

***FIRE, SMOKE OR FUMES  
OCCURRENCES  
ON TRANSPORT AIRPLANES***

R.G.W. CHERRY & ASSOCIATES  
LIMITED

Occurrences were classified as “Significant Events” if they resulted in, or it was likely that they resulted in, any of the following:

Diversion

Return to Departure Airport

Rejected Take-off

Emergency Evacuation

Depressurization

Fuel Dump

In-Flight Thrust Engine Shutdown (includes shutdown during take-off or landing)

Emergency Descent

Emergency Declared

Emergency Services Deployed

Ground Damage (other than Minor Damage)

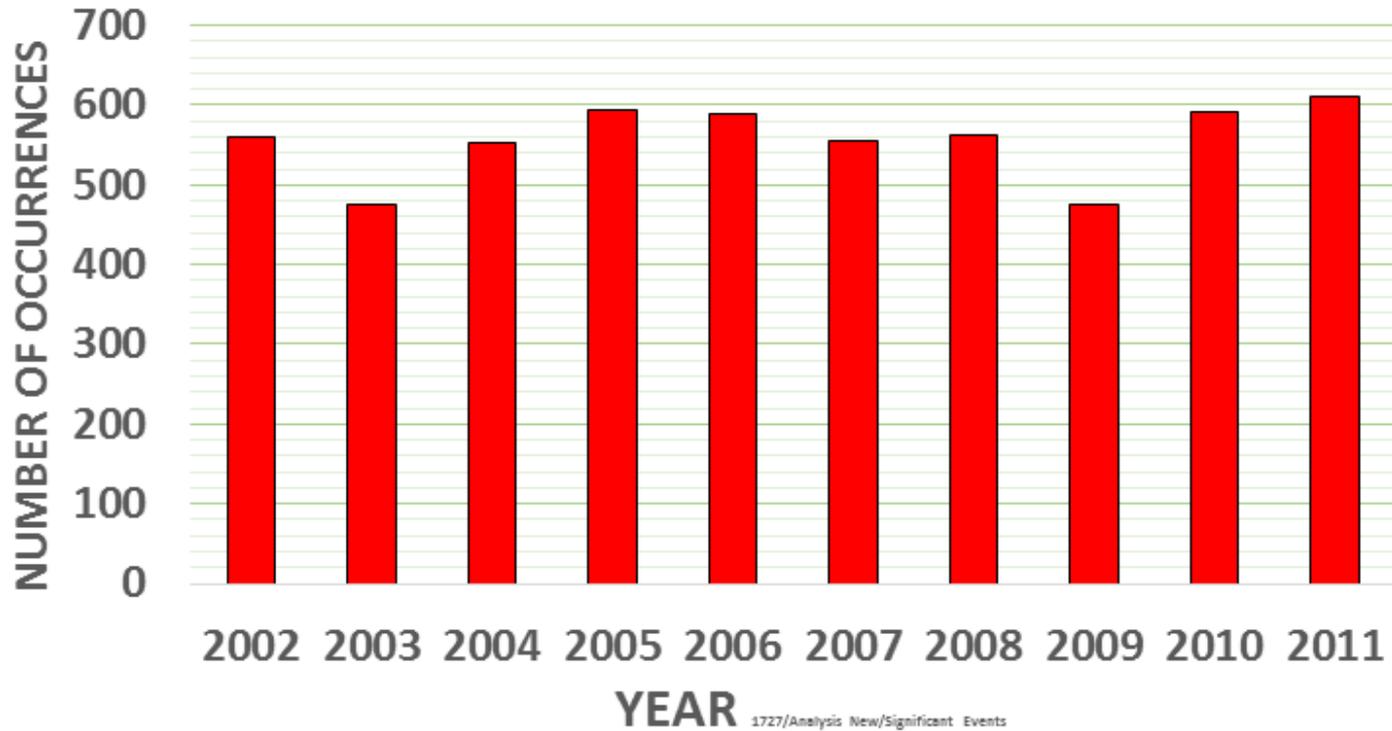
Airplane Damage (Minor, Substantial or Destroyed)

Overweight Landing

Study includes data for 10 years (2002-2011)

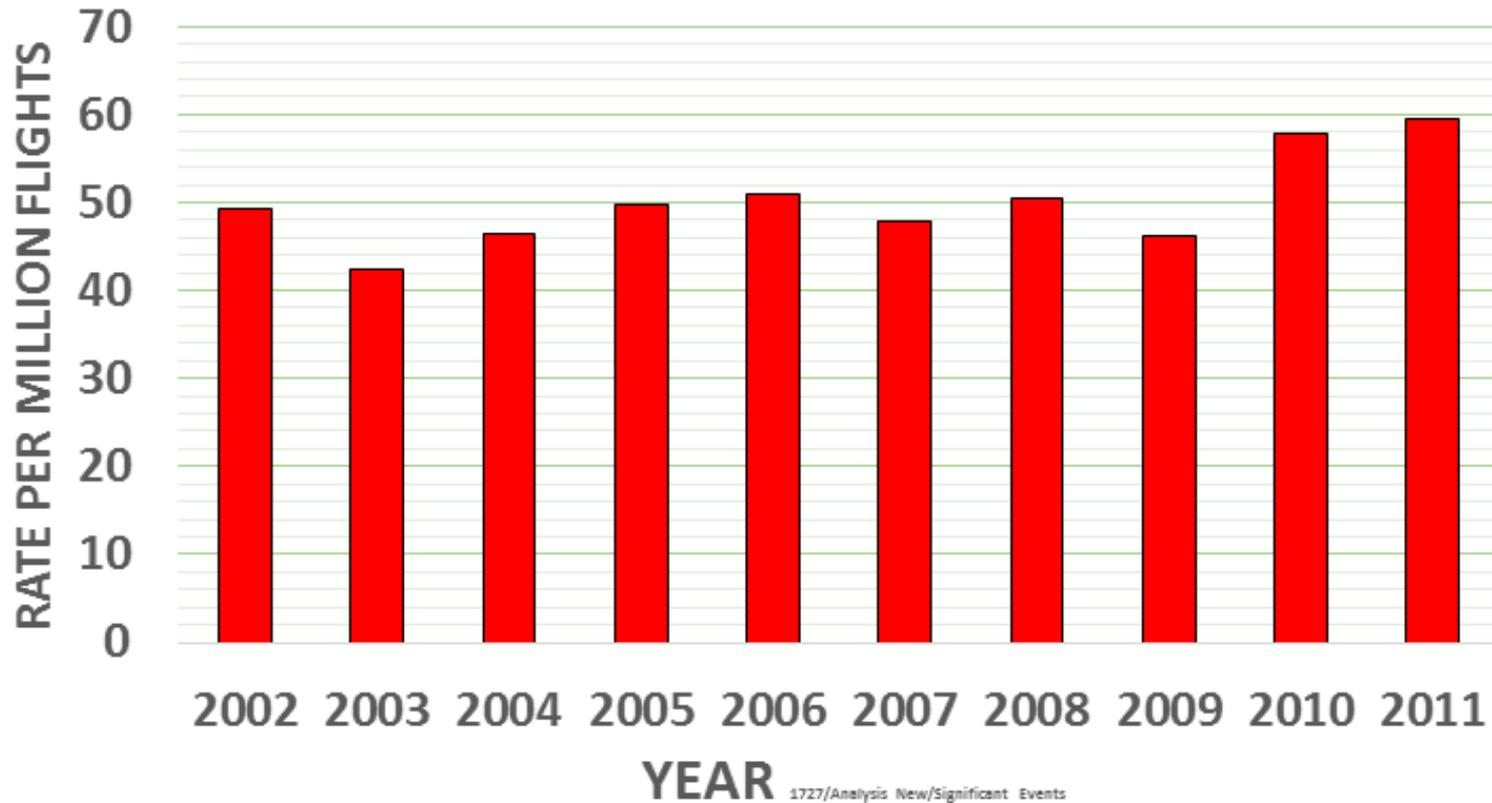
Of the 14,533 occurrences that were considered valid in the study approximately 38% were considered Significant Events.

## TOTAL NUMBER OF SIGNIFICANT EVENTS



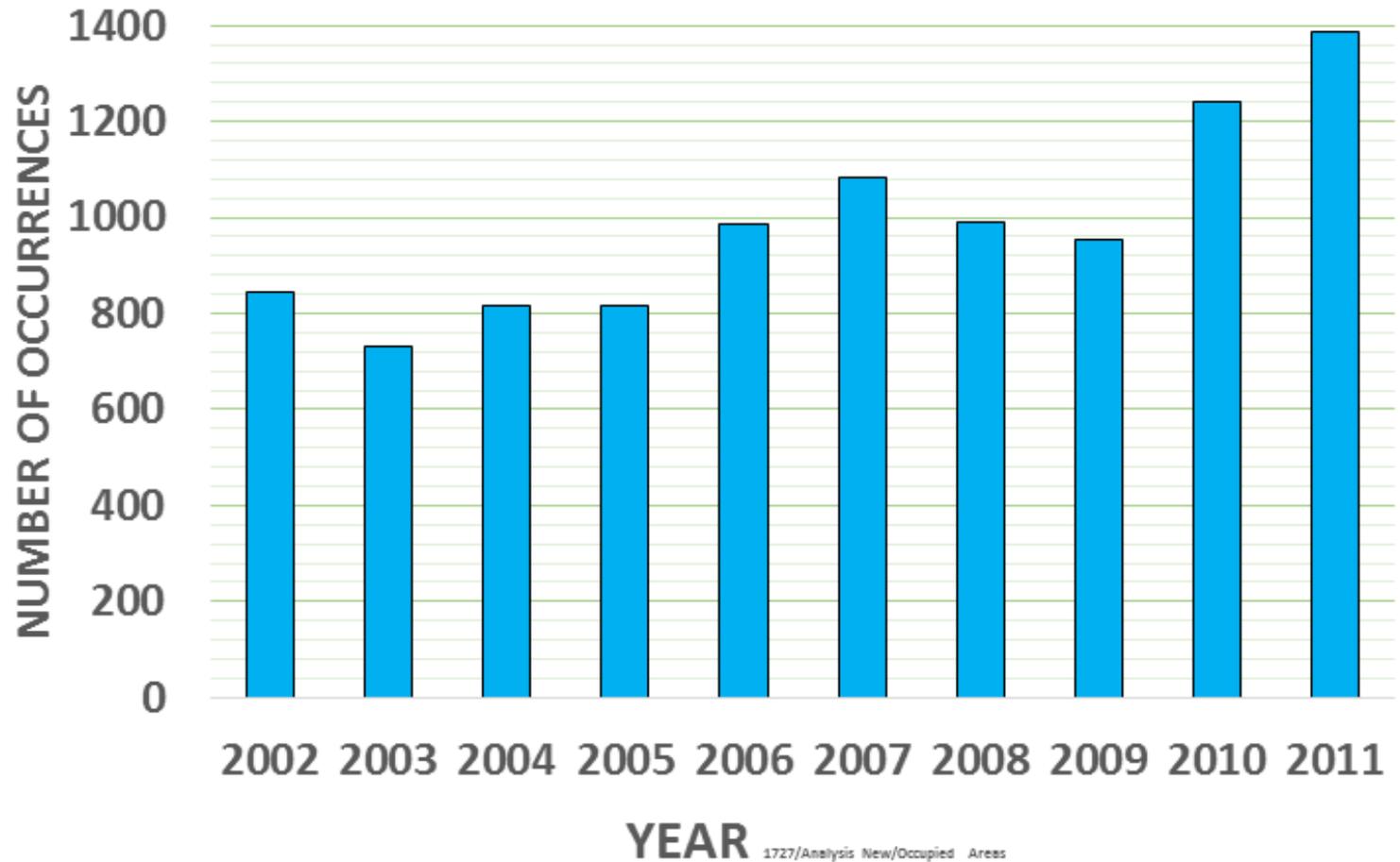
Significant Events - Total Number per Year

