Corgo

APU Monitoring system

Reducing air cargo carbon emissions

Problem

Airplanes have a third engine called an auxiliary power unit (APU) that generates power whenever the main engines are off. They run on jet fuel which makes their operation expensive and pollutive. Existing policies restrict APU usage, but currently there is no way to enforce them because there is no scalable or automated method to monitor or quantify APU usage.

APU
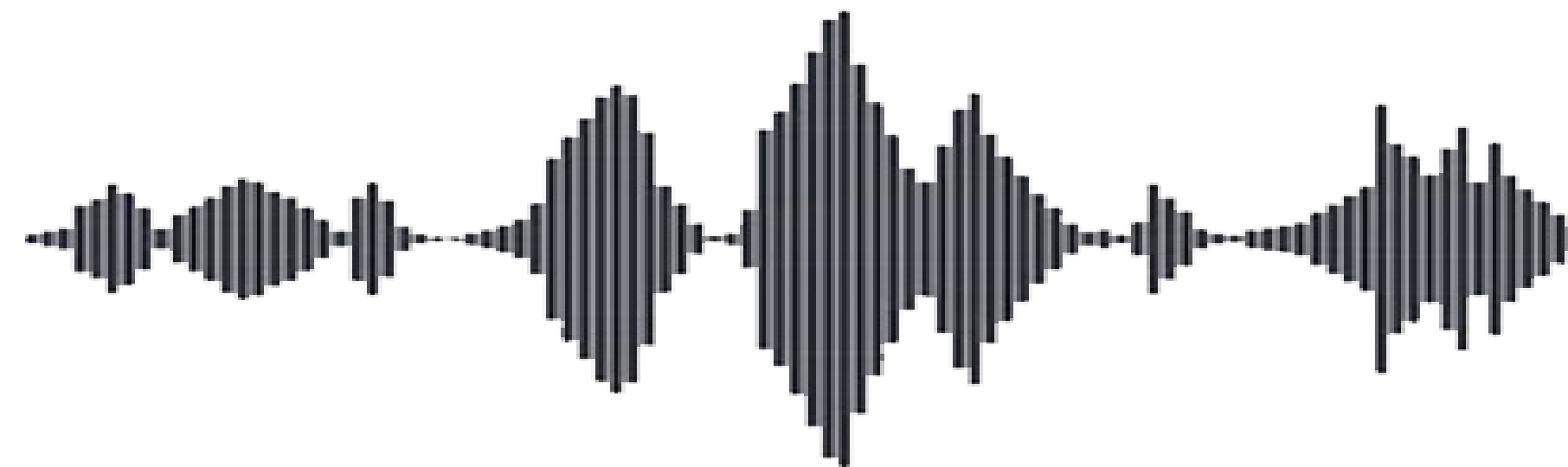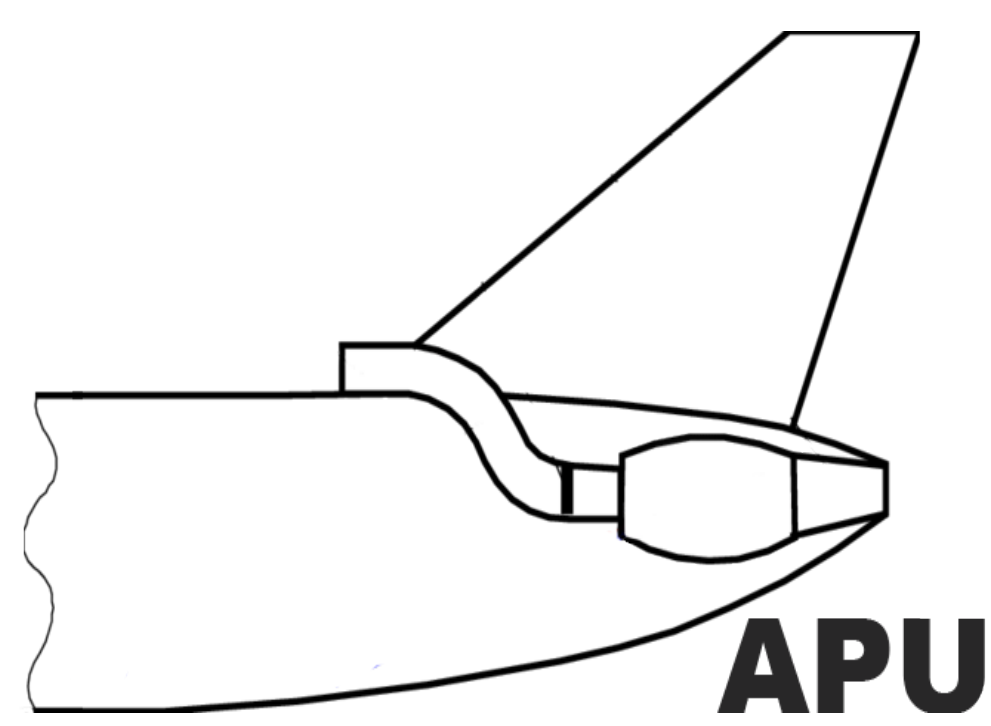
Detect APU status by gathering sound
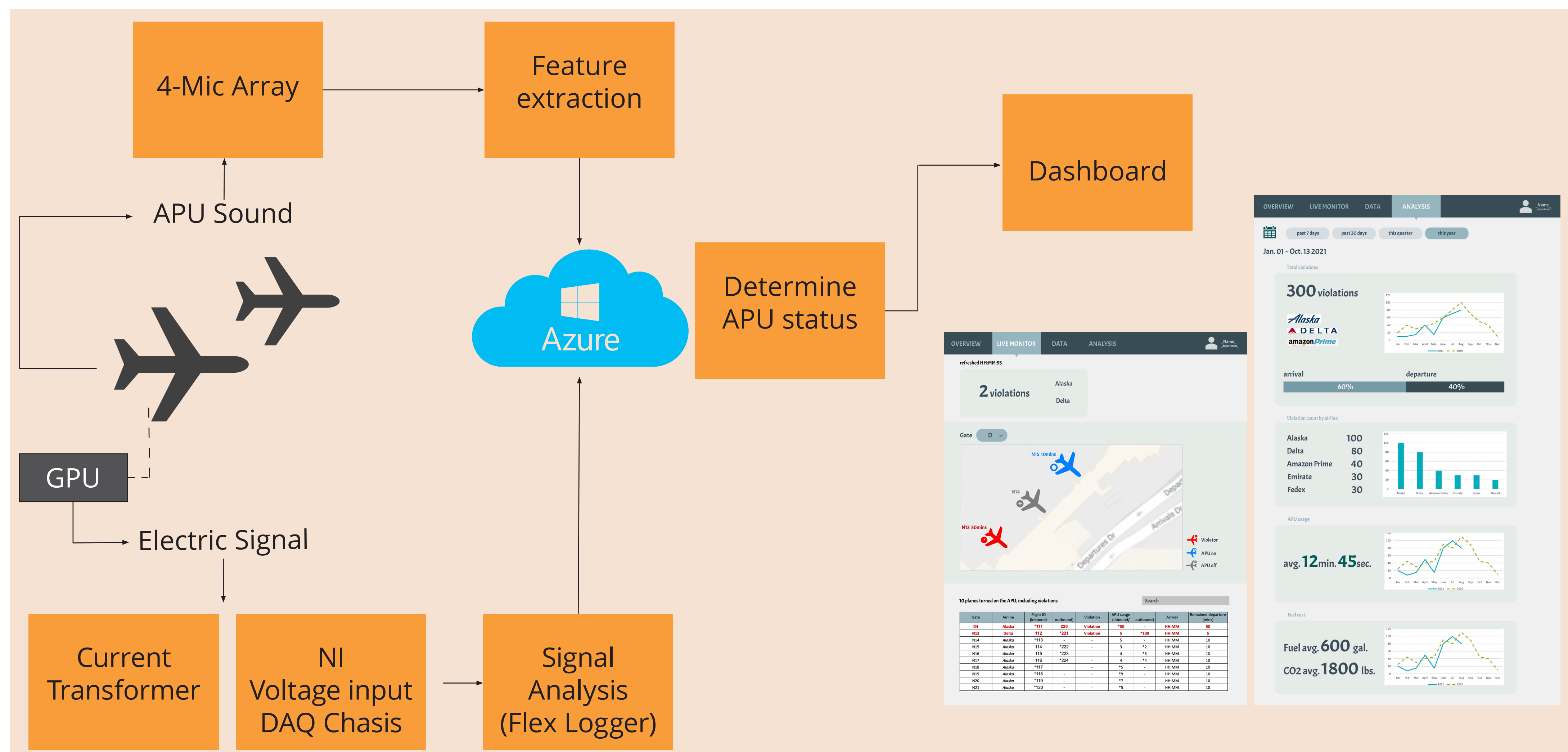
Approach & Solution

We created a system that detects, monitors, and reports APU usage to aid APU policy enforcement.

APU Sound Analysis

APUs operate noise with high frequency.
We installed three sound gathering devices each with 4-microphone array at SeaTac. These devices detect when and which aircraft's APU is activated. We extract features from sound files and apply our trained ML model to determine APU status and location.
The results are displayed on a real-time dashboard for airport monitoring staff.

Electrical signal from Ground Power Units (GPU)

We use electrical signals to monitor not only whether the APU or GPU is on or off, but also whether the GPU is reliably delivering enough power to the aircraft.
This may encourage airlines and pilots to trust the GPUs and thereby reduce APU usage.

Conclusions

The Corgo project is a continuation of a previous project that monitored a single aircraft in a fixed space at the passenger terminal of the airport.

In 2021, we carried out the project, a proof-of-concept for monitoring two or more aircrafts per device in a relatively large cargo area, and where fixed infrastructure like power and internet are limited.

Our work can be expanded upon to build robust, airport-wide APU monitoring systems that effectively relugate excessive CO2 emissions.

Product for gathering APU sound

Deployed in the airport

GLOBAL INNOVATION EXCHANGE X   Microsoft   SEA Seattle-Tacoma International Airport

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