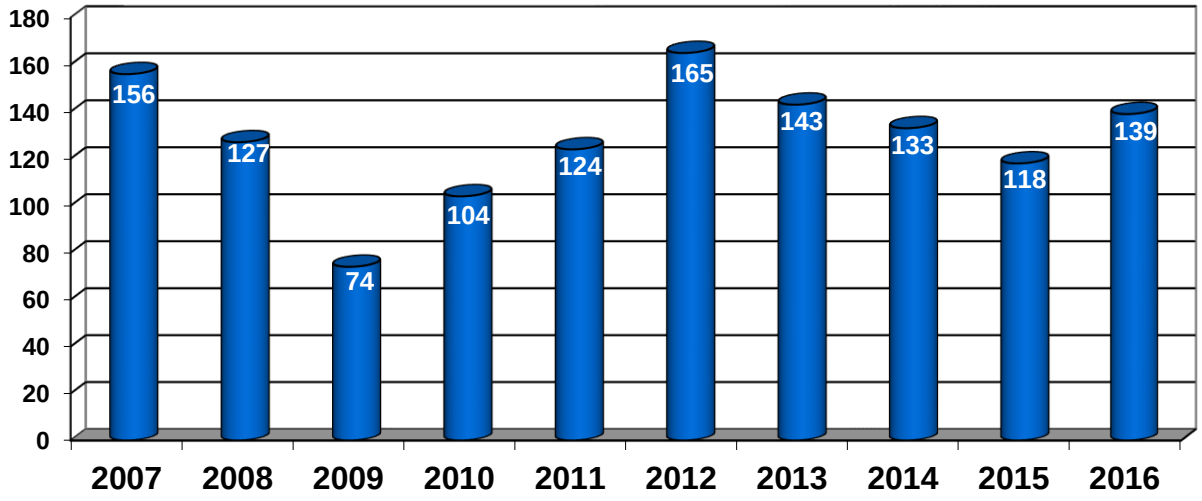


USFS Incident SAFECOMs by sub-category

There were a total of 139 Incident SAFECOM's reported. Below are the top 5 Incident SAFECOMs reported and the total number of Incident SAFECOMs reported for the last 10-years. These are consistent with previous years as the top 5. Last year was the exception where dragged loads were not in the top 5.



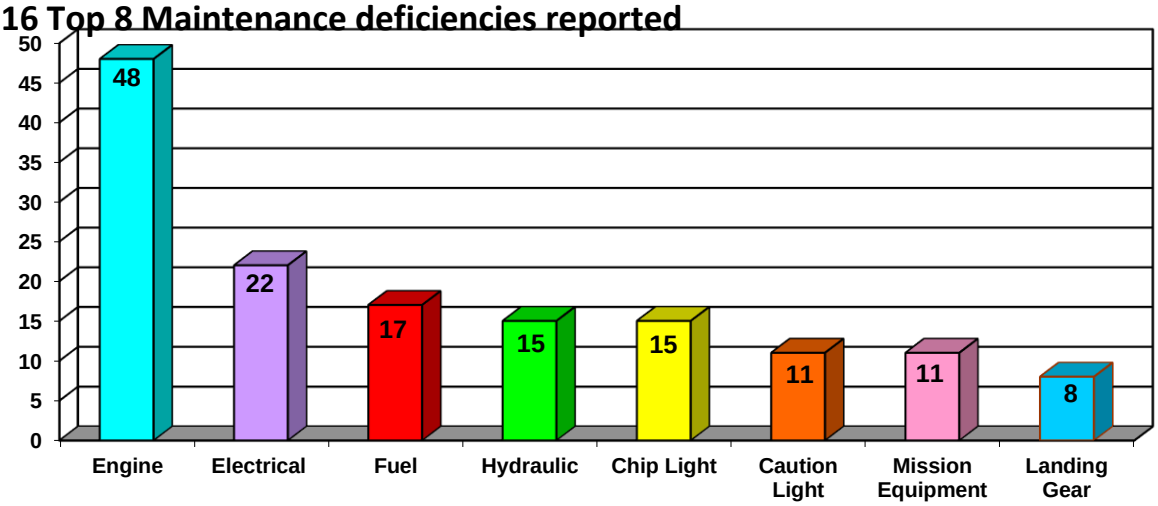
Total number of Incidents reported by year



