



Aviation Industry analysis and insights.

recommendations to business stakeholders
before investing in Aviation business.



Overview

In response to your company's strategic decision to diversify its portfolio, this report focuses on evaluating the aviation industry—specifically, the operational risks associated with different aircraft types.

Using historical data on aviation accidents from the National Transportation Safety Board (NTSB), the objective is to identify the lowest-risk aircraft models to guide future investments in both commercial and private aviation.

Business Understanding

As your company enters the aviation sector, **minimizing** risk is a top priority. The core business problem revolves around identifying which aircraft are most likely to offer safe and reliable service.

This includes understanding patterns in aircraft accidents, assessing factors that contribute to safety, and ultimately recommending aircraft models that align with the company's risk tolerance and operational goals.

What defines "low risk" in this context?



Data Understanding

The analysis leverages the [NTSB aviation accident dataset](#), which includes records of civil aviation accidents from 1962 to 2023. To ensure the reliability and relevance of the insights, we first explored the structure and quality of the dataset.

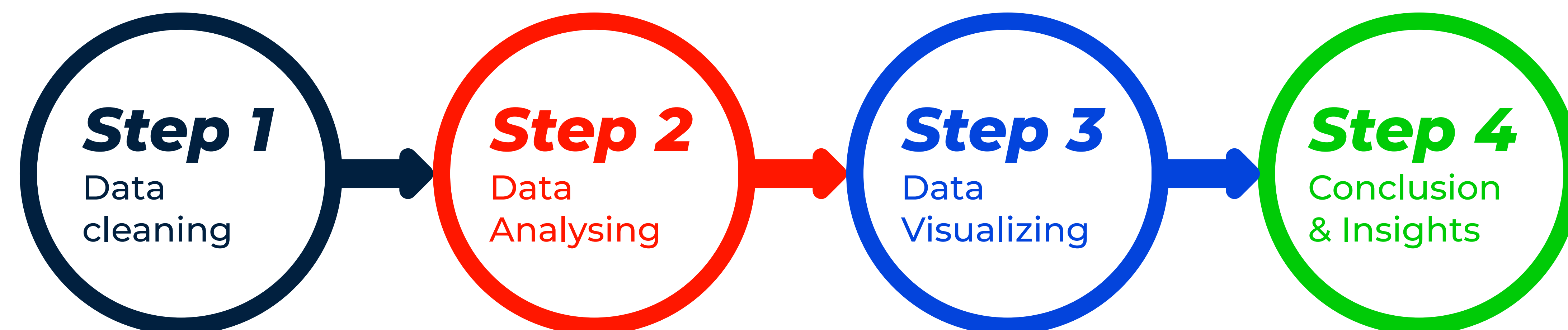
This stage involves understanding the key variables—such as aircraft type, number of fatalities, purpose of flight, and accident dates—that inform our assessment of risk across aircraft models.



Data Preparation

Before performing any in-depth analysis, the data was cleaned and prepared to ensure accuracy. This involved handling missing values, standardizing aircraft names, and generating new features like fatality ratios.

We then conducted exploratory analysis to identify trends, correlations, and outliers in accident rates across different aircraft types and usage categories. Visualizations supported this effort by highlighting key patterns in a clear and digestible format.



Data hint

`'Event.Date', 'Make', 'Model', 'Aircraft.Category', 'Engine.Type',
'Amateur.Built', 'Number.of.Engines', 'Purpose.of.flight',...`



Analysis and Recommendations

Based on the analysis, we developed three actionable business recommendations aimed at guiding safe and strategic investment in aircraft. Each recommendation is backed by empirical evidence from the dataset and aligns with operational considerations such as aircraft usage, maintenance needs, and historical safety performance.

