

# Research into Fire Smoke or Fumes Occurrences on Transport Airplanes

# Data Collection

- **Data Sources**
  - **FAA Service Difficulty Reports (SDRs).**
  - **The FAA Accident and Incident Data System (AIDS).**
  - **The NTSB Aviation Accident Database.**
- **Compilation of data, covering the period 2002 to 2011, into a bespoke Fire, Smoke or Fumes Occurrence Database compiled in Microsoft Excel.**

# Analysis

➤ **Data analysis for the following areas:**

1. **Occupied Areas**
2. **Engines**
3. **Auxiliary Power Unit (APU)**
4. **Inaccessible Cargo Bays**
5. **Accessible Cargo Bays**
6. **Main Deck Cargo Bays (freighter airplanes)**
7. **Lavatories**
8. **E & E Bays**
9. **Crew Rest Areas**
10. **Wheel Wells**

➤ **Detector Events (“False” and Genuine Warnings) are addressed for Areas 2 to 10.**

➤ **Rate of Occurrence and Consequences of the Event are addressed for all Areas.**

# Analysis

- **The study also assessed the costs of FSF Events. The data used in this evaluation was derived from studies carried out by reputable sources of the following cost impacts:**
  - **Unscheduled Landings**
  - **Injuries to Personnel**
  - **Fuel Jettisoning**
  - **Airplane Damage**
  - **Delays and Cancellations**
  - **Emergency Evacuations**
- **Report to be downloadable from the FAA Website.**

# “False Warnings”

**FALSE WARNING**

**OTHER  
“WARNINGS”**

**GENUINE  
WARNING**

The term “False Warning” relates to any indication to the crew that is erroneous and caused by faults in the detection system.

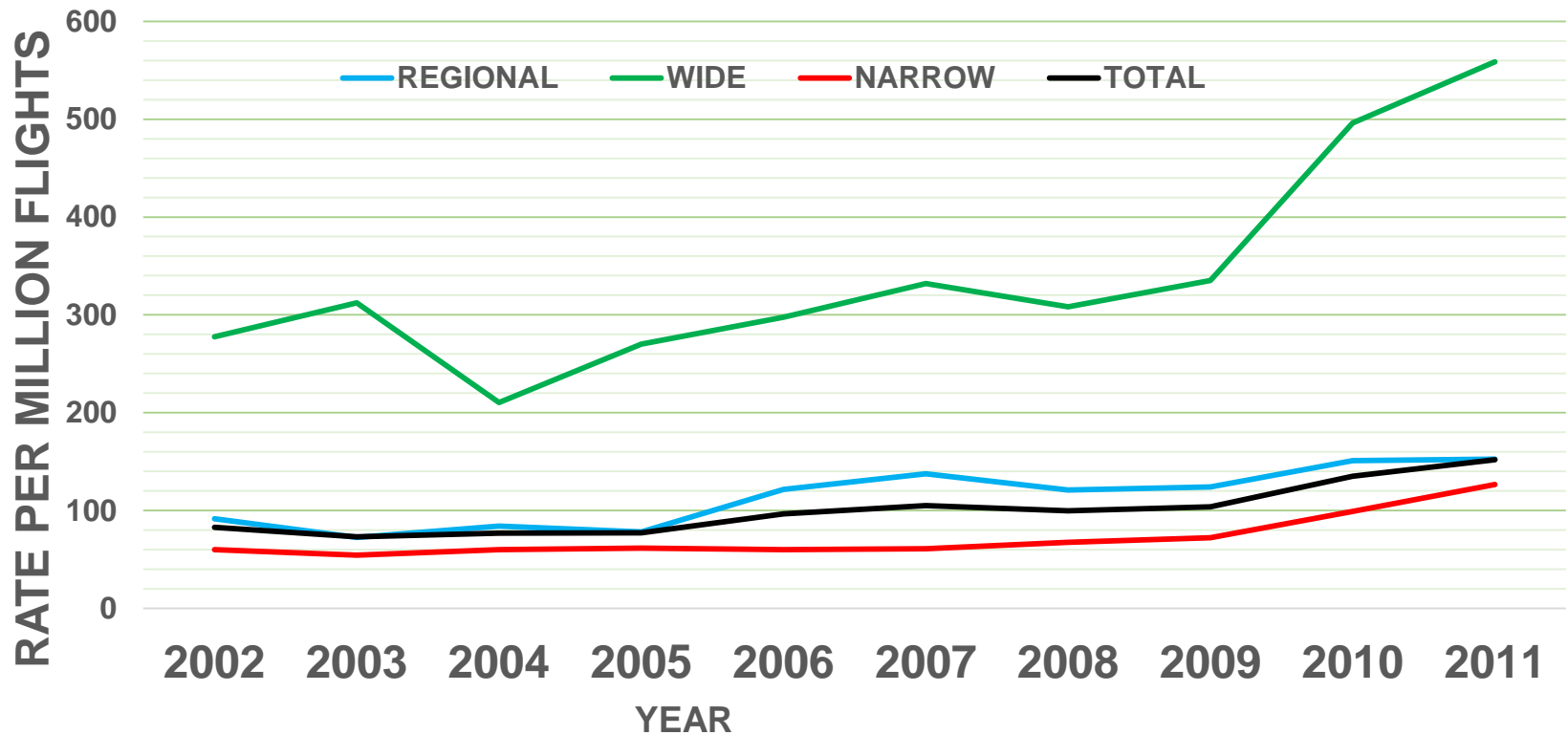
Caused by Gas/Fumes from sources other than those for which the system was primarily intended, with no faults in the detection system. By way of example it will include smoke generated in a lavatory originating from the air conditioning system.

The term “Genuine Warning” - includes only FSF that is generated by a source for which the detection system was designed to detect.

