



**Monday, October 21, 2019 12:10 to 12:25 p.m.**

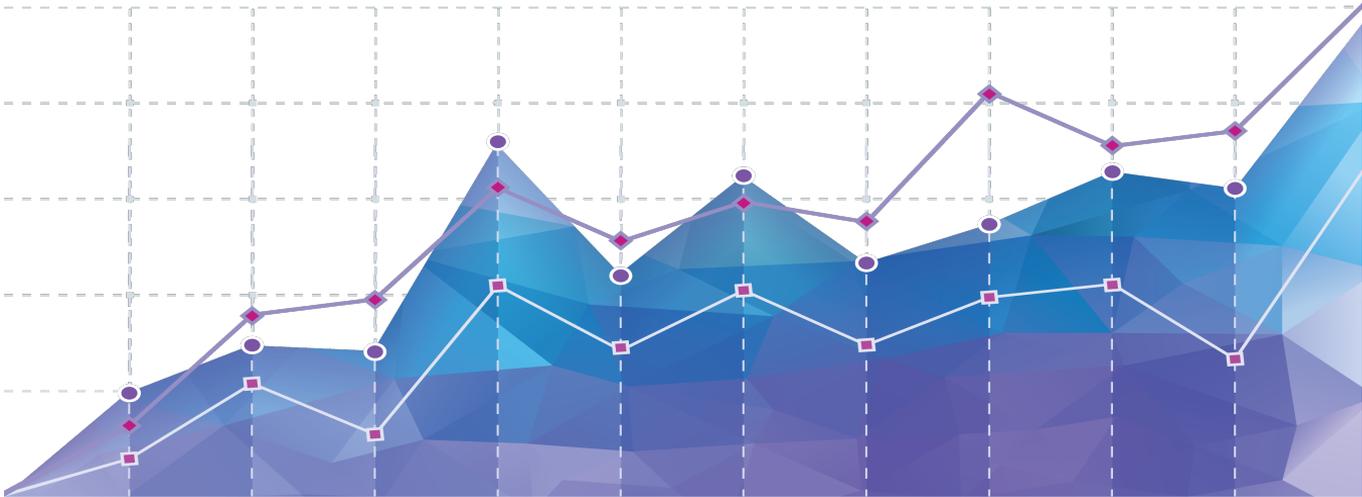
# **Single Pilot Data Update**

Presented by: Dan Ramirez, XOJET

- EXECUTIVE AVIATION DATA ANALYSIS PROCESS 2017/2018
- Presented October 2019

- The accident statistics presented in this summary are confined to data found in the 2010-2018 Breiling Report , ICAO 2010-2017 Safety Summary, 2010-2018 NTSB data, Assure Data Set 2010-2017. Within that set of airplanes, there are two groups excluded:
  - 1) Airplanes manufactured in the Former USSR are excluded because of the lack of operational data.
  - 2) Military Operations
- Definitions related to development of statistics in this summary are primarily based on corresponding International Civil Aviation Organization (ICAO), U.S. National Transportation Safety Board (NTSB), and Flight Safety Foundation (FSF) terms, as per all agreed taxonomies.

# Data Classification



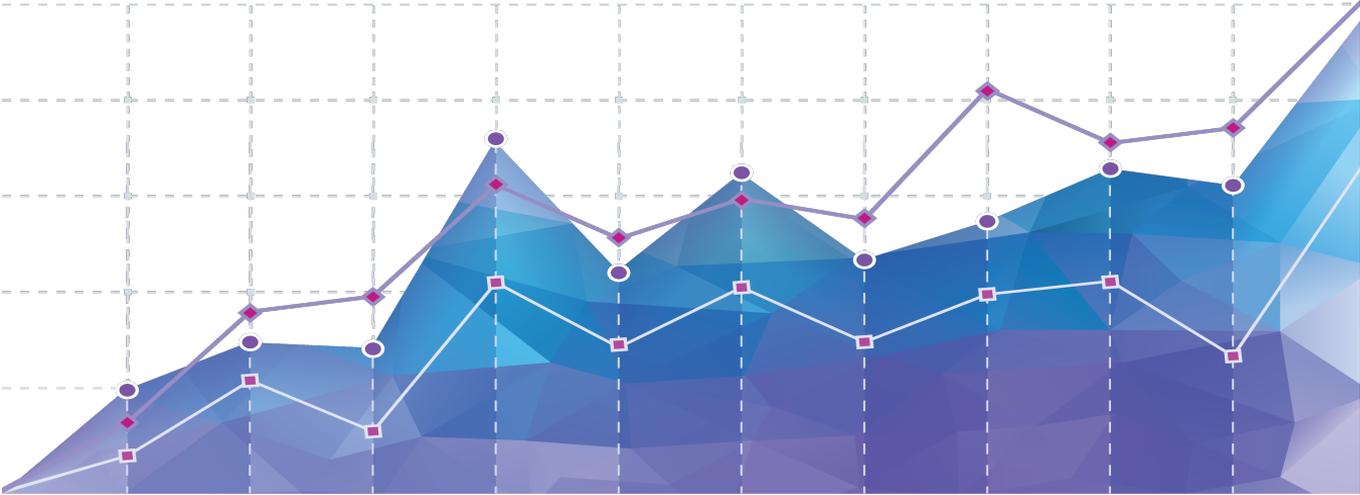
## Airplane Accident

- An occurrence associated with the operation of an airplane that takes place between the time any person boards the airplane with the intention of flight and such time as all such persons have disembarked, in which
- The airplane sustains substantial damage.
- The airplane is missing or is completely inaccessible. An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.
- Death or serious injury results from Being in the airplane.
- Direct contact with the airplane or anything attached thereto.
- Direct exposure to jet blast.

## Excluded Events

- Fatal and nonfatal injuries from natural causes.
- Fatal and nonfatal self-inflicted injuries or injuries inflicted by other persons.
- Fatal and nonfatal injuries of stowaways hiding outside the areas normally available to the passengers and crew.
- Nonfatal injuries resulting from atmospheric turbulence, normal maneuvering, loose objects, boarding, disembarking, evacuation, and maintenance and servicing.
- Nonfatal injuries to persons not aboard the airplane.
- The following occurrences are **not** considered airplane accidents: those that are the result of experimental test flights or the result of a hostile action, including sabotage, hijacking, terrorism, and military action.

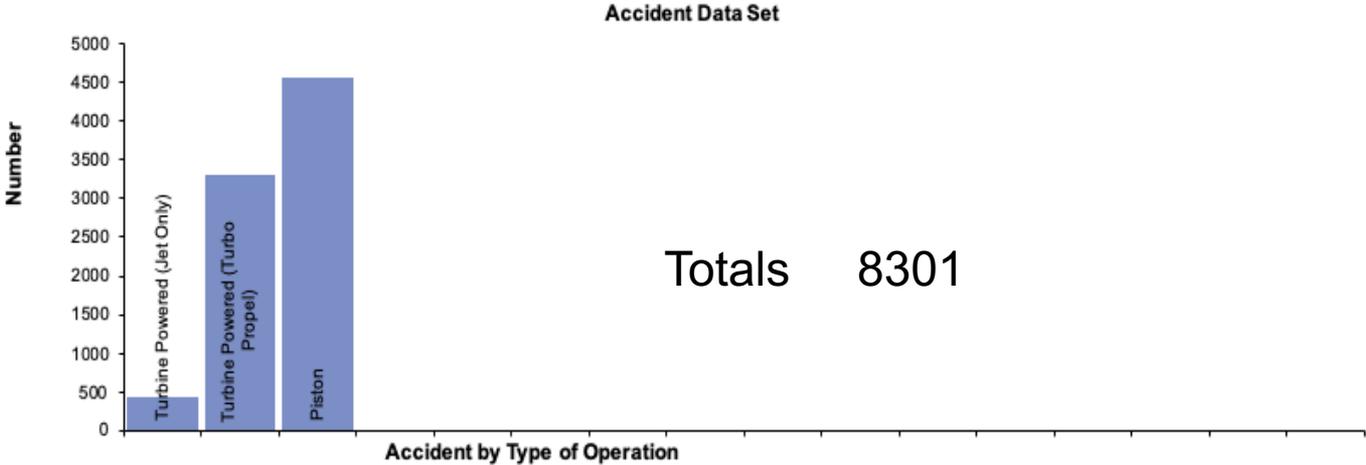
# Data Analysis



# Data Analysis – Aircraft Types Business Aircraft

## Event Group Data Analysis

Review data from Breiling Report, ICAO data, NTSB Data, Assure Data

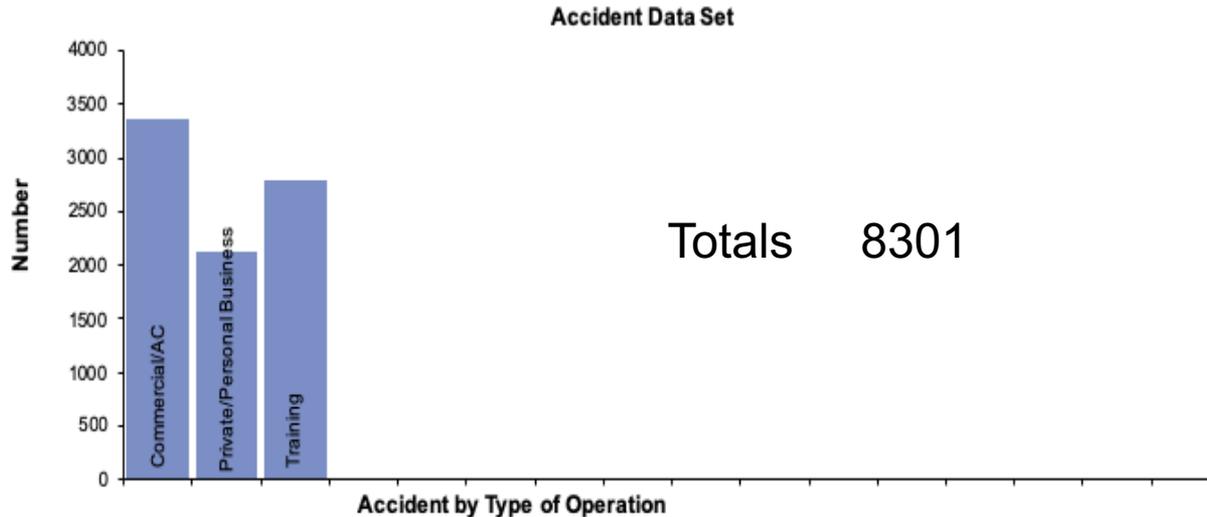


| Accident by Type of Operation  | Number |
|--------------------------------|--------|
| Turbine Powered (Jet Only)     | 440    |
| Turbine Powered (Turbo Propel) | 3305   |
| Piston                         | 4556   |