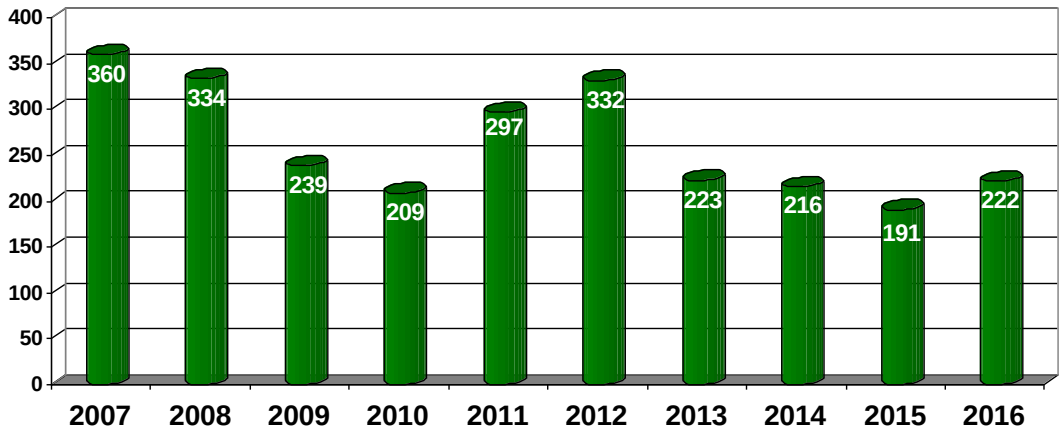
USFS Maintenance SAFECOM's by sub-category

There were a total of 222 maintenance SAFECOMs reported. Below are the top 8 Maintenance SAFECOMs reported and the total number of maintenance SAFECOMs reported for the last 10-years. Maintenance SAFECOMS accounted for 35% of all the USFS SAFECOM reports. Engine maintenance discrepancies continue to be the most reported; there were a total of 48, of which 5 were either an engine failure or required an engine shutdown.