# OCCUPIED AREAS

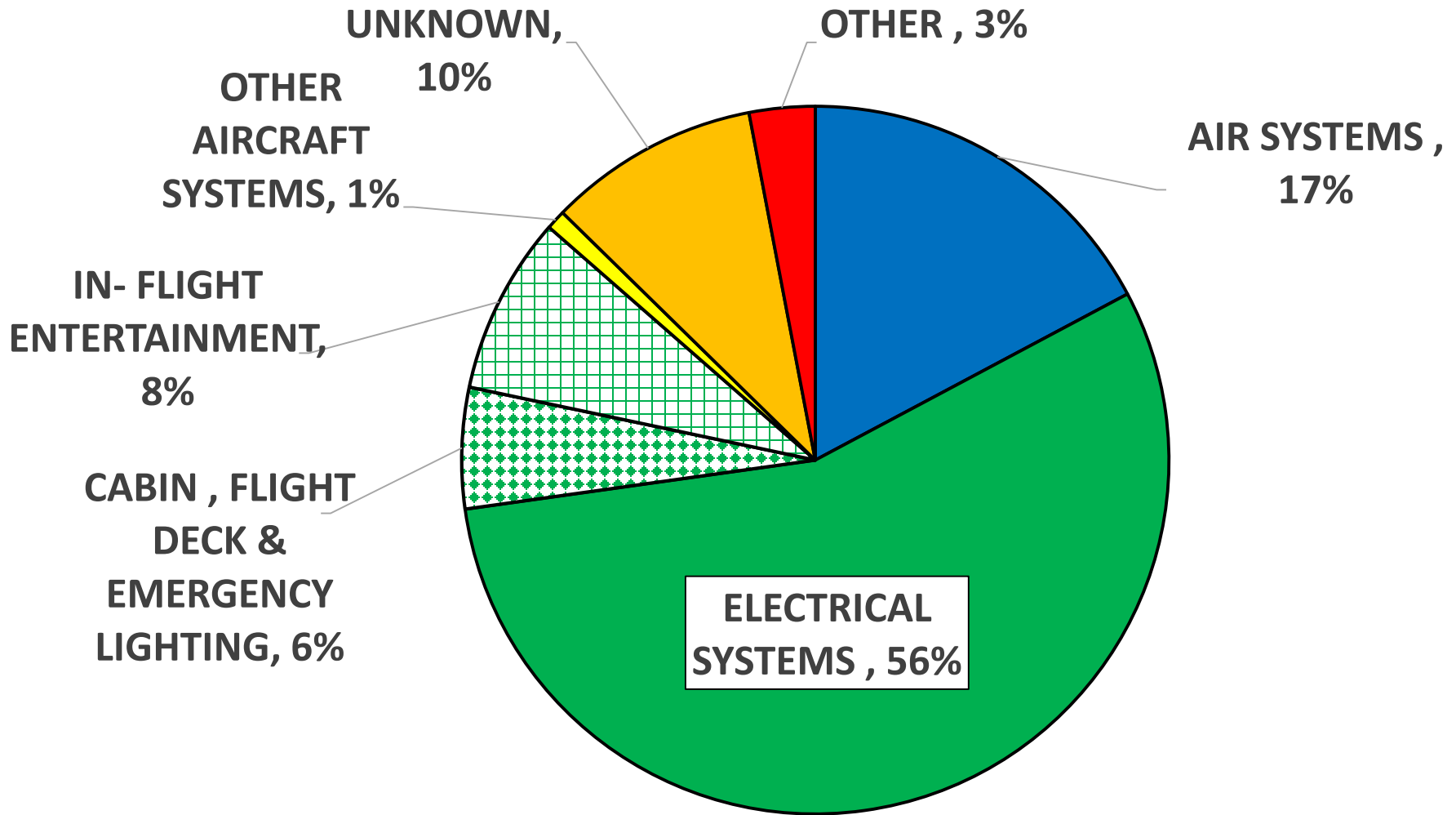
# Occupied Areas

RATE OF OCCURRENCE - ALL EVENTS PASSENGER AIRPLANES



**The Rate of Occurrence of Fire, Smoke or Fume Events in Occupied Areas appears to be increasing**

# Occupied Areas



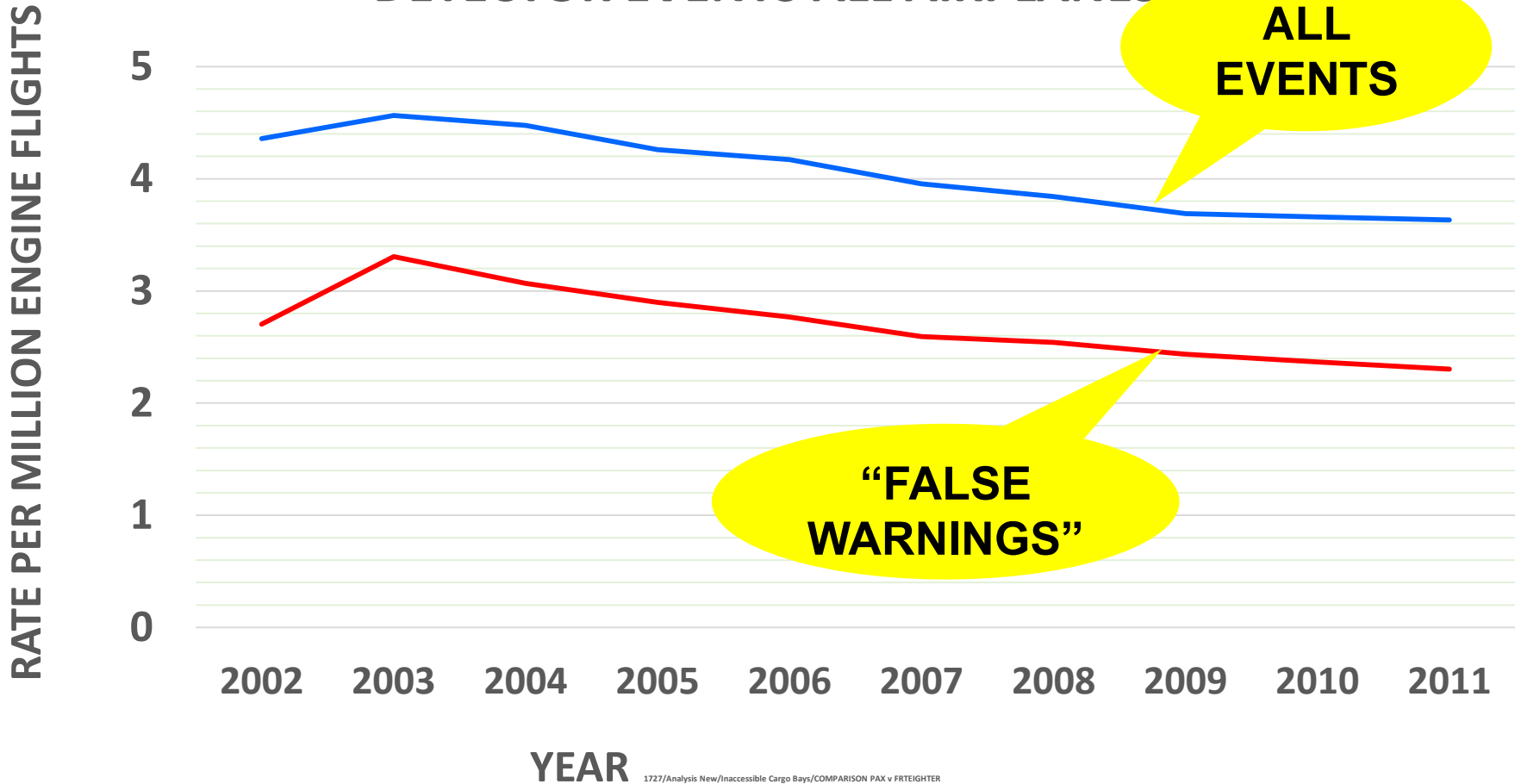
ALL EVENTS - WIDE BODY PASSENGER



# ENGINES

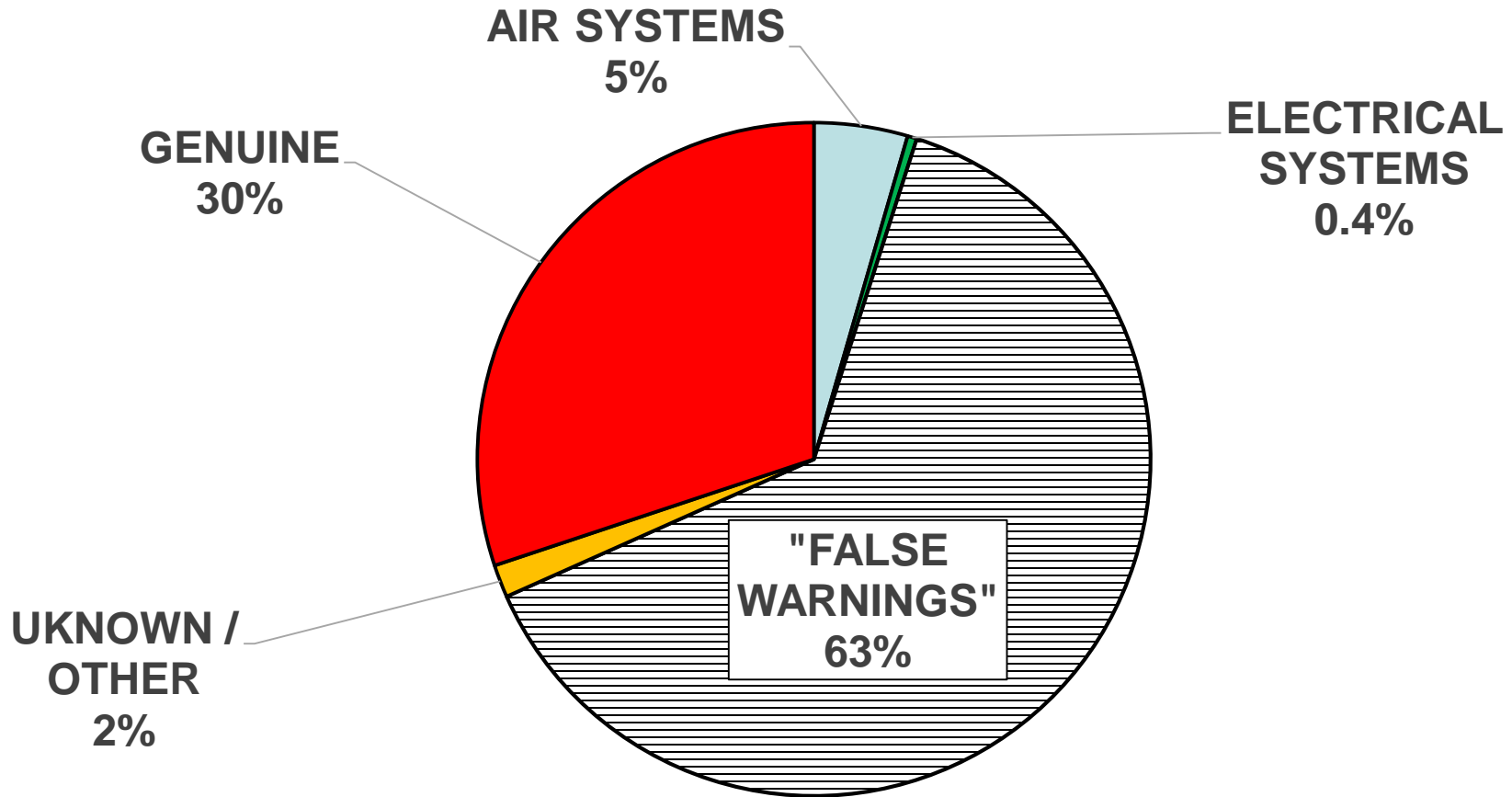
# Engines – Detector Events

## CUMULATIVE RATE OF OCCURRENCE ENGINE DETECTOR EVENTS ALL AIRPLANES



1727/Analysis New/Inaccessible Cargo Bays/COMPARISON PAX v FREIGHTER

