

SMART AIRCRAFT INVESTMENTS: Risk & Strategy

Data-Driven Decisions
for Safer Skies

March
2025



OUTLINE

- Overview ● Business Understanding ● Data Understanding
- Data Analysis ● Recommendations ● Next Steps





OVERVIEW

- The presentation will walk through the business challenge, data analysis, key insights, and final recommendations.
- Exploring the risks and opportunities in the aviation industry using data-driven insights to guide the company's investment decisions.
- Analyzing aviation accident data from **1962 to 2023**,
Objectives: *to identify key safety trends, uncover patterns in aircraft incidents, and determine which aircraft present the lowest risk.*
- By the end, you will have a clear strategy for selecting the safest and most reliable aircraft for investment.

BUSINESS UNDERTSANDING

The aviation industry presents both opportunities and risks for new investors.

- Safety, operational efficiency, and regulatory compliance are key factors in determining the viability of an aircraft investment.
- Understanding historical data on aviation safety will help identify trends and make informed decisions on which aircraft are best suited for a low-risk, profitable entry into the market.

Accidents and incidents can lead to financial losses, reputational damage, and legal challenges.



DATA UNDERSTANDING



The dataset contains aviation accident data from **1962 to 2023**, sourced from the National Transportation Safety Board (NTSB). It includes key details about civil aviation accidents and selected incidents in the United States and international waters.

KEY FOCUS:

ACCIDENTS DETAILS

- **Accident Date & Location** – When and where the incident occurred.
- **Accident Severity** – Classification of incidents, including fatalities and damages.
- **Probable Cause** – Identified reasons for the accident, such as mechanical failure or human error.

AIRCRAFT & FLIGHT DETAILS

- **Aircraft Information** – Type, model, and manufacturer details.
- **Flight Purpose** – Whether the flight was commercial, private, or military.

TABLE SLIDE

- First five records and key fields of the data

Event.Id	Accident. Number	Event.Date	Location	Injury. Severity	Registration. Number	Make	Model	Purpose.of.fl ight	Weather. Condition	Broad.phase .of.flight	Year	Month
20001218X4 5444	SEA87LA080	10/24/1948	MOOSE CREEK, ID	Fatal(2)	NC6404	Stinson	108-3	Personal	UNK	Cruise	1948	10
20001218X4 5447	LAX94LA336	7/19/1962	BRIDGEPOR T, CA	Fatal(4)	N5069P	Piper	PA24-180	Personal	UNK	Unknown	1962	7
20061025X0 1555	NYC07LA00 5	8/30/1974	Saltville, VA	Fatal(3)	N5142R	Cessna	172M	Personal	IMC	Cruise	1974	8
20001218X4 5448	LAX96LA321	6/19/1977	EUREKA, CA	Fatal(2)	N1168J	Rockwell	112	Personal	IMC	Cruise	1977	6
20041105X0 1764	CHI79FA064	8/2/1979	Canton, OH	Fatal(1)	N15NY	Cessna	501	Personal	VMC	Approach	1979	8

DATA ANALYSIS

Weather Conditions at Accident Time

Count of Event.Id

87,542

Aircraft.Category

- Airplane
- Balloon
- Blimp
- Glider
- Gyrocraft
- Helicopter
- Powered Parachute
- Powered-Lift
- Rocket
- ULTR
- Ultralight
- UNK
- Unknown
- Weight-Shift
- WSFT

