FAA Aircraft Registry Analytics

Executive Project Overview

FAA Aircraft Registry Analytics is an end-to-end data engineering project that transforms raw FAA registry data into an analytics-ready dataset and an interactive business intelligence dashboard. The project demonstrates production-style ETL design, data modeling, and insight delivery.

Business Objective

Provide a clean, reliable, and enriched aircraft registry dataset to support reporting on fleet size, manufacturers, aircraft models, ownership distribution, and long-term registration trends.

Data Pipeline Summary

- Extract: Ingest FAA MASTER and ACFTREF registry files and store raw snapshots.
- Transform: Clean, standardize, and validate aircraft registrations and reference data.
- Model: MASTER acts as a fact table and ACFTREF as a dimension table.
- Join: Enrich registrations with aircraft specifications.
- Load: Persist cleaned datasets in PostgreSQL for analytics and BI consumption.

Analytics Output

- ~303,000 active aircraft records
- Manufacturer, model, engine, and weight-class enrichment
- Analytics-ready dataset optimized for dashboards and KPIs

Key Insights Delivered

- Cessna is the largest aircraft manufacturer by fleet size in the U.S.
- Boeing has the highest model diversity across registrations.
- The majority of FAA-registered aircraft are general aviation.
- Aircraft ownership is concentrated in Texas, California, and Florida.

Technology Stack

Python, PostgreSQL, SQLAlchemy, Power BI

Use Case

Designed for data engineering and analytics portfolios, this project demonstrates real-world ETL design, data quality handling, dimensional modeling, and insight communication.

Created by Roza — Data Engineering & Analytics Portfolio