# Data Analysis – Aircraft Types Business Aircraft

## Event Group Data Analysis

Review data from Breiling Report, ICAO data, NTSB Data, Assure Data  
Jan-18



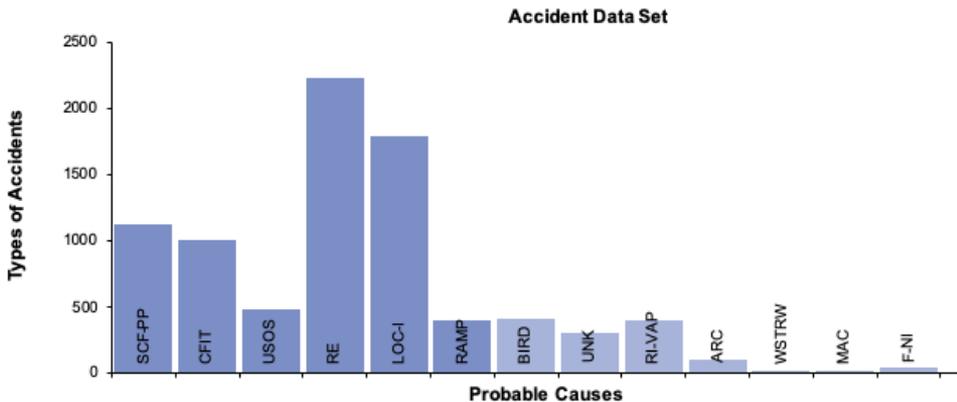
| Accident by Type of Operation | Number |
|-------------------------------|--------|
| Commercial/AC                 | 3370   |
| Private/Personal Business     | 2130   |
| Training                      | 2801   |

# Data Analysis – Aircraft Types Business Aircraft

## Event Group Data Analysis

Review data from Breiling Report, ICAO data, NTSB Data, Assure Data

1/1/2010 - 12/1/2018



Totals 8301

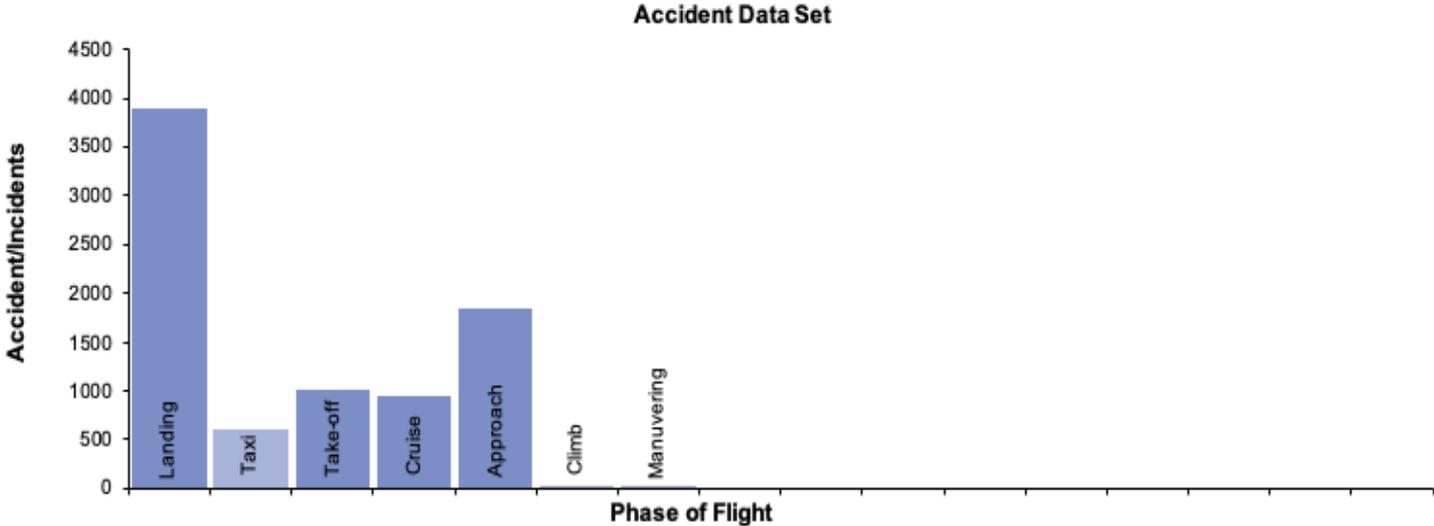
|        |                                                      |
|--------|------------------------------------------------------|
| ARC    | Abnormal Runway Contact                              |
| CFIT   | Controlled Flight Into or Toward Terrain             |
| F-NI   | Fire/Smoke (Non-Impact)                              |
| LOC-I  | Loss of Control—In Flight                            |
| MAC    | Midair/Near Midair Collision                         |
| OTHR   | Other                                                |
| RAMP   | Ground Handling                                      |
| RE     | Runway Excursion (Takeoff or Landing)                |
| RI-VAP | Runway Incursion—Vehicle, Aircraft, or Person        |
| SCF-PP | System/Component Failure or Malfunction (Powerplant) |
| UNK    | Unknown or Undetermined                              |
| USOS   | Undershoot/Overshoot                                 |
| WSTRW  | Wind Shear or Thunderstorm                           |

| Probable Causes | Types of Accidents |
|-----------------|--------------------|
| SCF-PP          | 1120               |
| CFIT            | 1002               |
| USOS            | 478                |
| RE              | 2234               |
| LOC-I           | 1792               |
| RAMP            | 402                |
| BIRD            | 412                |
| UNK             | 300                |
| RI-VAP          | 402                |
| ARC             | 100                |
| WSTRW           | 7                  |
| MAC             | 12                 |
| F-NI            | 40                 |

# Data Analysis – Aircraft Types Business Aircraft

## Event Group Data Analysis

Review data from Breiling Report, ICAO data, NTSB Data, Assure Data  
Jan-18

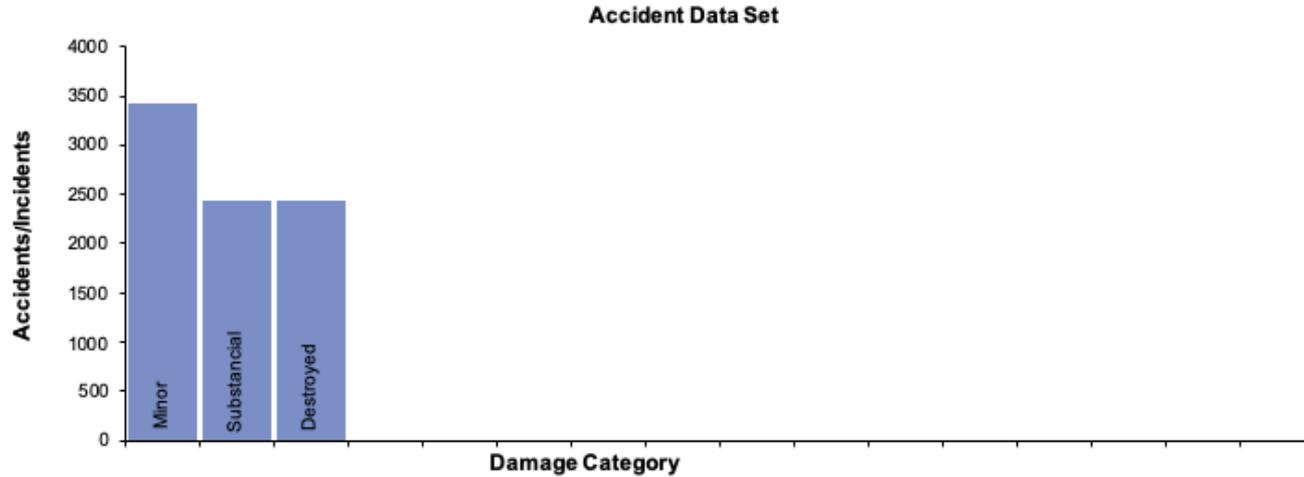


Totals 8301

# Data Analysis – Aircraft Types Business Aircraft

## Event Group Data Analysis

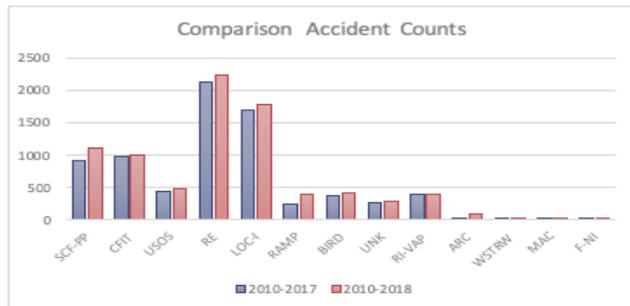
Review data from Breiling Report, ICAO data, NTSB Data, Assure Data  
Jan-18



