

1. Background

In a world where the aviation industry emits over **1 billion tonnes** of carbon dioxide per year, innovation becomes imperative.

Our team has worked with data from the **Pipistrel Velis Electro**, the **world's first** type certified and **Canada's one & only** electric plane.

2. Sustainability

Our project pioneers a platform for analyzing electric plane data, placing us at the forefront of integrating technology with sustainable aviation.

We contribute directly to **Sustainable Development Goal (SDG) 13**.



Targets

Support integration of electric planes and climate policies (aligns with 13.2)

Empower electric plane research and awareness (aligns with 13.3)

3. What's the problem with e-planes?

1 Limited battery capacity

E-plane range of ~ 45 min

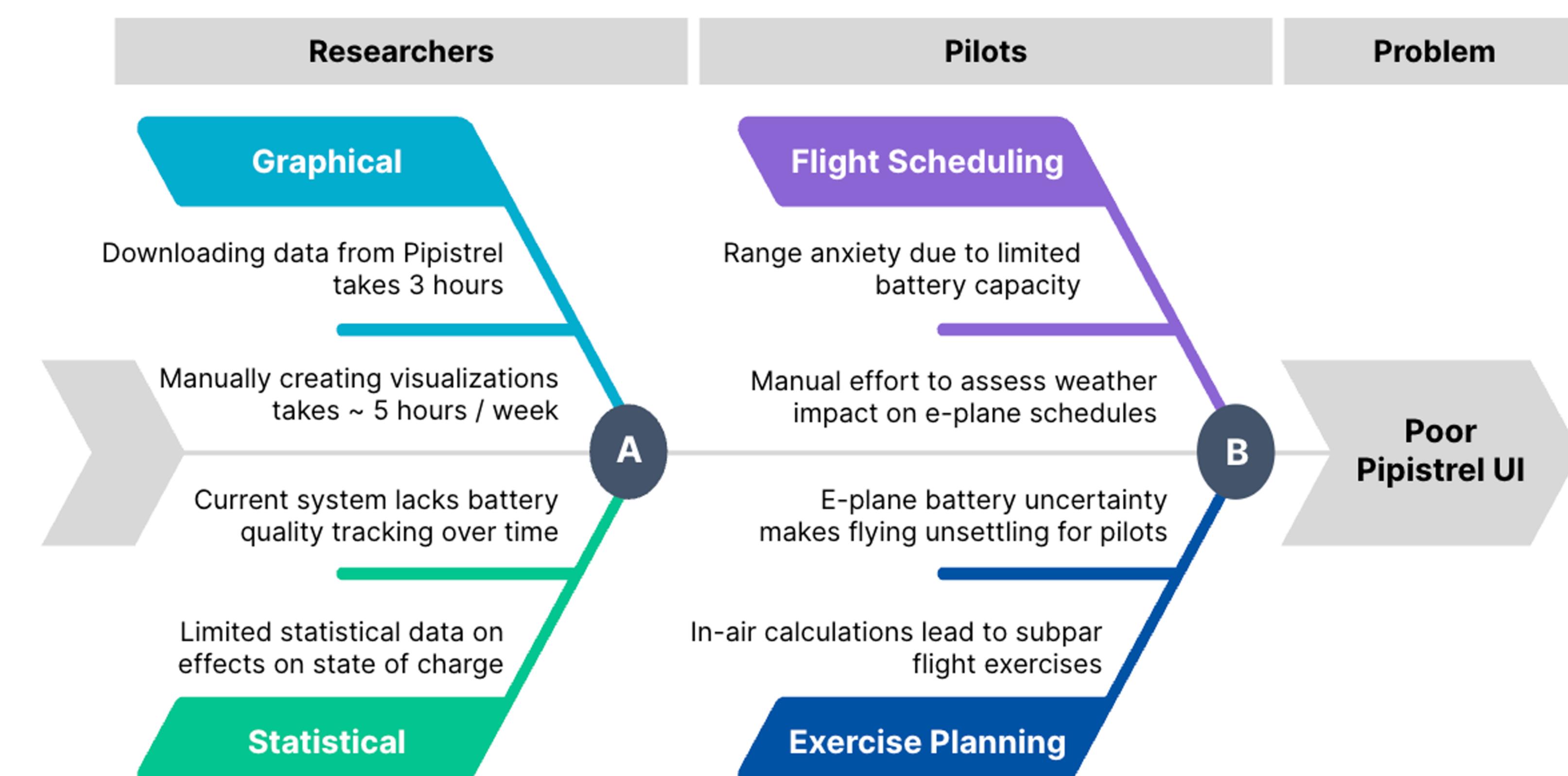
2 Lack of Knowledge

Performance in Canadian climate

3 Challenges with data visualization

Difficulty visualizing large volumes of data

4. Needs Analysis



5. Solution Overview

Pilots



Flight Scheduling: Determine the optimal flight times based on a simulation model derived from local weather forecasts