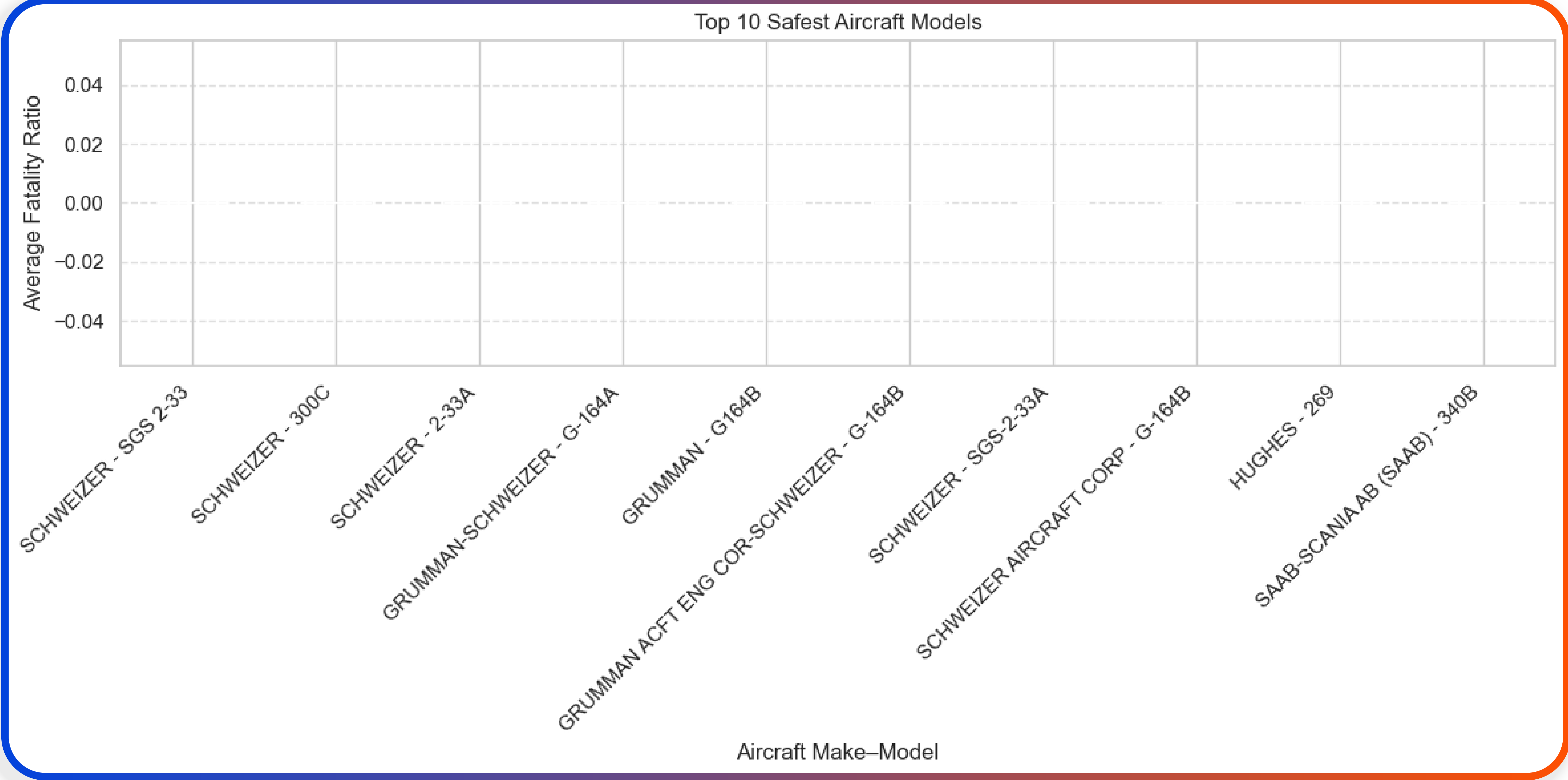
1) Prioritize Aircraft Models with Proven Safety Records

Certain aircraft models consistently demonstrate lower accident and fatality rates, even in high-usage scenarios. Investing in these models can provide a strong balance between performance and safety.



