

Project presentation

Presented by Veneser Pamelah



Introduction

As our company looks to diversify its portfolio by expanding into the aviation industry, understanding the risks associated with operating aircraft is critical. This project focuses on analyzing historical aviation incident data to identify patterns and determine which aircraft models and operational conditions pose the lowest risks. By leveraging detailed data on factors such as weather conditions, flight purposes, aircraft types, and geographical regions, we aim to provide actionable insights that will guide strategic decisions on aircraft acquisition and operational safety. This analysis will help ensure that our expansion into the commercial and private aviation sectors is both informed and risk-conscious.



Business Context

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As part of our diversification strategy, we are exploring opportunities in the aviation industry for both commercial and private operations. To ensure a safe and successful entry, it's critical to assess and understand the risks associated with aircraft. By analyzing historical incident data, we aim to identify low-risk aircraft models and operational conditions, enabling us to make informed decisions that minimize risk and ensure regulatory compliance.



Dataset

For this analysis, we utilized a comprehensive dataset of historical aviation incidents, which includes key details such as aircraft make and model, incident dates, weather conditions, flight purpose, injury severity, and geographical location. The dataset spans thousands of incidents and offers insights into risk factors associated with different aircraft and operational conditions. This data provides the foundation for identifying patterns and trends to inform our recommendations for safe and strategic aircraft acquisitions.



Process Overview

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01

Data Exploration & Visualization
Initial analysis was conducted to explore trends and patterns in the data. Visualizations were created to understand key factors such as the frequency of incidents by aircraft make, the impact of weather conditions, and the distribution of incidents over time.

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03

Risk Analysis by Key Factors
We performed deeper analysis by focusing on critical risk factors, such as the relationship between total injuries and flight purpose, number of engines, and weather conditions. Statistical summaries and charts helped identify high-risk categories.



Process Overview

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04

Modeling & Insights Generation

Based on the findings, we identified specific aircraft models, flight conditions, and operational practices associated with lower risk. This information was used to generate actionable insights that can inform aircraft acquisition decisions.

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Dashboard Creation

To present the results effectively, we built interactive dashboards in Tableau, showcasing key metrics and visualizations, such as total injuries by flight purpose, incidents over time, and incident distribution by aircraft make and location.

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Final Recommendation.

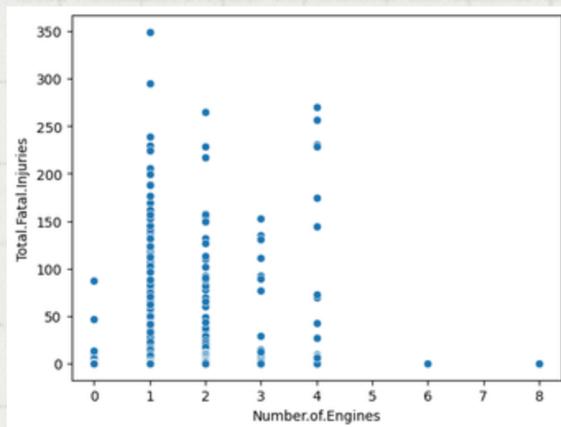
The insights generated were distilled into recommendations for the head of the aviation division, focusing on which aircraft and conditions offer the lowest risk for the company's expansion into aviation.