# Engines – “False Warnings”

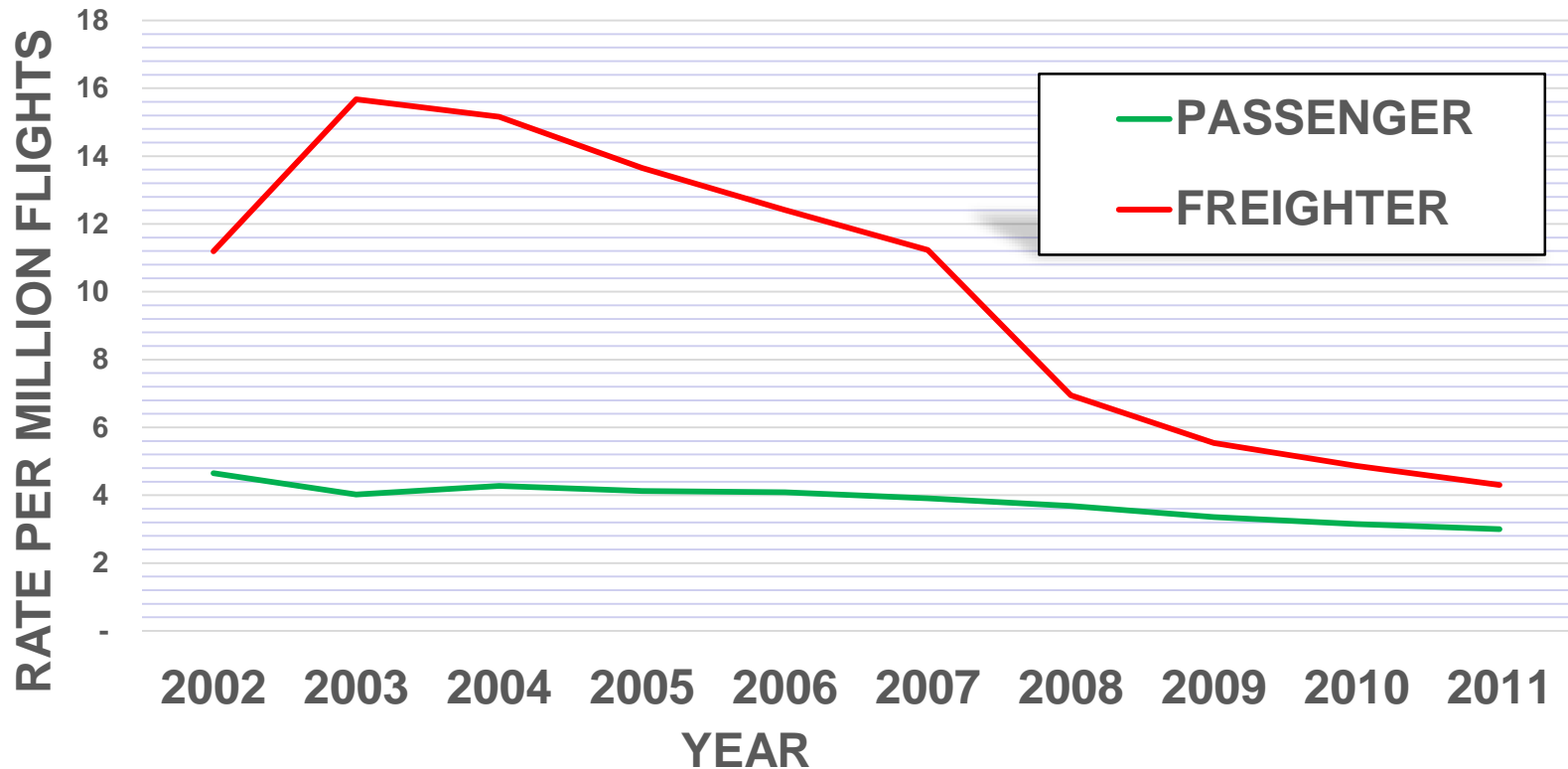


**ALL DETECTOR EVENTS**

# INACCESSIBLE CARGO BAYS

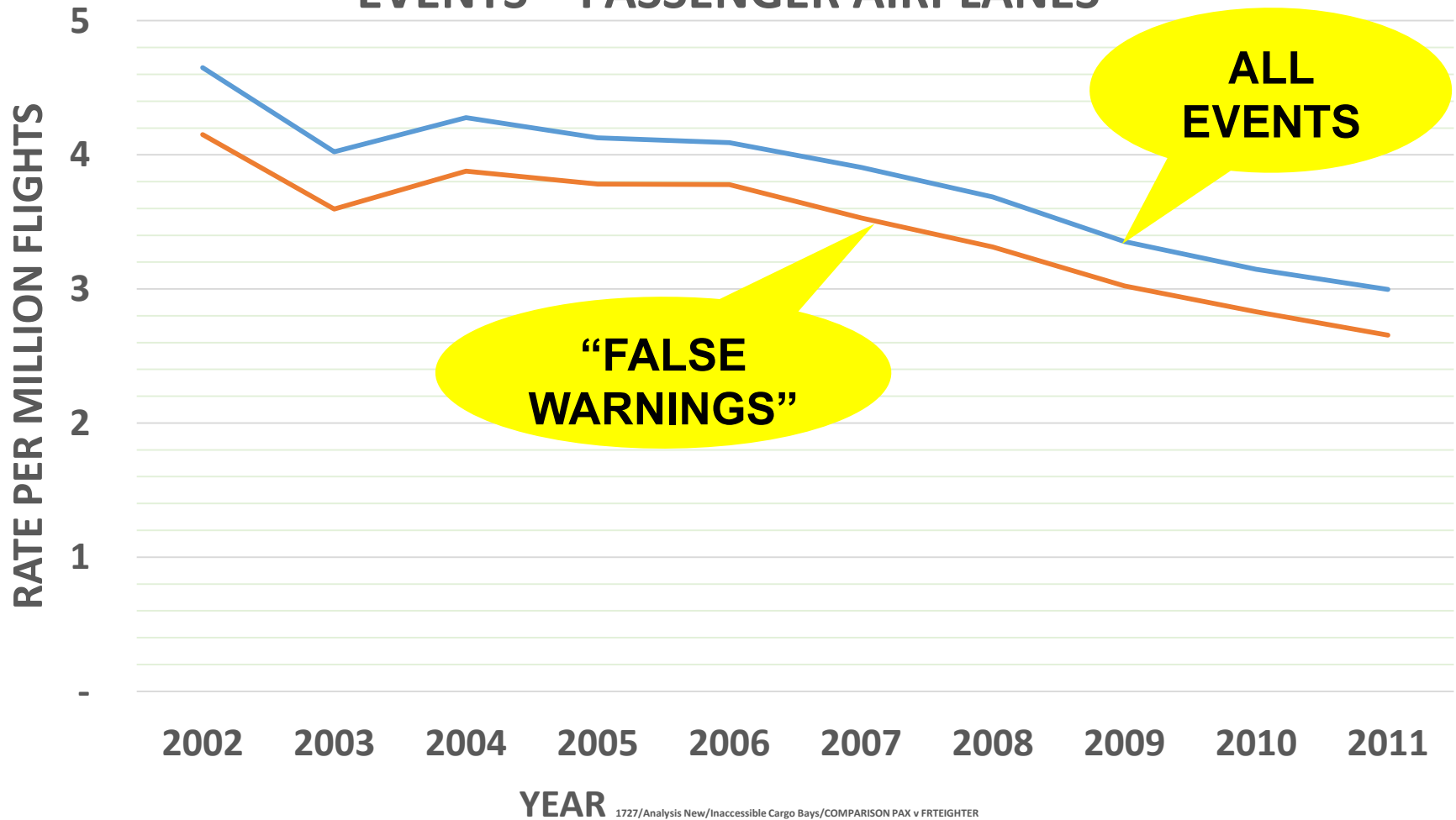
# Inaccessible Cargo Bays

## CUMULATIVE RATE OF OCCURRENCE OF ALL DETECTOR EVENTS



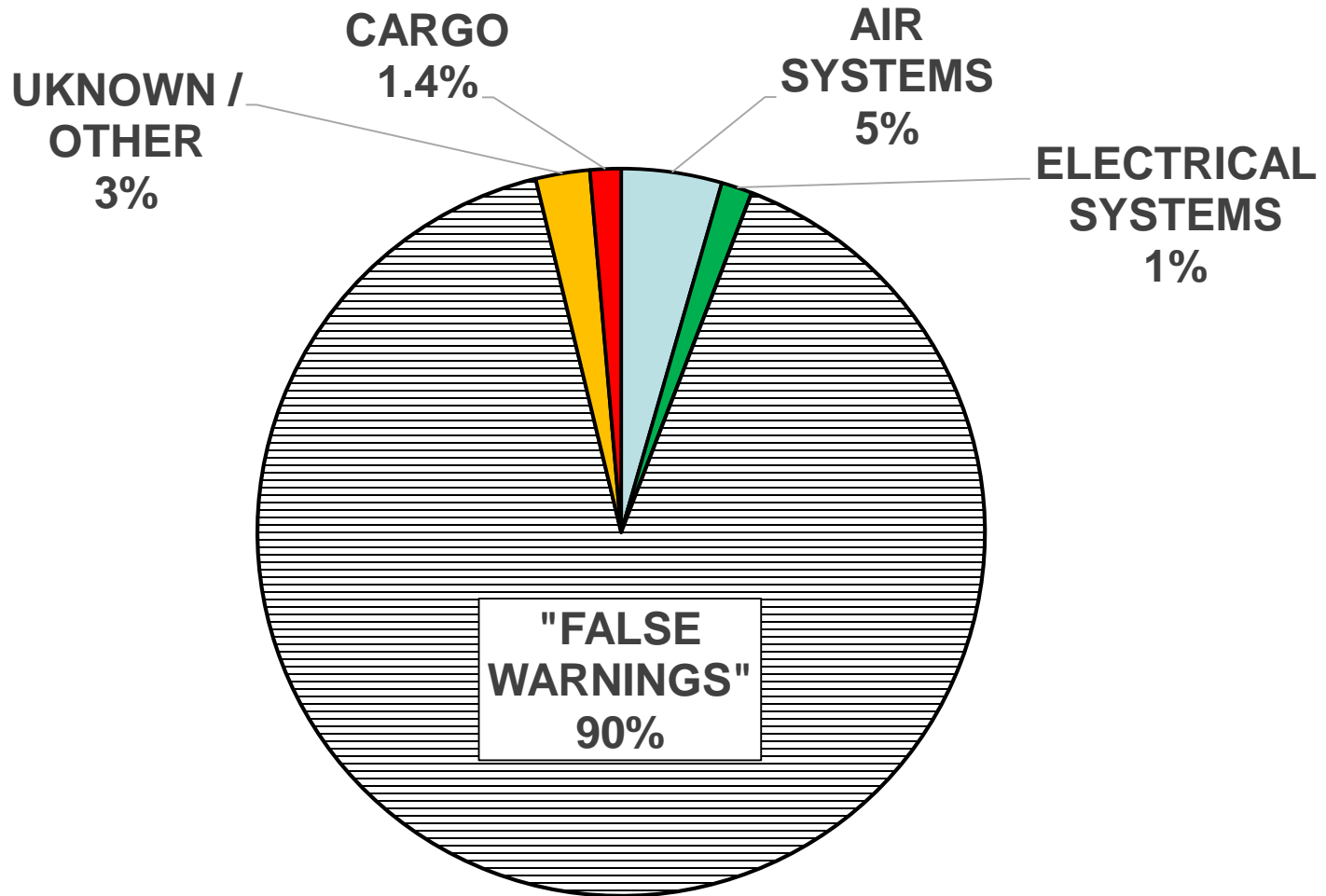
# Inaccessible Cargo Bays

## CUMULATIVE RATE OF OCCURRENCE OF DETECTOR EVENTS – PASSENGER AIRPLANES



1727/Analysis New/Inaccessible Cargo Bays/COMPARISON PAX v FRTEIGHTER

# Inaccessible Cargo Bays



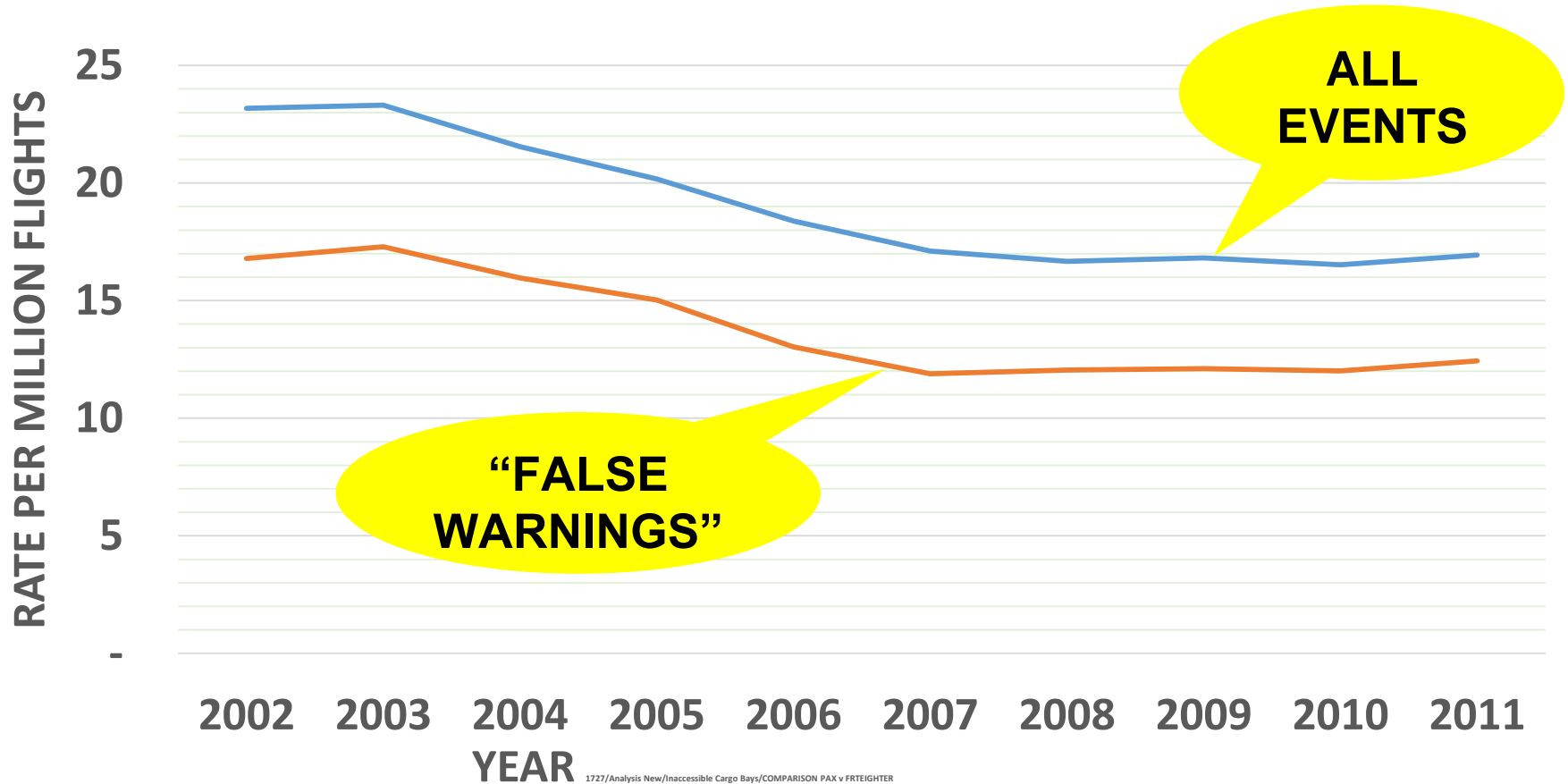