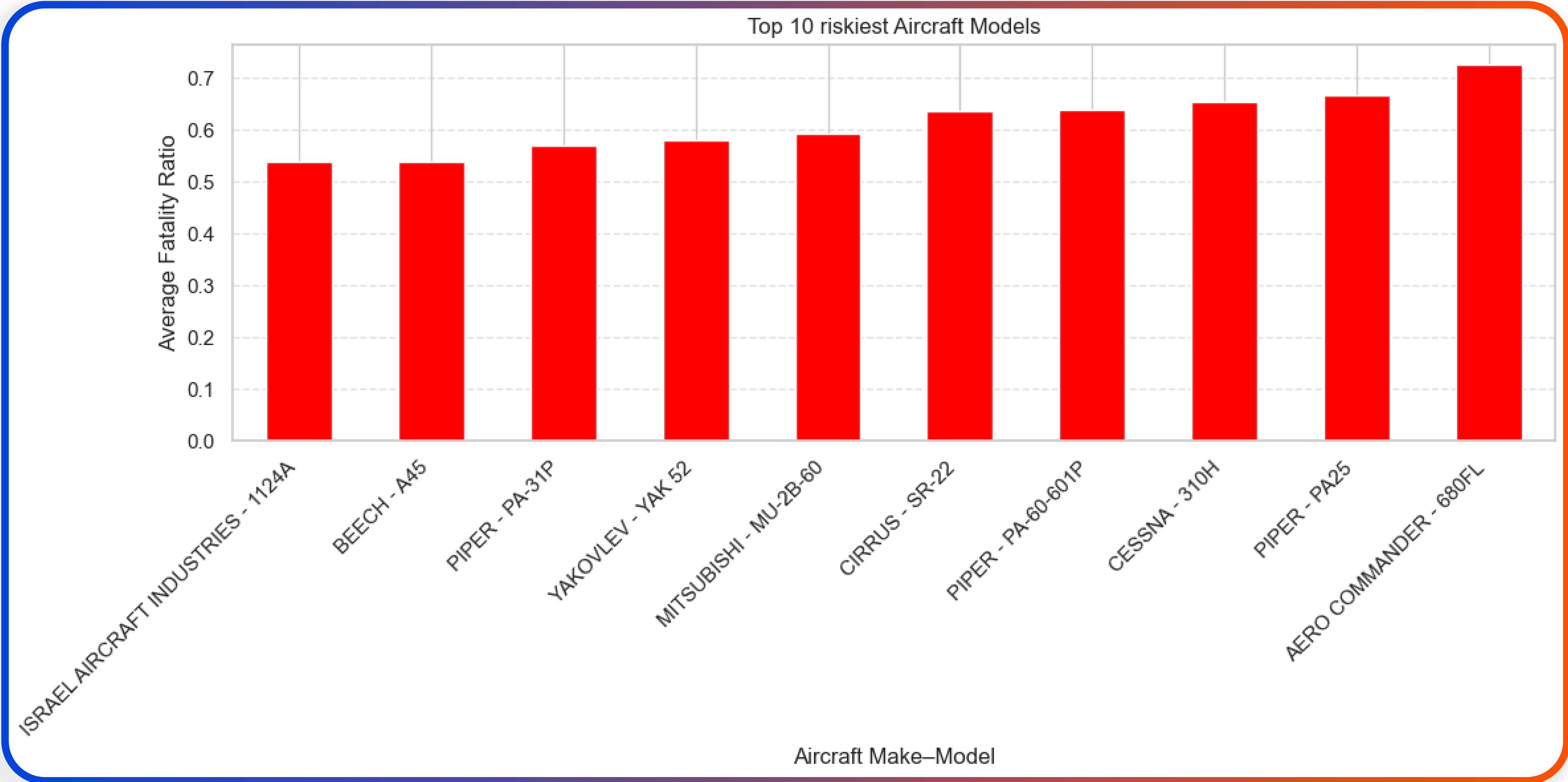
The top 5 safest Make Model aircraft by fatality ratio

