



Project Plan Presentation

Weather Monitoring and Impact Assessment

The Capstone Experience

Team NetJets

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*From Students...
...to Professionals*

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Project Sponsor Overview

- The world's largest private aviation company and a pioneer of fractional jet ownership.
- Founded in 1964, NetJets operates a fleet of more than 700 aircraft serving thousands of airports globally.
- The company provides fractional ownership, leasing, and jet card programs with a focus on safety, reliability, and world-class service.



Project Functional Specifications

- Visually display airports and aircraft that will be impacted by severe weather.
- Allow historical playback of weather and flights for post-event analysis.
- Provide an easy to use, intuitive map to visualize data.
- Enhance situational awareness, reduce disruptions, and improve decision-making across NetJets operations.

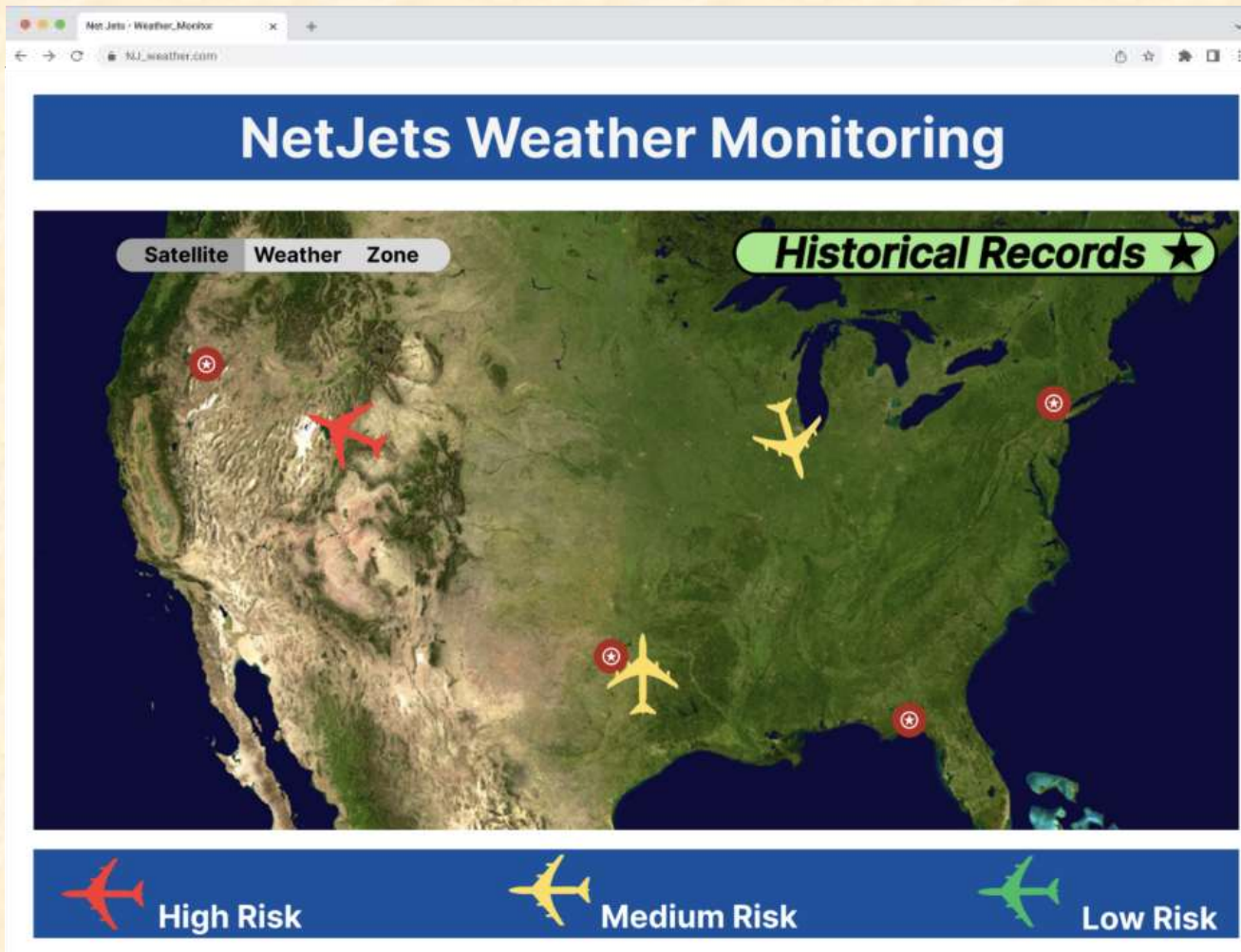


Project Design Specifications

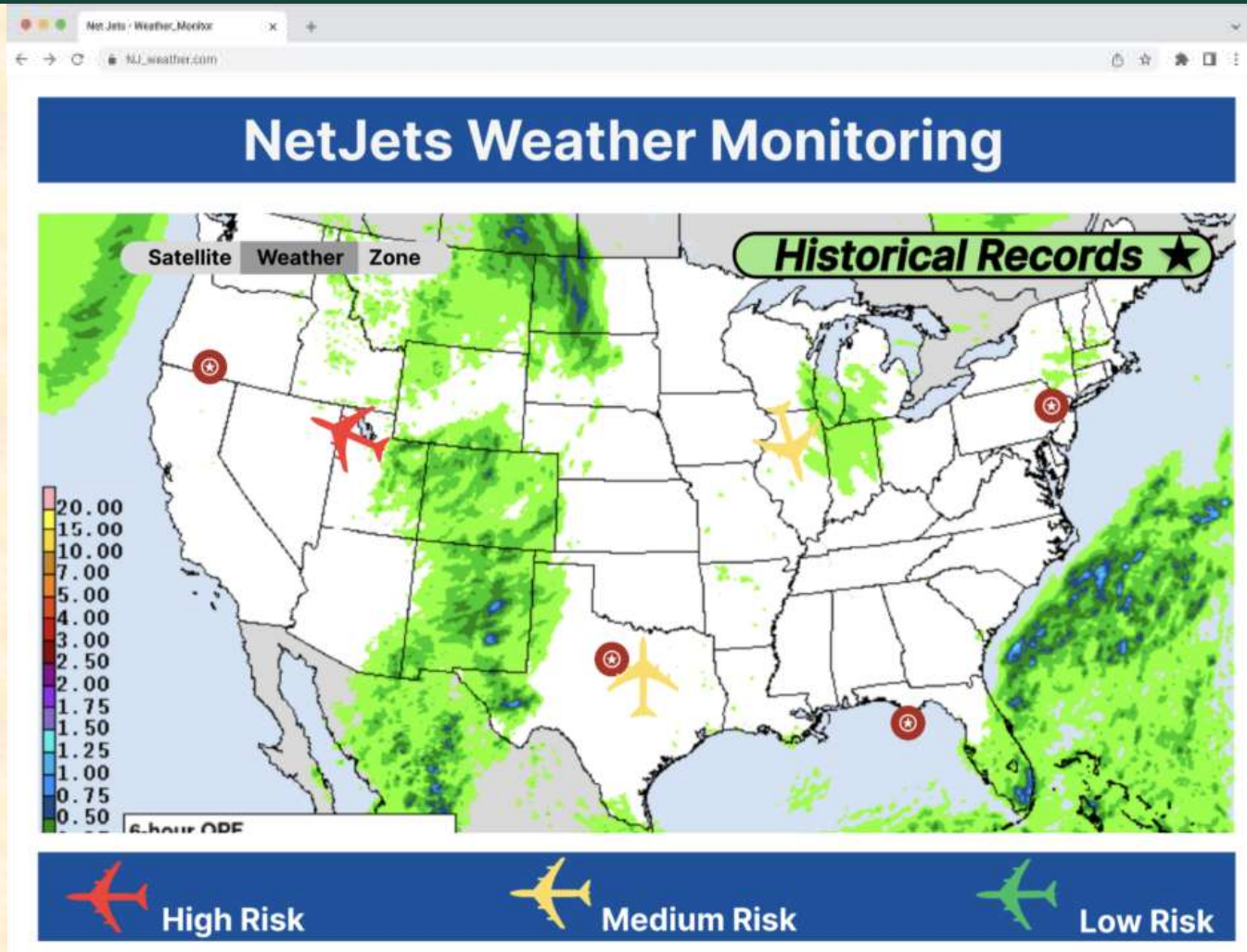
- A map interface with 3 views :
 - Satellite, Weather, and Risk Zone
- A flight visual with detailed analysis
- A historical record system that allows for searching for previous flights and weather.