## RATE OF OCCURRENCE OF SIGNIFICANT EVENTS



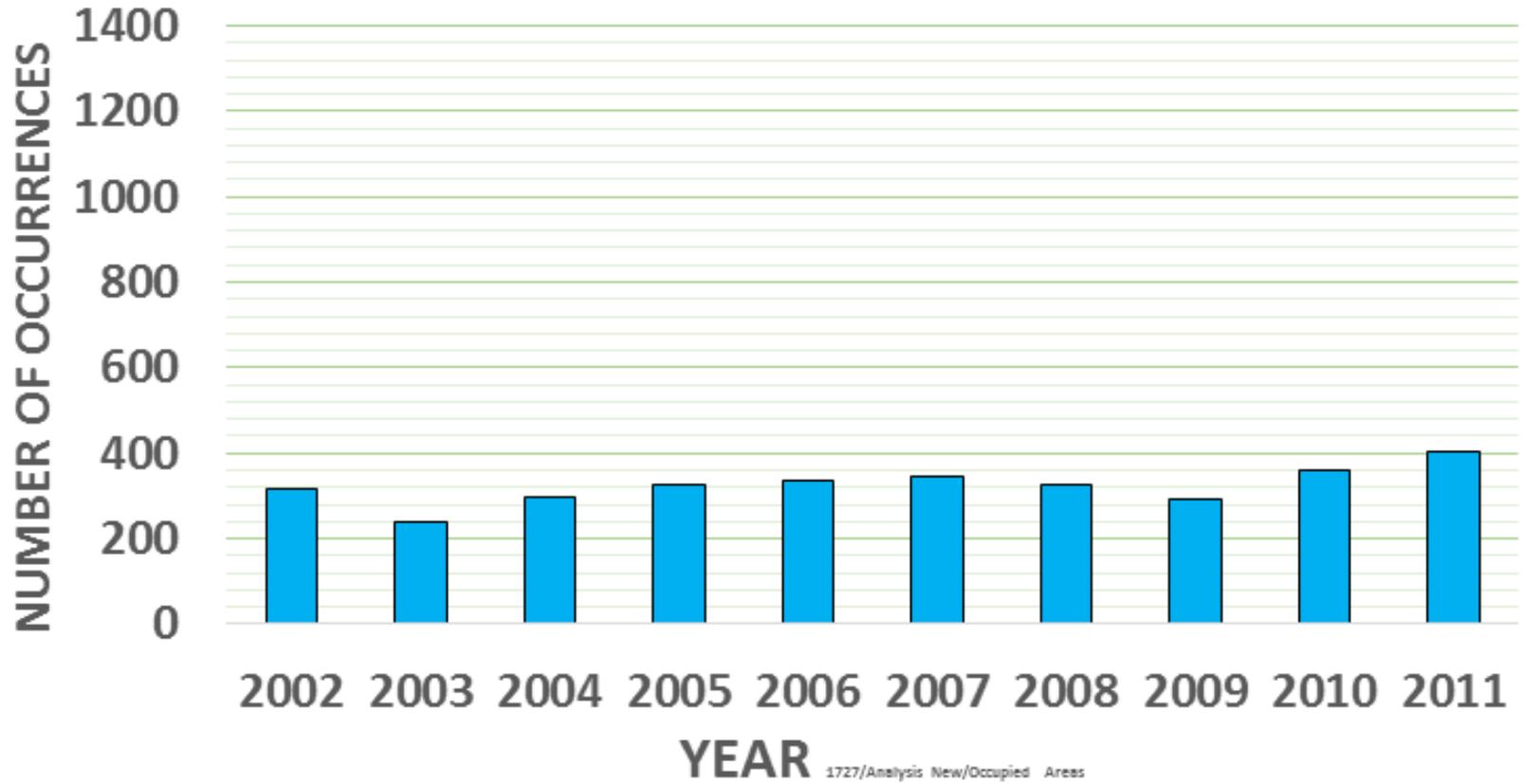
Significant Events - Rate of Occurrence per Million flights

## ALL EVENTS



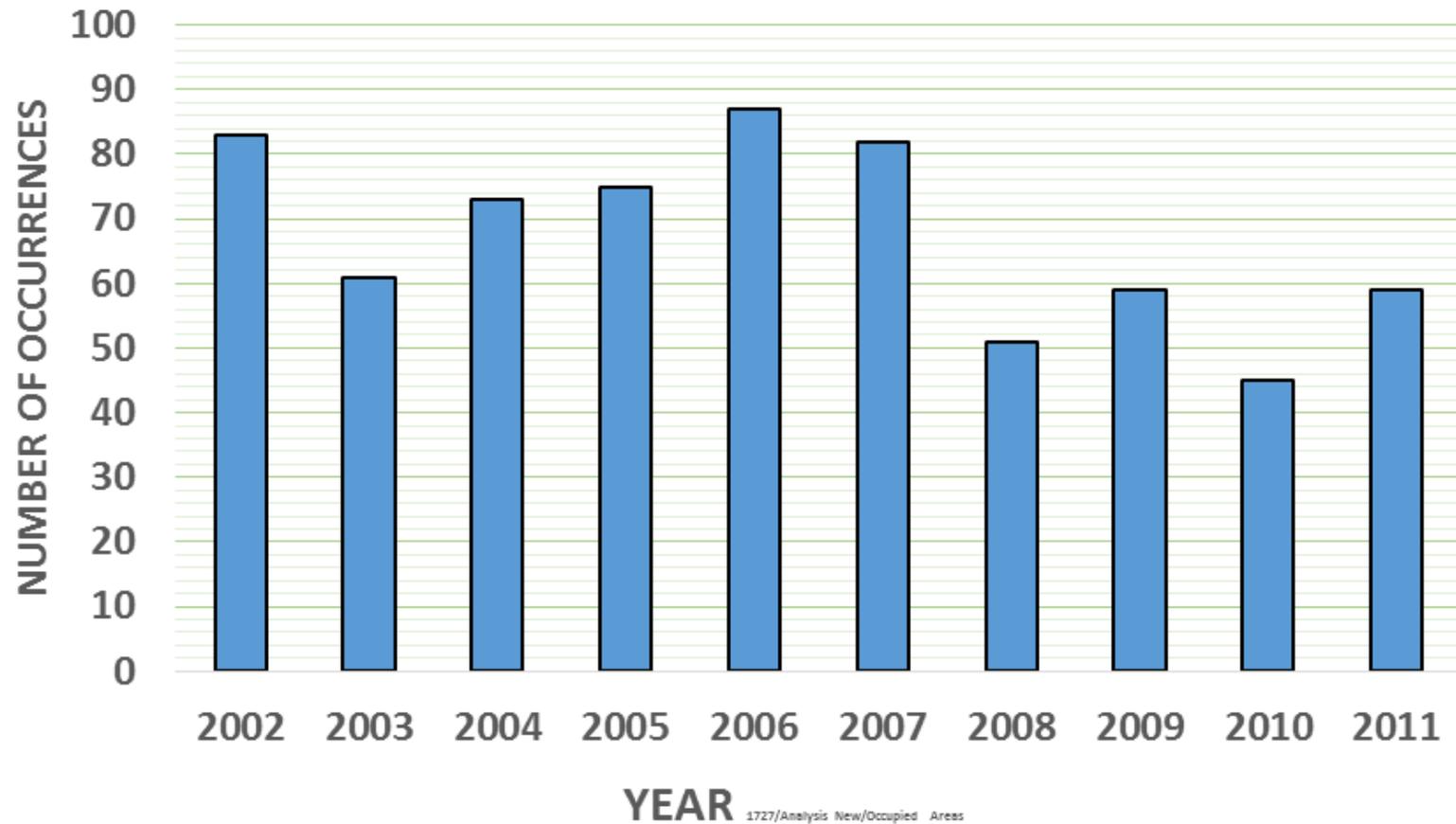
– Occupied Areas - Annual Number of All FSF Events in – Passenger Airplanes

# SIGNIFICANT EVENTS



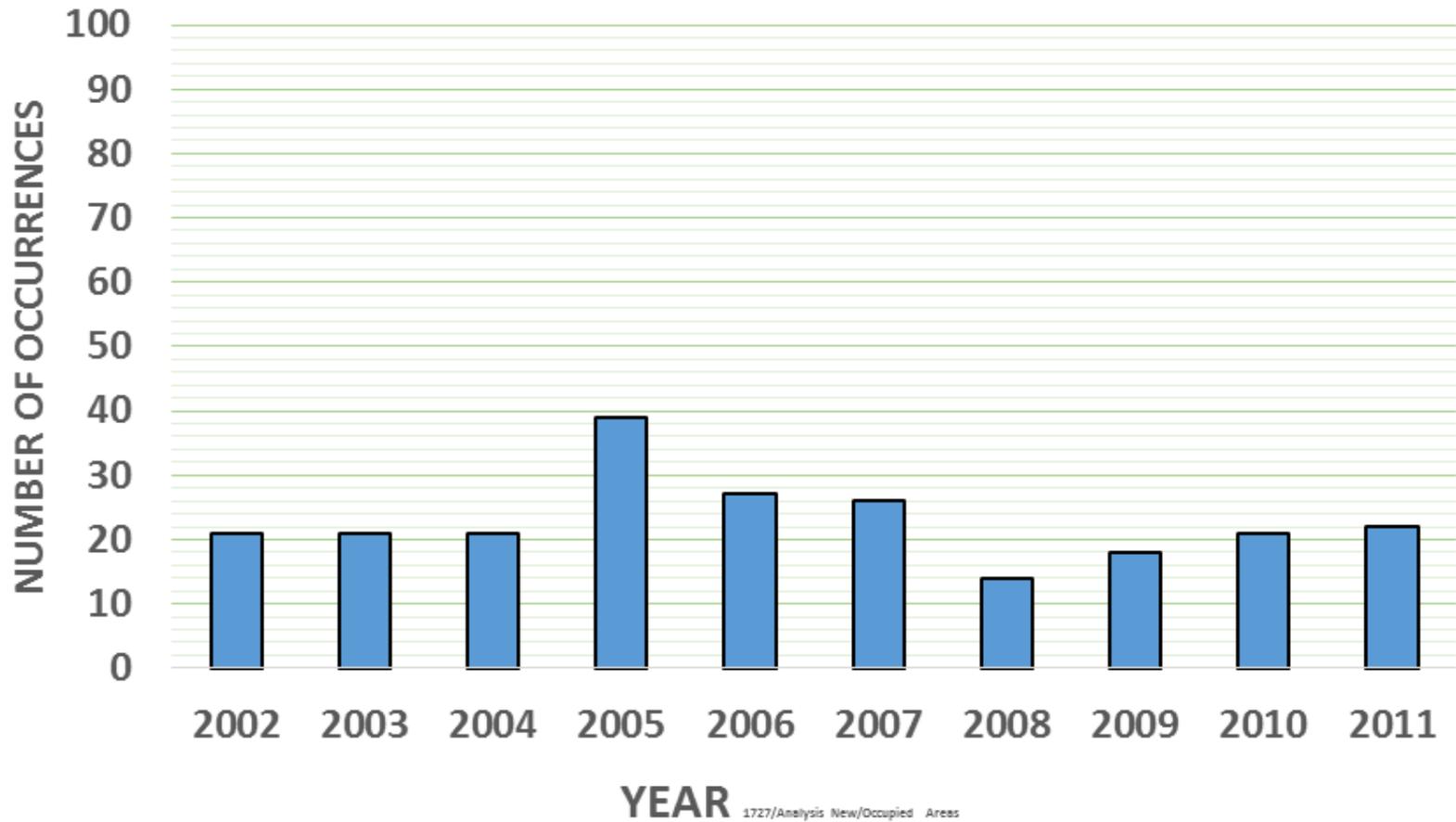
Occupied Areas - Annual Number of Significant FSF Events in – Passenger Airplanes