**ALL DETECTOR EVENTS**

# MAIN DECK CARGO BAYS



# Main Deck Cargo Bays (Freighter Airplanes)

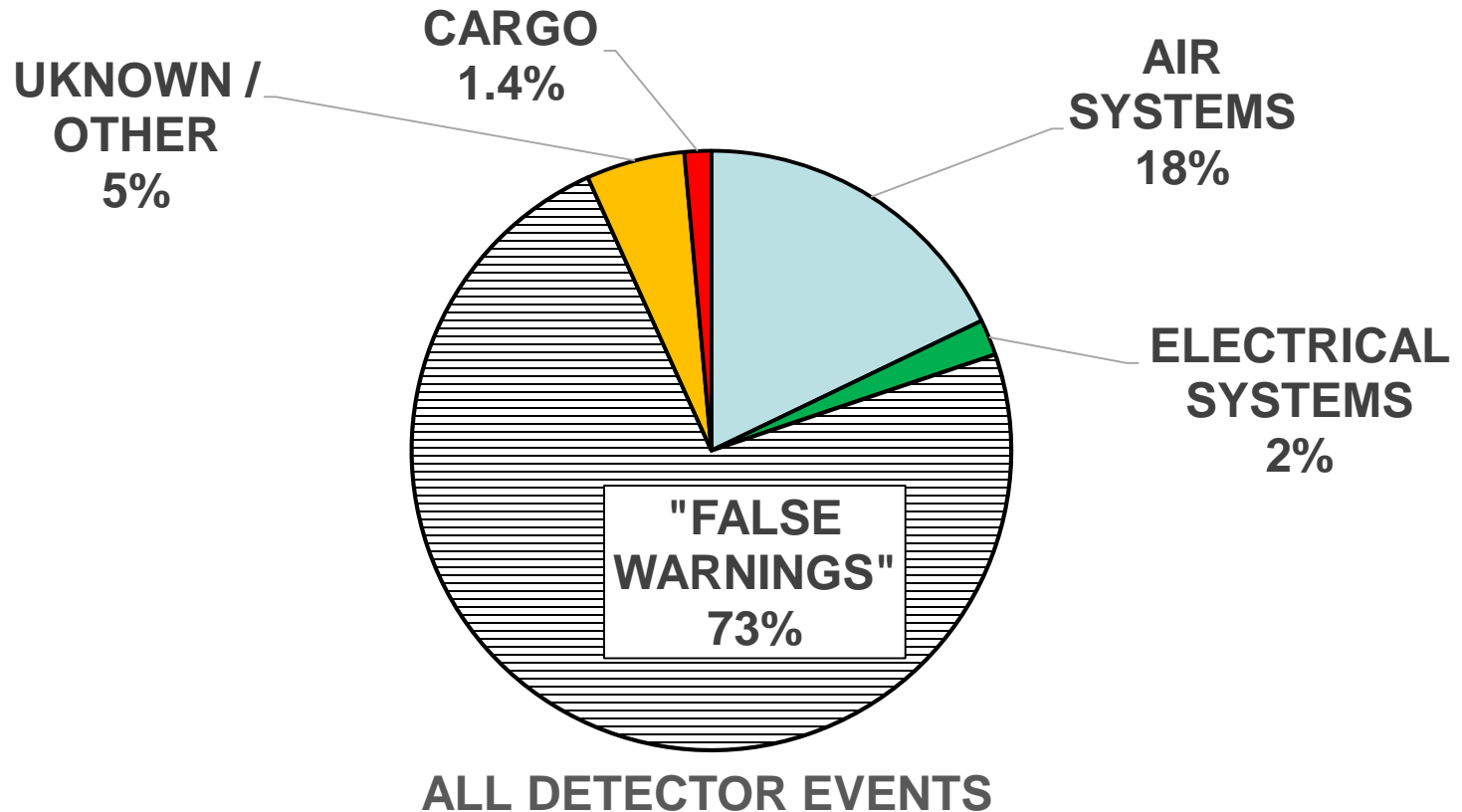
## CUMULATIVE RATE OF OCCURRENCE OF DETECTOR EVENTS



1727/Analysis New/Inaccessible Cargo Bays/COMPARISON PAX v FRTEIGHTER

# Main Deck Cargo Bays (Freighter Airplanes)

- Three Cargo bay fires were identified over the study period and all resulted in the aircraft being destroyed.



# ALL CARGO BAYS

# All Cargo Bays

- Considering all cargo bays fitted with detectors a total of 4 occurrences of actual fires were found.