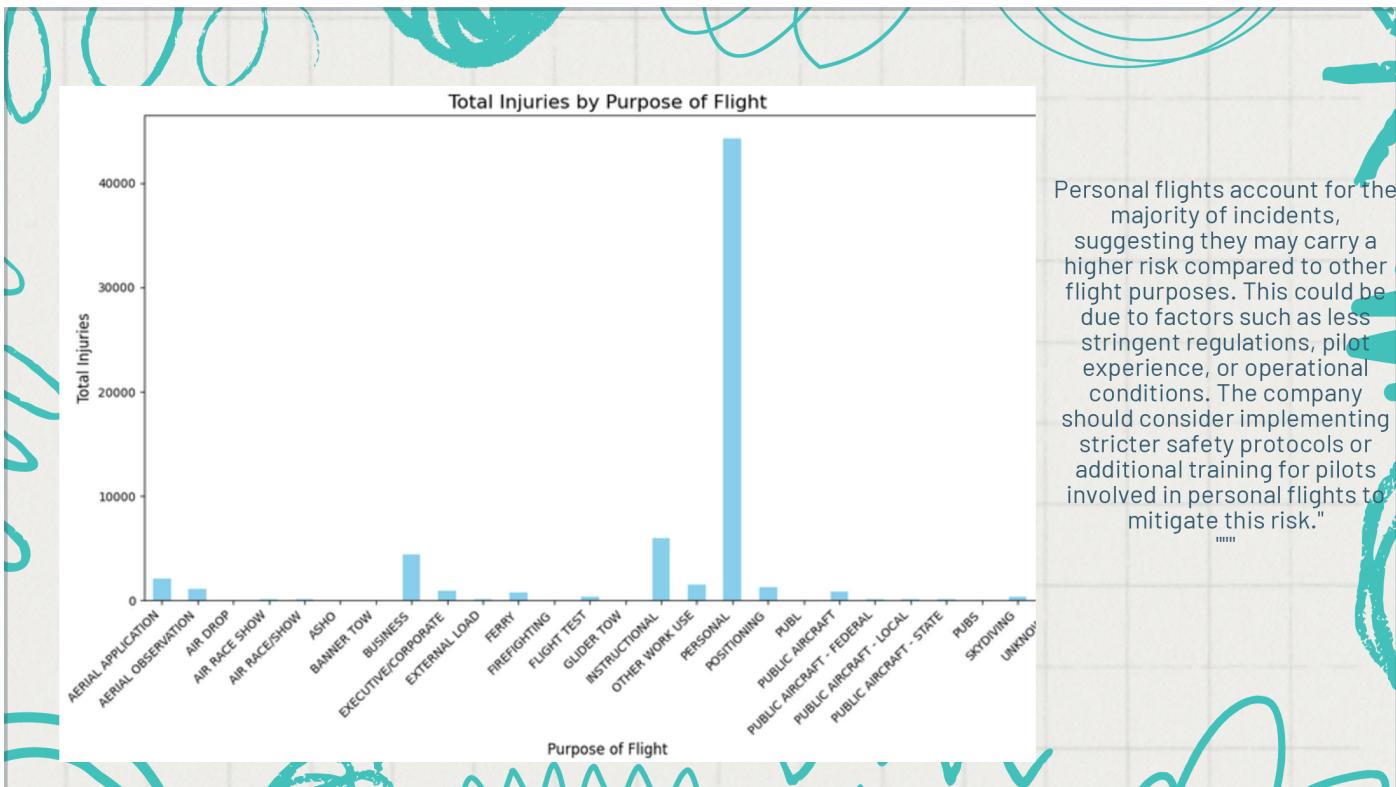
Results and Reccomendations