## NUMBER OF OCCURRENCES - ALL EVENTS



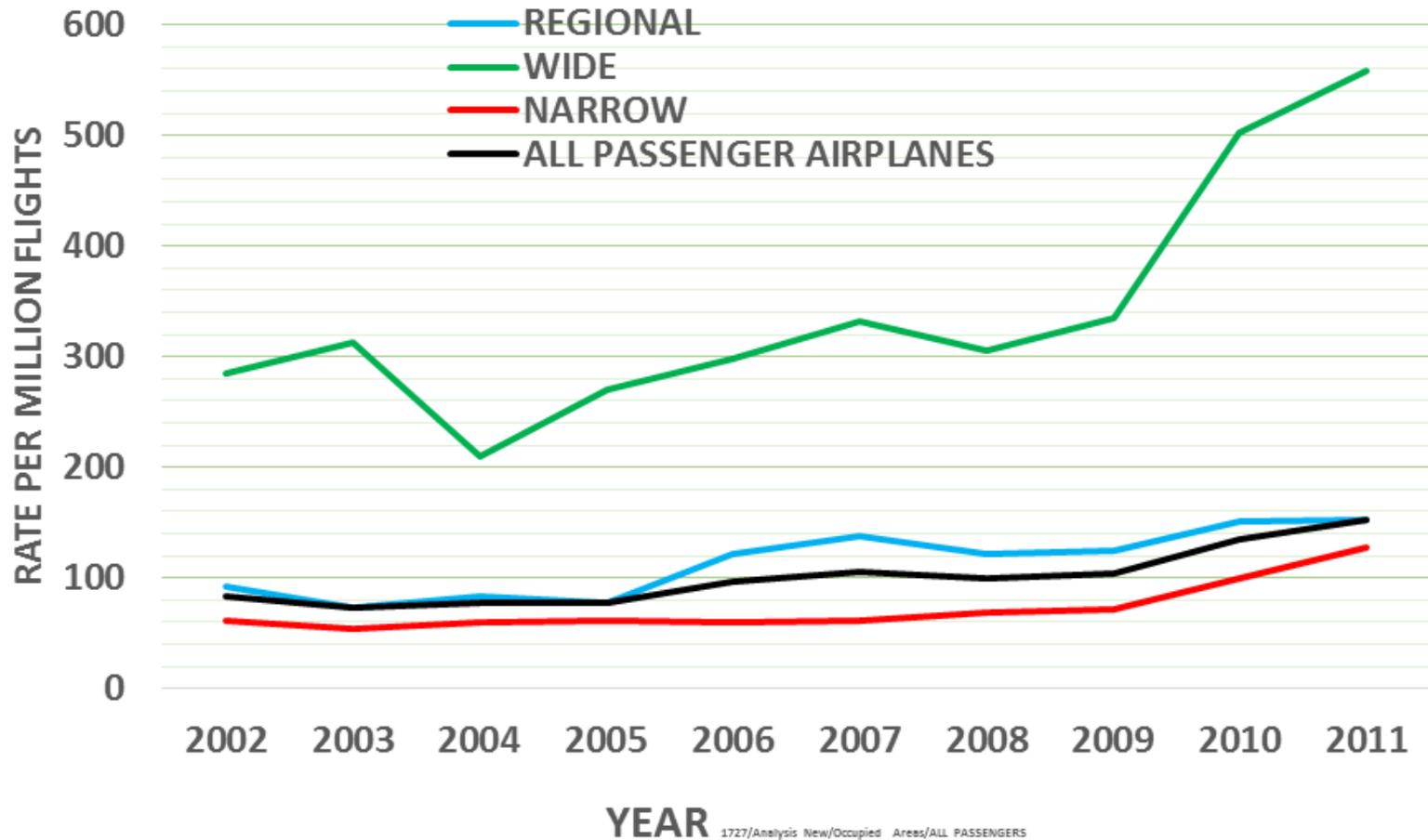
Occupied Areas - Annual Number of All FSF  
Events in – Freighter Airplanes

## NUMBER OF OCCURRENCES - SIGNIFICANT EVENTS



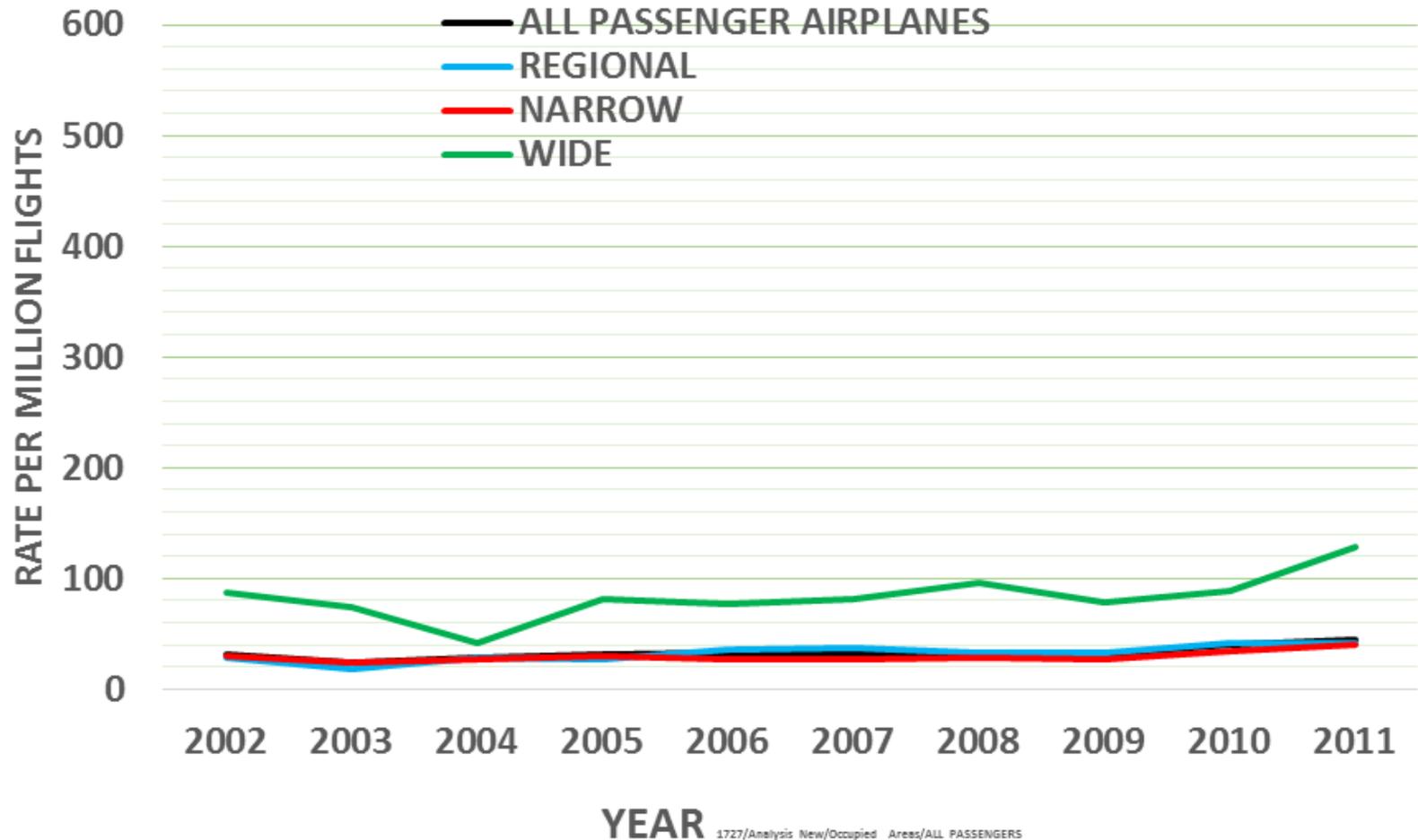
Occupied Areas - Annual Number of Significant FSF Events in – Freighter Airplanes

