

New Aviation Fleet Acquisition Risk Analysis

Prepared for: Executive Leadership & Aviation
Division

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BEGINNING

- Overview
- Business Understanding

OVERVIEW

The goal of this analysis is to help the company enter the aviation sector by identifying low-risk fleet using historical accident data from the National Transportation Safety Board (NTSB).

This is how this study has been achieved:

- Analyze 60 years of aircraft accident reports.
- Evaluate risk based on:
 - Air Craft Category
 - Engine Type and No. of Engines
 - Make (Manufacturer)
 - Injury Severity
 - Aircraft Damage Outcomes
- Finally, Generate three insights tied to business recommendation.





BUSINESS UNDERSTANDING

Our Company wants to Invest in Aircraft for commercial and Private Operations. Before purchasing Aircraft, Leaders need to Understand:

- Which Aircrafts Historically have the lowest accident and fatality rates.
- Whether Engine type or number of Engines affect Safety.
- Which Manufacturers have historically safer aircraft.
- What type of accidents typically lead to severe injuries or total aircraft loss.

BUSINESS QUESTION

Which aircrafts generally in regards to type and specifications pose a low risk of operation for our proposed new aviation business?

MIDDLE

- Data Understanding
- Data Analysis



DATA UNDERSTANDING

The Source of Data is a Dataset by National Transportation Safety Board, Aviation Accident Data (1962_2023).

Description of Data

The data typically contains records of incidents, aircraft operation, make, airports operated in, flight details and safety outcomes (fatal, serious ,injured, uninjured). The contributing factors to injuries for different types of aircrafts.

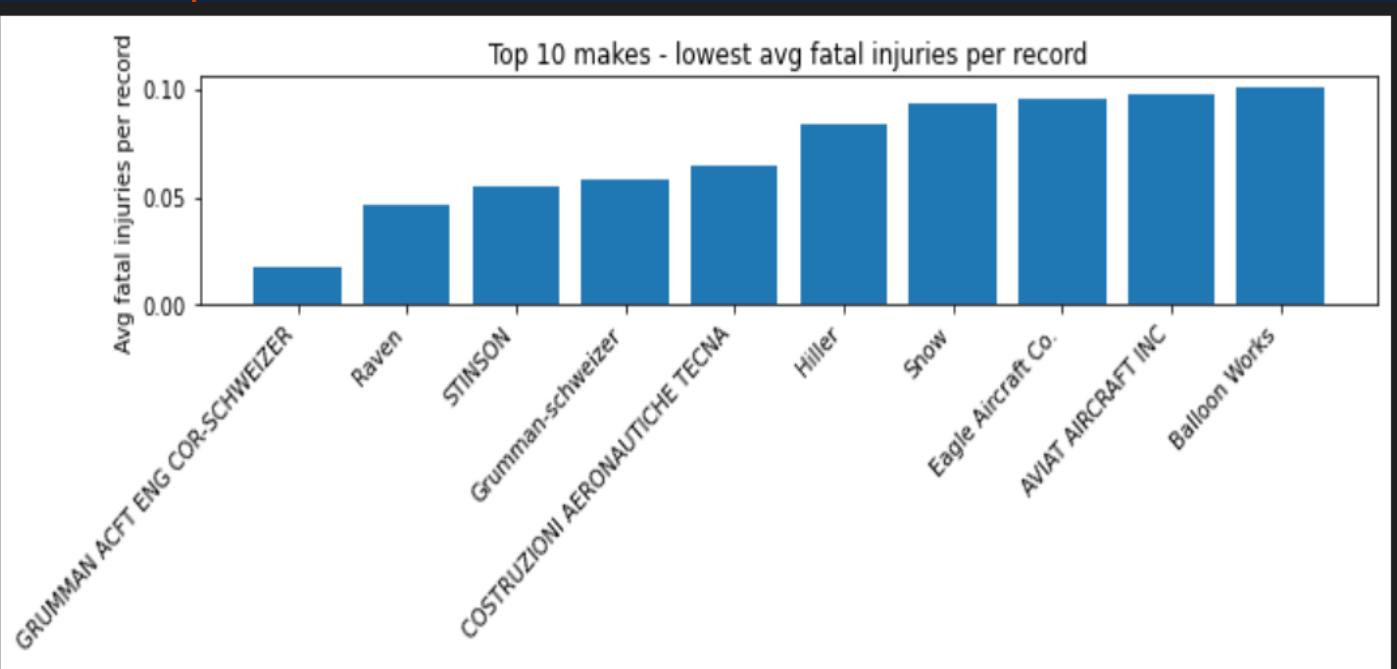
DATA ANALYSIS

To Evaluate Aircraft Safety, we came up with the following conclusions to help determine which best Makes of Aircraft to purchase and their risk factors levels.