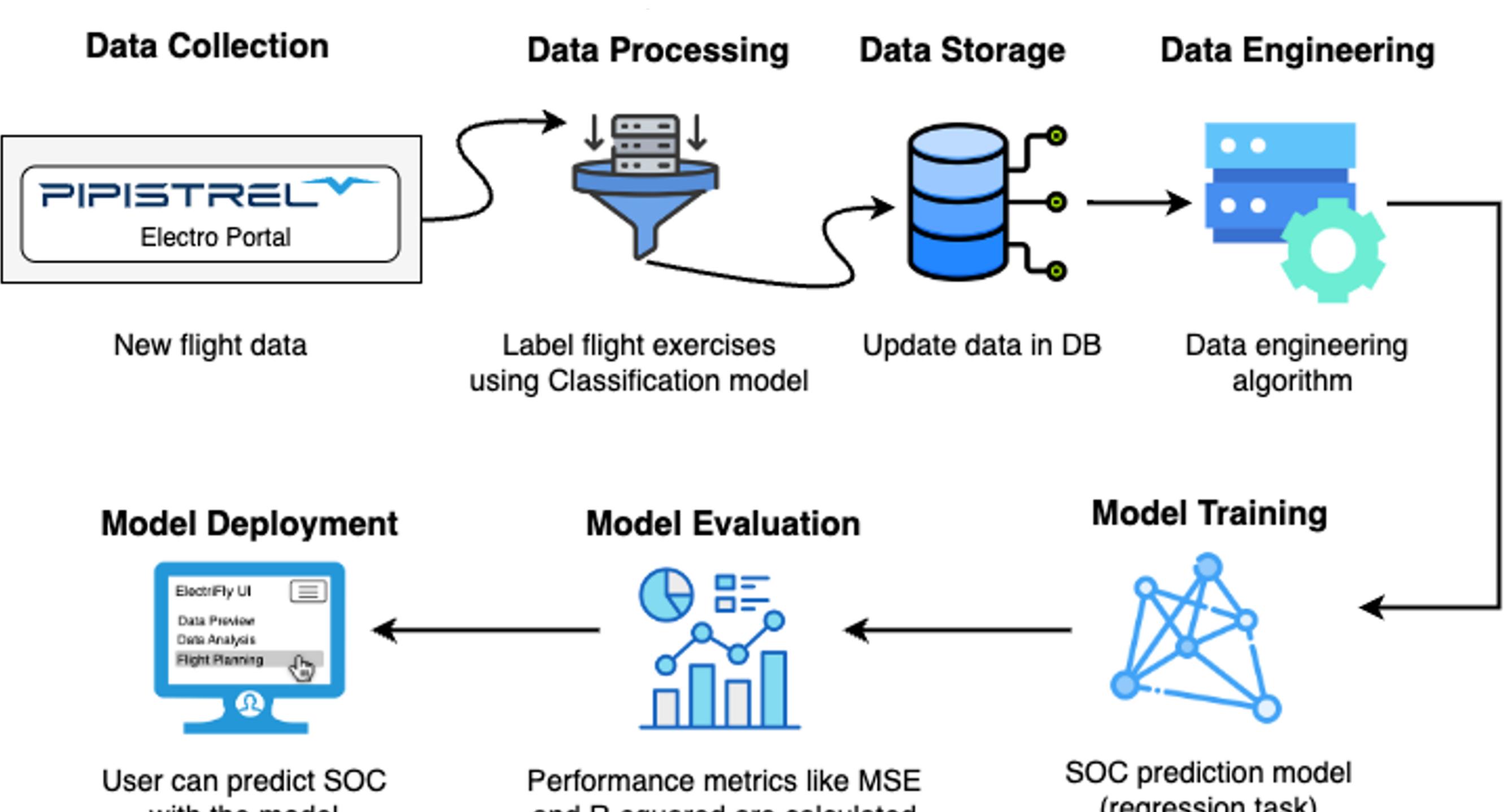


Flight Exercise Planning: Empower pilots' confidence during flight by planning what exercises can be performed in the air

	Linear Regression	Ridge Regression	Random Forest	XGBoost
Mean Squared Error (MSE)	3.83	6.44	1.6	2.02
Coefficient of Determination	0.66	0.66	0.91	0.89
K-fold cross validation score	0.64	0.63	0.85	0.88

ML model results used to determine battery life for the flight exercise planning tool