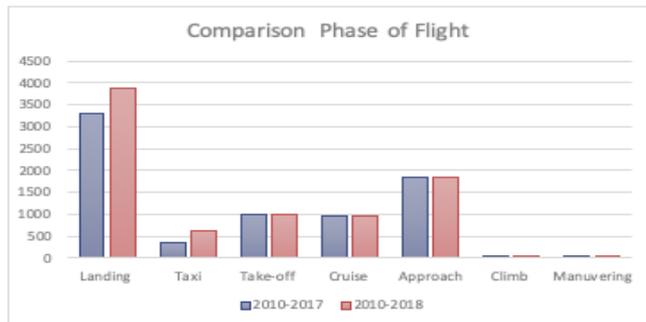
Totals 8301

# Comparison 2017-2018

| Comparison Accident Counts | 2010-2017   | 2010-2018   | Percentage of Change |
|----------------------------|-------------|-------------|----------------------|
| SCF-PP                     | 927         | 1120        | 17%                  |
| CFIT                       | 984         | 1002        | 2%                   |
| USOS                       | 450         | 478         | 6%                   |
| RE                         | 2125        | 2234        | 5%                   |
| LOC-I                      | 1692        | 1792        | 6%                   |
| RAMP                       | 250         | 402         | 38%                  |
| BIRD                       | 368         | 412         | 11%                  |
| UNK                        | 265         | 300         | 12%                  |
| RI-VAP                     | 389         | 402         | 3%                   |
| ARC                        | 3           | 100         | 97%                  |
| WSTRW                      | 2           | 7           | 71%                  |
| MAC                        | 1           | 12          | 92%                  |
| F-NI                       | 1           | 40          | 98%                  |
| <b>Total</b>               | <b>7457</b> | <b>8301</b> |                      |

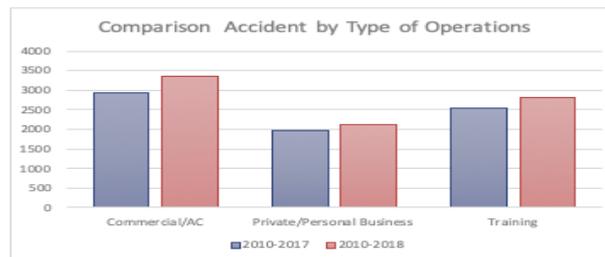


| Phase of Flight | 2017        | 2018        | Percentage of Change |
|-----------------|-------------|-------------|----------------------|
| Landing         | 3298        | 3890        | 15%                  |
| Taxi            | 359         | 610         | 41%                  |
| Take-off        | 1002        | 1000        | 0%                   |
| Cruise          | 950         | 950         | 0%                   |
| Approach        | 1844        | 1844        | 0%                   |
| Climb           | 3           | 6           | 50%                  |
| Manuvering      | 1           | 1           | 0%                   |
| <b>Total</b>    | <b>7457</b> | <b>8301</b> |                      |

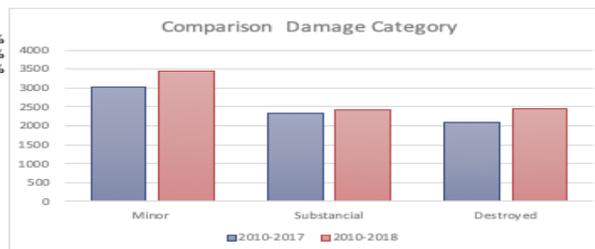


# Comparison 2017-2018

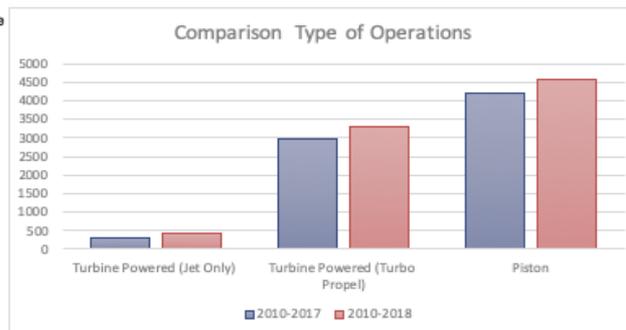
| Accident by Type of Operation | 2017 | 2018 | Percentage of Change |
|-------------------------------|------|------|----------------------|
| Commercial/AC                 | 2926 | 3370 | 13%                  |
| Private/Personal Business     | 1982 | 2130 | 7%                   |
| Training                      | 2549 | 2801 | 9%                   |



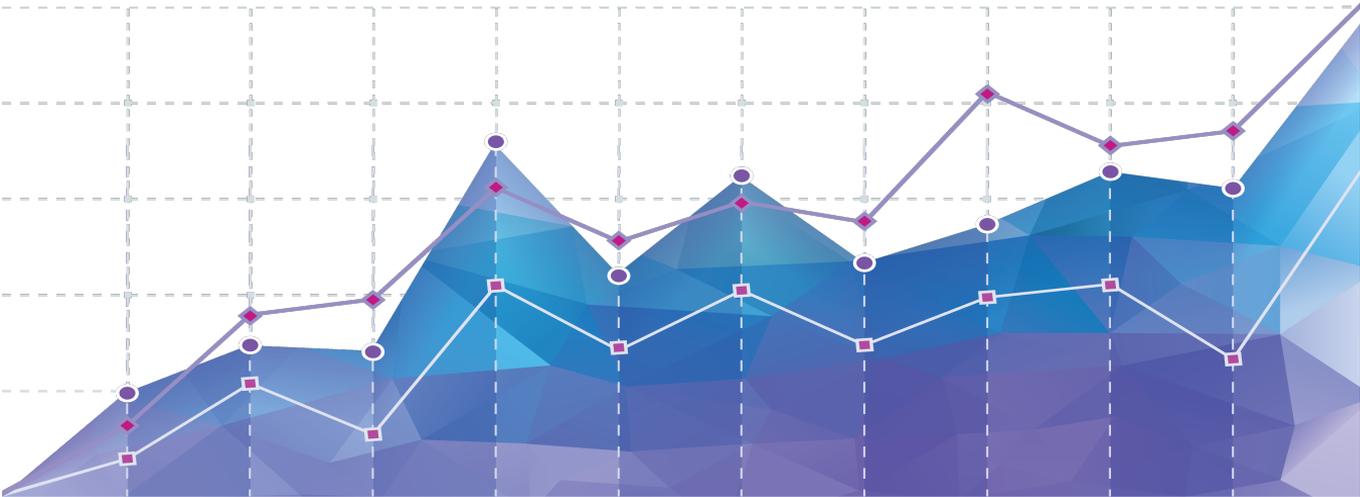
| Damage Category | 2017 | 2018 | Percentage of Change |
|-----------------|------|------|----------------------|
| Minor           | 3015 | 3432 | 12%                  |
| Substantial     | 2345 | 2430 | 3%                   |
| Destroyed       | 2097 | 2439 | 14%                  |



| Accident by Type of Operation  | 2017 | 2018 | Percentage of Change |
|--------------------------------|------|------|----------------------|
| Turbine Powered (Jet Only)     | 289  | 440  | 34%                  |
| Turbine Powered (Turbo Propel) | 2986 | 3305 | 10%                  |
| Piston                         | 4200 | 4556 | 8%                   |

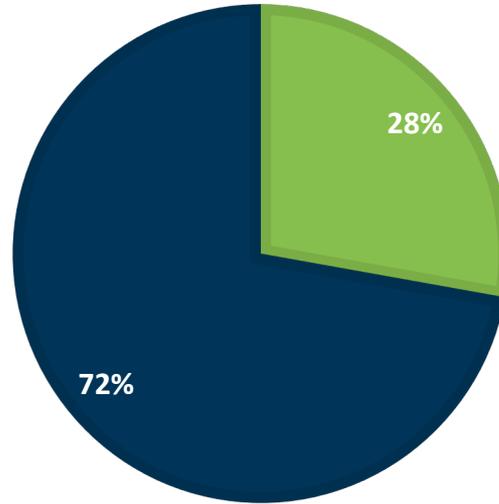


# Data Analysis – Single Pilot Business Accidents



# Single Pilot / Main Business Aircraft Data Set

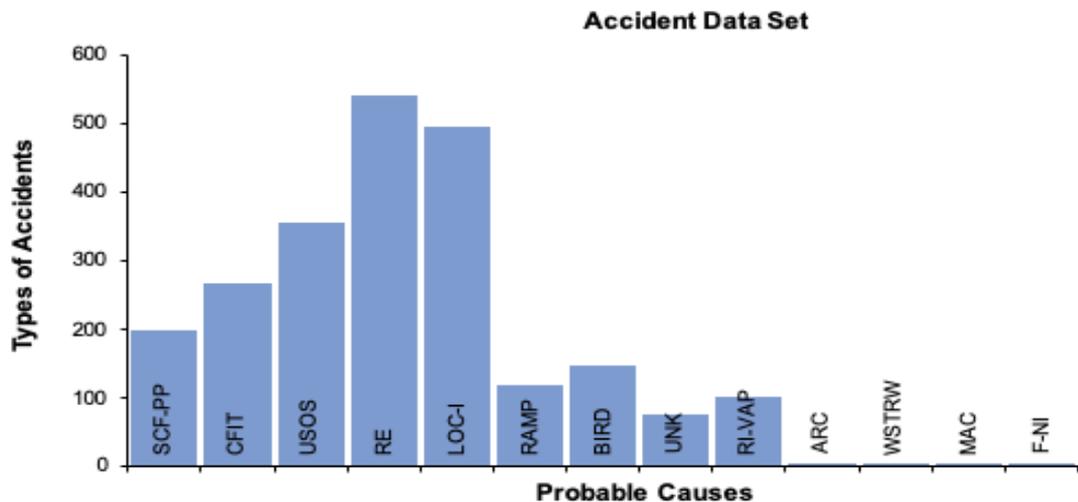
■ Single Pilot   ■ All other operations



## DATA ANALYSIS – AIRCRAFT TYPES BUSINESS AIRCRAFT (SP)

### Event Group Data Analysis

Review data from Breiling Report, ICAO data, NTSB Data, Assure Data  
1/1/2010 - 12/1/2018