- SCHWEIZER - SGS 2-33
- SCHWEIZER - 300C
- SCHWEIZER - 2-33A
- GRUMMAN-SCHWEIZER - G-164A
- GRUMMAN - G164B



The top 5 riskiest Make Model aircraft by fatality ratio

- AERO COMMANDER - 680FL
- PIPER - PA25
- CESSNA - 310H
- PIPER - PA-60-601P
- CIRRUS - SR-22

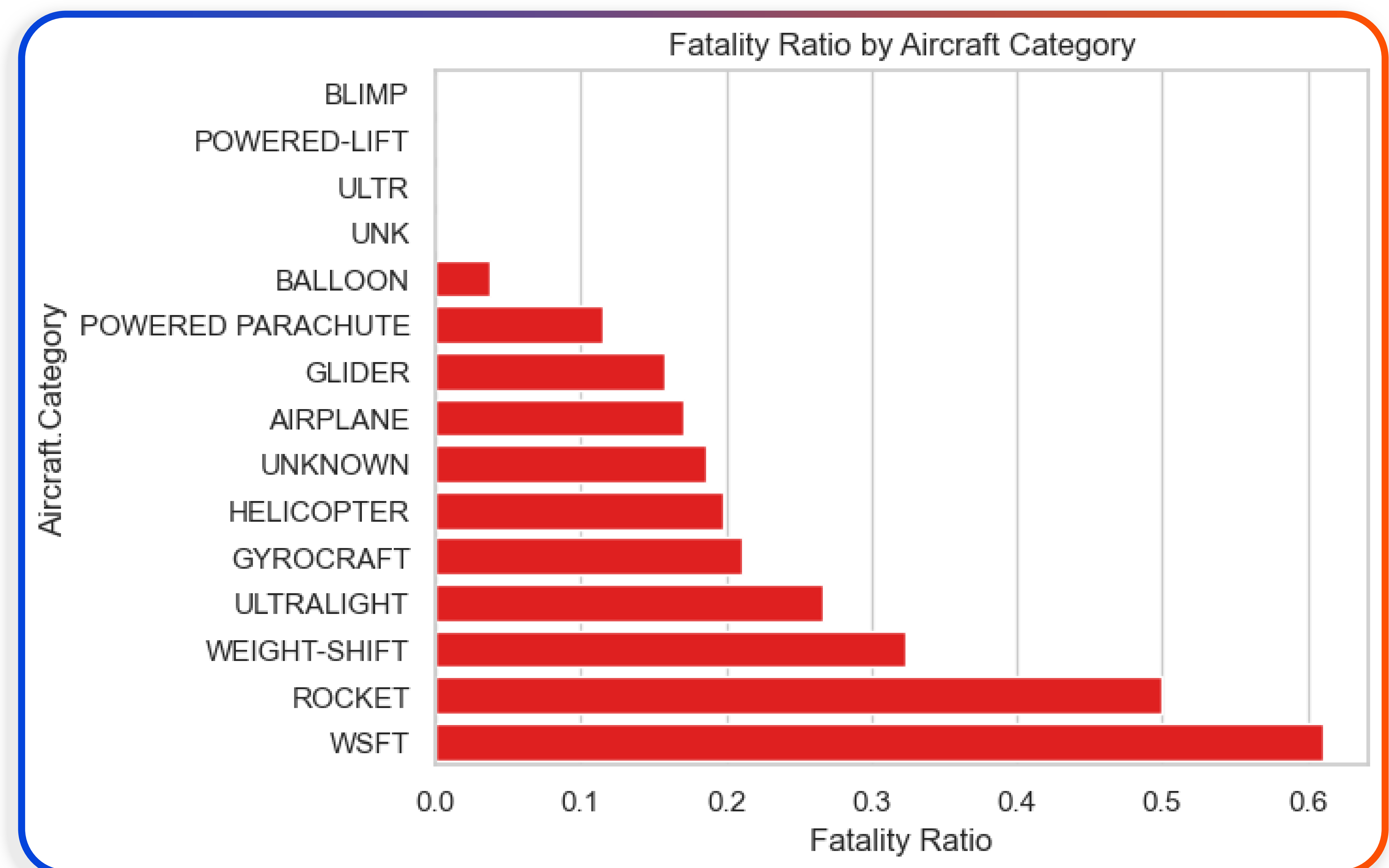


2) Avoid Older Aircraft or Categories with High Risk

The data indicates a strong correlation between aircraft age and accident severity, particularly among older piston-engine aircraft. Avoiding high-risk categories during initial investment phases can reduce exposure to maintenance costs and safety liabilities.