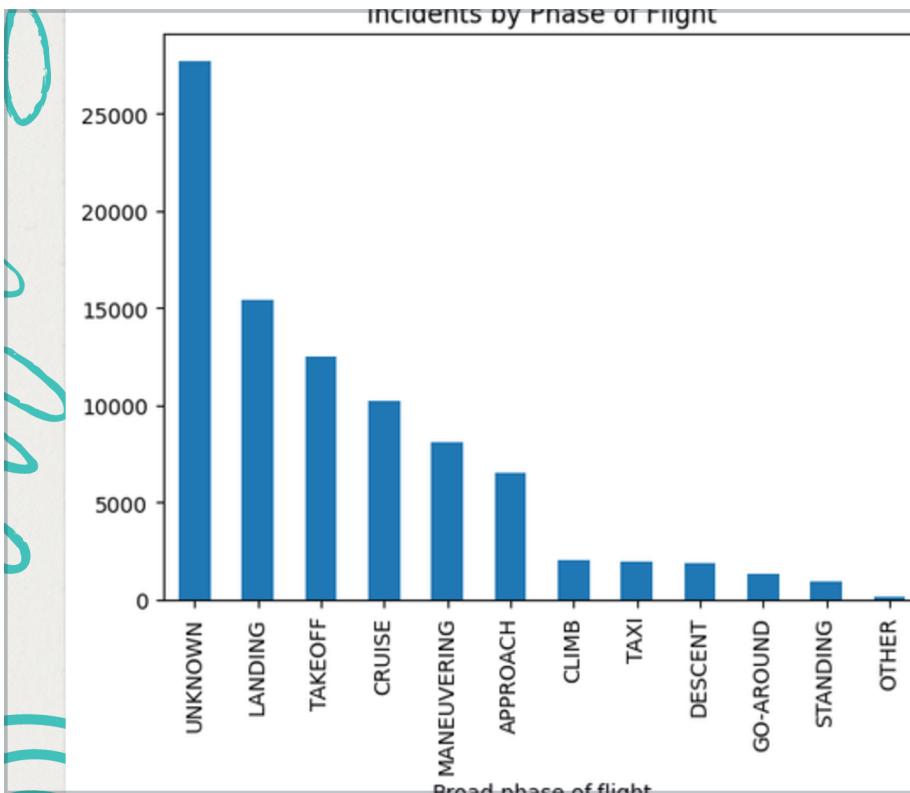
The Visualizations provides the
insights of the project