Totals 2308

| Probable Causes | Types of Accidents |
|-----------------|--------------------|
| SCF-PP          | 198                |
| CFIT            | 267                |
| USOS            | 356                |
| RE              | 540                |
| LOC-I           | 494                |
| RAMP            | 118                |
| BIRD            | 147                |
| UNK             | 74                 |
| RI-VAP          | 100                |
| ARC             | 3                  |
| WSTRW           | 2                  |
| MAC             | 1                  |
| F-NI            | 1                  |

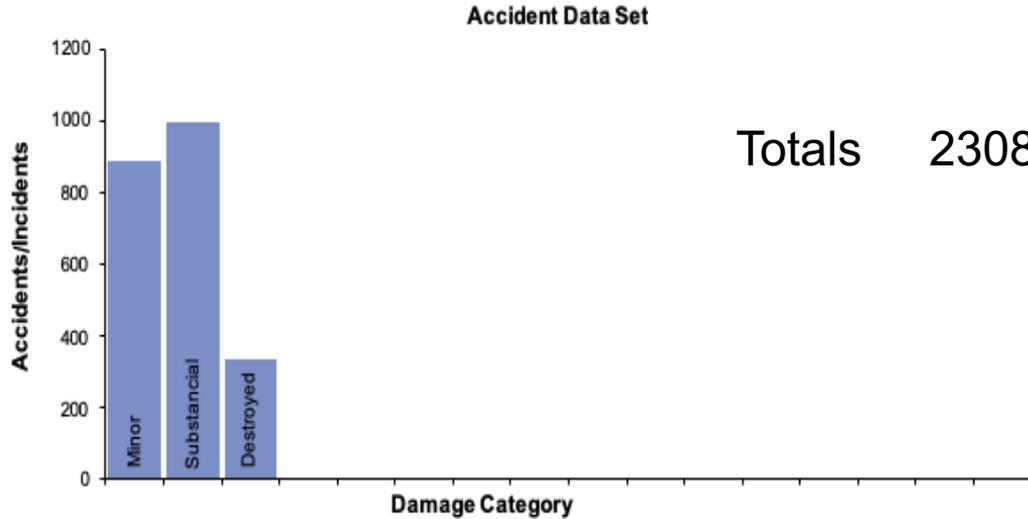
|        |                                                      |
|--------|------------------------------------------------------|
| ARC    | Abnormal Runway Contact                              |
| CFIT   | Controlled Flight Into or Toward Terrain             |
| F-NI   | Fire/Smoke (Non-Impact)                              |
| LOC-I  | Loss of Control—In Flight                            |
| MAC    | Midair/Near Midair Collision                         |
| OTHR   | Other                                                |
| RAMP   | Ground Handling                                      |
| RE     | Runway Excursion (Takeoff or Landing)                |
| RI-VAP | Runway Incursion—Vehicle, Aircraft, or Person        |
| SCF-PP | System/Component Failure or Malfunction (Powerplant) |
| UNK    | Unknown or Undetermined                              |
| USOS   | Undershoot/Overshoot                                 |
| WSTRW  | Wind Shear or Thunderstorm                           |

# DATA ANALYSIS – AIRCRAFT TYPES BUSINESS AIRCRAFT (SP)

## Event Group Data Analysis

Review data from Breiling Report, ICAO data, NTSB Data, Assure Data

Jan-18



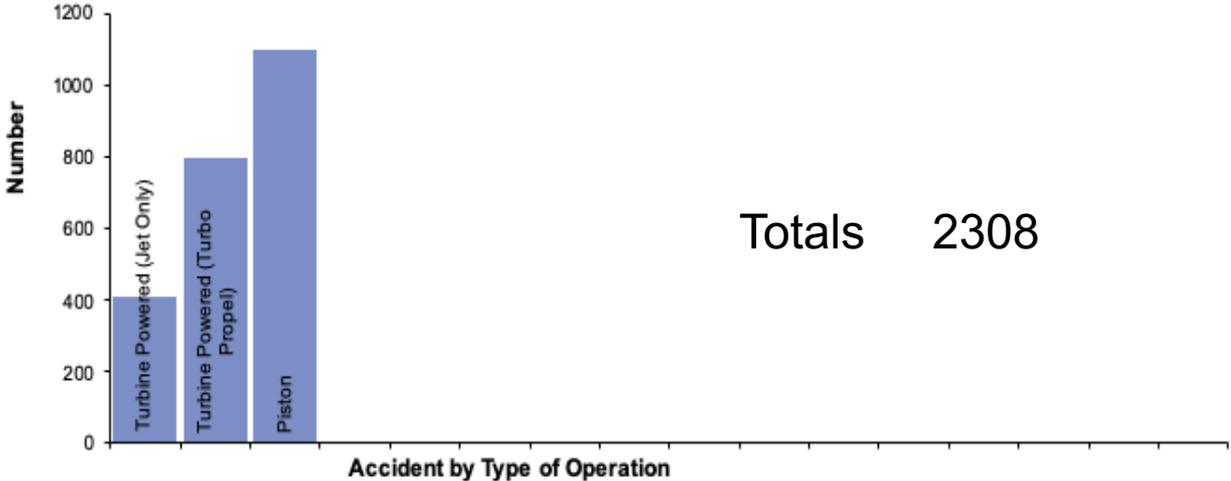
| Damage Category | Accidents/Incidents |
|-----------------|---------------------|
| Minor           | 890                 |
| Substantial     | 995                 |
| Destroyed       | 423                 |

# DATA ANALYSIS – AIRCRAFT TYPES BUSINESS AIRCRAFT (SP)

## Event Group Data Analysis

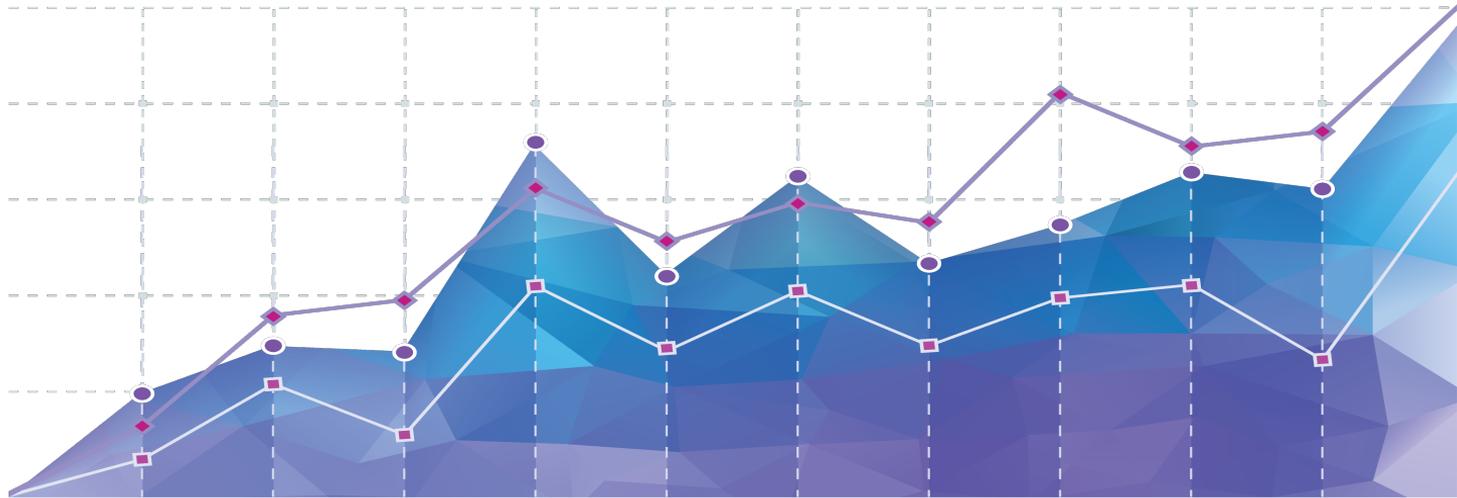
Review data from Breiling Report, ICAO data, NTSB Data, Assure Data  
 Jan-18

Accident Data Set



| Accident by Type of Operation  | Number |
|--------------------------------|--------|
| Turbine Powered (Jet Only)     | 408    |
| Turbine Powered (Turbo Propel) | 798    |
| Piston                         | 1102   |