- This was from approximately 800 Detector Events i.e. **1 in 200** warnings is associated with an actual fire.
- This should be compared with the Blake study (2000): “The ratio of false cargo compartment fire detector alarms to actual fire or smoke events is increasing and is currently at 200 to 1 over the previous 5 years.”

<http://www.fire.tc.faa.gov/pdf/tn00-29.pdf>

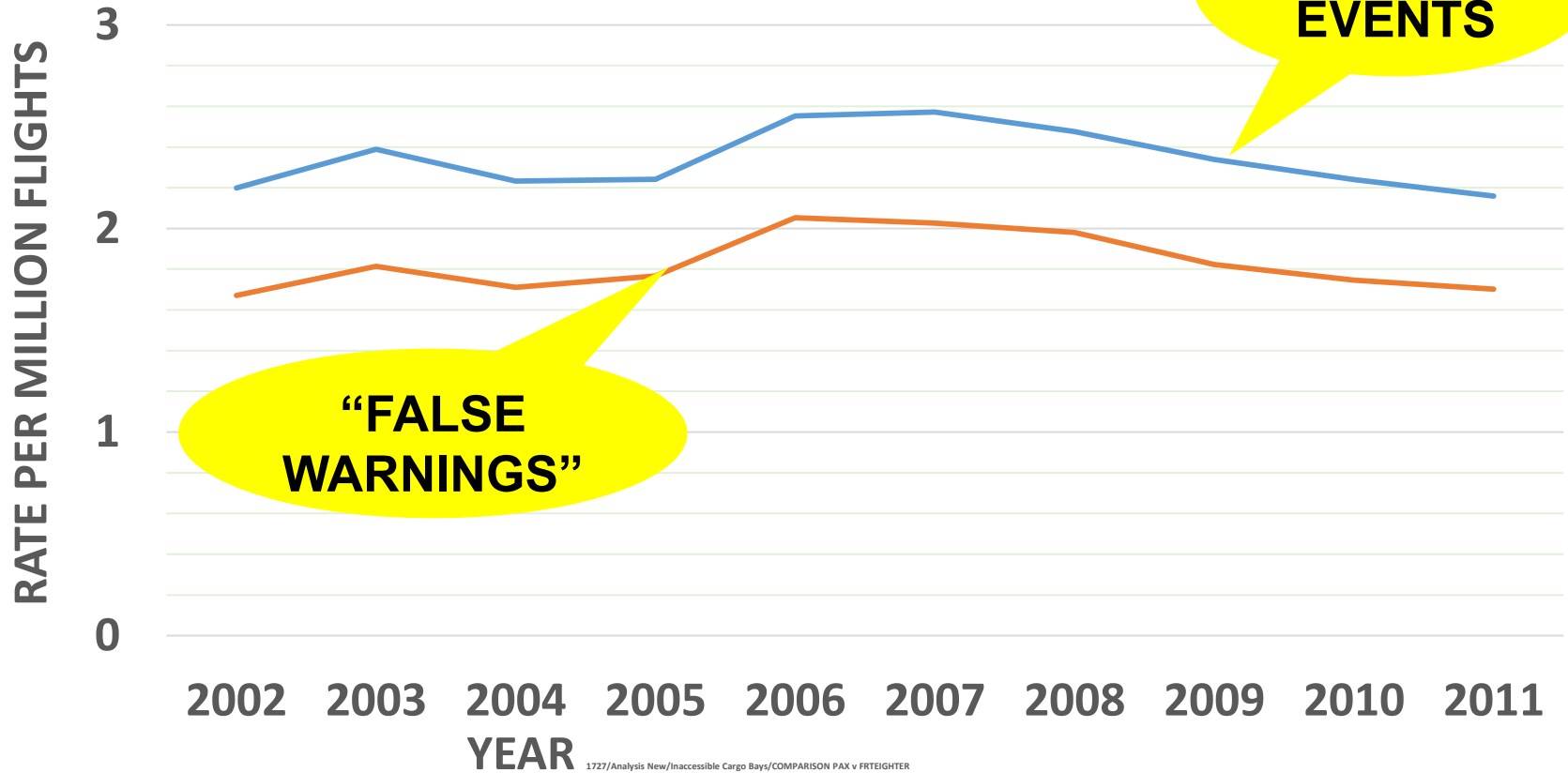
# All Cargo Bays

- **Despite the majority of Detector Events being False Warnings, thankfully, the Flight Crews were found to take the correct actions appropriate to a genuine warning.**