- Top 10 Makes with the Lowest Average Fatal Injuries per record.
- Worst 10 Makes by proportion of Accidents with Fatalities.
- Average Fatal Injuries by Aircraft Category

Data Visualization from Analysis

Plot A: Top 10 Makes with Lowest Average Fatal Per Record



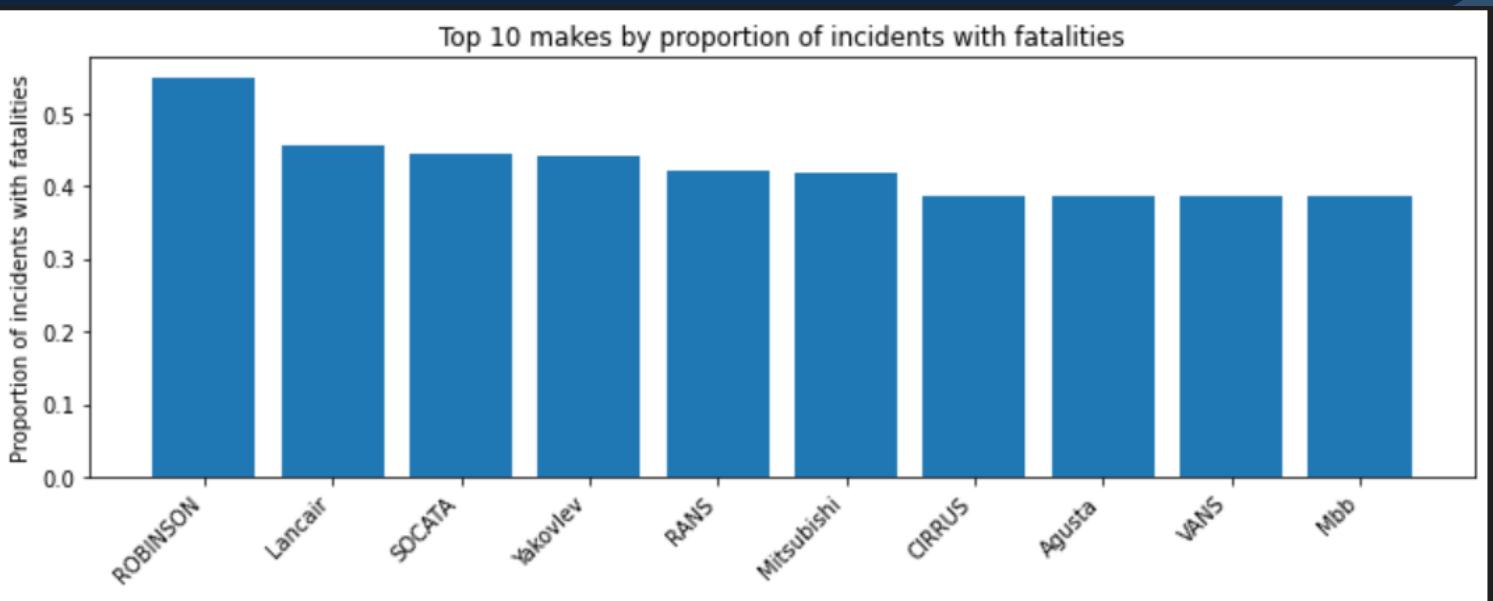
This bar chart ranks aircraft manufacturers (make) by their average number of fatal injuries per incident, focusing only on makes with a sufficient number of records (e.g., ≥ 30) to ensure reliability.

Aircraft makes at the left (lowest bars) demonstrate consistently lower fatal outcomes across many historical incidents. This indicates:

- Better aircraft design robustness
- More reliable systems
- Stronger safety track records in real-world operations

Data Visualization from Analysis

Plot B: Worst 10 Makes by proportion of Accidents with Fatalities



This chart highlights aircraft makes where a **high percentage of incidents result in at least one fatality**, regardless of how many total incidents they have.