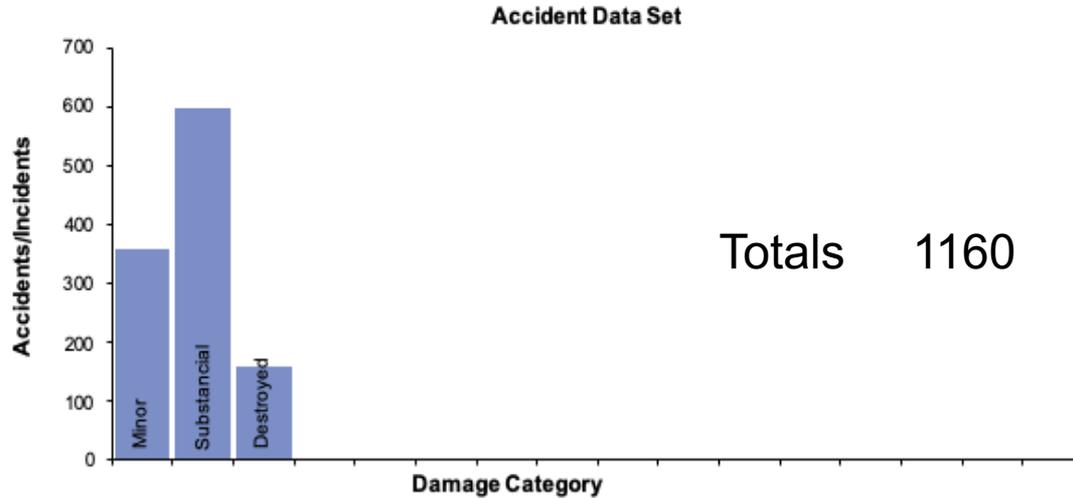
# DATA ANALYSIS – PISTON DATA



# DATA ANALYSIS – AIRCRAFT TYPES BUSINESS AIRCRAFT (SP PISTON)

## Event Group Data Analysis

Review data from Breiling Report, ICAO data, NTSB Data, Assure Data  
Jan-18

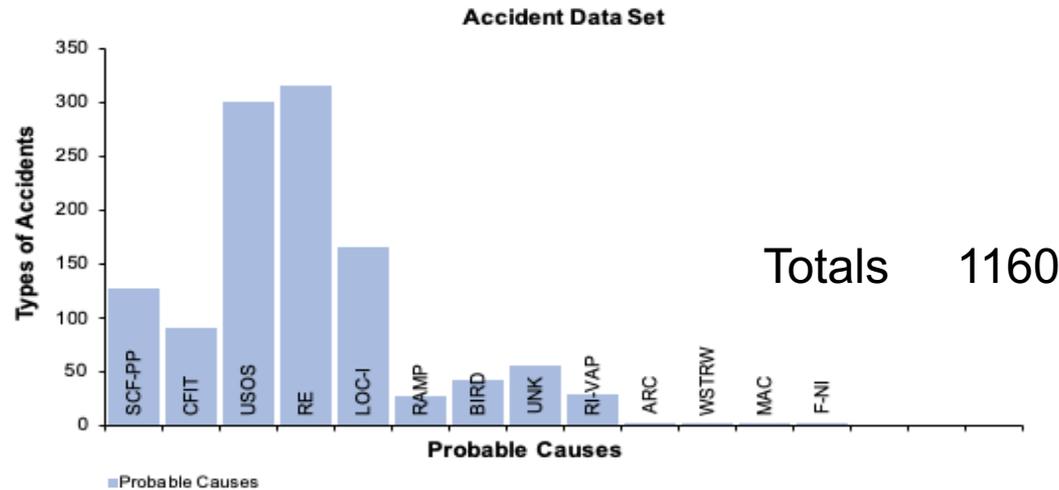


| Damage Category | Accidents/Incidents |
|-----------------|---------------------|
| Minor           | 358                 |
| Substantial     | 598                 |
| Destroyed       | 204                 |

# DATA ANALYSIS – AIRCRAFT TYPES BUSINESS AIRCRAFT (SP PISTON)

## Event Group Data Analysis

Review data from Breiling Report, ICAO data, NTSB Data, Assure Data  
1/1/2010 - 12/1/2018

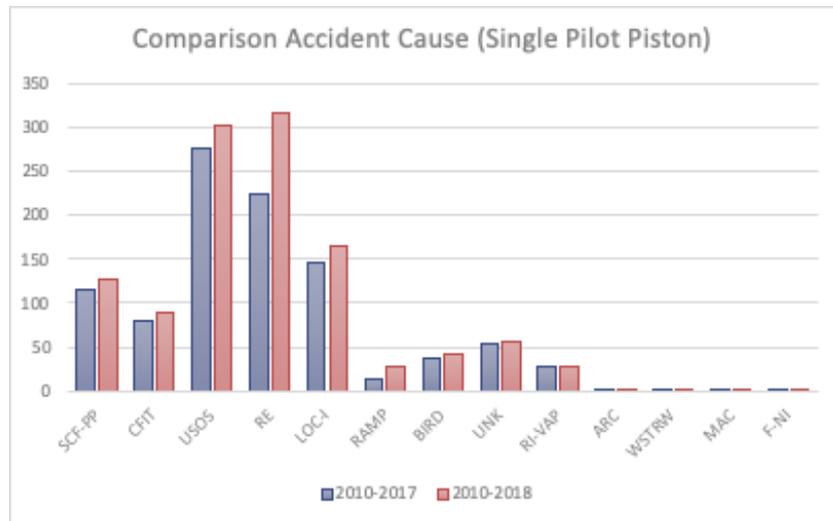


| Probable | Types of Accidents |
|----------|--------------------|
| SCF-PP   | 127                |
| CFIT     | 90                 |
| USOS     | 301                |
| RE       | 315                |
| LOC-I    | 165                |
| RAMP     | 28                 |
| BIRD     | 42                 |
| UNK      | 56                 |
| RI-VAP   | 29                 |
| ARC      | 3                  |
| WSTRW    | 2                  |
| MAC      | 1                  |
| F-NI     | 1                  |

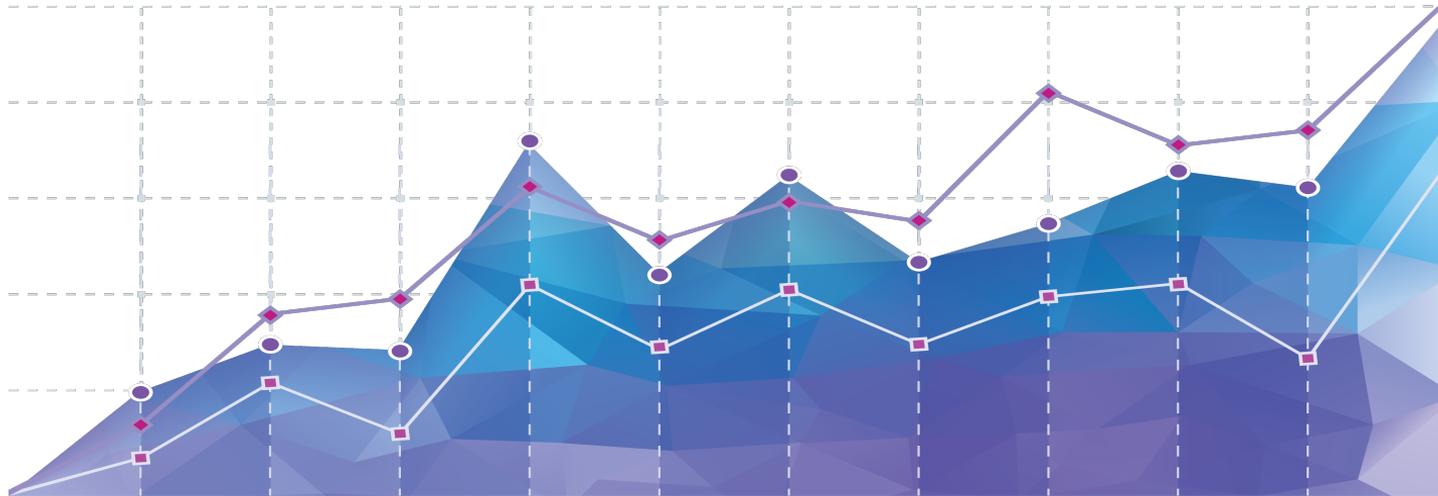
|        |                                                      |
|--------|------------------------------------------------------|
| ARC    | Abnormal Runway Contact                              |
| CFIT   | Controlled Flight Into or Toward Terrain             |
| F-NI   | Fire/Smoke (Non-Impact)                              |
| LOC-I  | Loss of Control—In Flight                            |
| MAC    | Midair/Near Midair Collision                         |
| OTHR   | Other                                                |
| RAMP   | Ground Handling                                      |
| RE     | Runway Excursion (Takeoff or Landing)                |
| RI-VAP | Runway Incursion—Vehicle, Aircraft, or Person        |
| SCF-PP | System/Component Failure or Malfunction (Powerplant) |
| UNK    | Unknown or Undetermined                              |
| USOS   | Undershoot/Overshoot                                 |
| WSTRW  | Wind Shear or Thunderstorm                           |