# APUs

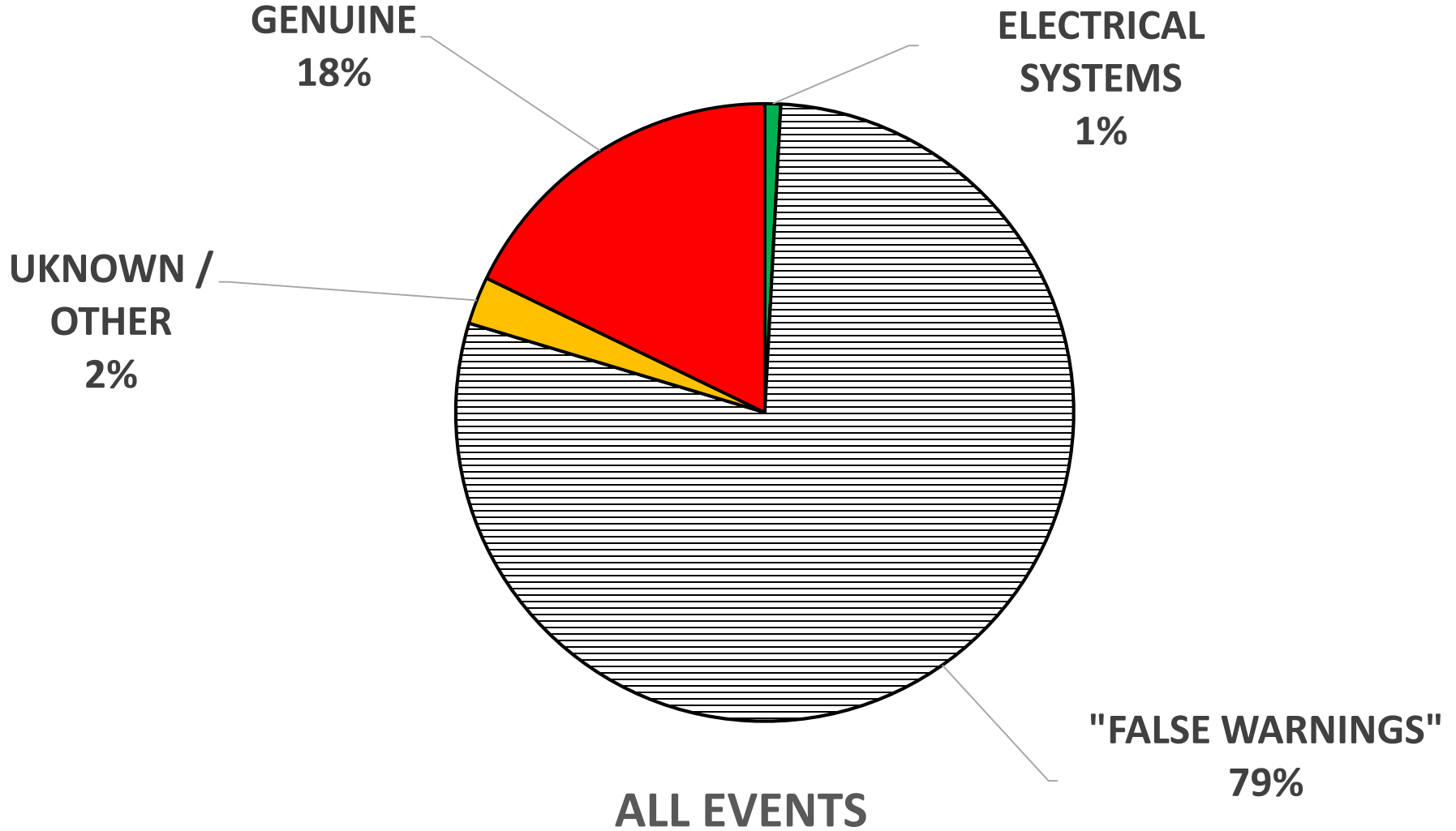
# APU

## CUMULATIVE RATE OF OCCURRENCE OF DETECTOR EVENTS - ALL AIRPLANES



1727/Analysis New/Inaccessible Cargo Bays/COMPARISON PAX v FRTEIGHTER

# APU

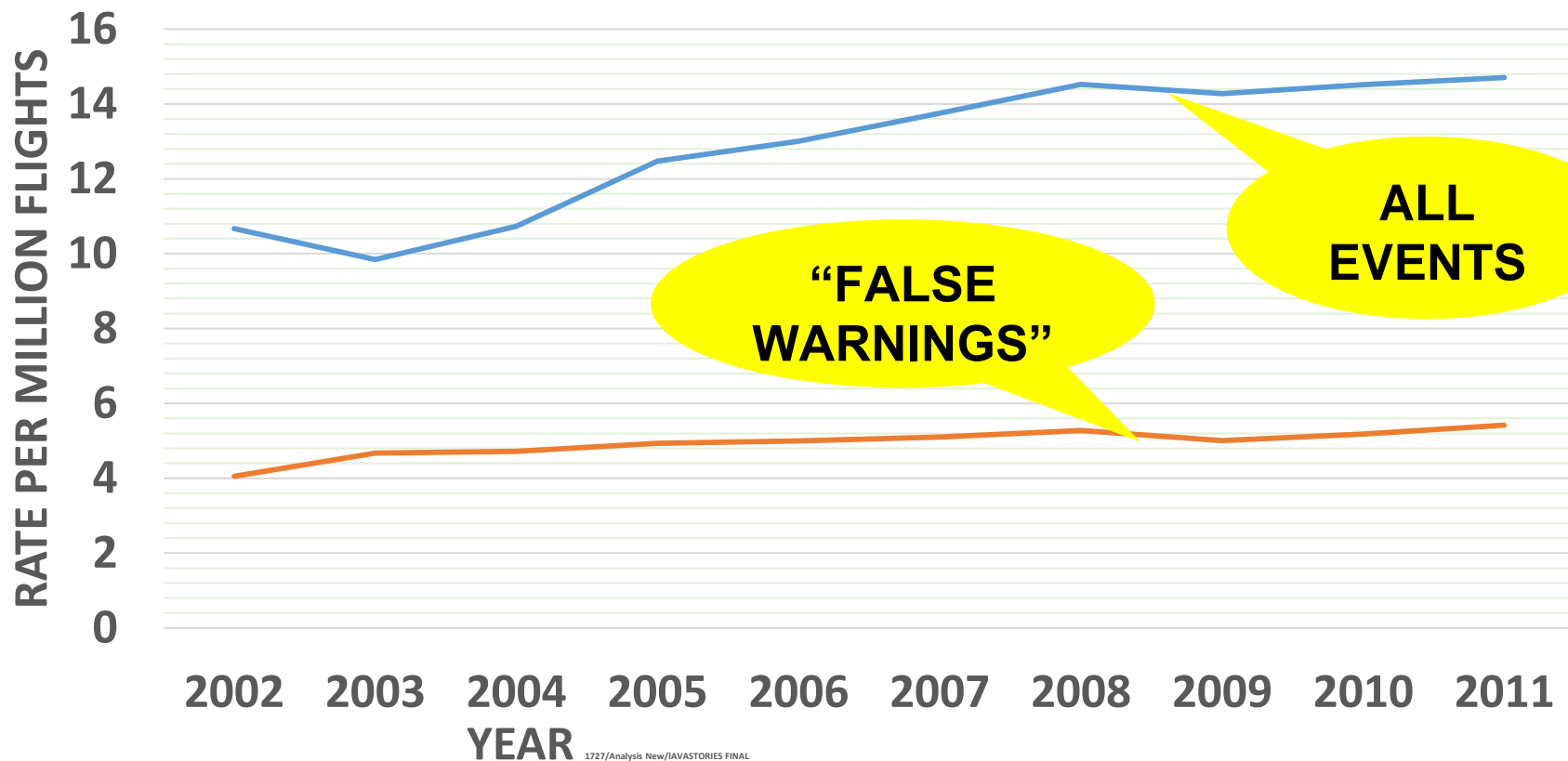




# Lavatories

# LAVATORIES

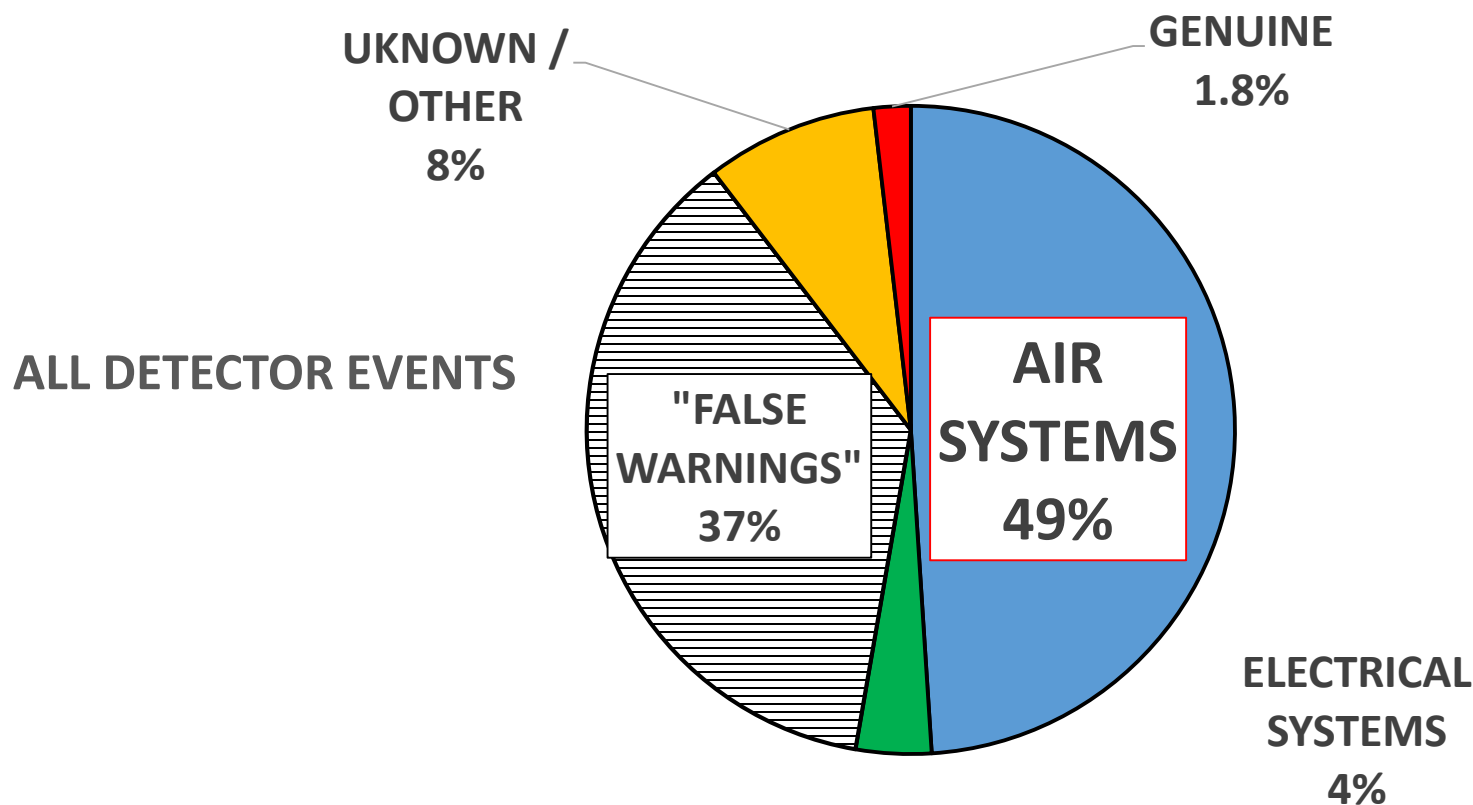