## RATE OF OCCURRENCE - ALL EVENTS

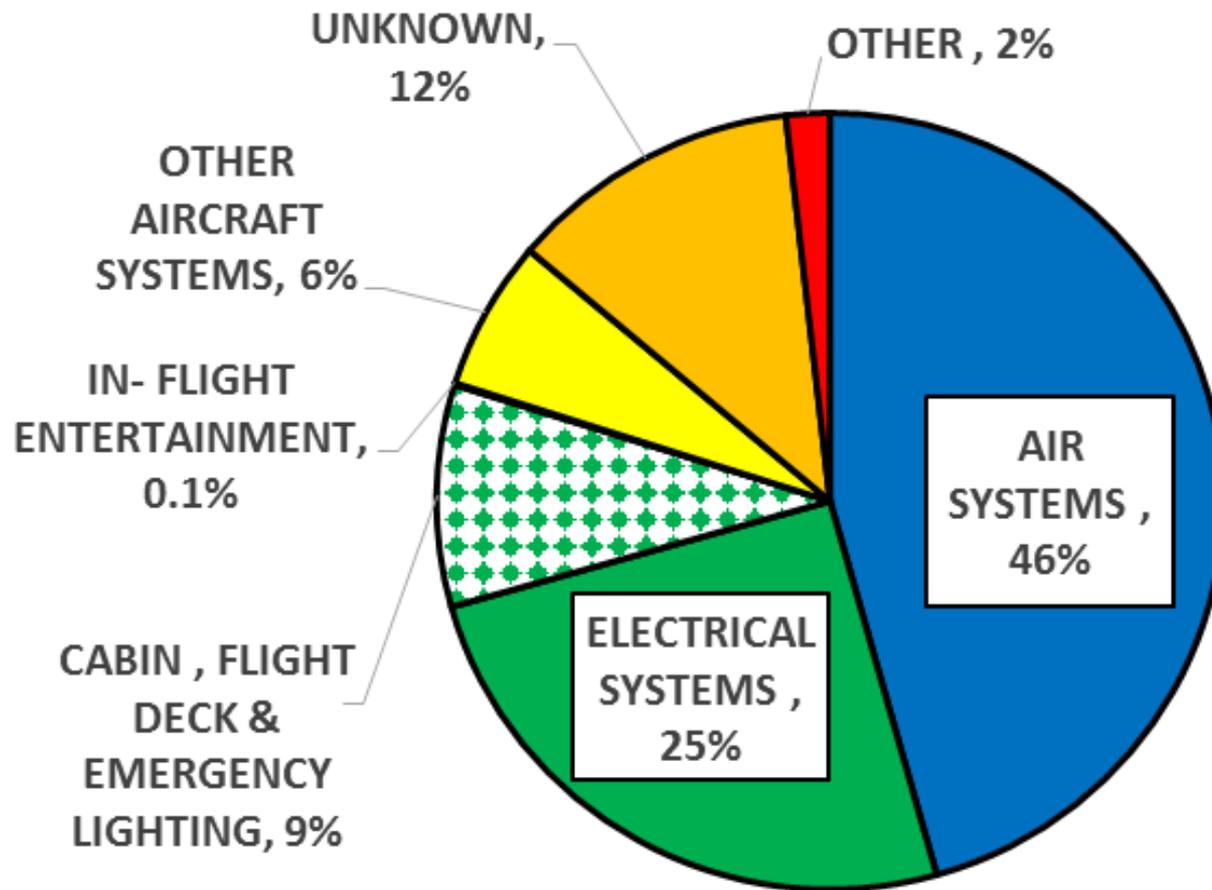


– Occupied Areas - Rate of Occurrence of All FSF Events – Passenger Airplanes

## RATE OF OCCURRENCE - SIGNIFICANT EVENTS

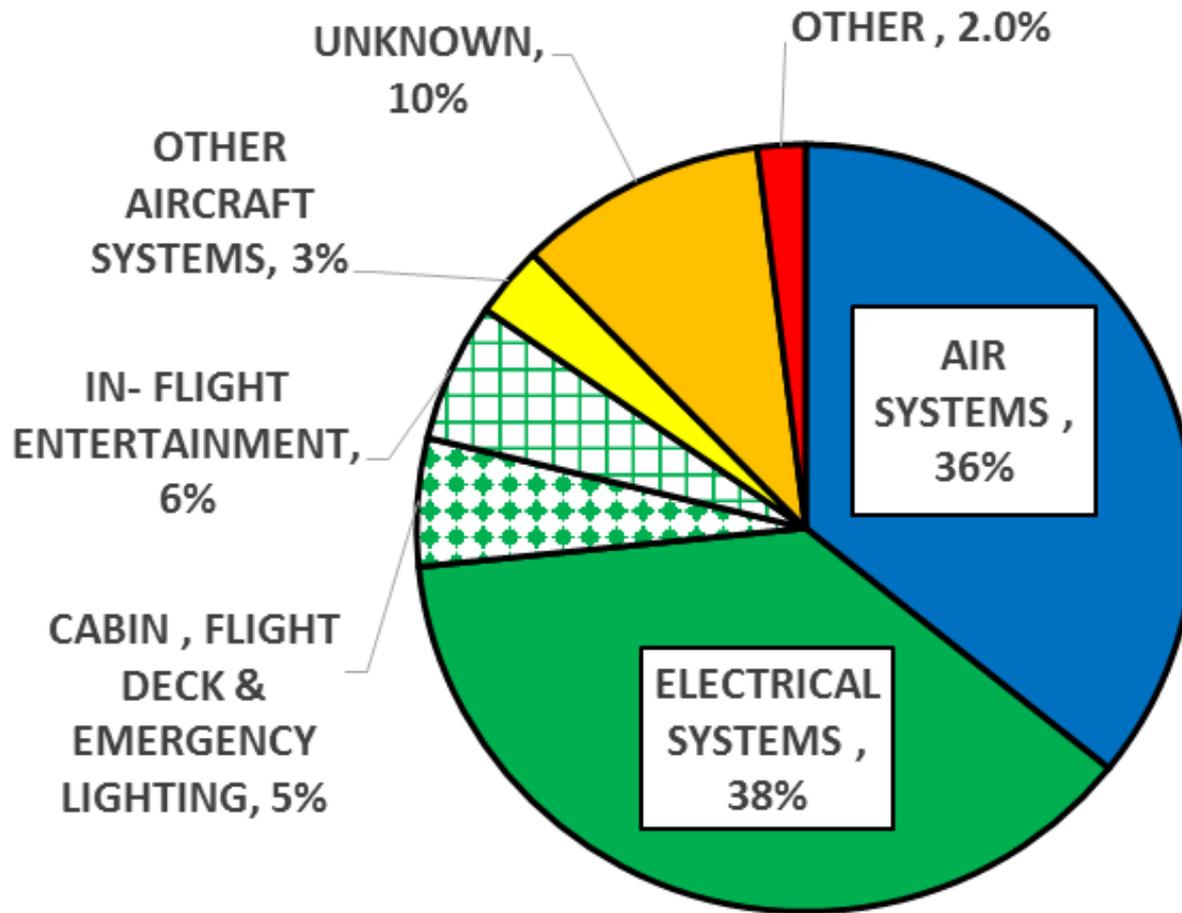


– Occupied Areas - Rate of Occurrence of Significant FSF Events – Passenger Airplanes



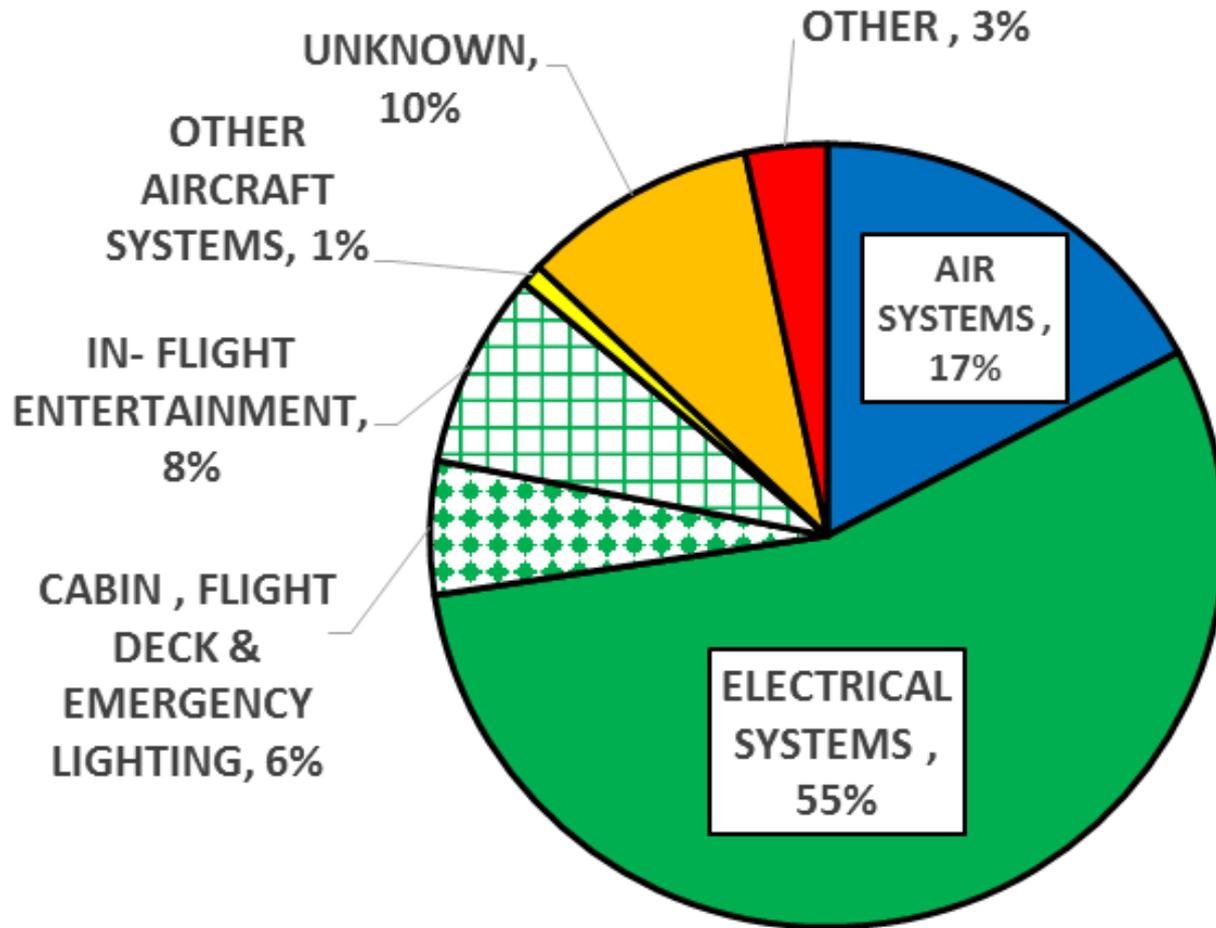
**ALL EVENTS** 1727/Analysis New/1727/Analysis New/Occupied Areas

– Occupied Areas - Sources of FSF in Regional Passenger Airplanes



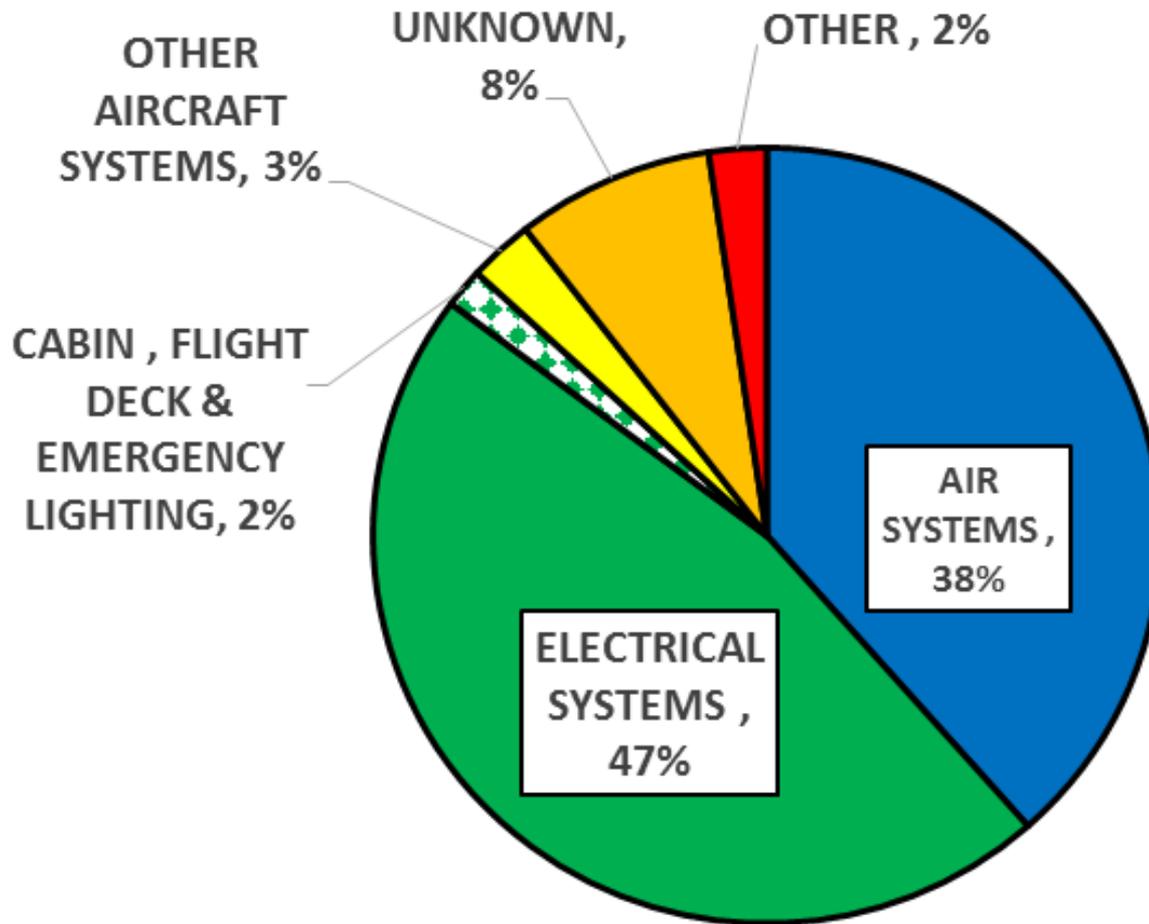
**ALL EVENTS** 1727/Analysis New/1727/Analysis New/Occupied Areas

– Occupied Areas - Sources of FSF in Narrow Body Passenger Airplanes



**ALL EVENTS** 1727/Analysis New/1727/Analysis New/Occupied Areas

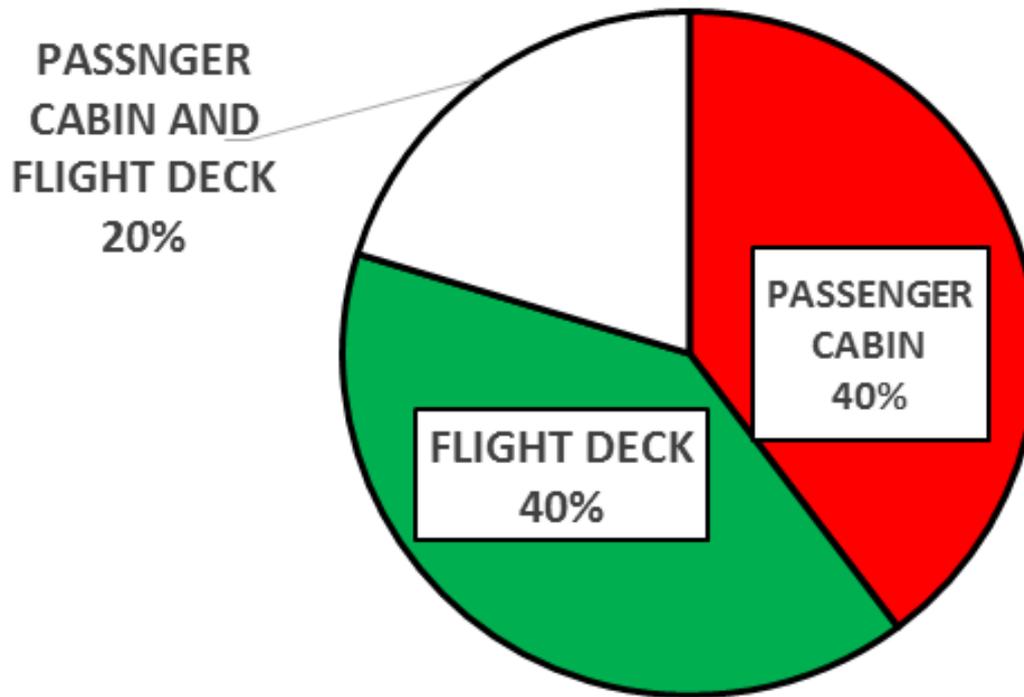
Occupied Areas - Sources of FSF in Wide Body Passenger Airplanes