# COMPARISON 2017-2018

| Single Pilot Probable Cause | Single Pistor | Percentage of Change |     |
|-----------------------------|---------------|----------------------|-----|
| SCF-PP                      | 115           | 127                  | 9%  |
| CFIT                        | 80            | 90                   | 11% |
| USOS                        | 275           | 301                  | 9%  |
| RE                          | 225           | 315                  | 29% |
| LOC-I                       | 145           | 165                  | 12% |
| RAMP                        | 14            | 28                   | 50% |
| BIRD                        | 38            | 42                   | 10% |
| UNK                         | 54            | 56                   | 4%  |
| RI-VAP                      | 29            | 29                   | 0%  |
| ARC                         | 3             | 3                    | 0%  |
| WSTRW                       | 2             | 2                    | 0%  |
| MAC                         | 1             | 1                    | 0%  |
| F-NI                        | 1             | 1                    | 0%  |



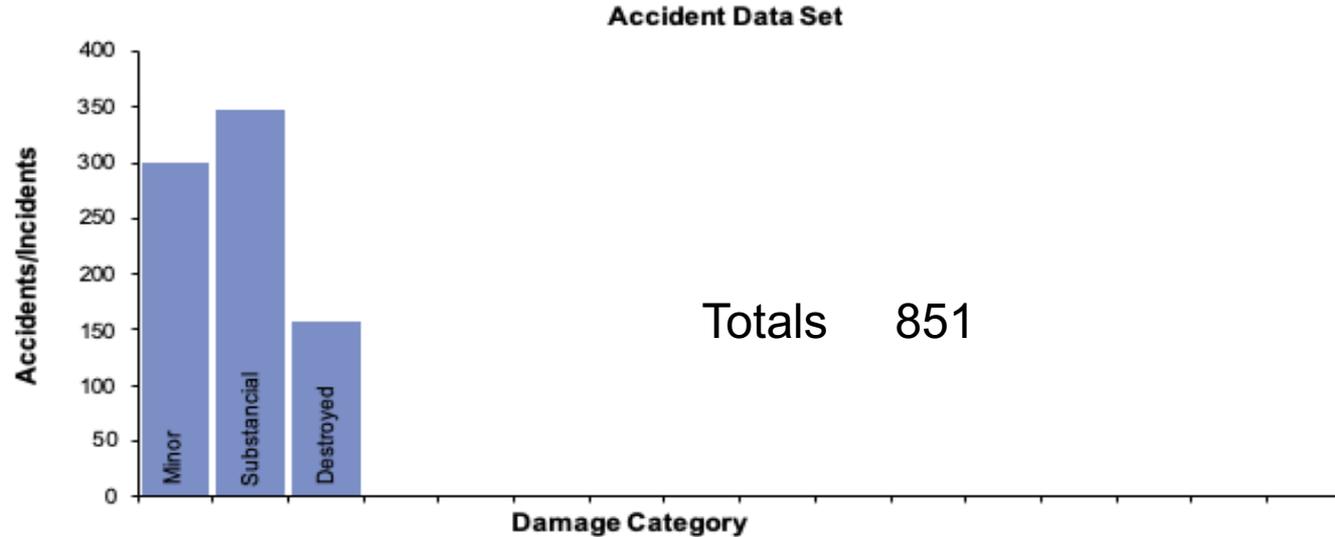
# DATA ANALYSIS – TURBO PROP DATA



# DATA ANALYSIS – AIRCRAFT TYPES BUSINESS AIRCRAFT (SP TURBOPROP)

## Event Group Data Analysis

Review data from Breiling Report, ICAO data, NTSB Data, Assure Data  
Jan-18

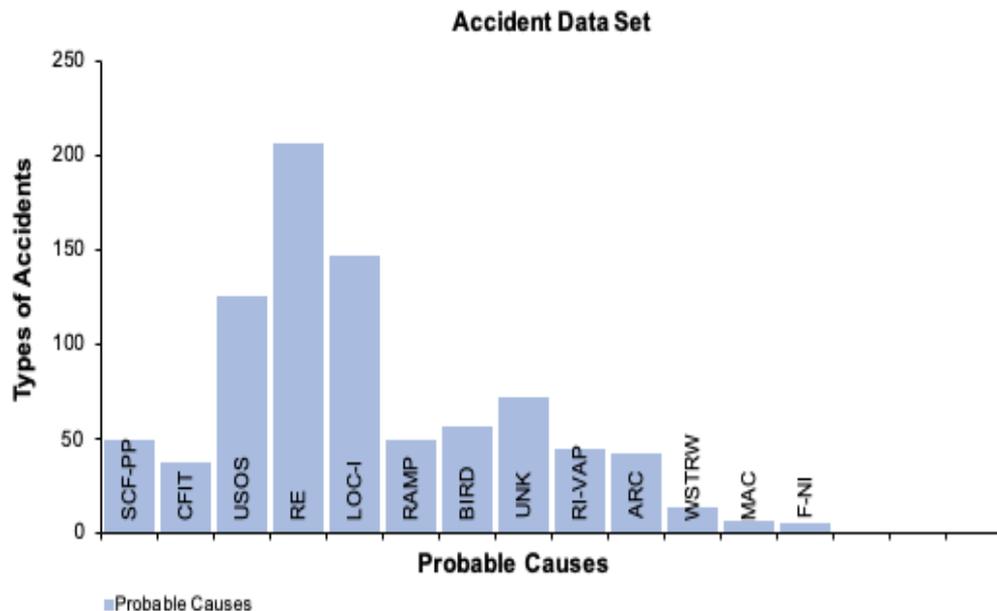


| Damage Category | Accidents/Incidents |
|-----------------|---------------------|
| Minor           | 301                 |
| Substantial     | 348                 |
| Destroyed       | 202                 |

## DATA ANALYSIS – AIRCRAFT TYPES BUSINESS AIRCRAFT (SP TURBOPROP)

### Event Group Data Analysis

Review data from Breiling Report, ICAO data, NTSB Data, Assure Data  
1/1/2010 - 12/1/2018



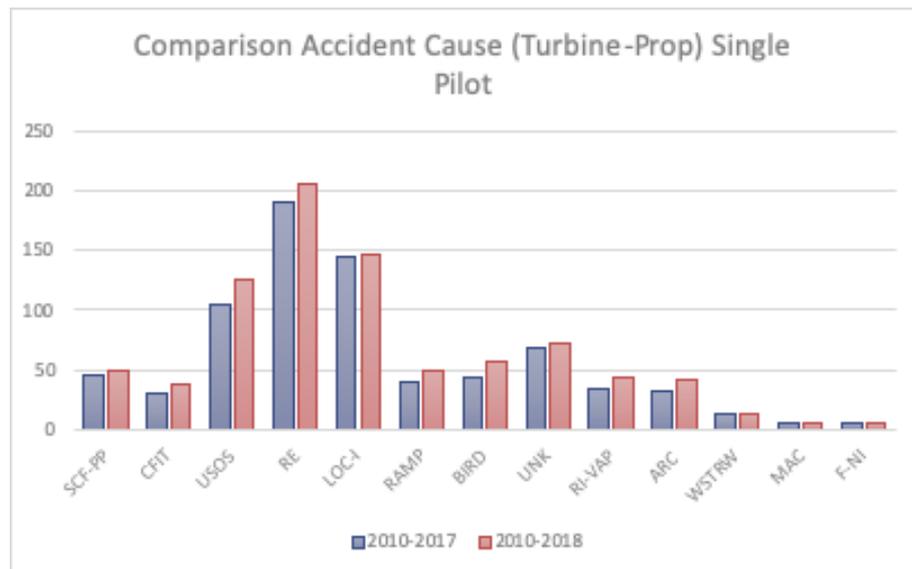
Totals 851

| Probable Causes | Types of Accidents |
|-----------------|--------------------|
| SCF-PP          | 49                 |
| CFIT            | 37                 |
| USOS            | 125                |
| RE              | 206                |
| LOC-I           | 147                |
| RAMP            | 49                 |
| BIRD            | 56                 |
| UNK             | 72                 |
| RI-VAP          | 44                 |
| ARC             | 42                 |
| WSTRW           | 13                 |
| MAC             | 6                  |
| F-NI            | 5                  |

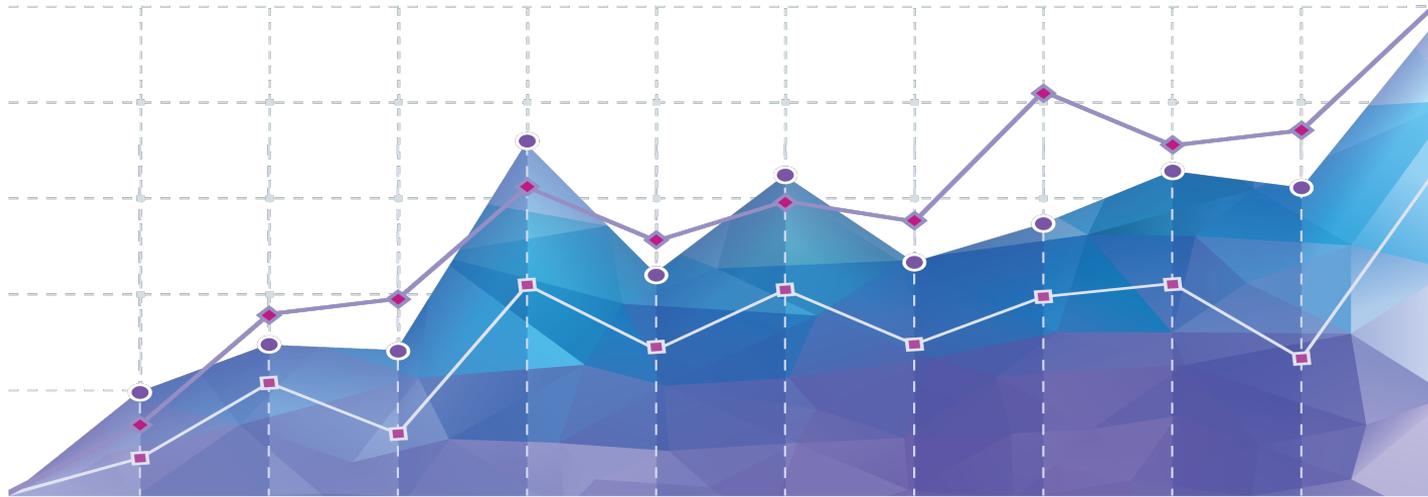
|        |                                               |
|--------|-----------------------------------------------|
| ARC    | Abnormal Runway Contact                       |
| CFIT   | Controlled Flight Into or Toward Terrain      |
| F-NI   | Fire/Smoke (Non-Impact)                       |
| LOC-I  | Loss of Control—In Flight                     |
| MAC    | Midair/Near Midair Collision                  |
| OTHR   | Other                                         |
| RAMP   | Ground Handling                               |
| RE     | Runway Excursion (Takeoff or Landing)         |
| RI-VAP | Runway Incursion—Vehicle, Aircraft, or Person |
| SCF-PP | System/Component Failure or Malfunction (P    |
| UNK    | Unknown or Undetermined                       |
| USOS   | Undershoot/Overshoot                          |
| WSTRW  | Wind Shear or Thunderstorm                    |