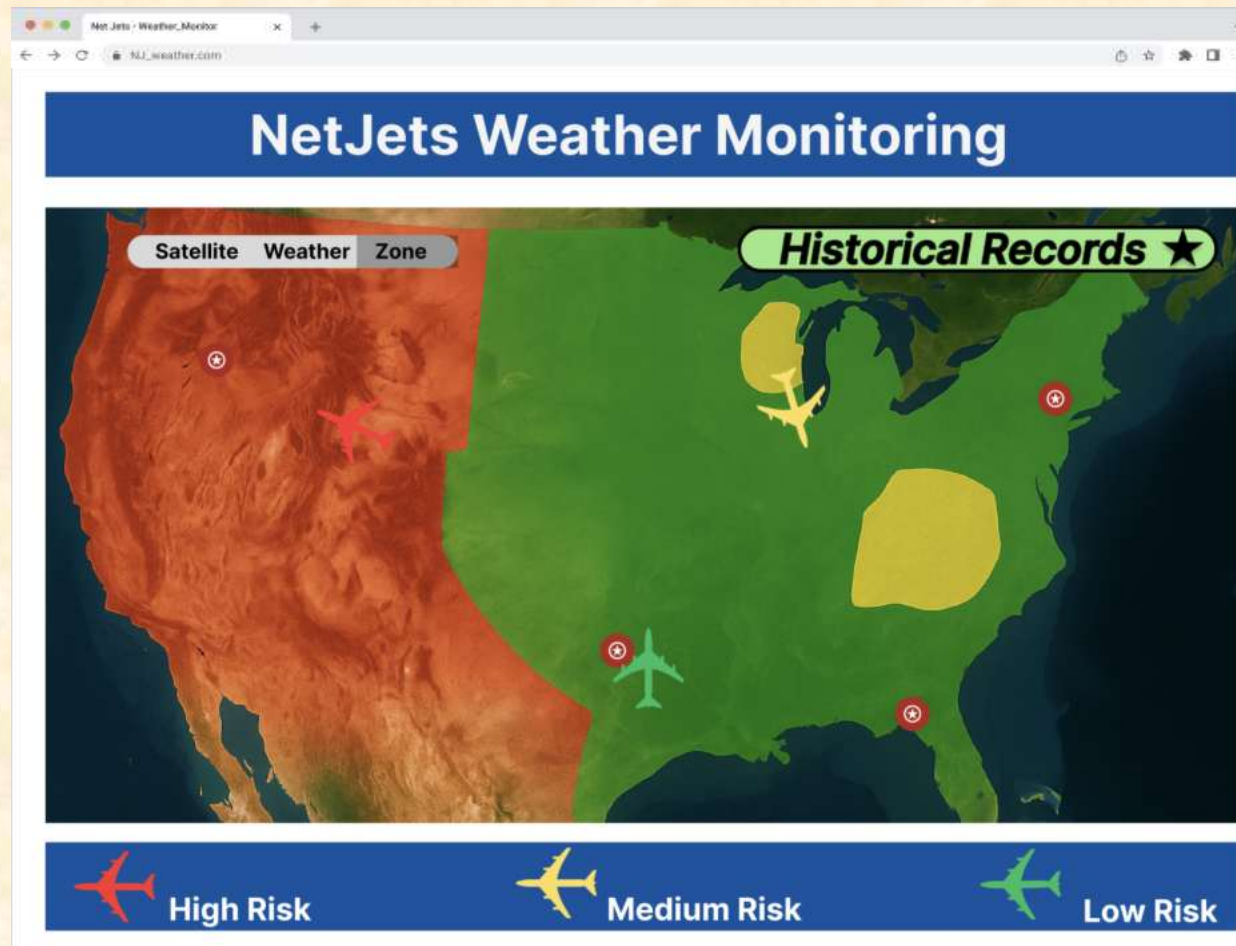
The Satellite Map



The Weather Map



The Zone Map



Clicking Flights and Stations



Historical Records & Filtering

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Historical Records ★

Date — Time — Flight #

ORG : DST Flight # Status: ● ● ●	ORG : DST Flight # Status: ● ● ●
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Reset **Apply**