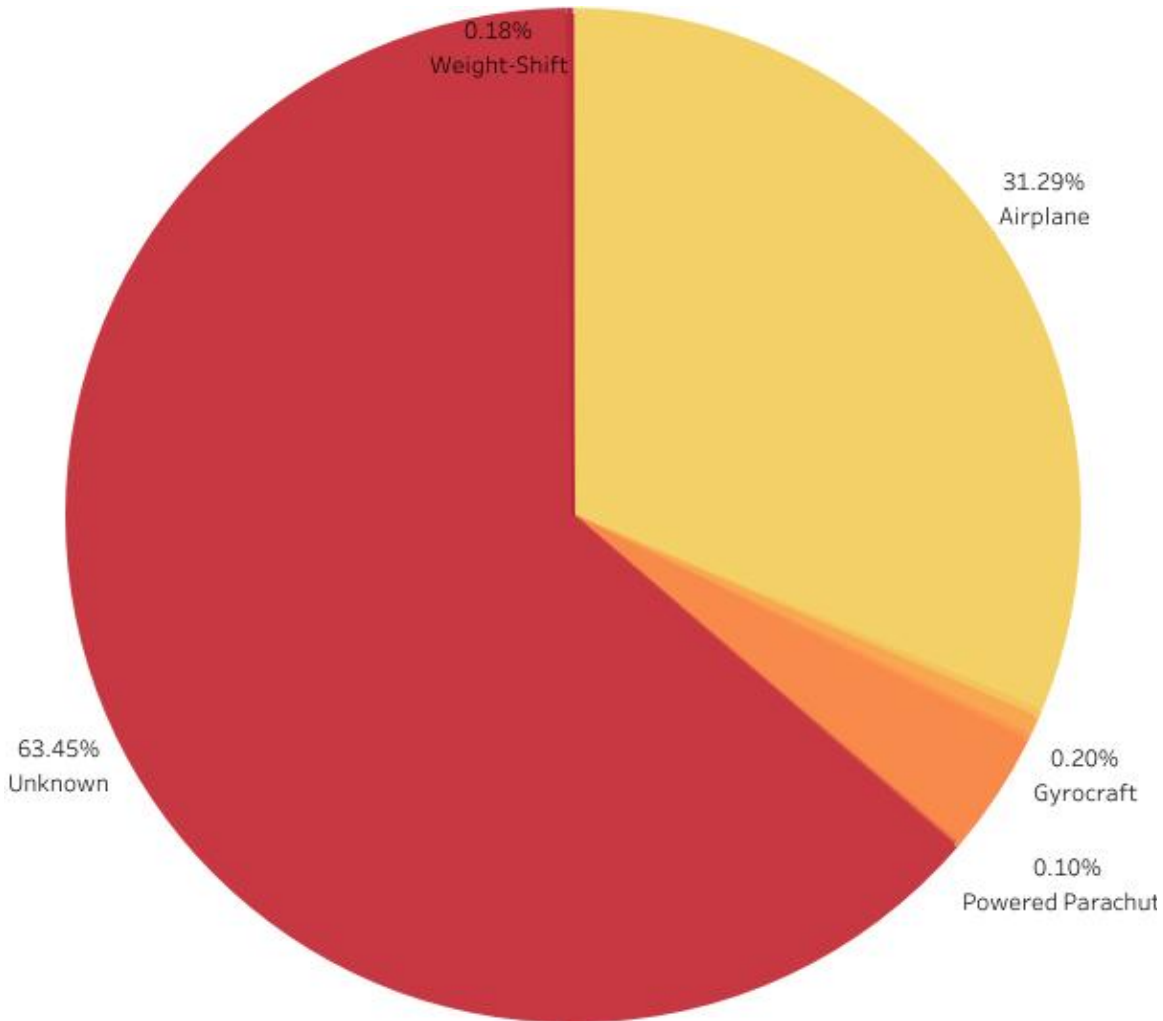
63.45%
Unknown


31.29%
Airplane

0.10%
Power Parachute

0.18%
Weight Shift

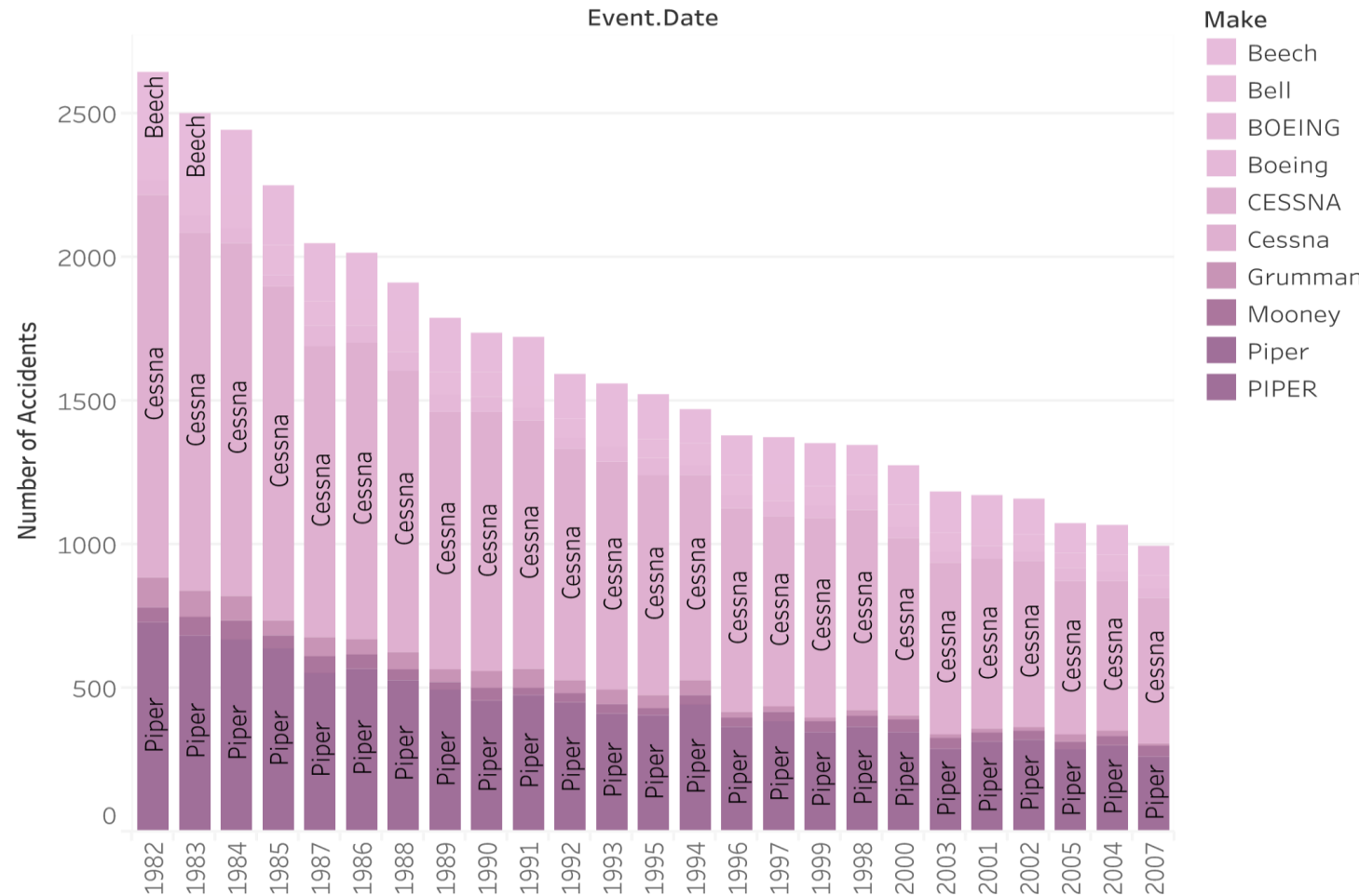
0.28%
Gyro craft



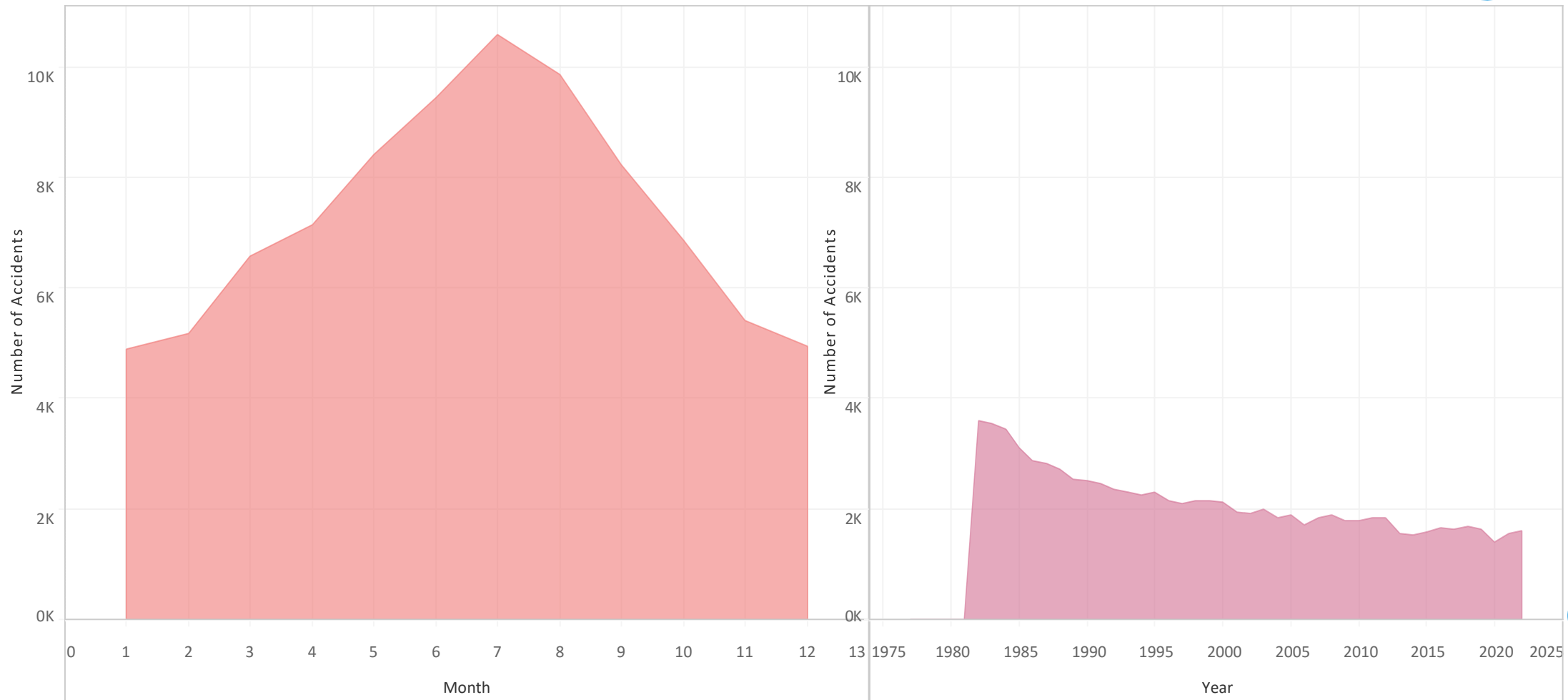
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- ❖ **Majority Unknown (63.45%)** – A large portion of aircraft involved in accidents are unidentified.
 - ❖ **Airplanes Account for 31.29%** – Most known accidents involve airplanes.
 - ❖ **Small Contribution from Other Categories** – Gyrocraft (0.20%), Powered Parachute (0.10%), and Weight-Shift (0.18%) have minimal accident occurrences.
 - ❖ **Total Recorded Events:** 87,542 accidents.
 - ❖ **Focus on Airplane Safety** – Since airplanes are the most recorded category, safety improvements in this sector can have a significant impact.

Accident Frequency

- High Accidents in 1980s-1990s: Likely due to less advanced technology and regulations.