## COMPARISON 2017-2018

| Single Pilot Accident Cause | Turbine | Prop |     |
|-----------------------------|---------|------|-----|
| SCF-PP                      | 45      | 49   | 8%  |
| CFIT                        | 30      | 37   | 19% |
| USOS                        | 105     | 125  | 16% |
| RE                          | 190     | 206  | 8%  |
| LOC-I                       | 145     | 147  | 1%  |
| RAMP                        | 39      | 49   | 20% |
| BIRD                        | 43      | 56   | 23% |
| UNK                         | 68      | 72   | 6%  |
| RI-VAP                      | 34      | 44   | 23% |
| ARC                         | 32      | 42   | 24% |
| WSTRW                       | 13      | 13   | 0%  |
| MAC                         | 6       | 6    | 0%  |
| F-NI                        | 5       | 5    | 0%  |



# DATA ANALYSIS – TURBINE (JET) DATA

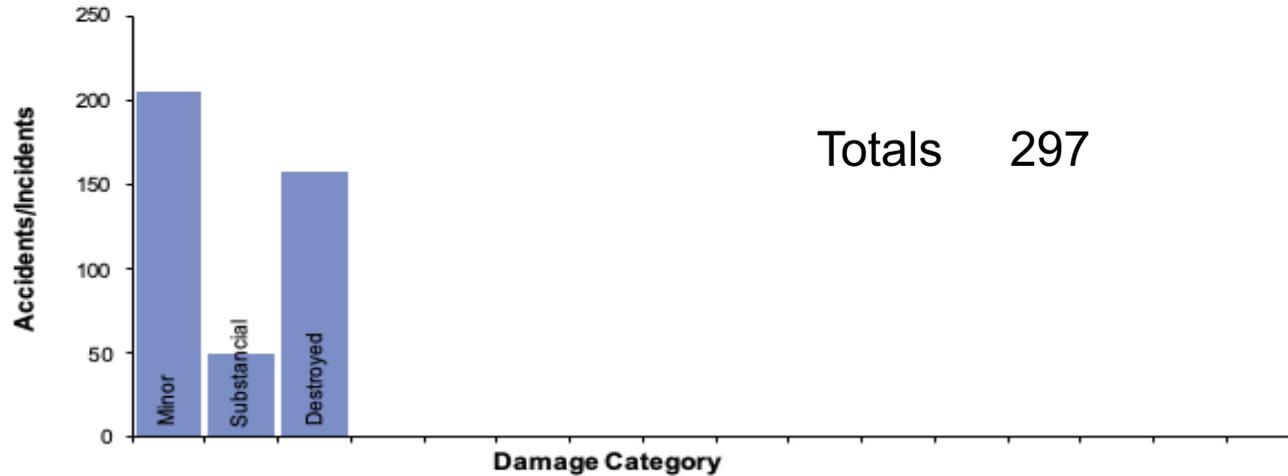


# DATA ANALYSIS – AIRCRAFT TYPES BUSINESS AIRCRAFT (SP TURBINE)

## Event Group Data Analysis

Review data from Breiling Report, ICAO data, NTSB Data, Assure Data  
Jan-18

**Accident Data Set**

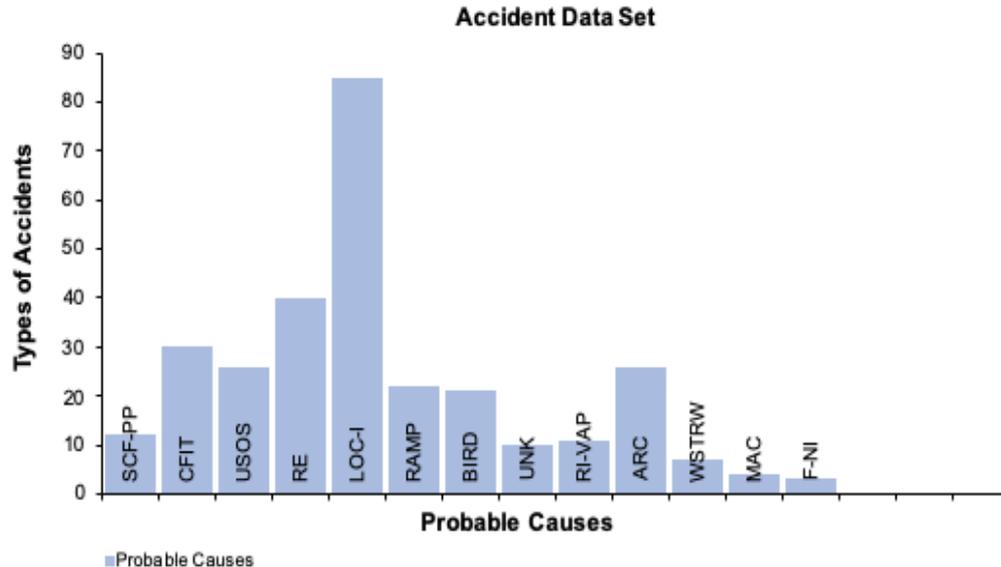


| Damage Category | Accidents/Incidents |
|-----------------|---------------------|
| Minor           | 206                 |
| Substantial     | 50                  |
| Destroyed       | 41                  |

# DATA ANALYSIS – AIRCRAFT TYPES BUSINESS AIRCRAFT (SP TURBINE)

## Event Group Data Analysis

Review data from Breiling Report, ICAO data, NTSB Data, Assure Data  
1/1/2010 - 12/1/2018

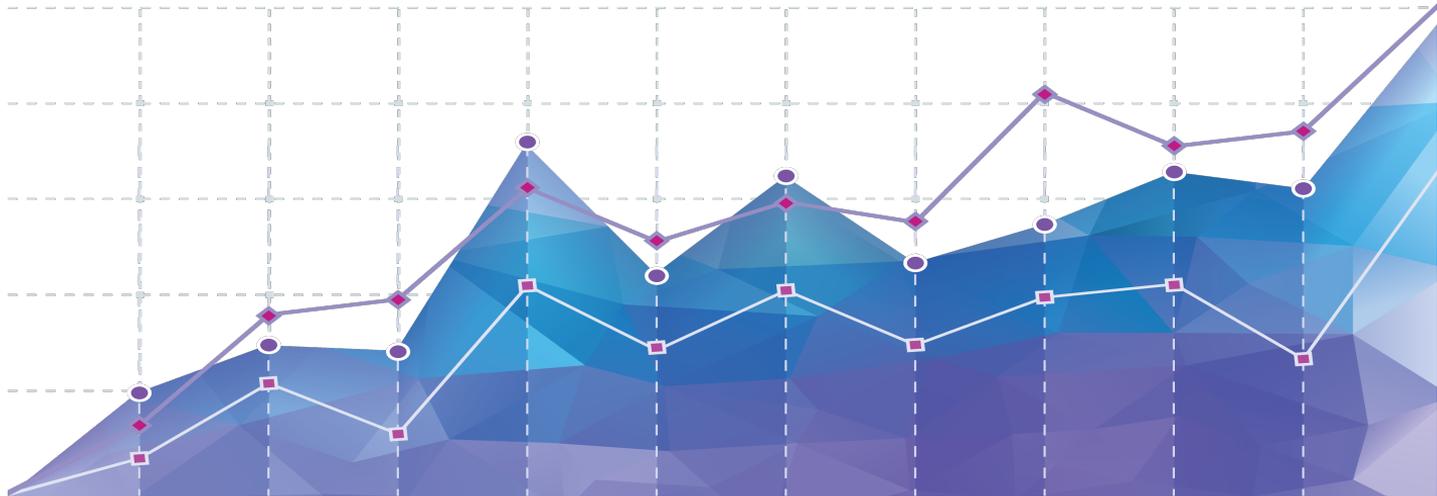


Totals 297

|        |                                                    |
|--------|----------------------------------------------------|
| ARC    | Abnormal Runway Contact                            |
| CFIT   | Controlled Flight Into or Toward Terrain           |
| F-NI   | Fire/Smoke (Non-Impact)                            |
| LOC-I  | Loss of Control—In Flight                          |
| MAC    | Midair/Near Midair Collision                       |
| OTHR   | Other                                              |
| RAMP   | Ground Handling                                    |
| RE     | Runway Excursion (Takeoff or Landing)              |
| RI-VAP | Runway Incursion—Vehicle, Aircraft, or Person      |
| SCF-PP | System/Component Failure or Malfunction (Probable) |
| UNK    | Unknown or Undetermined                            |
| USOS   | Undershoot/Overshoot                               |
| WSTRW  | Wind Shear or Thunderstorm                         |

| Probable Cause | Types of Accidents |
|----------------|--------------------|
| SCF-PP         | 12                 |
| CFIT           | 30                 |
| USOS           | 26                 |
| RE             | 40                 |
| LOC-I          | 85                 |
| RAMP           | 22                 |
| BIRD           | 21                 |
| UNK            | 10                 |
| RI-VAP         | 11                 |
| ARC            | 26                 |
| WSTRW          | 7                  |
| MAC            | 4                  |
| F-NI           | 3                  |