Total Fatal Injuries vs. Number of Engines

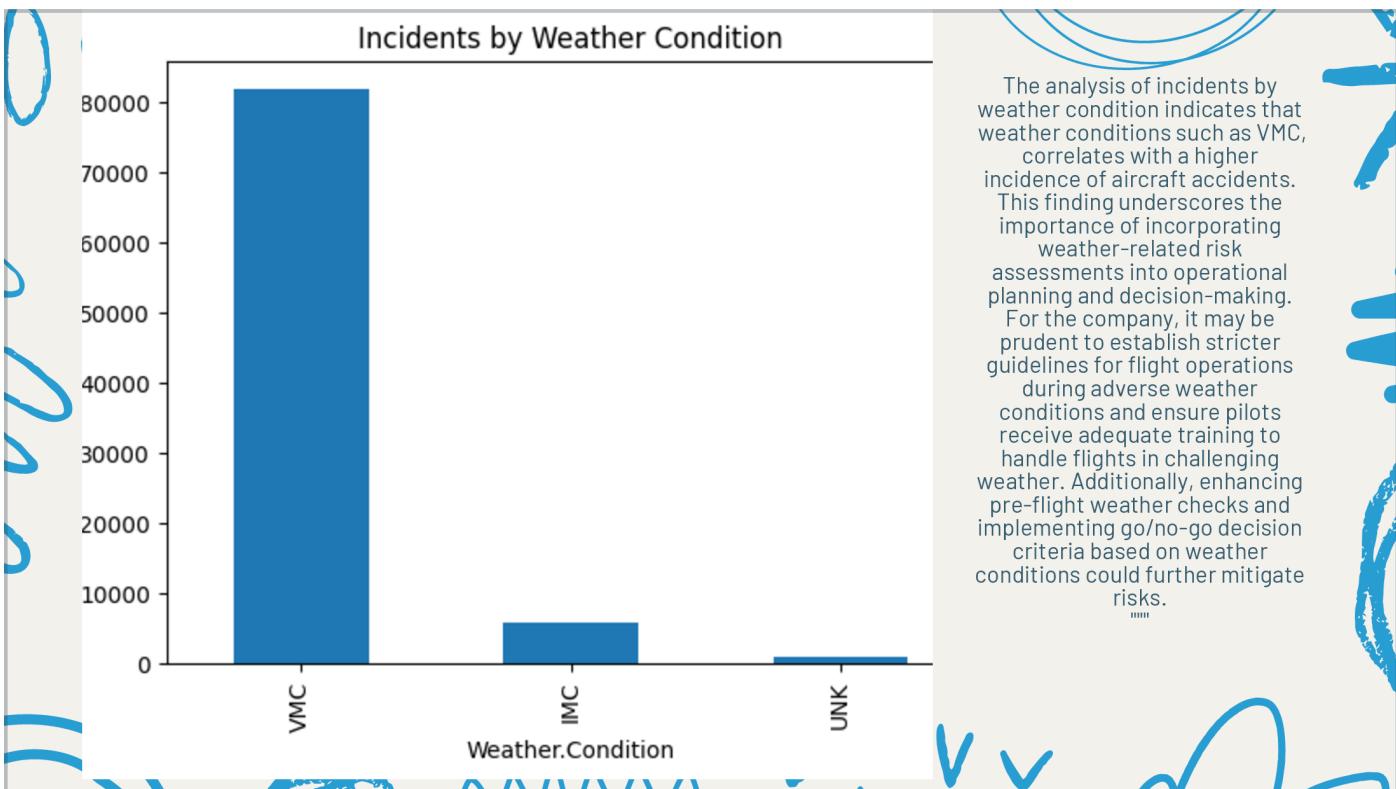


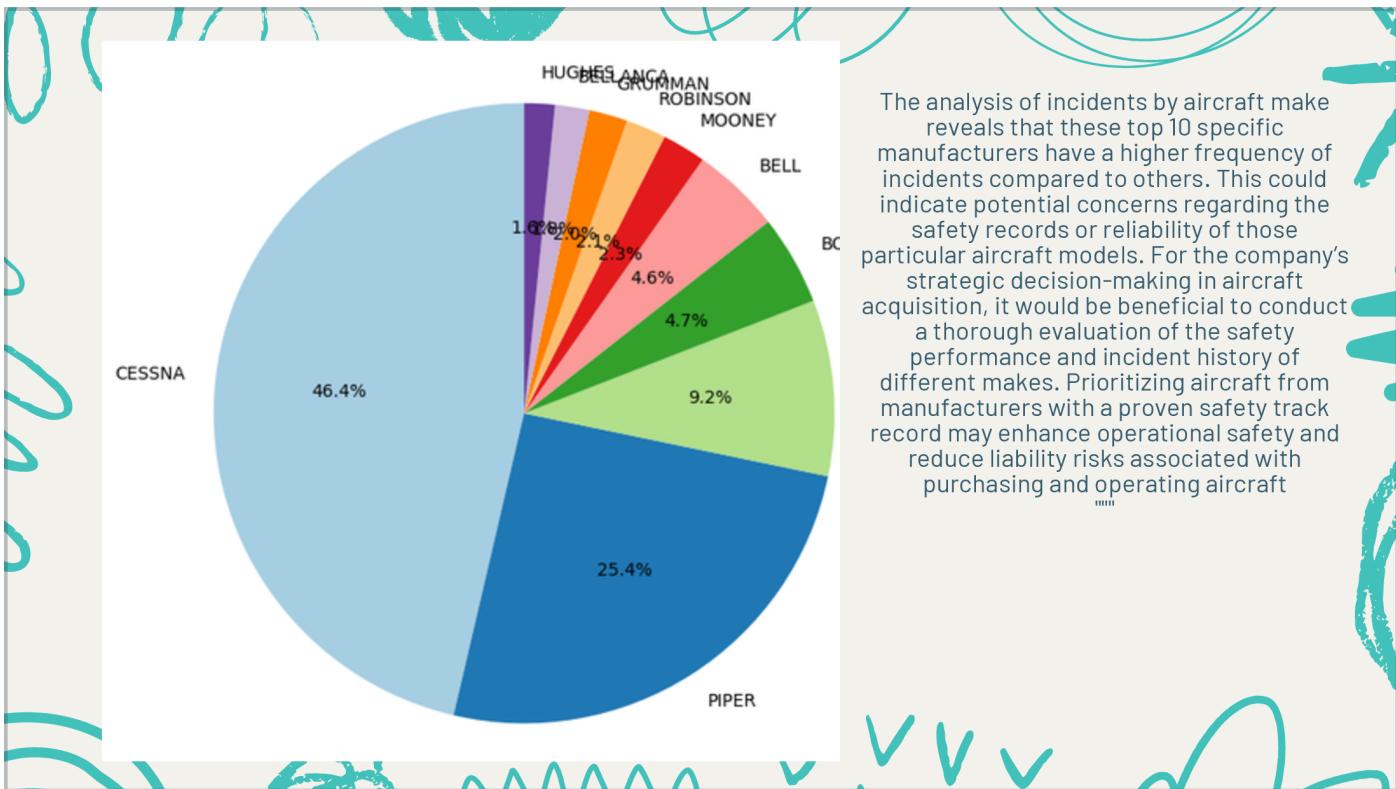
Aircraft with fewer engines appear to be associated with a higher number of fatal injuries compared to those with 5 engines and above. This suggests that those with 4 engines and below aircraft might present a greater risk in the event of an accident. For the company's expansion into aviation, investing in aircrafts with 5 engines and above could be a safer option, as they may offer greater reliability and safety in emergency situations.



