IPSW 2026 Industrial Challenge – Air Canada Cargo

Seasonal Market Rate Recommendation for Air Cargo Pricing

1. Business Context

Air Canada Cargo transports freight across a global network of origin–destination markets. Seasonal market reference rates ($/kg) are defined at the level of **origin country to destination airport city**, and serve as baseline pricing benchmarks.
These market rates are currently reviewed and updated twice per year, aligned with airline scheduling seasons:

- **Winter season:** November 1st to March 31st
- **Summer season:** April 1st to October 31st

Pricing analysts determine these seasonal market rates by combining multiple sources of information, including:

- Historical Air Canada shipment volumes and pricing data
- Market benchmark data (WorldACD), providing industry-level pricing indicators
- Capacity and schedule changes across seasons
- Competitive capacity and schedule data from DIIO
- Sales team insights on customer demand and regional market conditions

For each country of origin to destination airport city market and season, the pricing system defines a baseline market rate.
Individual shipments within that market may be priced using:

- The baseline market rate
- Spot rates
- Exception / RFP rates

Each shipment therefore has an **actual applied rate**, which may or may not match the baseline market rate.
By analyzing historical data at the market level, it is possible to measure how frequently baseline market rates were used versus overridden by Spot or Exception rates. This provides insight into how well baseline market rates aligned with actual market conditions.
Air Canada Cargo seeks to explore whether statistical and machine learning methods can support and improve this seasonal pricing process. While market rates are currently reviewed twice per year, a data-driven modeling approach could enable more frequent monitoring and recalibration.

2. Problem Statement

The objective of this challenge is to develop statistical and machine learning models to support seasonal market rate recommendation.

Given historical data on pricing, demand, capacity, competition, and applied pricing behavior, estimate the appropriate seasonal market rate for each: **origin country, destination airport city, and season.**

Formally, the goal is to estimate:

$$\text{Market Rate}_{\text{origin/ country, destination airport city, season}}$$

This corresponds to recommending one baseline market rate per origin country to destination airport city market and season.

Historical applied rate behavior including how frequently baseline market rates were used versus overridden may provide useful signals for assessing and improving market rate calibration.

3. Available Data

Participants will have access to anonymized historical data including:

Market and Time Information

- Origin country
- Destination Airport City
- Dates and seasonal indicators (Winter / Summer)

Pricing Data

- Baseline market rates
- Spot rates
- Exception / RFP rates
- Actual applied rates (final rate used for each shipment)

Demand and Operational Data

- Shipment volumes and booking patterns
- Capacity indicators such as load factors and flight frequency
- Seasonal schedule changes

Market Benchmark and Competitive Data

- Market pricing indicators derived from WorldACD
- Competitive capacity and schedule data derived from DIIO

The dataset may contain missing values, noise, and heterogeneity typical of real-world industrial data.

4. Scientific and Modeling Questions

Participants are invited to explore questions such as:

- Can seasonal market rates be reliably estimated using historical pricing, demand, capacity, and competitive data?
- Which variables are most important in determining appropriate market rates for each market?
- How do actual applied rates compare to baseline market rates across markets and seasons?
- Can historical applied rate patterns be used to identify markets where baseline rates may be misaligned?
- How do changes in capacity, demand, and competition influence appropriate market rates?

Participants are encouraged to explore and compare different statistical and machine learning approaches appropriate for structured, market-level data