**ALL EVENTS** 1727/Analysis New/Occupied Areas

Occupied Areas - Sources of FSF in Freighter Airplanes

## FSF Events – by Location

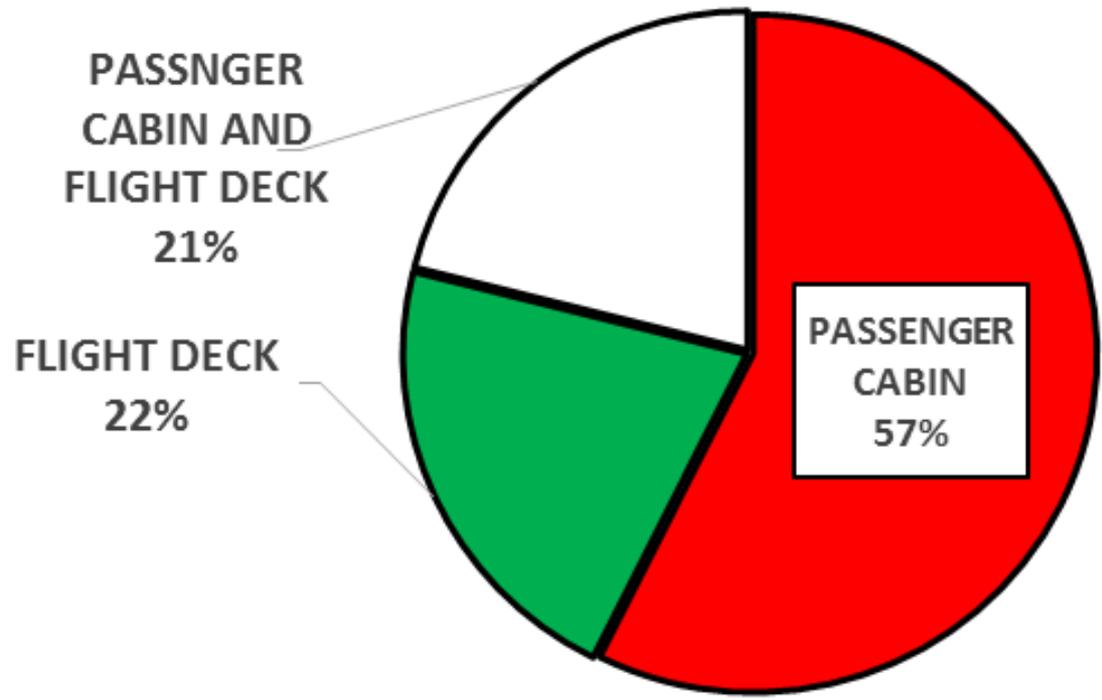


**ALL EVENTS**

1727/Analysis New/occupied Areas

Occupied Areas - Location of FSF in Regional Passenger Airplanes

## FSF Events – by Location

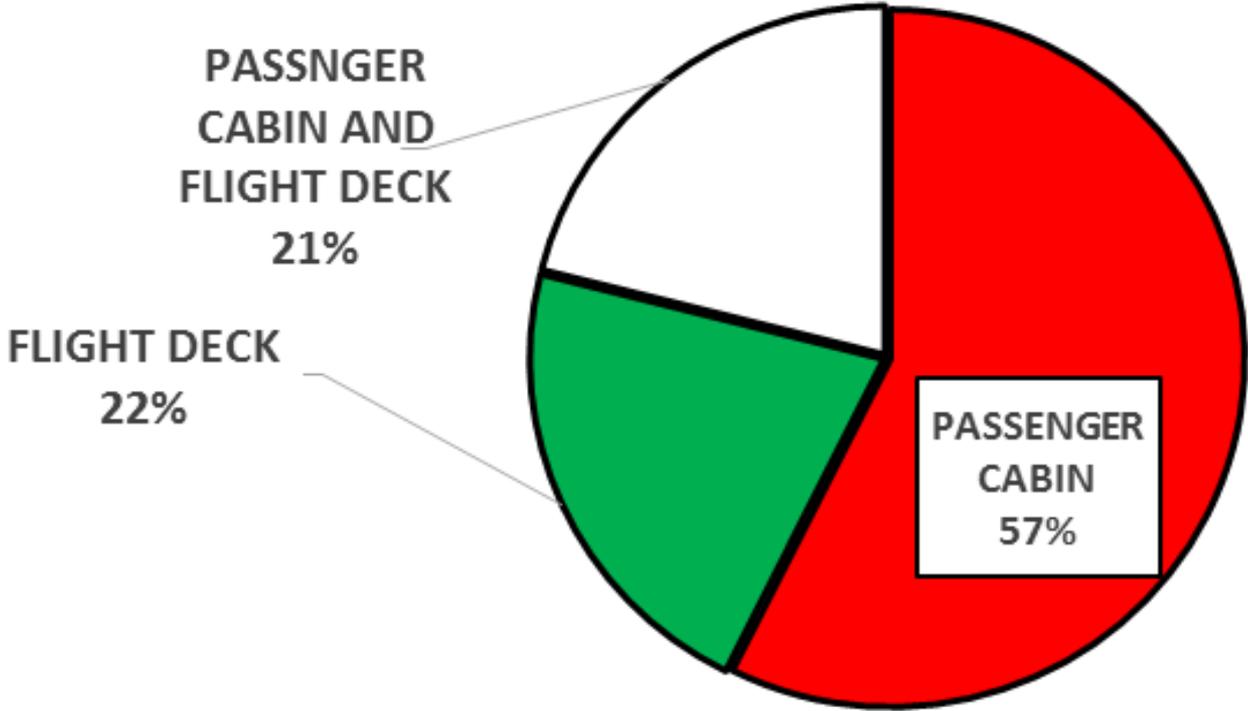


## ALL EVENTS

1727/Analysis New/occupied Areas

Occupied Areas - Location of FSF in Narrow Body Passenger Airplanes

# FSF Events – by Location



**ALL EVENTS**

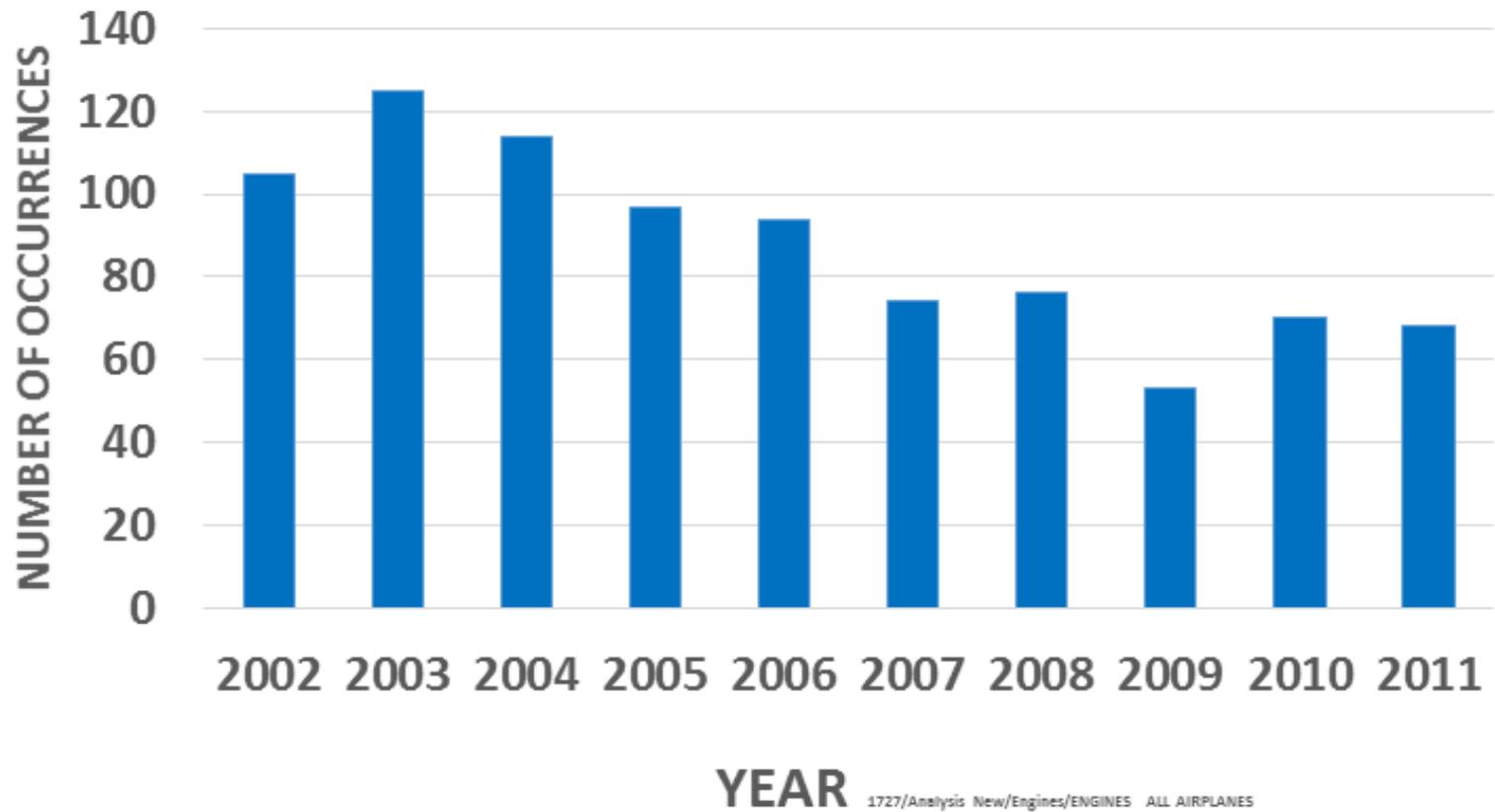
1727/Analysis New/Occupied Areas

Occupied Areas - Location of FSF in Wide Body Passenger Airplanes

**– Occupied Areas - Proportion of FSF resulting in Unscheduled Landings or Rejected Take-offs**

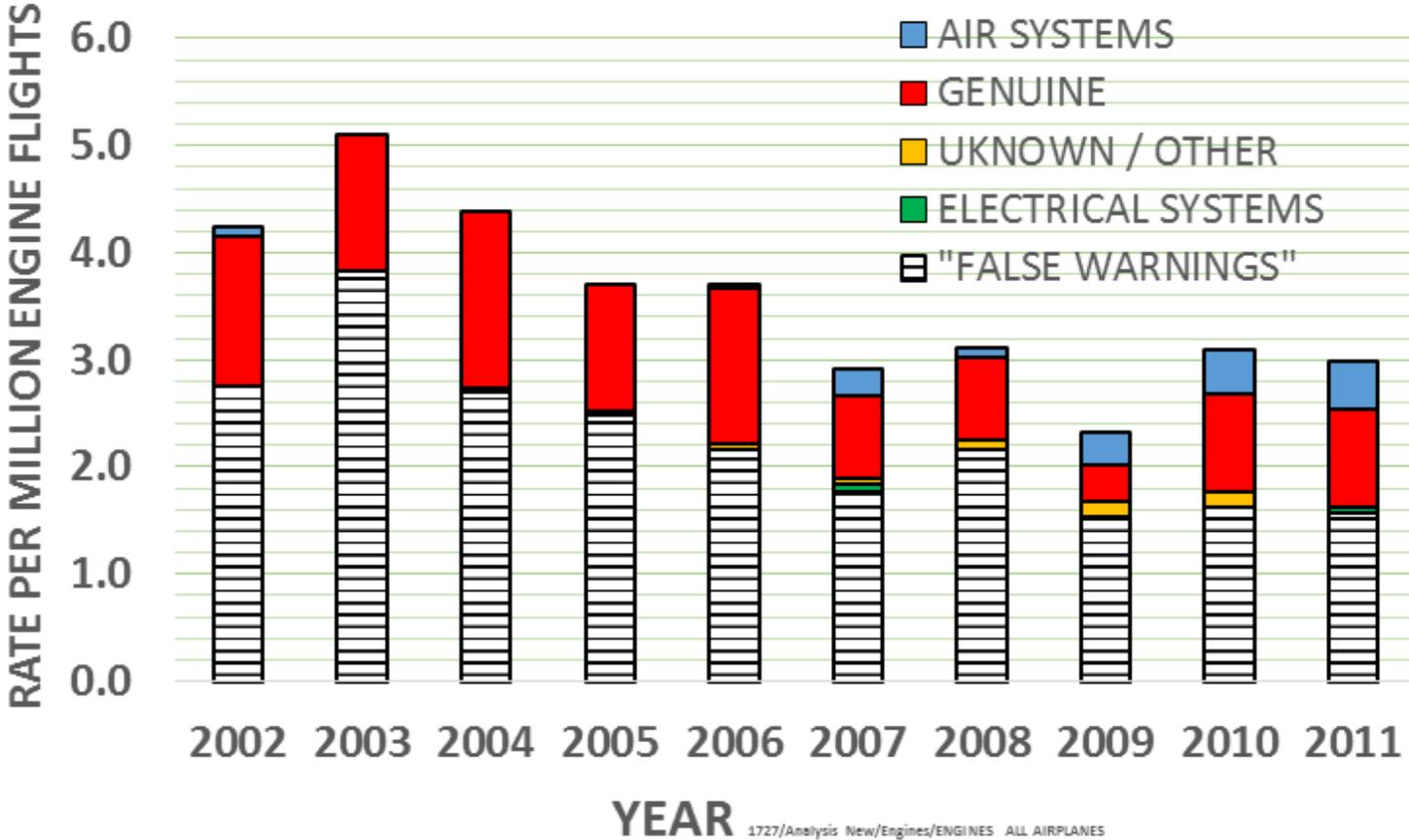
	<u>All</u> Fire, Smoke or Fume Events	Number of Unscheduled Landings	Unscheduled Landing Proportion	Number of Rejected Take- offs	Rejected Take-off Proportion
Regional Passenger	4936	1120	23%	72	1.5%
Narrow Body Passenger	3739	1307	35%	32	0.9%
Wide Body Passenger	1250	279	22%	5	0.4%
All Passengers	9925	2706	27%	109	1.1%
All Freighters	687	190	28%	8	1.2%