Machine Learning Pipeline



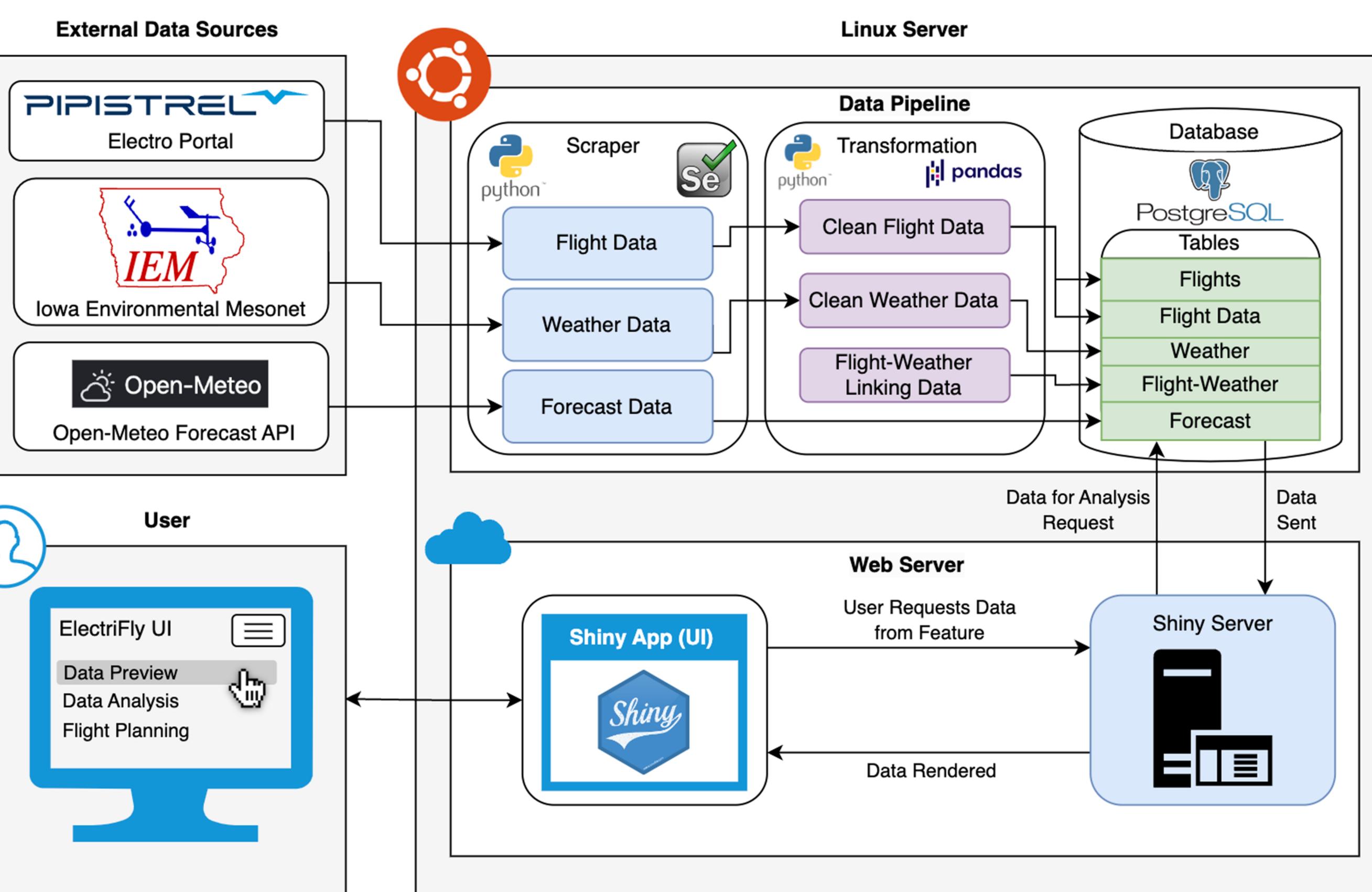
Researchers

Data Visualizations: Gain comprehensive insights into plane and battery behaviours

Custom Graphs: Develop your own graphs and plot any variable including flight and weather data

Statistical Insights: Unlock valuable statistical insights to enhance flight operations efficiency

6. System Architecture



7. Technology Stack



Shiny
(frontend)



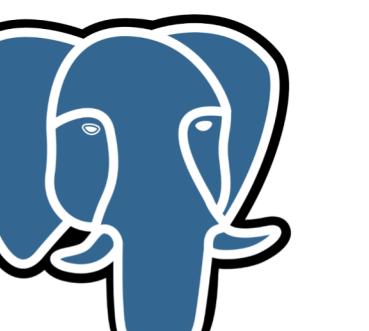
Python
(backend)



Selenium
(backend)



Jupyter
(backend)



PostgreSQL
(database)

8. Verification & Validation

Heuristic Evaluation

49 UI issues discovered on the app

120% App performance boost

Pilot Program

75% of users plan on using this tool

79 System Usability Score

9. Impact Propagation