# DATA ANALYSIS – CONTRIBUTING FACTORS (SP)



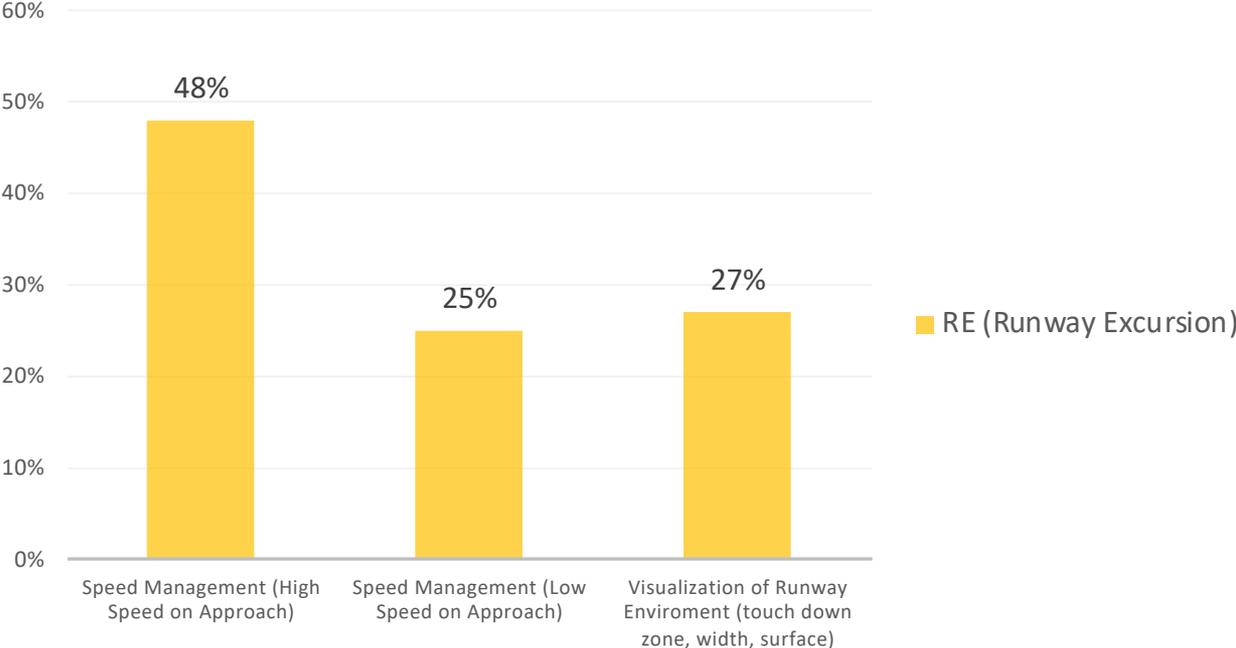
# OBSERVATIONS



- The top 4 causes of single pilot operations accident/incident cause:
  1. RE- Runway Excursions
  2. LOC-I (Loss of Control In Flight)
  3. USOS (Undershoot/Overshoot)
  4. CFIT (Control Flight Into Terrain)

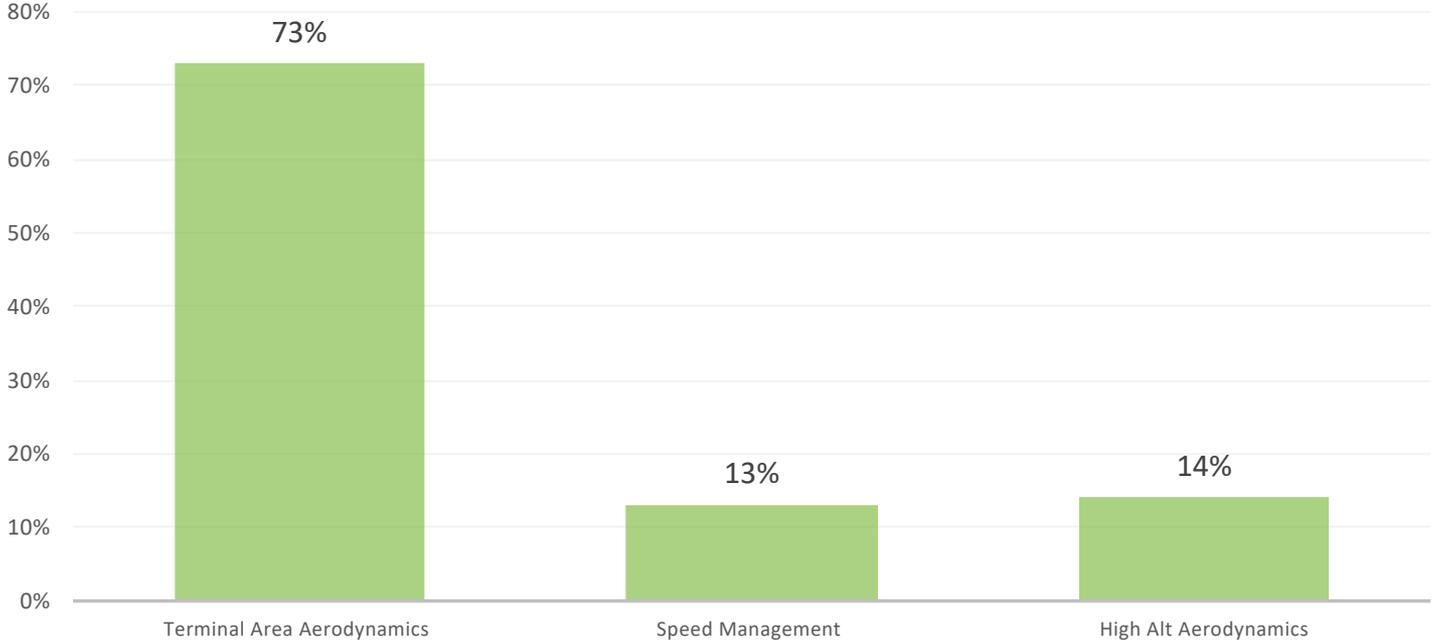
# OBSERVATIONS

RE (Runway Excursion)

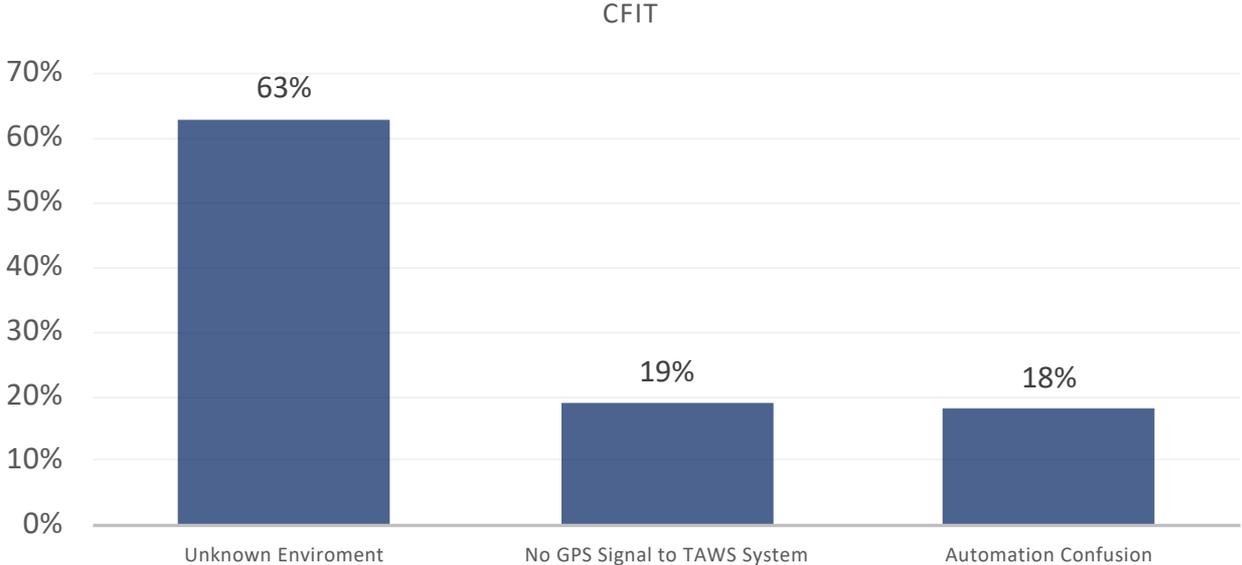


# OBSERVATIONS

LOC-I



# OBSERVATIONS





**NBAA | BACE**®

OCTOBER 22-24, 2019 • LAS VEGAS, NV