Aviation Risk Strategy: Quantifying Safety for New Fleet Procurement

---

Overview

This project provides a **data-driven risk framework** using 60+ years of NTSB accident data to establish the optimal safety foundation for a new aviation division. The analysis segments risk into three measurable scores to deliver **concrete, actionable policies** for fleet procurement and operational deployment, minimizing liability and catastrophic loss.

Final Notebook: [Link to your final Aviation.ipynb file here]

Stakeholder Presentation: [Link to your Final Presentation PDF here]

Business Understanding

Stakeholder and Key Business Questions

- **Primary Stakeholder:** Head of the Aviation Division.
- **Goal:** To establish the lowest-risk operational and equipment profile possible at launch.

Key Business Questions

1. **Procurement (R2):** Which manufacturer offers the lowest **inherent fatal risk**?
2. **Operations (R3 - Frequency):** Where do we focus training to prevent the most **common accidents**?
3. **Safety Policy (R1 - Severity):** Where do we focus specialized training to mitigate the most **catastrophic consequences**?

Data Understanding and Analysis

Source of Data

The analysis uses historical civil aviation accident data from the **NTSB (National Transportation Safety Board)**, covering the period from **1962–2023**.

Description of Data

Data was cleaned and segmented using Python/Pandas to create three distinct risk metrics:

Aviation Risk Strategy: Quantifying Safety for New Fleet Procurement

Risk Score	Metric	Strategic Focus
R2 (Equipment)	**Fatal Accident Rate (%)** by Manufacturer.	**Procurement**
R3 (Frequency)	**Total Count** of Accidents by Phase.	**High-Volume** Mitigation
R1 (Severity)	**Average Total Injuries** per Accident by Phase.	**Consequence** Mitigation

Three Visualizations

The three core charts visually confirm the risk profile:

1. **Equipment Risk (R2) Chart:** Highlights **BOEING** as the safest manufacturer (lowest Fatal Rate).
2. **Operational Frequency (R3) Chart:** Identifies **LANDING** and **TAKEOFF** as the most frequent accident phases (highest count).
3. **Operational Severity (R1) Chart:** Identifies **CLIMB** and **MANEUVERING** as the phases with the highest average injuries (highest severity).

Conclusion

Summary of Conclusions (Three Relevant Findings)

1. **Procurement Policy: BOEING** is confirmed as the low-risk choice, exhibiting a Fatal Accident Rate of only **6.08%**.
2. **High-Frequency Priority: LANDING** and **TAKEOFF** require the highest resource allocation for **SOP development** and supervision to reduce the sheer **number** of incidents.
3. **High-Severity Priority: CLIMB** and **MANEUVERING** require specialized **Advanced Scenario Training** to mitigate the severe, catastrophic outcomes of rare failures.