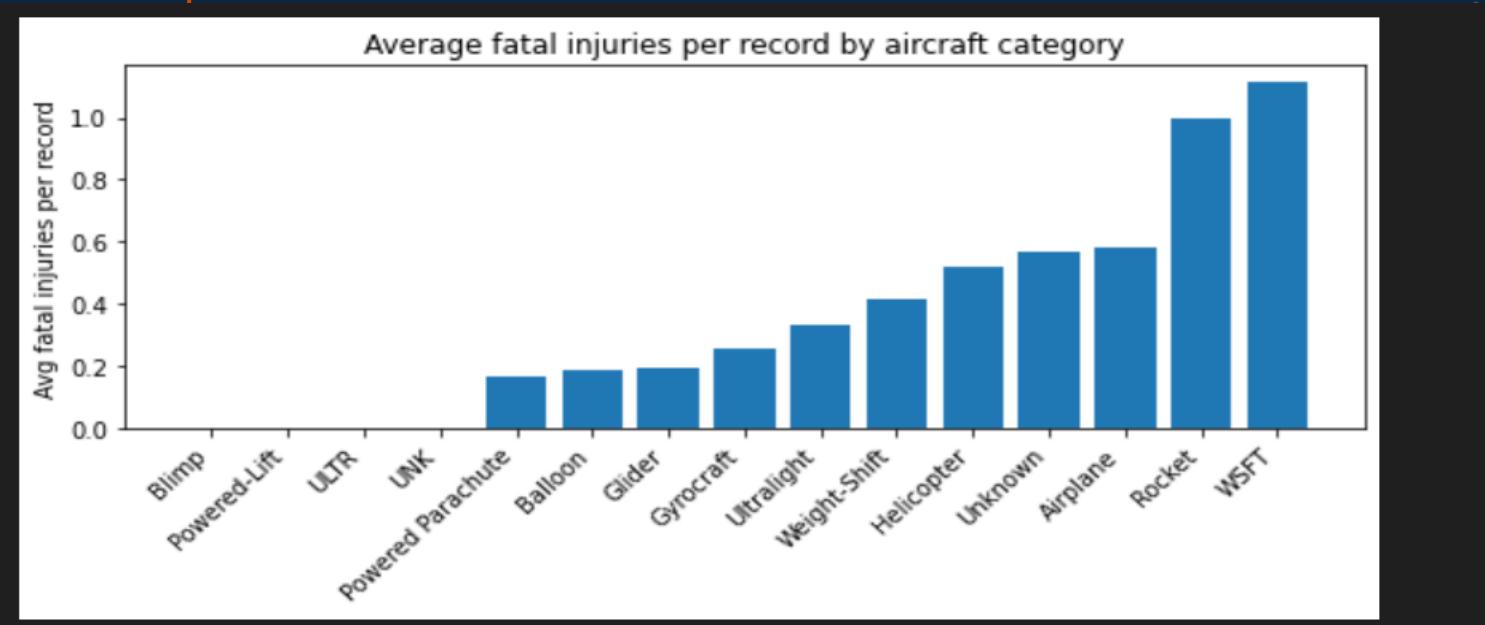
- Each bar = one aircraft manufacturer
- Height of bar = likelihood that an incident involves a fatality
- Focuses on **risk probability**, not severity size.

Some aircraft makes may not have many incidents, but **when something goes wrong, it is more likely to be fatal**. This indicates:

- Less margin for error
- Potential design, performance, or operational vulnerabilities
- Higher insurance and liability exposure