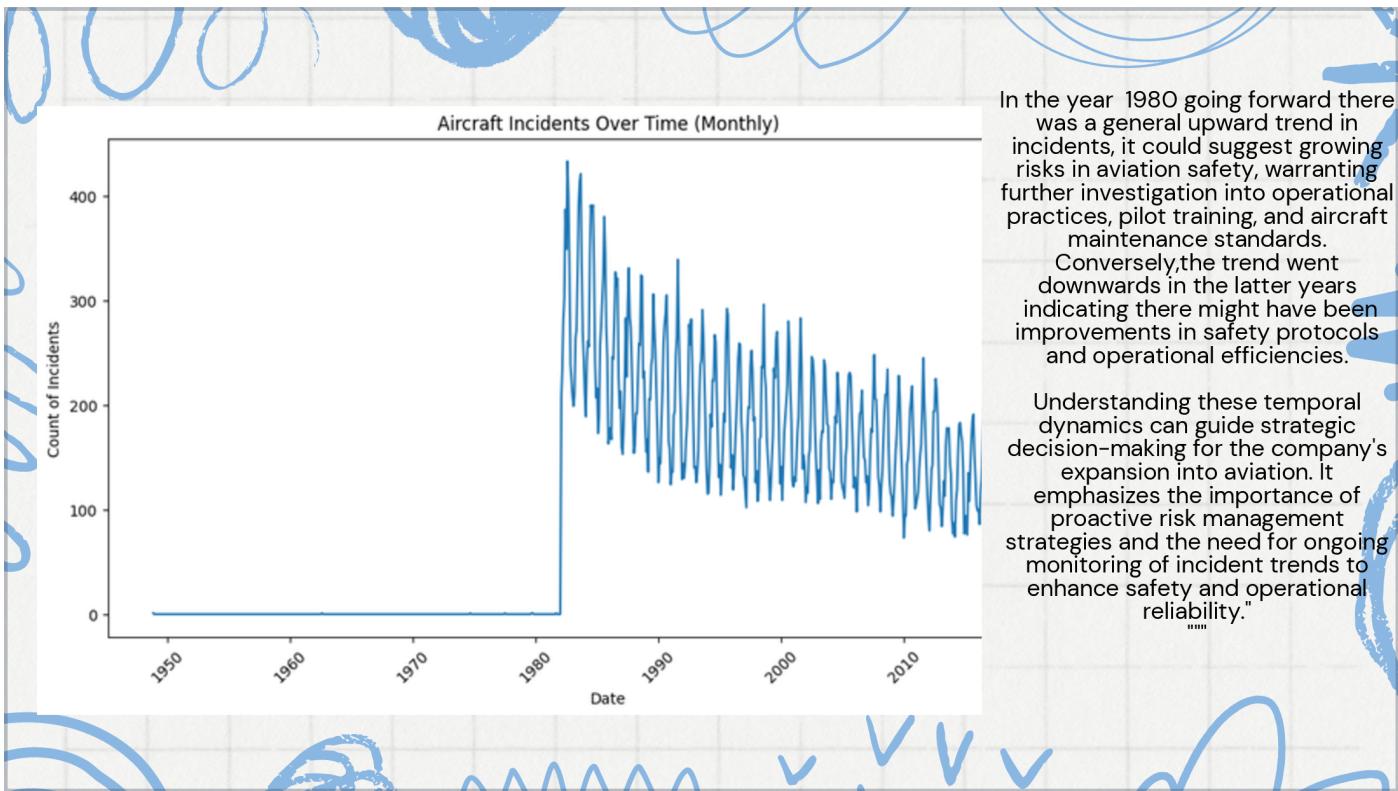


The significant number of incidents classified under the unknown' broad phase of flight highlights a critical gap in data reporting and analysis. This suggests that when incidents occur without clear documentation of the flight phase, it complicates understanding the underlying causes and patterns. For effective risk management and safety improvements, the company should prioritize enhancing data collection and reporting practices, ensuring that all incidents are accurately categorized. This could lead to better insights into safety protocols and potentially reduce future incidents.





The analysis of incidents by aircraft make reveals that these top 10 specific manufacturers have a higher frequency of incidents compared to others. This could indicate potential concerns regarding the safety records or reliability of those particular aircraft models. For the company's strategic decision-making in aircraft acquisition, it would be beneficial to conduct a thorough evaluation of the safety performance and incident history of different makes. Prioritizing aircraft from manufacturers with a proven safety track record may enhance operational safety and reduce liability risks associated with purchasing and operating aircraft



Interactive Dashboard

For a deeper dive into the analysis and to explore the data interactively, please refer to the Tableau dashboard using the link below. The dashboard provides detailed visualizations of key factors such as aircraft make, weather conditions, flight purpose, and injury severity, helping to uncover critical insights for decision-making.

https://public.tableau.com/app/profile/vannessa.pamela/viz/AviationDataVisualization_17272875805400/AviationDataVisualization

Evaluation

Comprehensive Risk Assessment: The analysis provided valuable insights into risk factors such as aircraft make, flight purpose, and weather conditions. These insights can help guide the company's aircraft acquisition strategy by focusing on low-risk options.

Data Quality Challenges: Some columns, such as the broad phase of flight and aircraft category, had significant missing values, limiting their usefulness in the analysis. Addressing these gaps could improve the accuracy of the results.

Visualization Effectiveness: The use of interactive dashboards in Tableau enhanced the presentation and allowed for a deeper exploration of the data. However, some complex patterns, such as those related to injury severity and flight phases, could benefit from more advanced visualizations.

Future Improvements

Data Enrichment: Integrating external data sources, such as maintenance records, weather data, or pilot experience, could provide a more holistic view of risk factors and enhance the accuracy of the analysis.

Predictive Modeling: Developing machine learning models to predict the likelihood of incidents based on aircraft make, operational conditions, and environmental factors could offer proactive insights for the aviation division.