Historical Records ★

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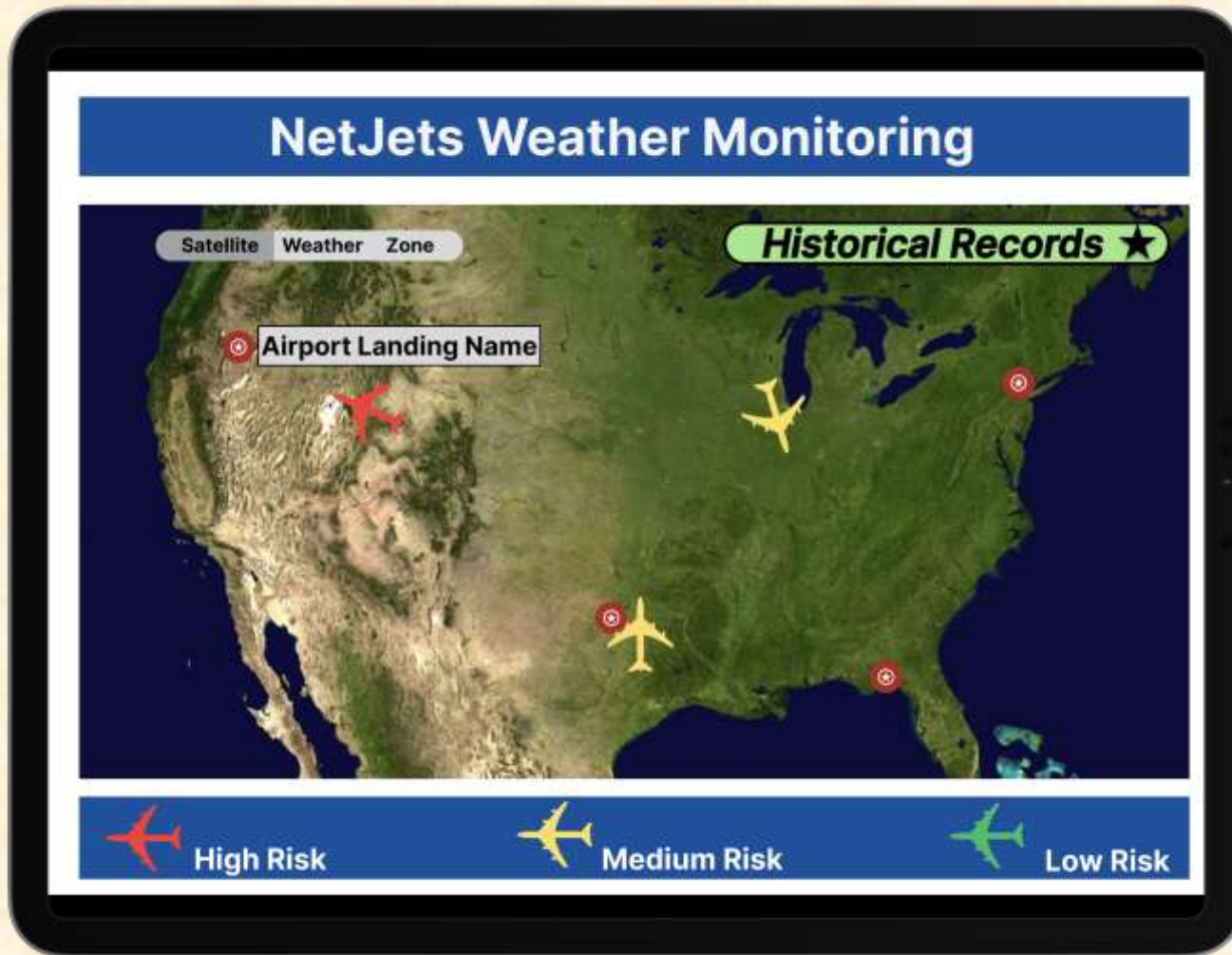
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Historical Records & Filtering