- Improved Safety Since 2000s: Stricter regulations, better pilot training, and advanced aircraft safety features.
- Cessna & Piper Most Involved: Common in accidents due to high usage in training and private flights.
- Stable Accident Rates Recently: Aviation safety improvements have led to fewer accidents over time.



Accident Trends







- ❑ Accidents **increase steadily** from January to August, peaking in **August**.
 - ❑ After August, accidents **decline gradually**, reaching the lowest levels in **December**.
 - ❑ Possible reasons: seasonal weather changes, travel patterns, or operational factors.
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- ✓ **Accidents peaked in the early 1980s** but have been **declining over time**.
 - ✓ The overall trend suggests **improvements in aviation safety**.
 - ✓ Recent years show **relatively stable accident numbers**, indicating a possible plateau in accident reduction.


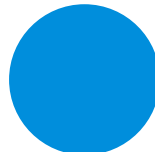



RECOMMENDATIONS



- Invest in Aircraft with Strong Safety Records – Focus on models with low accident rates and high reliability.
 - Avoid High-Risk Flight Conditions – Prioritize aircraft with advanced avionics for safer operations.
 - Prioritize Commercial Over Private Operations – Commercial aviation has lower accident rates and stricter regulations.
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NEXT STEPS

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- Develop a Risk Management Strategy – Invest in pilot training, modern safety features, and strict maintenance protocols.
 - Choose the Right Business Model – Research profitable markets and consider partnerships with aviation firms.
 - Monitor & Adapt Using Data – Track aircraft performance, stay updated on regulations, and optimize operations.
 - Consult industry experts.
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THANK YOU!

- Do you have any questions or need clarification on any points?

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