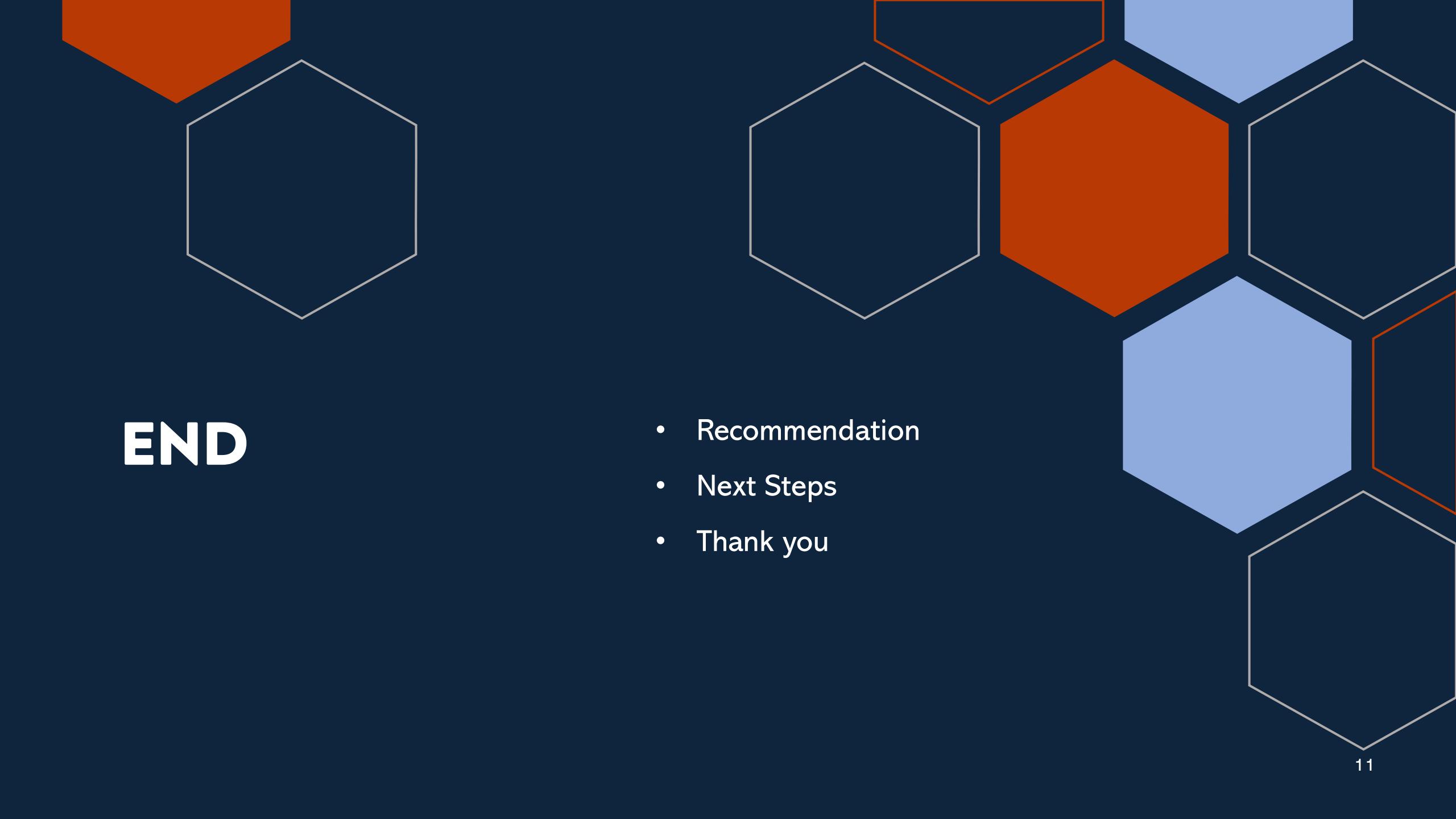
Data Visualization from Analysis

Plot C: Average Fatal Injuries by Aircraft Category



This graph compares **broad aircraft categories** (e.g., Transport, Commuter, Experimental, General Aviation) by **average fatal injuries per incident**. Certified commercial categories (such as **Transport and Commuter aircraft**) consistently show:

- Lower average fatalities
 - Better survivability
 - More regulated design, maintenance, and pilot training standards
- Non-certified or experimental categories show significantly **higher fatal injury averages**.



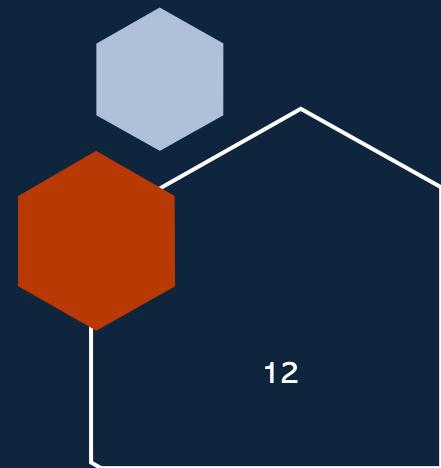
END

- Recommendation
- Next Steps
- Thank you

Recommendation

Recommendations in order of Derived Graphs above respectively are as follows:

- **Prioritize purchasing aircraft from the top-ranked manufacturers in this chart**, as they statistically produce fewer fatal injuries per incident and therefore reduce financial, legal, and reputational risk for the company.
- **Avoid or strictly limit investment in aircraft makes appearing in this chart**, unless their use is restricted to non-commercial, low-exposure operations with enhanced training and safety controls.
- **Limit initial fleet purchases to certified commercial aircraft categories** and avoid experimental or amateur-built categories for revenue-generating operations.

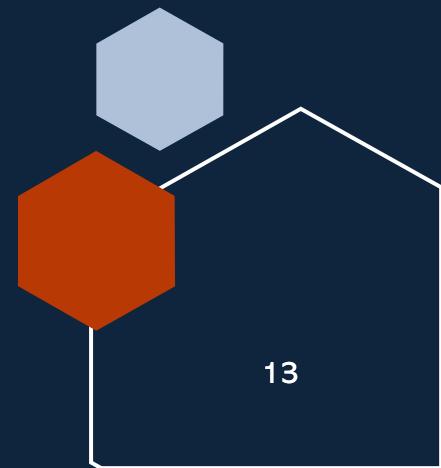


Next Steps

To minimize operational, financial, and reputational risk:

Build the initial aviation fleet using aircraft that:

- Come from **top-ranked manufacturers** in Graph 1
- Are **absent from or low on the risk list** in Graph 2
- Belong to **certified commercial aircraft categories** shown as safest in Graph 3



Thank You!

- Feel Free to ask any Questions and broader explanation on a slide to clarify further in Regards to the Analysis Provided. You can also use the below contacts to reach out to me!
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