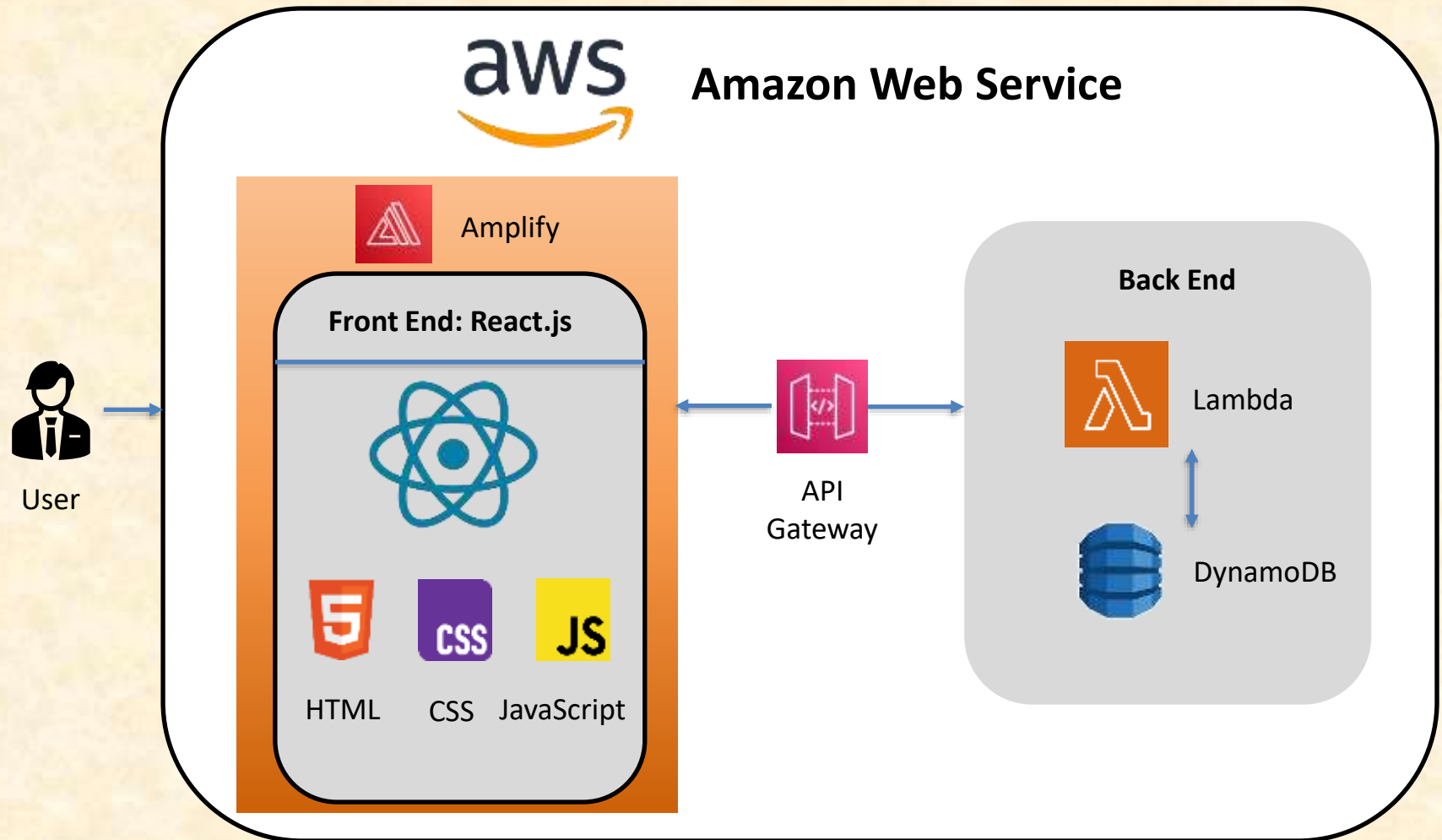


Project Technical Specifications

- Front End: React (HTML, CSS, JS)
 - Controls the look of the page and will display all data
- AWS Amplify, API Gateway, Lambda
 - Amplify: Hosts web applications
 - API Gateway: Receives and sends HTTP requests between front end and Lambda
 - Lambda: Calls functions based on request. Sends and receives data from database



Project System Architecture



Project System Components

- Software Platforms / Technologies
 - React, HTML, CSS, JS
 - Specific APIs: OpenSky, National Oceanic and Atmospheric Administration (NOAA) Weather Service
 - AWS Services: DynamoDB, API Gateway, Lambda
 - Libraries: Leaflet



Project Risks

- Keeping track of flights while they're in the air
 - Accurately tracking real time flight data can be challenging because real time flight data sources can be delayed, inconsistent, or incomplete.
 - Research different real time flight tracking APIs and test them to see which provides the most accurate and consistent data.
- Data Performance and Storage For Real Time Weather and Flight Data
 - The web app will need to store a large amount of data in order to display and analyze flight and weather data
 - Use AWS services like DynamoDB for fast data querying, Lambda for processing data and performing computations, and API Gateway to manage API requests.
- Complexity of the Impact Correlation
 - An imprecise algorithm may consistently produce false positives which would incorrectly flag the safety of an aircraft and require operators to do extra work or worse, false negatives failing to flag an at risk aircraft.
 - Compare two dynamic four-dimensional data sets: aircraft position (latitude, longitude, altitude, time) and weather phenomena (a 3D volume that changes with time), introduce safety buffers and fallback mechanisms.
- Calculating and Displaying weather risk zones:
 - The app will have to create areas where the weather conditions cause potential risk to flights
 - Start by figuring out what constitutes low, medium, and high risk weather conditions using different data points (wind speed, precipitation, and other factors).



Questions?

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