2016 Top 8 Maintenance deficiencies reported

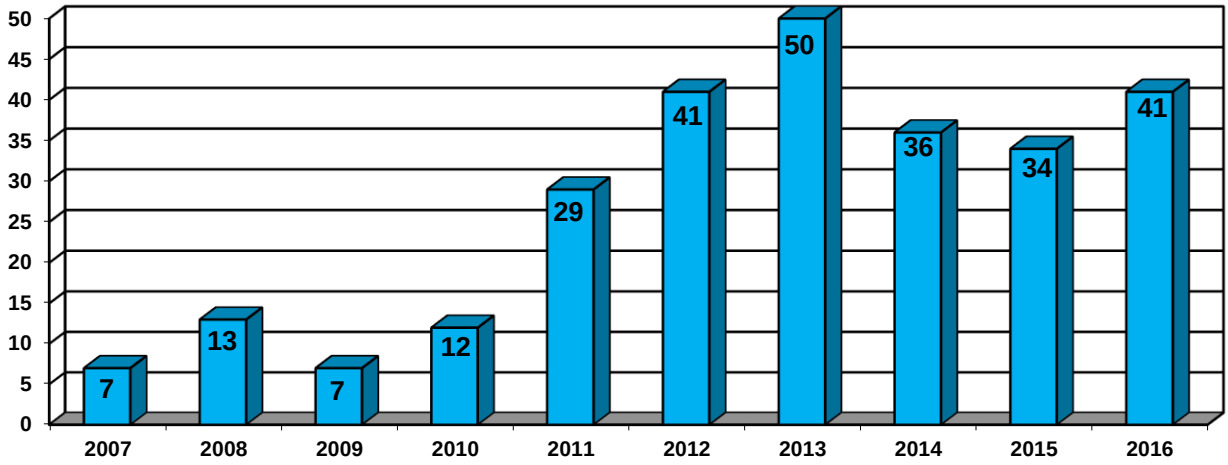


Total number of Maintenance deficiencies reported by year



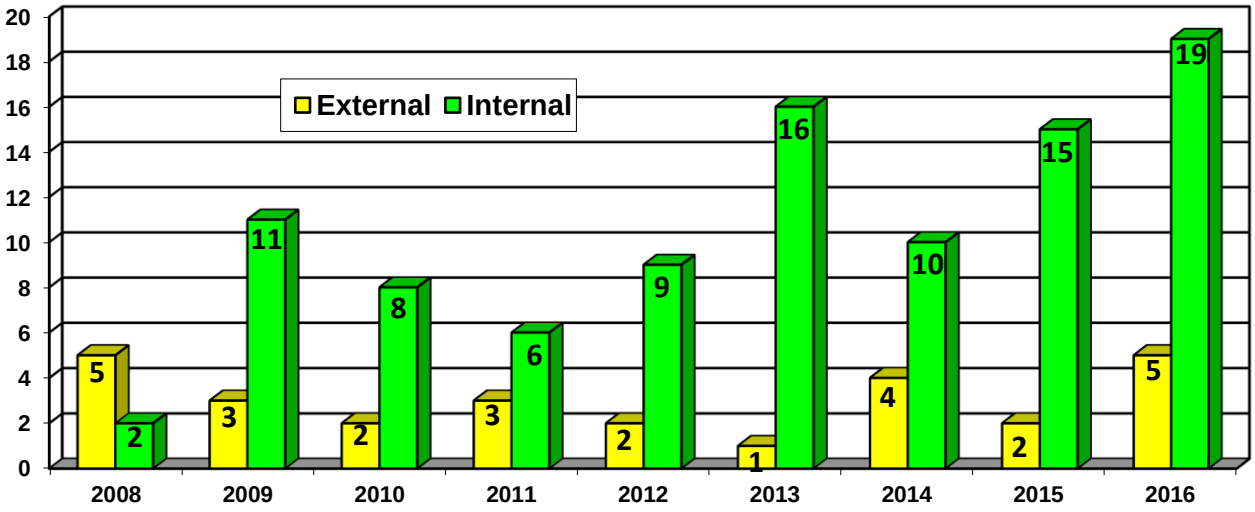
USFS Mishap Prevention SAFECOM's

Mishap Prevention is a category to recognize the good things folks are doing in aviation. Most Airwards come from the SAFECOM system under this category.



USFS Management SAFECOM's by sub-category

Below are the SAFECOM reports classified as Management, sub-categorized by internal and external.



Mishap Summary

Fortunately the Forest Service had no accidents and only one Incident With Potential (IWP) in 2016. The table below shows the basic information. For additional information review the A-200 Mishap Review on the Interagency Aviation Training website.

Date	Region/Forest	Aircraft Type	Incident Description
8/3/16	R-2/4 Wyoming State	King Air 90	Aircraft Upset


USDA
United States Department of Agriculture
IF YOU FLY, WE CAN'T
DRONES NEAR WILDFIRES ARE NOT SAFE
FLYING DRONES OR UAS (UNMANNED AIRCRAFT SYSTEMS) WITHIN OR NEAR WILDFIRES WITHOUT PERMISSION COULD CAUSE INJURY OR DEATH TO FIREFIGHTERS AND HAMPER THEIR ABILITY TO PROTECT LIVES, PROPERTY, AND NATURAL CULTURAL RESOURCES
FIRE MANAGERS MAY SUSPEND AERIAL FIREFIGHTING UNTIL UNAUTHORIZED UAS LEAVE THE AREA, ALLOWING WILDFIRE TO GROW LARGER.
CONTACT YOUR NEAREST LAND MANAGEMENT AGENCY OFFICE TO LEARN MORE ABOUT UAS AND PUBLIC LANDS
Forest Service
ANF
E-23