## TOTAL NUMBER - ALL EVENTS



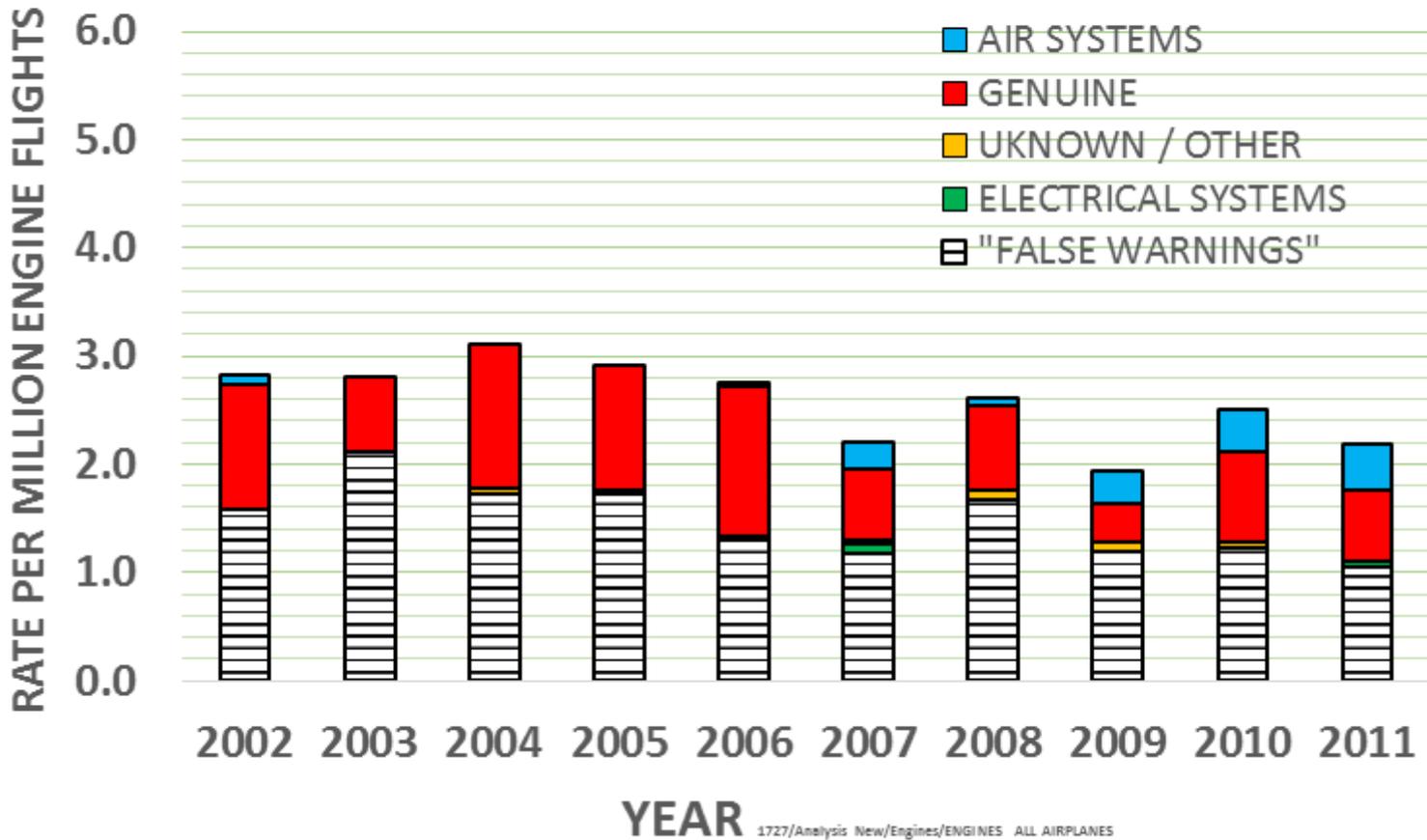
Engine - Detector Events per Year

# RATE OF OCCURRENCE - ALL EVENTS

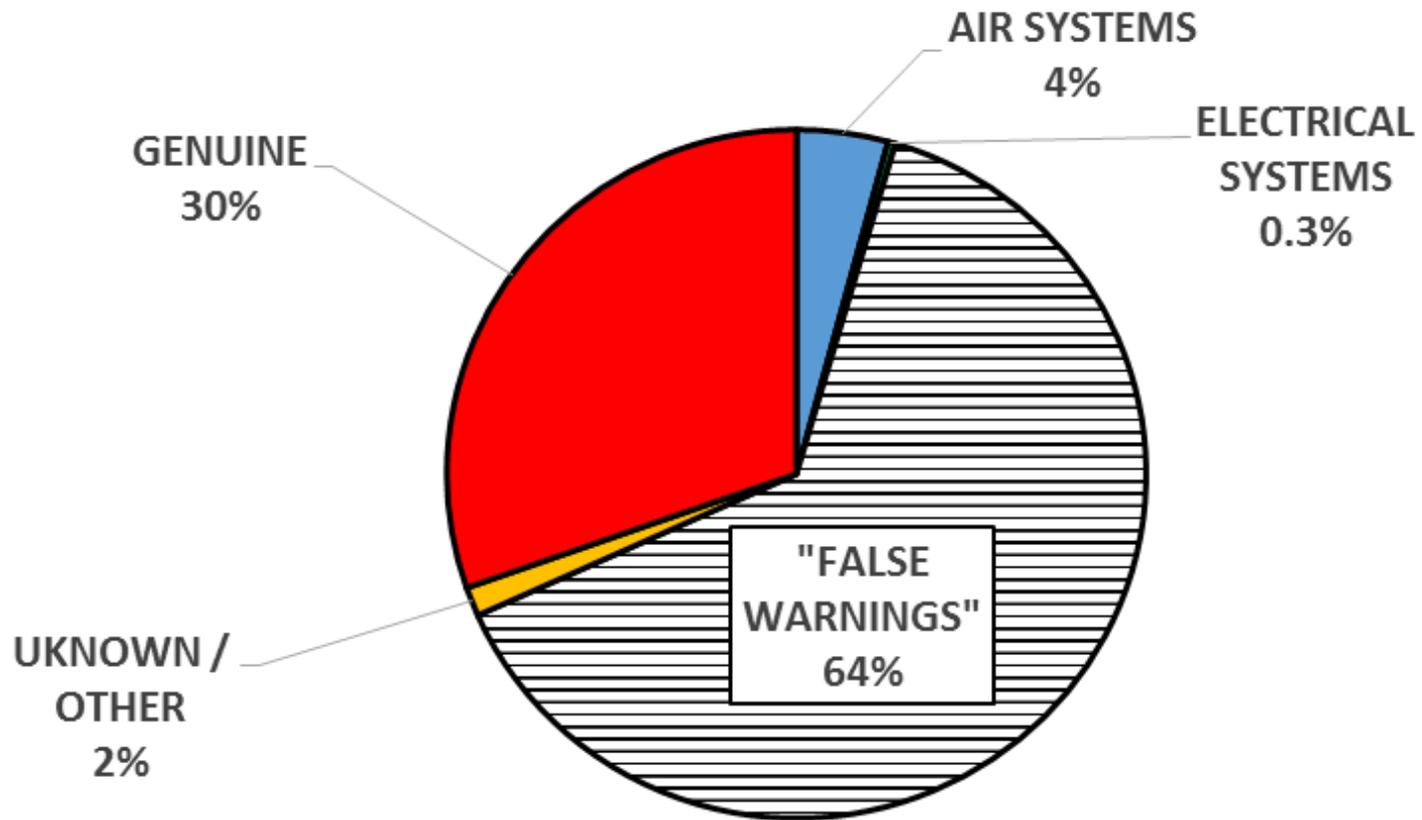


- Engine - Rate of Occurrence of All Detector Events for All Airplanes

## RATE OF OCCURRENCE - SIGNIFICANT EVENTS

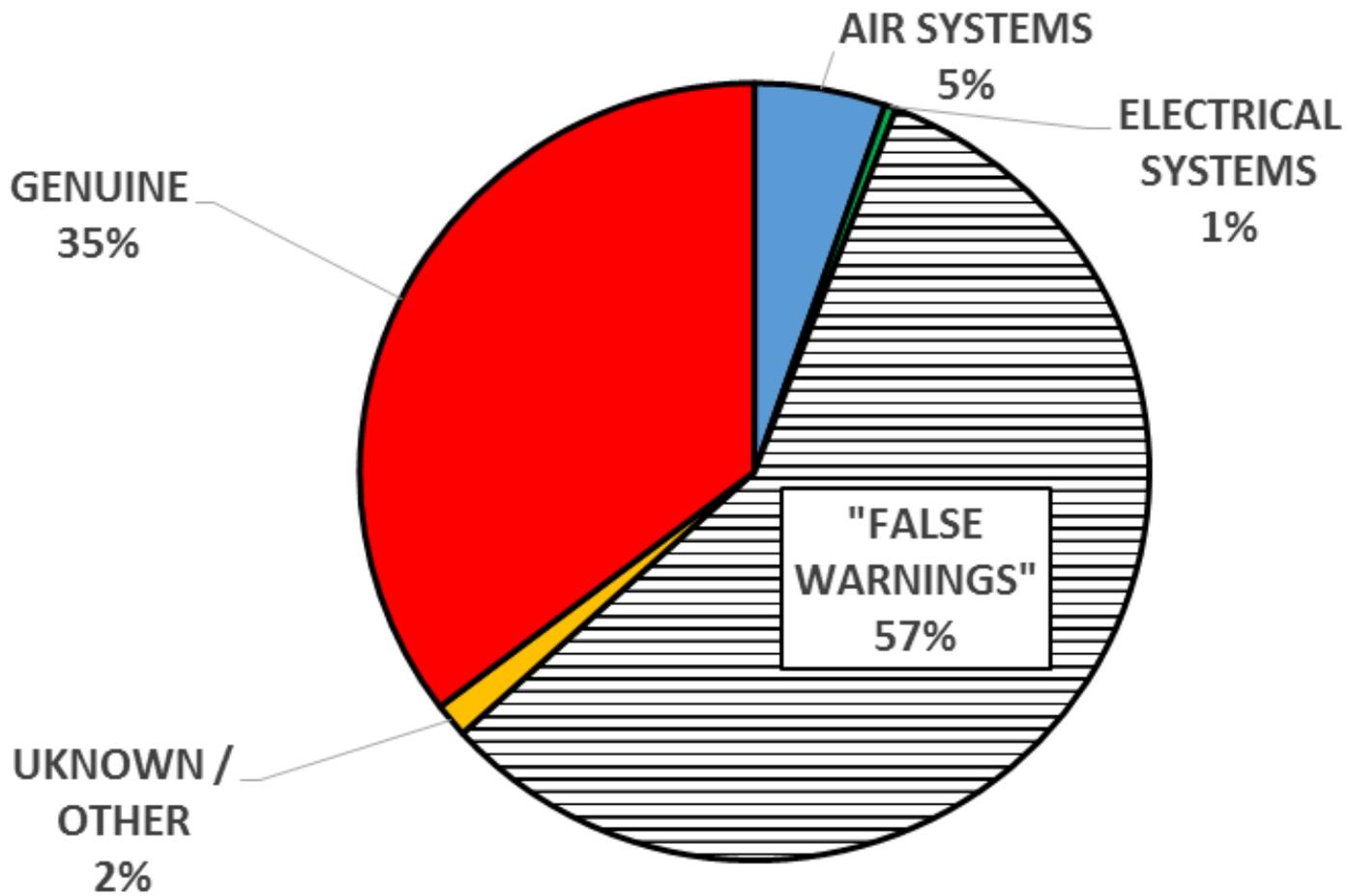


Engine - Rate of Occurrence of Significant Detector Events for All Airplanes



**ALL EVENTS** 1727/Analysis New/Engines

Engine - All Detector Events – by FSF Source



**SIGNIFICANT EVENTS** 1727/Analysis New/Engines

– Engine - Significant Detector Events – by FSF Source

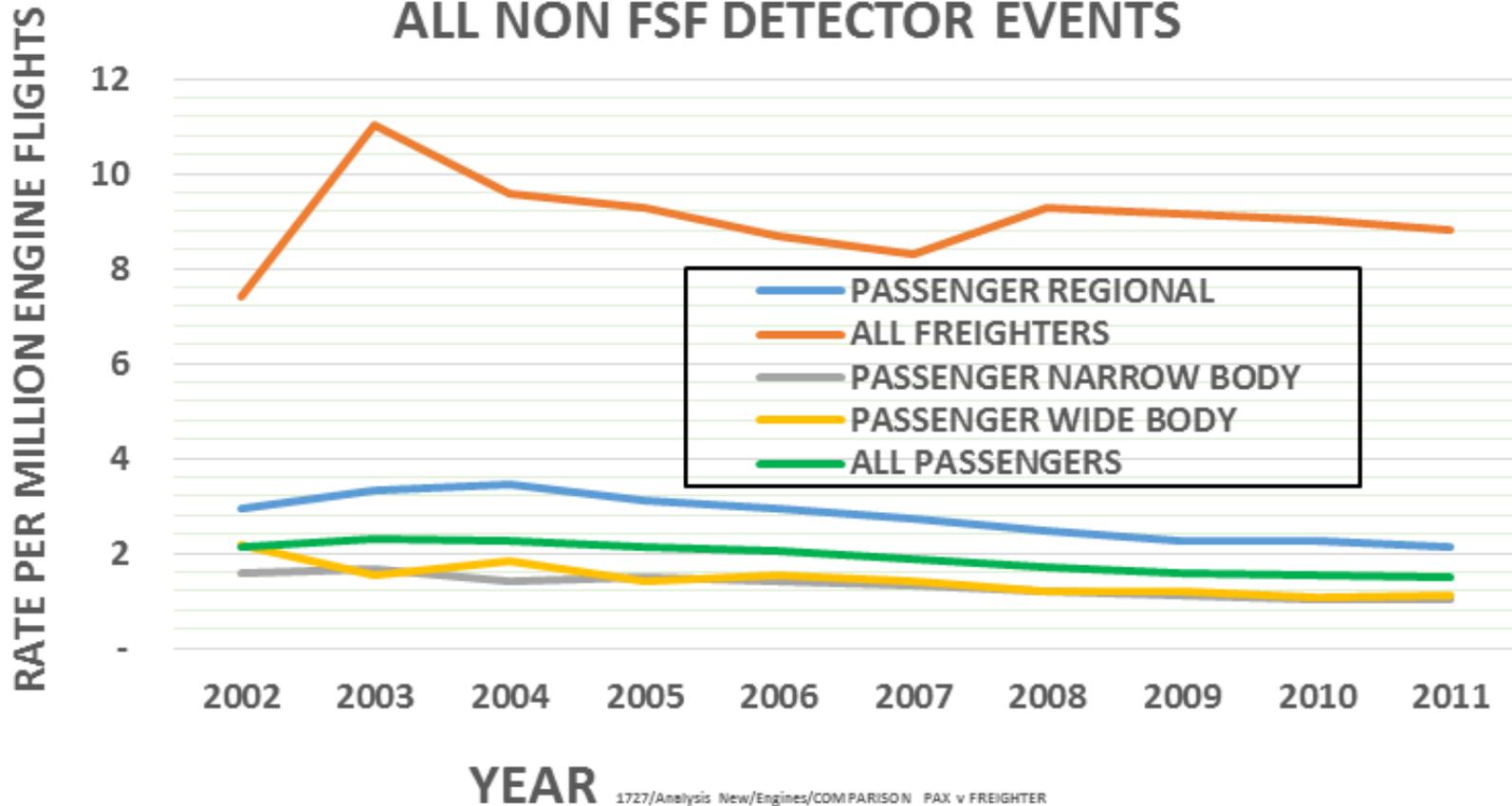