## CUMULATIVE RATE OF OCCURRENCE OF DETECTOR EVENTS ALL PASSENGER AIRPLANES



1727/Analysis New/IAVASTORIES FINAL

# Lavatories

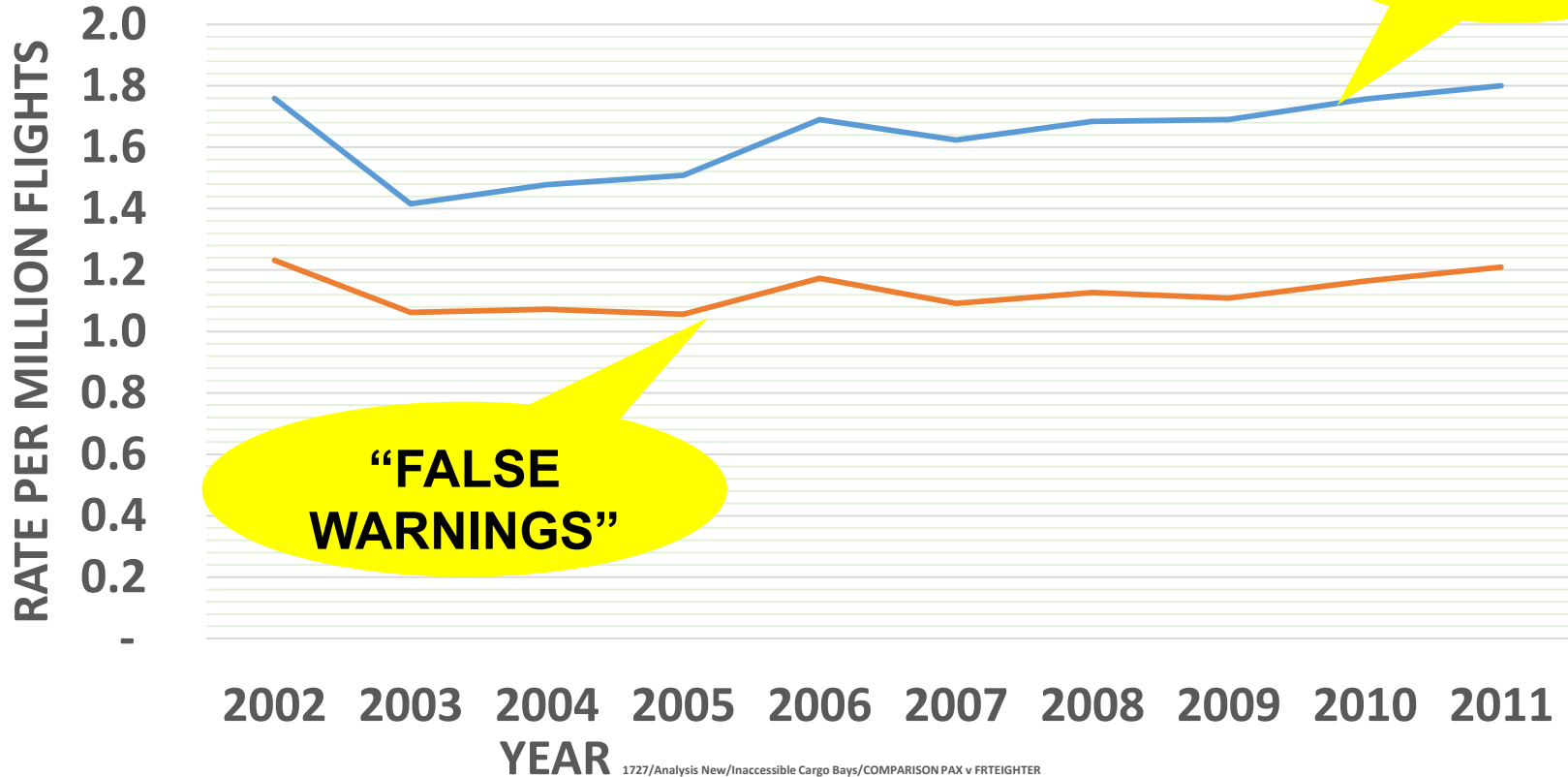
- **Very few Lavatory Smoke Detector Warmings result from FSF originating in the Lavatory - most appear to be caused by the Air Systems.**