The top 5 riskiest Aircraft Category by fatality ratio

WSFT
ROCKET
WEIGHT-SHIFT
ULTRALIGHT
GYROCRAFT



3) Invest in flight purpose with low risk records

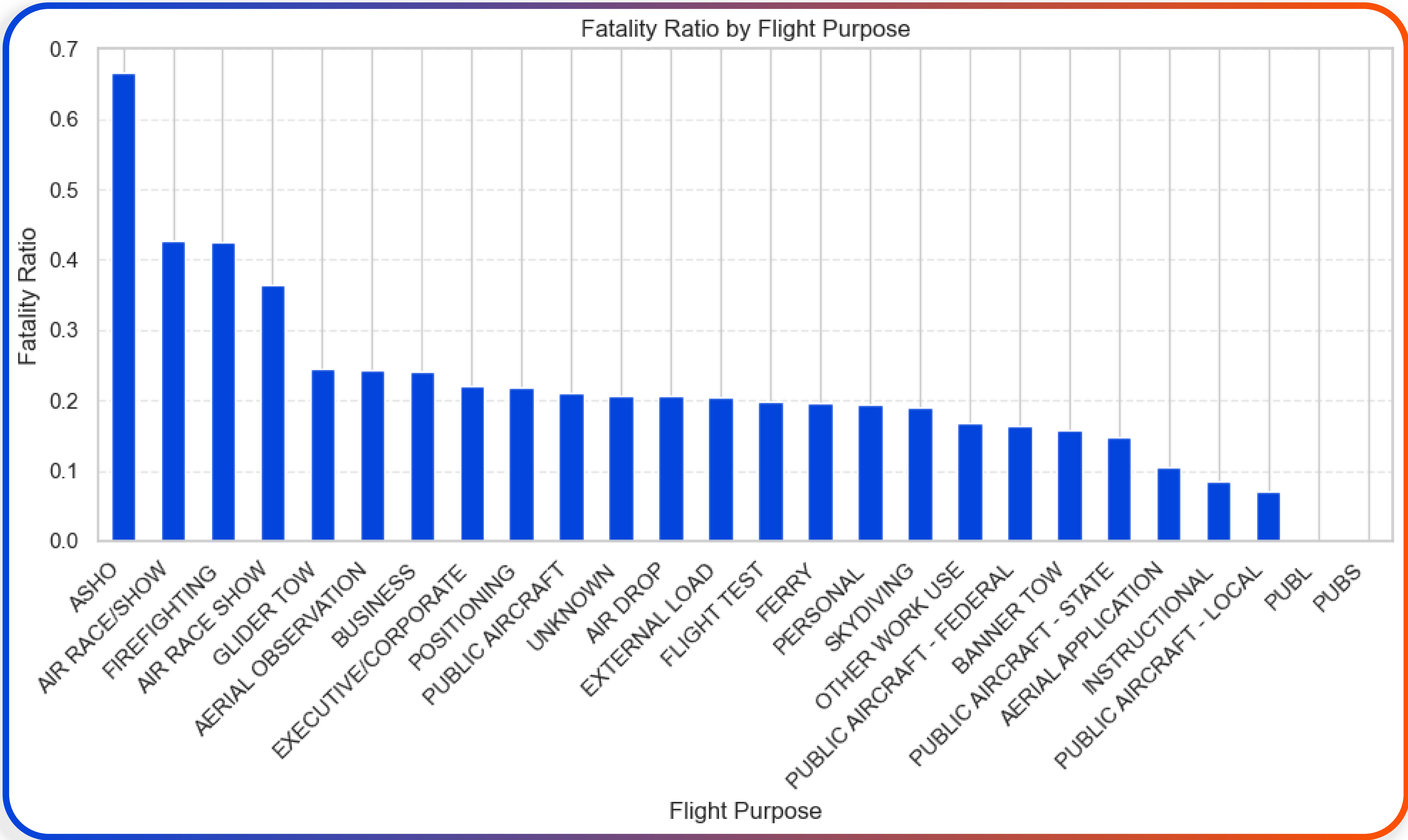
Risk levels differ by flight purpose and aircraft engine type. You can ensure a long term growth return on investment by prioritizing specific flight purpose.