**Engine - Proportion of Genuine and “False Warnings” for All Detector Events**

ALL EVENTS	REGIONAL PASSENGERS	NARROW BODY PASSENGERS	WIDE BODY PASSENGERS	ALL FREIGHTERS
“FALSE WARNINGS”	79%	51%	66%	61%
GENUINE	18%	41%	32%	32%

**Engine - Proportion of Genuine and “False Warnings” for Significant Detector Events**

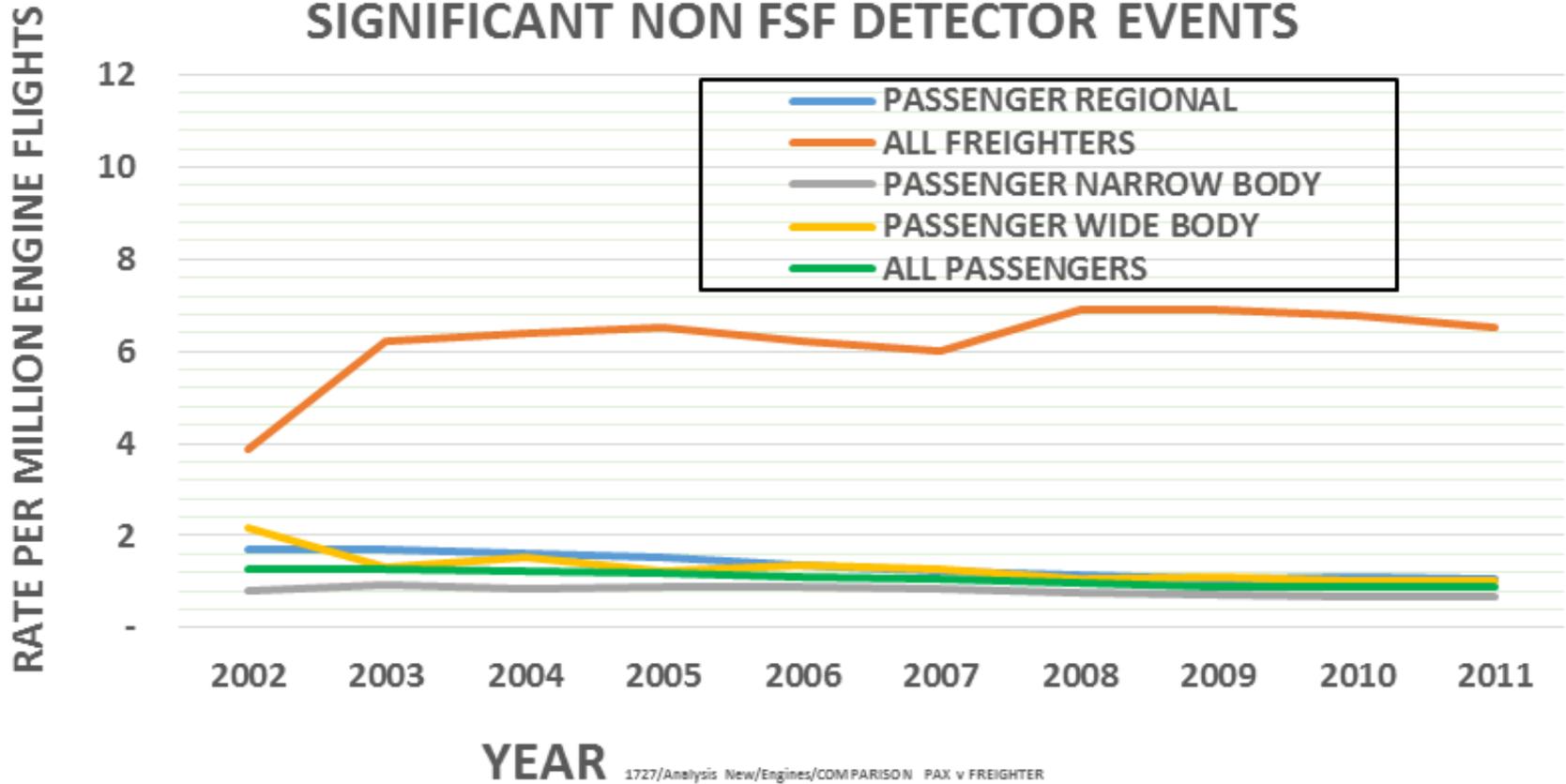
SIGNIFICANT EVENTS	REGIONAL PASSENGERS	NARROW BODY PASSENGERS	WIDE BODY PASSENGERS	ALL FREIGHTERS
“FALSE WARNINGS”	73%	67%	67%	57%
GENUINE	24%	31%	31%	35%

## CUMULATIVE RATE OF OCCURRENCE OF ALL NON FSF DETECTOR EVENTS



Engine - Cumulative Rate of Occurrence of All “False Warning” Detector Events per Year for Freighter & Passenger Airplanes