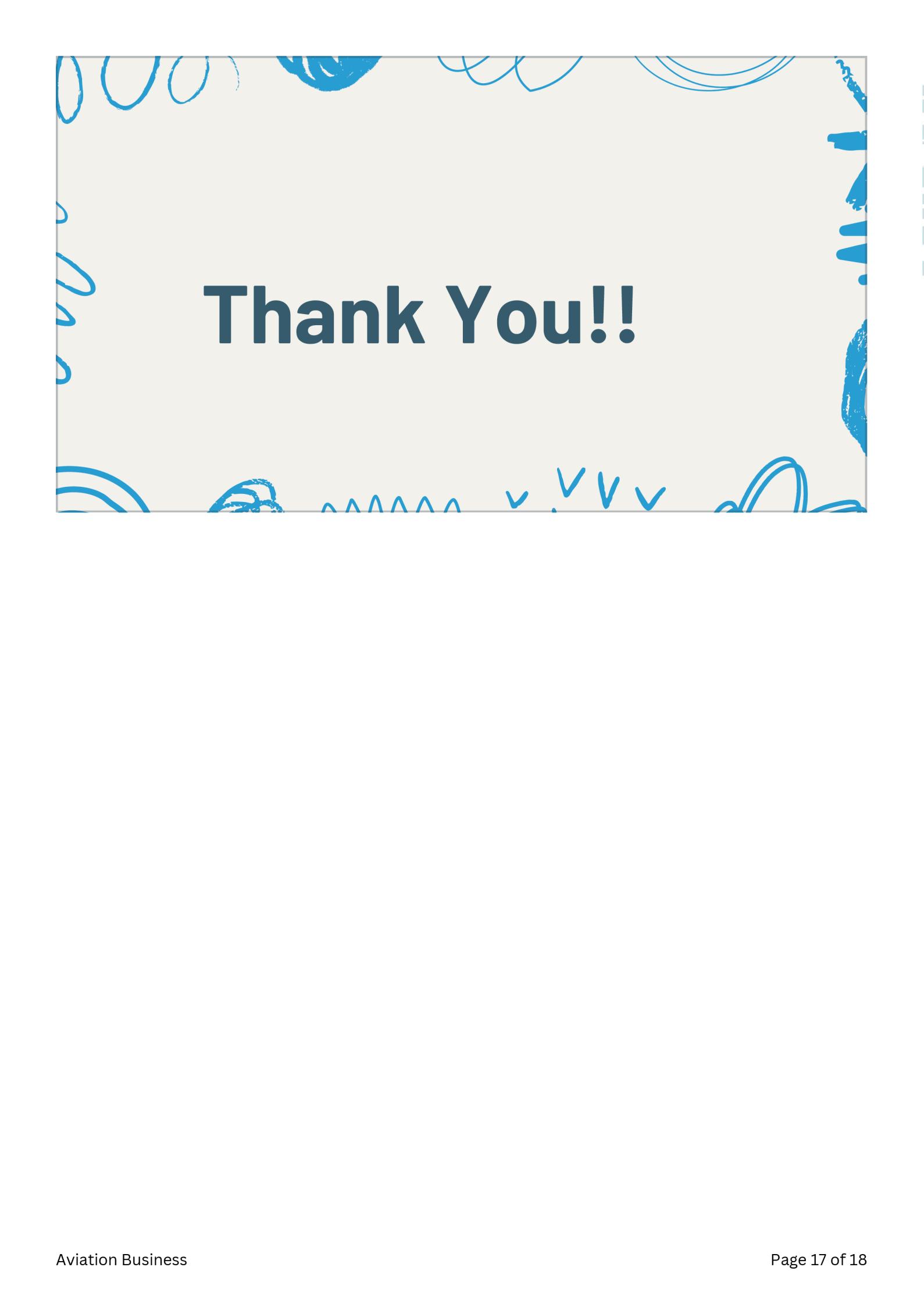
Real-Time Risk Monitoring: Implementing real-time data tracking and monitoring systems could help the company assess ongoing risks and adjust operations accordingly.

Enhanced Geographical Analysis: A more granular geographical analysis, such as mapping incident patterns by state, region, or airport, could reveal localized risks and inform strategic decisions on routes and operating bases.

Phase-of-Flight Analysis: Further investigation into the broad phase of flight could provide critical insights into when most incidents occur.

For any further inquiries or additional details on the analysis and recommendations,
please feel free to reach out:

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Thank You!!