The top 3 safest flight purpose by fatality ratio

- PUBS
- PUBL
- PUBLIC AIRCRAFT - LOCAL

The top 3 riskiest flight purpose by fatality ratio

- ASHO
- AIR RACE/SHOW
- FIREFIGHTING

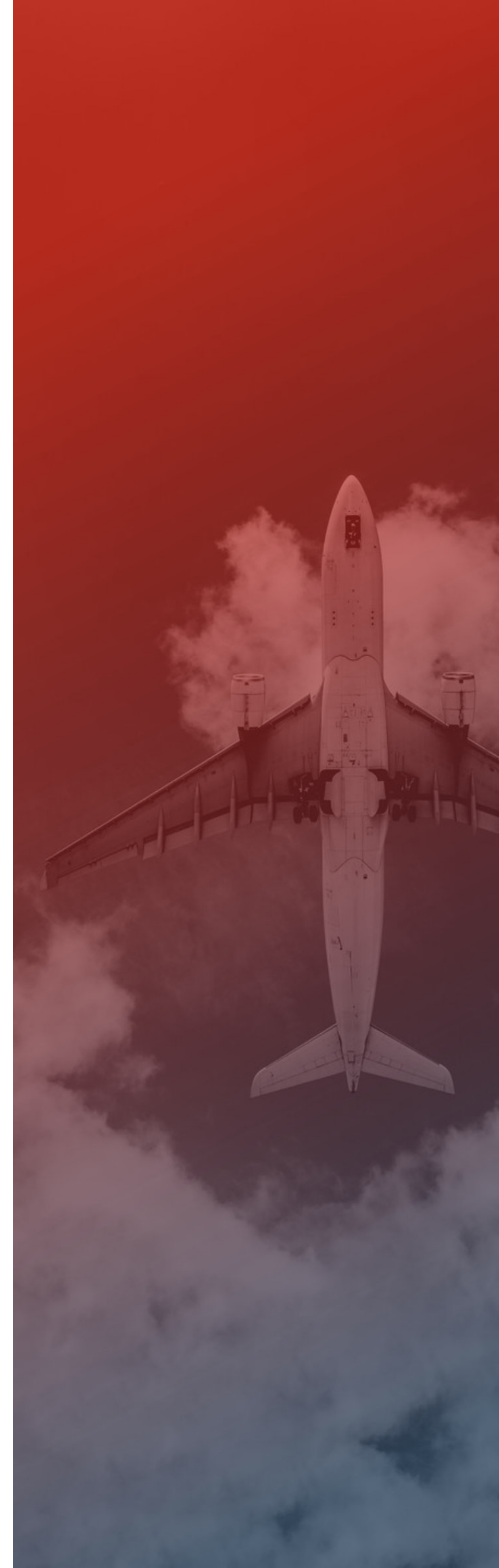


Conclusion

The findings provide a data-driven foundation for selecting aircraft that align with your company's safety standards and business objectives. By focusing on models with a strong track record, avoiding high-risk categories, and aligning aircraft types with use cases, your company can make informed decisions as it enters the aviation sector.

Next Steps

Next steps include validating these insights with industry experts, incorporating financial and operational cost data, and exploring real-time aircraft performance metrics for continuous risk monitoring.





Good luck !