## CUMULATIVE RATE OF OCCURRENCE OF SIGNIFICANT NON FSF DETECTOR EVENTS

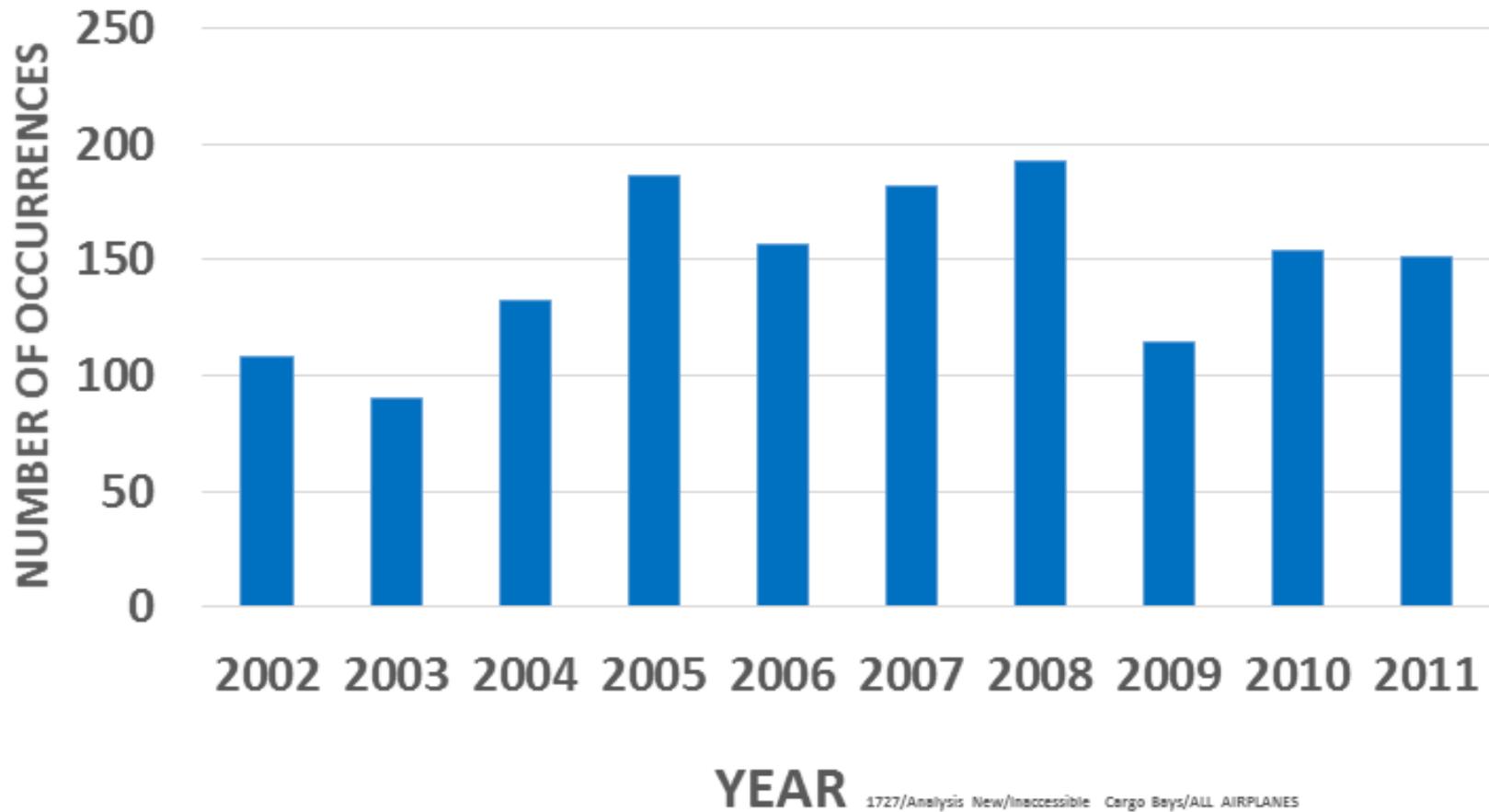


Engine - Cumulative Rate of Occurrence of Significant “False Warning”  
Detector Events per Year for Freighter & Passenger Airplanes

**– Engine - Proportion of False Warnings resulting in Unscheduled Landings or Rejected Take-offs**

	<u>All</u> “False Warning” Detector Events	Number of Unscheduled Landings	Unscheduled Landing Proportion	Number of Rejected Take-offs	Rejected Take-off Proportion
Regional Passenger	182	55	30%	13	7%
Narrow Passenger	107	52	49%	2	2%
Wide Passenger	26	22	85%	1	4%
All Passengers	315	129	41%	16	5%
All Freighters	234	94	40%	11	5%

## TOTAL NUMBER - ALL EVENTS

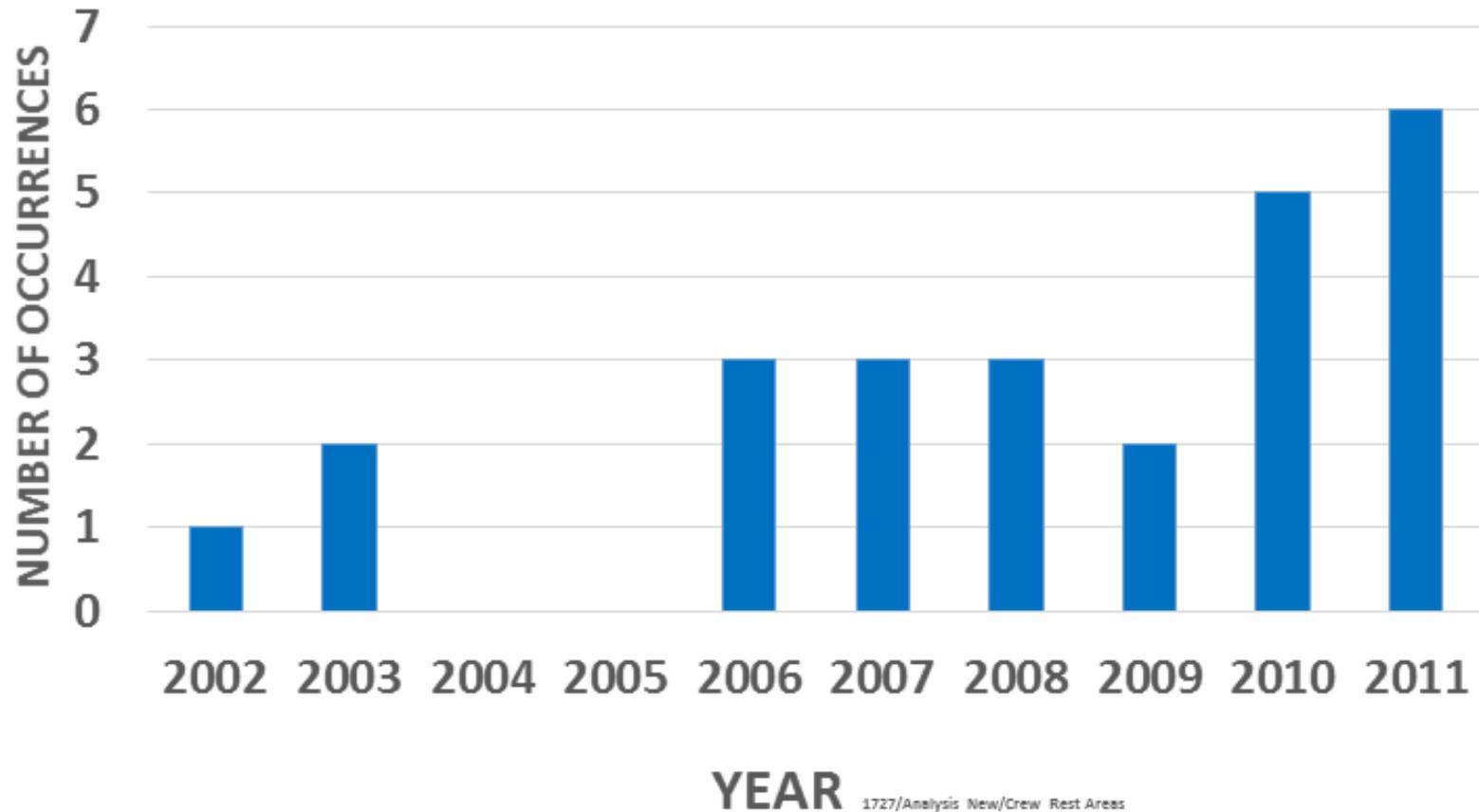


– Lavatory - Airplane Detector Events per Year for Passenger Airplanes

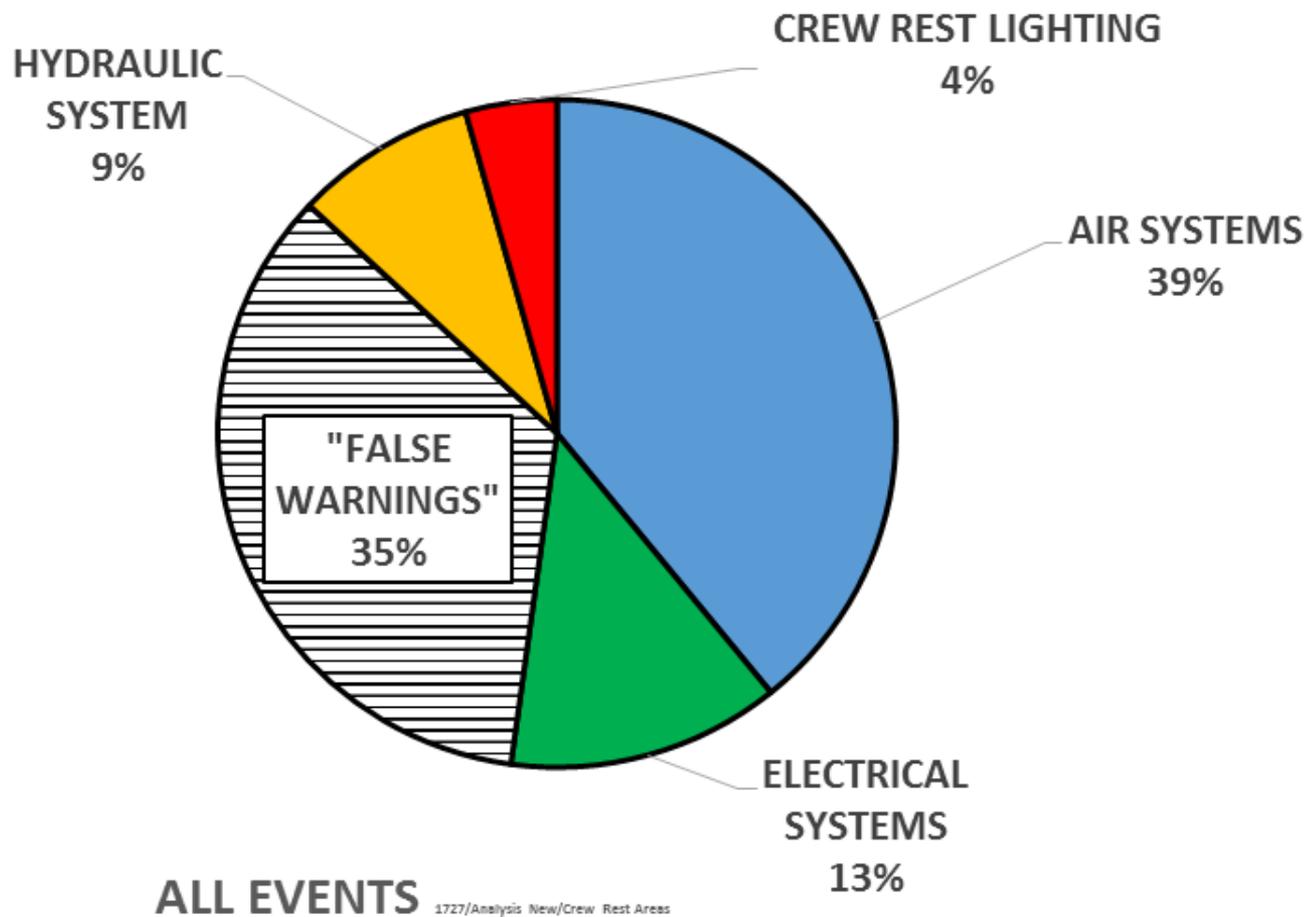
**Lavatory - Proportion of “False Warnings” resulting in Unscheduled Landings or Rejected Take-offs**

	All “False Warning” Detector Events	Number of Unscheduled Landings	Unscheduled Landing Proportion	Number of Rejected Take-offs	Rejected Take-off Proportion
Regional Passenger	431	112	26%	19	4%
Narrow Passenger	59	8	14%	0	0%
Wide Passenger	40	1	3%	0	0%
All Passengers	530	121	23%	0	0%
All Freighters	4	0	0%	0	0%

## TOTAL NUMBER - ALL EVENTS



– Crew Rest Areas - Wide Body Airplane Detector Events per Year



Crew Rest Areas - Identified Causes of All Detector Events

Ongoing work:

Cost impact

Additional years of data added to Data Base

Report to be published and Data Base released in Fall