# E & E BAYS

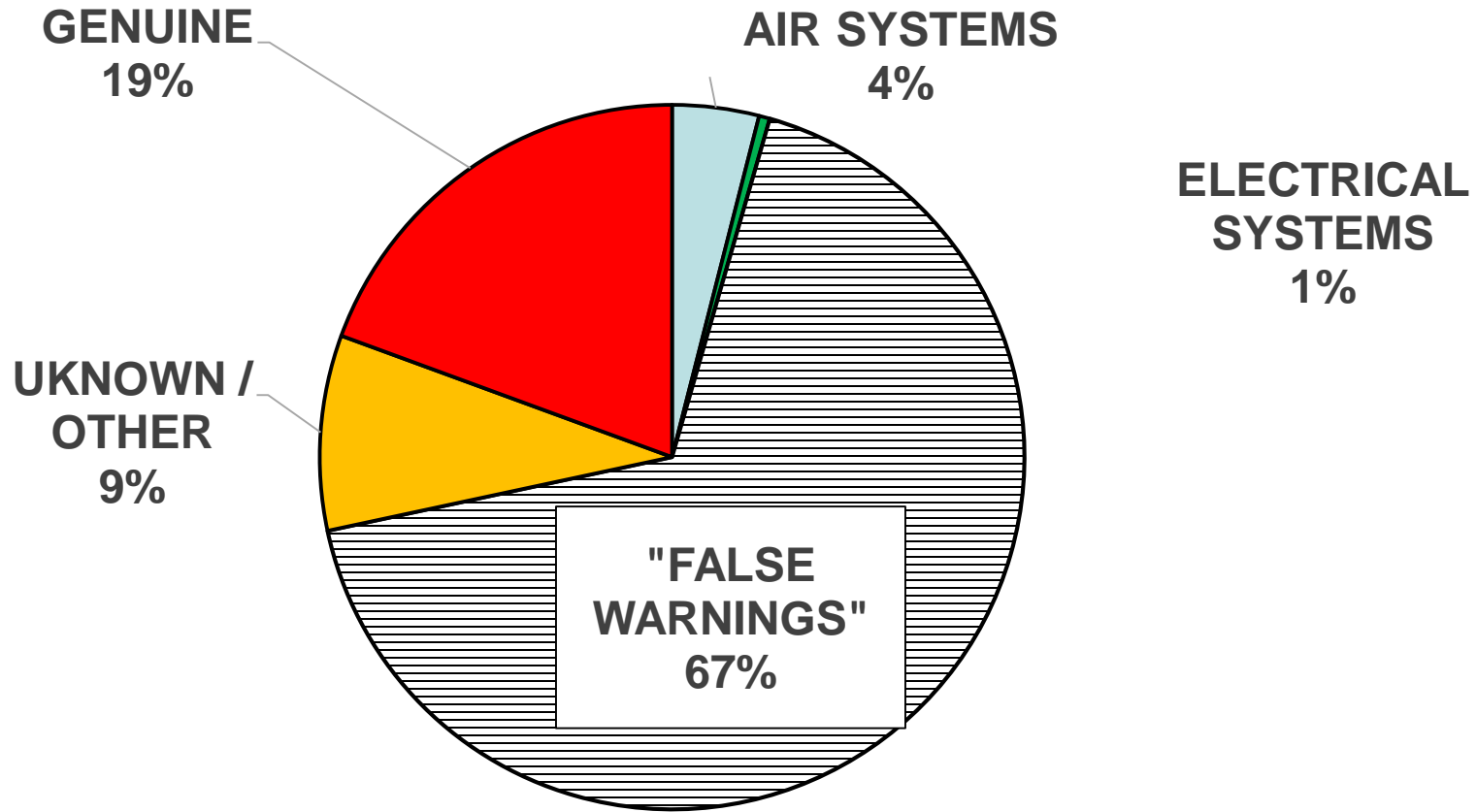
# E&E Bays

## RATE OF OCCURRENCE - ALL EVENTS – ALL AIRPLANES



1727/Analysis New/Inaccessible Cargo Bays/COMPARISON PAX v FRTEIGHTER

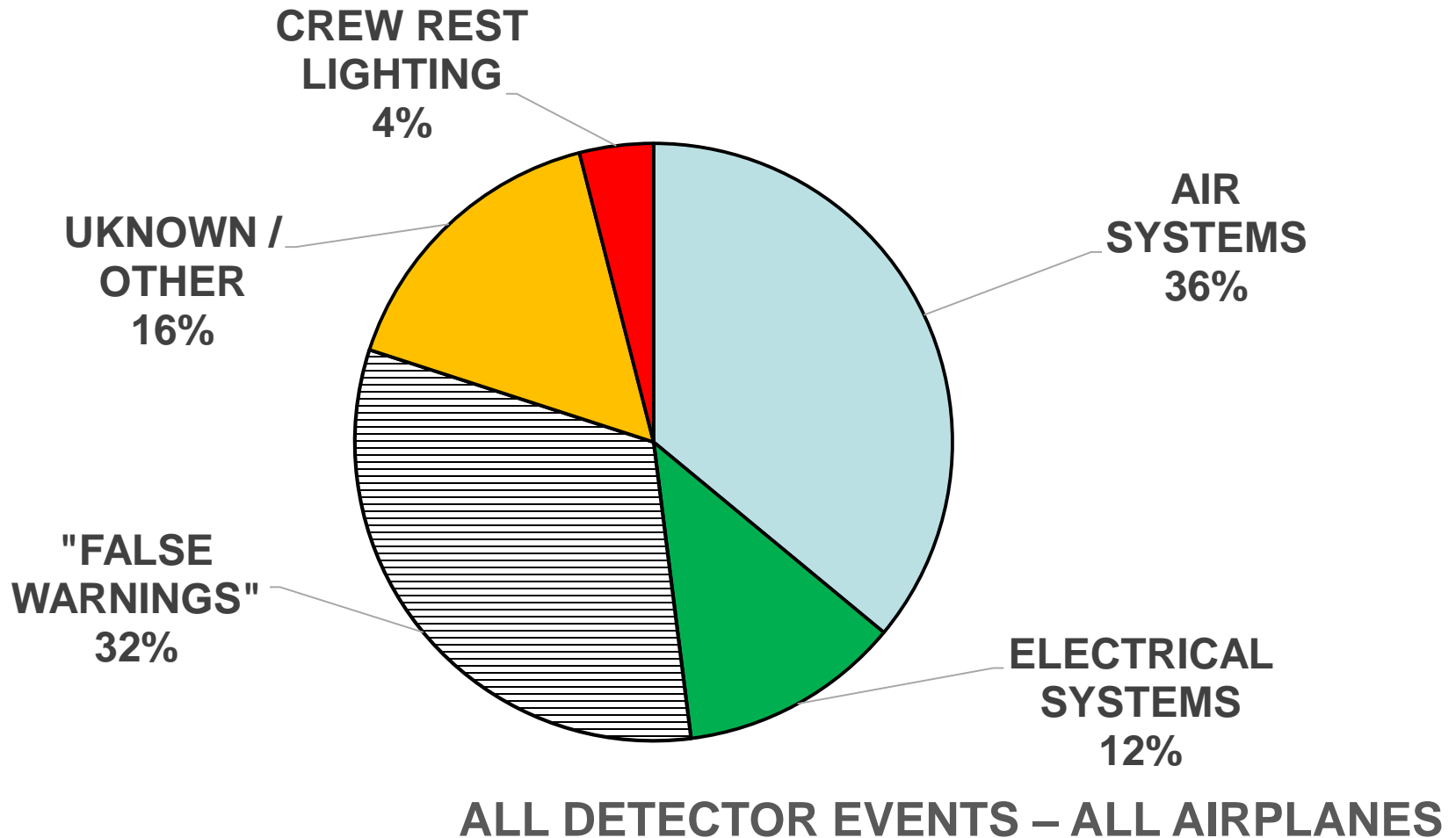
# E&E Bays



ALL DETECTOR EVENTS – ALL AIRPLANES

# CREW REST AREAS

# Crew Rest Areas





# WHEEL WELLS

# Wheel Wells

